Silverton Wind Farm

Vegetation Management Plan

FINAL REPORT

Prepared for GE Renewable Energy

20 December 2018

Biosis offices

NEW SOUTH WALES

Albury
Phone: (02) 6069 9200
Email: albury@biosis.com.au

Newcastle
Phone: (02) 4911 4040
Email: newcastle@biosis.com.au

Sydney
Phone: (02) 9101 8700
Email: sydney@biosis.com.au

Wollongong
Phone: (02) 4201 1090
Email: wollongong@biosis.com.au

VICTORIA

Melbourne
Phone: (03) 8686 4800
Email: melbourne@biosis.com.au

Ballarat
Phone: (03) 5304 4250
Email: ballarat@biosis.com.au

Wangaratta
Phone: (03) 5718 6902
Email: wangaratta@biosis.com.au

Document information

Report to:	GE Renewable Energy
Prepared by:	Sera Cutler
	Paul Price
Biosis project no.:	26380
File name:	**26380.SilvertonWF.VMP.FNL02.20181220.docx**
Citation:	Biosis 2018. Silverton Wind Farm: Vegetation Management Plan. Report for GE Renewable Energy. Author: Cutler S & Price P. Biosis Pty Ltd, Albury. Project Number 26380.

Document control

Version	Internal reviewer	Date issued
Draft version 01	Sera Cutler	16/04/2018
Draft version 02	Renée Woodward	09/05/2018
Draft version 03	Sera Cutler	23/05/2018
Final Version 01	Sera Cutler/ Renée Woodward	17/12/2018
Final Version 02	Sera Cutler/ Renée Woodward	20/12/2018

Acknowledgements

Biosis acknowledges the contribution of the following people and organisations in undertaking this study:

- GE Renewable Energy: Catherine Powers, Davorin Jelaca, Mark Bennetts & Dragan Garabiljevic
- Catcon: Paul Busolin & Clare Patterson
- Jacobs: Damien Wagner
- AGL: Bree Lacey
- Leaseholder John Blore
- Ian Sluiter from Ogyris for external technical review
- NSW Department of Planning and Environment: Stephen Shoesmith
- NSW Office of Environment and Heritage: Peter Ewin, Miranda Kerr,
- NSW Office of Environment and Heritage for access to the BioNet Atlas of NSW Wildlife

Biosis staff involved in this project were:

- Steve Mueck & Sarah Hilliar (field survey); Julian Turner, Andrew Longmire, Gareth Davies, Sarah Hilliar & James Shepherd (mapping)

Contents

Tables

Figures

1 Introduction

1.1 Background

The Silverton Wind Farm study area is located approximately five kilometres north of Silverton and 25 kilometres northwest of Broken Hill in the far west of NSW (Figure 1).

In May 2009, the Silverton Wind Farm project was granted approval under the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) by the then NSW Minister for Planning. Approval was granted for the construction of 282 wind turbines and associated infrastructure. This included Concept Approval for the construction, operation and decommissioning of up to 598 wind turbines and associated infrastructure. The wind farm was declared a critical infrastructure project under the EP&A Act, as an energy generating development with the capacity to generate at least 250MW.

Approvals were received to extend the commencement date of construction under Modification 1 (11 April 2011) and Modification 2 (3 June 2016). Further modification (Modification 3) was then approved by the NSW Planning and Assessment Commission (PAC) on 22 December 2016 in accordance with Clause 8J(8) of the *Environmental Planning and Assessment Regulation 2000* and the transitional arrangements of the EP&A Act. Modification 3 sought to decrease the maximum number of turbines to 167, while increasing the dimensions and capacity of each turbine. The current project involves the development of 58 of these turbines.

Approval was granted for the modifications to the project approval (08_022 MOD 3) and concept approval (08_0022MOD2) subject to the conditions set out in the instrument of approval. The detailed project history and compliance with conditions of consent relevant to biodiversity is outlined in the Biodiversity Adaptive Management Plan (BAMP) (Biosis 2018b).

The Silverton Wind Farm project is being undertaken by the Powering Australian Renewables Fund (PARF), a partnership between AGL, QIC and Future Fund. PARF have engaged GE-CATCON (a consortium led by GE Electric International (hereafter referred to as GE) and Civil and Allied Technical Construction Pty Ltd (hereafter referred to as CATCON) under an Engineer, Procure and Construct (EPC) Contract to deliver the Silverton Wind Farm works. TransGrid (Network Service Provider – NSW) has been engaged under the Project Agreement to deliver the connection works.

Condition 18 of the Project Approval requires that prior to the commencement of construction, the Proponent must prepare a Biodiversity Management Plan (BAMP Biosis 2018b) for the project, which includes a Vegetation Management Plan for the site. This Vegetation Management Plan has been developed to satisfy that condition for the Silverton Wind Farm works to be delivered by GE-CATCON.

This plan has been developed in consultation with:

- NSW Government Department of Planning and Environment (DPE)
- NSW Government Office of Environment and Heritage (OEH).

1.2 Purpose

The purpose of this Vegetation Management Plan (VMP) is to ensure proper guidelines and methodologies are in place to manage the potential impacts to vegetation arising from the operation and asset management activities associated with the Silverton Wind Farm works. These activities are detailed in Section 1.5.

This VMP provides an overview of the vegetation management that will be implemented across the Silverton Wind Farm and was prepared by suitably qualified experts from Biosis (Sera Cutler, Senior Botanist and Paul Price, Restoration Ecologist). It describes the activities to manage any vegetation clearing required as part of operation and asset management actives, to maintain retained vegetation, and to restore vegetation and habitat in temporary disturbance areas. It provides a description of specific vegetation management, monitoring and reporting measures that will be undertaken by GE appointed contracting and subcontracting staff.

Annual monitoring and reporting will be followed by a review of the management approach to evaluate the performance of management actions and to inform potential adaptive management responses. The aim of these reviews is to continually improve on-ground management and ecological outcomes. A comprehensive review of monitoring and management will be undertaken after three years, being after surveys in spring 2021, particularly to ensure there is a net gain in the conservation value of PGSW.

Further details on monitoring requirements and the adaptive management approach are provided in the BAMP. This VMP will be implemented in conjunction with the BAMP and associated management plans described in Section 1.4.

1.3 Scope and objectives

The scope of this VMP is to develop a framework for managing potential impacts to vegetation arising from the operation and maintenance of the Silverton Wind Farm. Specifically, this VMP will outline vegetation management required for the wind farm operation and maintenance activities, address requirements for the ongoing management of weeds and the implementation of vegetation and habitat restoration measures in the temporary disturbance areas. The VMP will also address ongoing management actions required to protect the surrounding vegetation from potential impacts arising from the operation and maintenance of the wind farm.

The specific objectives for the implementation of this VMP are to:

- Outline the management requirements for retained vegetation, including details on vegetation protection measures e.g. fencing.
- Outline the ongoing management of any temporary clearance areas and ongoing vegetation disturbance relating to overhead power line infrastructure.
- Describe required weed management activities.
- Describe restoration activities required for temporary disturbance areas.
- Provide schedules for inspection, monitoring, management and corrective actions.
- Support other existing management and recovery plans.

This VMP addresses the Silverton Wind Farm works component of the Silverton Wind Farm project. It does not address the connection works to be delivered by Transgrid. For the purpose of this VMP, the area that will be managed by this plan is defined by the Silverton Wind Farm 'study area' shown in (Figure 1).

This VMP clearly defines the roles and responsibilities for required works, provides a timeline for completion and outlines monitoring and reporting requirements relevant to vegetation management within the study area. More specific details relating to monitoring and reporting requirements are contained within the BAMP.

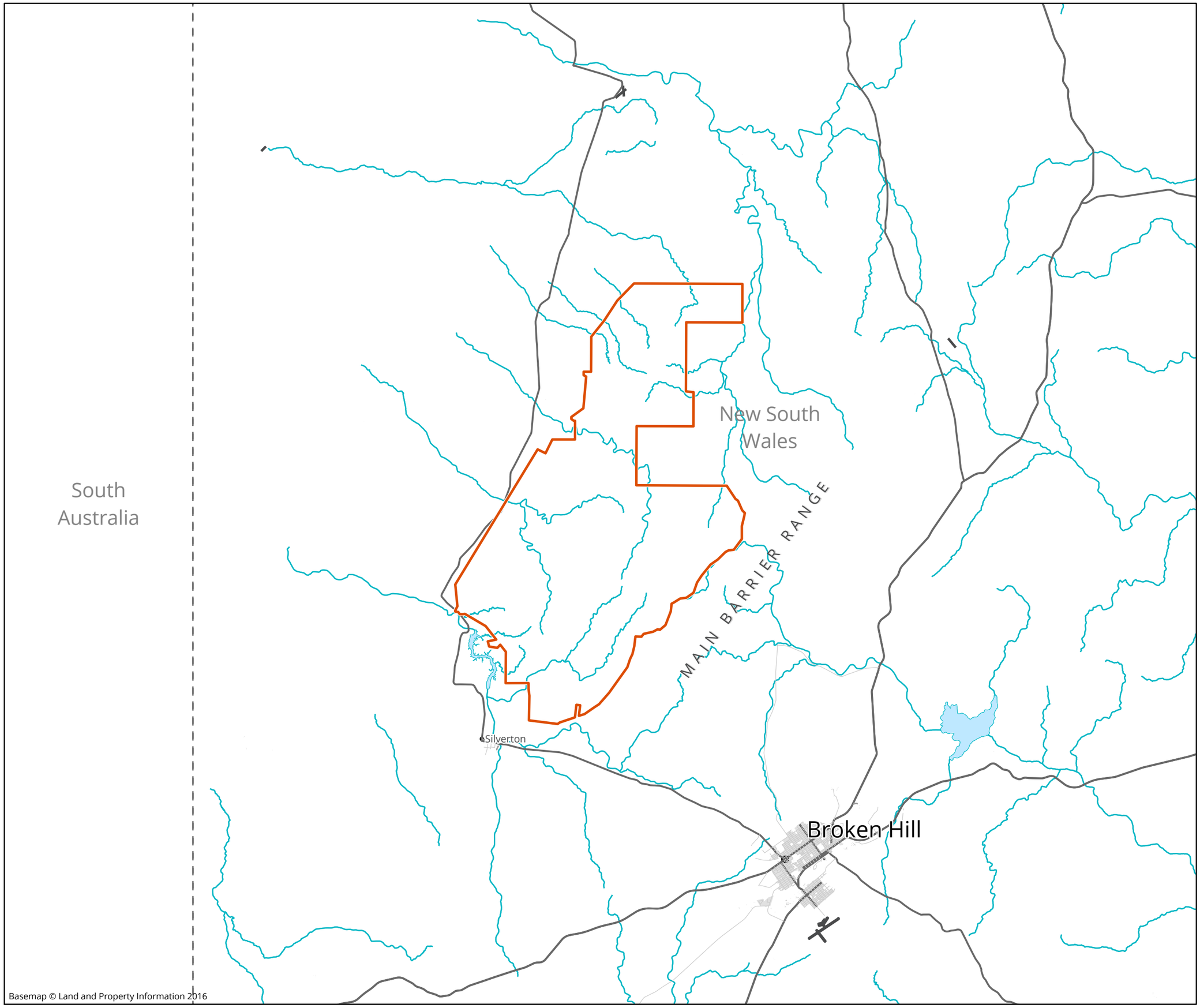


Figure 1 – Location of the study area

Matter: 26380
Checked by RW, drawn by: ARL
Last edited by: alongmire on 04 September 2018
Location:P:\26300s\26380\Mapping\26380_PGSW_GMP

1.4 Relationship to other plans

This VMP addresses the asset management strategies of the following documents and reports:

- Silverton Wind Farm – Road upgrade and maintenance strategy (Catcon 2017a)
- General Electric International Inc. Operational and Maintenance Agreement (GE 2018a)
- General Electric International Inc. Operational and Maintenance Manual (GE 2018b)
- Silverton Wind Farm – Site Management Plan (GE 2018c).
- Essential Energy's Vegetation Management Plan 2018 (Essential Energy 2018).

This VMP also addresses recommendations and guidelines of the following reports:

- Biodiversity Adaptive Management Plan (BAMP) (Biosis 2018b).
- Barrier Range Dragon Management Plan (BRDMP) (Biosis 2018a).
- Goat Management Plan (GMP) (Biosis 2018d).
- Porcupine Grass Sparse Woodland Recovery Plan (PGSWRP) (Biosis 2018e).
- Construction Environmental Management Plan (CEMP) (Catcon 2017b).

The specific management actions, monitoring and adaptive management responses in relation to vegetation management are described in the BAMP. The BAMP is the overarching document that details the methods, actions, monitoring and reporting identified for biodiversity management within the Silverton Wind Farm. Specifically, the BAMP incorporates these requirements for the GMP, PGSWRP, BRDMP and VMP (this document) into one cohesive implementation document. This allows for a unified approach to on-ground monitoring and management of biodiversity at the Silverton Wind Farm site. The VMP is to be read in conjunction with the GMP, PGSWRP and BAMP.

The Bird and Bat Adaptive Management Plan (BBAMP) (Biosis 2018c) is a stand-alone document that aims to ensure the wind farm does not have a significant impact on the viability of the population of any bird or bat species. The required monitoring and reporting actions are detailed separately in that plan.

1.5 Wind farm operational requirements

The current Stage of the Silverton Wind Farm involves the installation and maintenance of 58 GE 3.4 MW 130-metre-rotor wind turbines, a 220 kilovolt substation and the required associated asset and supporting infrastructure (AGL 2017). The Silverton Wind Farm assets and infrastructure are shown in Figure 2.

Proposed service activities relating to operational and asset management within the Silverton Wind Farm are outlined in Table 1-1.

Table 1-1 Operational and asest management activities

Service type	Task and timing	Responsibility
Turbines and supporting infrastructure including electrical substations	All scheduled asset and infrastructure servicing will be undertaken as per the approved Operational and Maintenance Agreement and Manual (GE 2018a, 2018b).	GE operational staff

Service type	Task and timing	Responsibility
Access roads and batter maintenance	Inspections of roads servicing the Silverton Wind Farm (outside the study area) will be carried out, weekly to monitor potholes, rutting, corrugations, scouring, regrowth adjacent to road network and general ground cover in accordance with the Road Upgrade and Maintenance Strategy (Catcon 2017a). Roads and hardstands within the Silverton Wind Farm will be visually inspected at a minimum 6 monthly (or as specified further below) and a high level condition report submitted (GE 2018a). Visual assessments will note any access road conditions that need to be reported (washouts, ruts etc.), the condition of the gravel around base of the WTG and any hazards that need to be corrected (e.g. overgrown weeds/vegetation) (GE 2018b). In line with Catcon (2017a) recommendations, additional inspections will be completed after significant rain events*, farmers works that affect or alter the roads, significant traffic movements and the like. Maintenance activities to include: grading to rectify most defects identified by inspections followed by a smooth drum roller or grader roller attachment; application of water during maintenance grades and rolling in dry periods to aid compaction to graded surfaces; removal of any surplus material left by maintenance grades, ensure that drainage flows remain unobstructed; recording of all inspections and maintenance activities (Catcon 2017a). For all areas uphill of or adjacent to PGSW (Figure 3), or in rocky outcrops or artificial habitats as mapped in the BRDMP, tracks will be inspected monthly and after significant rainfall events* or weekly in areas where construction is continuing. Maintenance in areas uphill of or adjacent to PGSW, or in rocky outcrops or artificial Barrier Range Dragon habitats as mapped in the BRDMP, will be in accordance with Section 4.1.5.	GE operational staff
Drainage	Inspections and maintenance of the drainage network on roads servicing the Silverton Wind Farm (outside the study area) will be carried out weekly to monitor and manage sediment build up; establishment of vegetation or other obstacles blocking drains and pipes; scouring of open drains/at pipe inlet and outlets; and weed infestations in accordance with Catcon (2017a). Within the Silverton Wind Farm drains supporting access tracks will be inspected as part of access road and batter maintenance 6-monthly (see above) or as detailed further below. Any additional stormwater drains will be visually inspected annually and excessive silt build up and trash removed as required (GE 2018a). In line with Catcon (2017a) recommendations, additional inspections of drainage infrastructure within the study area will be completed after significant rain events* farmers works that affect or alter the roads, significant traffic movements and the like. Maintenance activities to include clearing drains of sediment; clearing drains of excessive vegetation and obstacles; filling scours or regrading drain to hard surface material with consideration to be had for revegetation or other forms of scour protection; clearing drains of excessive weed infestations (Catcon 2017a).	GE operational staff

Service type	Task and timing	Responsibility
	Sediment removed from tracks and drains for maintenance activities will • only be located in disturbed areas • not be placed or pushed into areas uphill of or adjacent to PGSW (Figure 3) or in rocky outcrops or artificial Barrier Range Dragon habitats as mapped in the BRDMP as detailed in Section 4.1.6.	
Fencing, grates and gates	6 monthly inspection of WF sub station and Operational and Maintenance facility security fences, gates and locks (GE 2018a). Any defects will be repaired within two weeks. Inspection of existing PGSW/Goat fencing and gates quarterly as per the GMP. GE will work with the leaseholder to ensure fences are maintained and any damage repaired within two weeks of notification.	GE operational staff
Vegetation clearance for all existing Turbine associated assets including power lines and substations.	Trimming of vegetation as per Essential Energy's Vegetation Management Plan (Essential Energy 2018) as described in Table 4-1. The frequency of clearing cycles is based on practical factors including regrowth rates, fire risk, climate, type of vegetation, recurrent costs, conservation considerations etc. (Essential Energy 2018). It is anticipated that the frequency of vegetation clearance for the Silverton Wind Farm will be undertaken on a 6 – 12 monthly basis pending seasonal requirements.	GE / Essential Energy

**Significant rain events are considered to be greater than 25 millimetres*

1.6 Roles and responsibilities

Implementation of this VMP is the responsibility of GE who have been contracted by PARF to deliver the operational works for Silverton Wind Farm. All GE contract and subcontractor staff are responsible for working in accordance with this VMP.

GE will appoint a suitably qualified Project Ecologist and Vegetation Management Contractor to undertake the vegetation management activities specified in this VMP.

1.7 Updating this plan

This plan will be reviewed annually and updated periodically and will be revised whenever the scope or methods of operational management of the wind farm change, or whenever the recommended management actions are found to be ineffective. Any new versions will be submitted to OEH and DPE for approval and subsequently issued as part of ongoing revisions to the VMP and BAMP.

A comprehensive review of monitoring and management will be undertaken after three years in spring 2021, particularly to ensure there is a net gain in the conservation value of PGSW. This review will update management recommendations if required. The BAMP and associated plans will be reviewed in consultation with OEH and DPE.

2 Site description

2.1 Tenure and current land use

The Silverton Wind Farm has been constructed on NSW Crown Land offered as leasehold under the authority of the *Western Lands Act 1901*. The land is currently used by four independent lessees for grazing purposes, including grazing by Feral Goats, under four separate General Purpose Leases. A wind farm lease (Special Purpose Lease) was assigned to PARF as part of financial close on the Silverton Wind Farm project.

2.2 Flora

Flora recorded from the Silverton Wind Farm are documented in Biosis (2018d), NGH Environmental (2008a, 2008b), NSW Scientific Committee (2010), and OEH (2017b, 2017c) and summarised in Appendix 2. This includes a total of 209 taxa comprising 173 native and 36 introduced plant species.

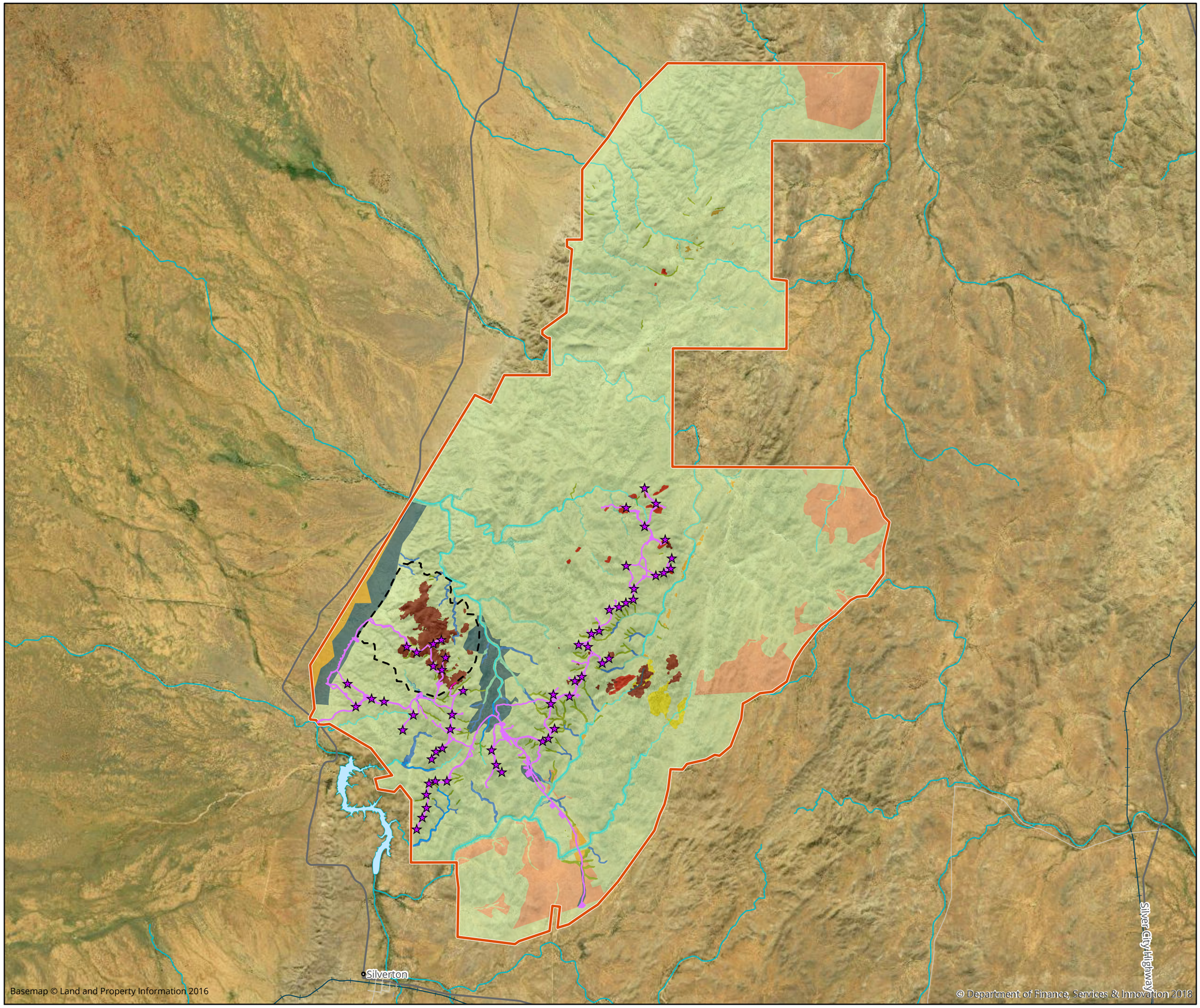
2.2.1 Vegetation communities

The study area contains eleven vegetation communities including nine recognised Plant Community Types (PCTs) and two undescribed vegetation types (VEGs) as documented in NGH Environmental (2008a, 2008b) and mapped by NGH Environmental (2016) and Biosis (2018d):

- Black Bluebush low open shrubland of the alluvial plains and sand plains of the arid and semi-arid zones (PCT153)
- Black Oak – Western Rosewood – Blue Bush/Saltbush (PCT60)
- Bluebush shrubland on stony rises and downs of the arid zone (PCT155)
- Chenopod Shrubland (PCT 156)
- Chenopod – Red Mallee woodland/shrubland (VEG2)
- Mulga/Red Mallee Shrubland (VEG1)
- Mulga-Dead Finish on stony hills mainly of the Channel Country and Broken Hill Complex Bioregions (PCT123)
- Porcupine Grass - Red Mallee - Gum Coolibah hummock grassland / low sparse woodland on metamorphic ranges on the Barrier Range, Broken Hill Complex Bioregion – (hereafter described as Porcupine Grass Sparse Woodland, PGSW) (PCT359)
- Prickly Wattle open shrubland of drainage lines on stony rises and plains of the arid climate zone (PCT136)
- River Red Gum Woodland of rocky creeks in the ranges of the arid climate zone (PCT234)
- River Red Gum open woodland of intermittent watercourses mainly of the arid climate zone (PCT41).

Vegetation communities are mapped in Figure 2.

General vegetation community descriptions will be included in site inductions (Section 4.1.1).



Legend

- VMP area
- Goat fence
- Infrastructure
- Pre-existing road
- Turbine

Management zone / Vegetation community

- MZ1: Black Bluebush Shrubland (PCT153)
- MZ2: Black Oak – Western Rosewood – Blue Bush/Saltbush (PCT60)
- MZ3: Bluebush shrubland (PCT155)
- MZ4: Chenopod shrubland (PCT156)
- MZ5: Chenopod – Red Mallee Woodland/shrubland (VEG2)
- MZ6: Mulga-Dead Finish (PCT123)
- MZ7: Mulga/Red Mallee Shrubland (VEG1)
- MZ8: Porcupine Grass Sparse Woodland (PGSW) (PCT359)
- MZ9: Prickly Wattle open shrubland (PCT136)
- MZ10: River Red Gum Woodland of rocky creeks (PCT234)
- MZ11: River Red Gum Open Woodland of intermittent watercourses (PCT41)

Figure 2.1 – Infrastructure, vegetation and management zones

0 5

Kilometres

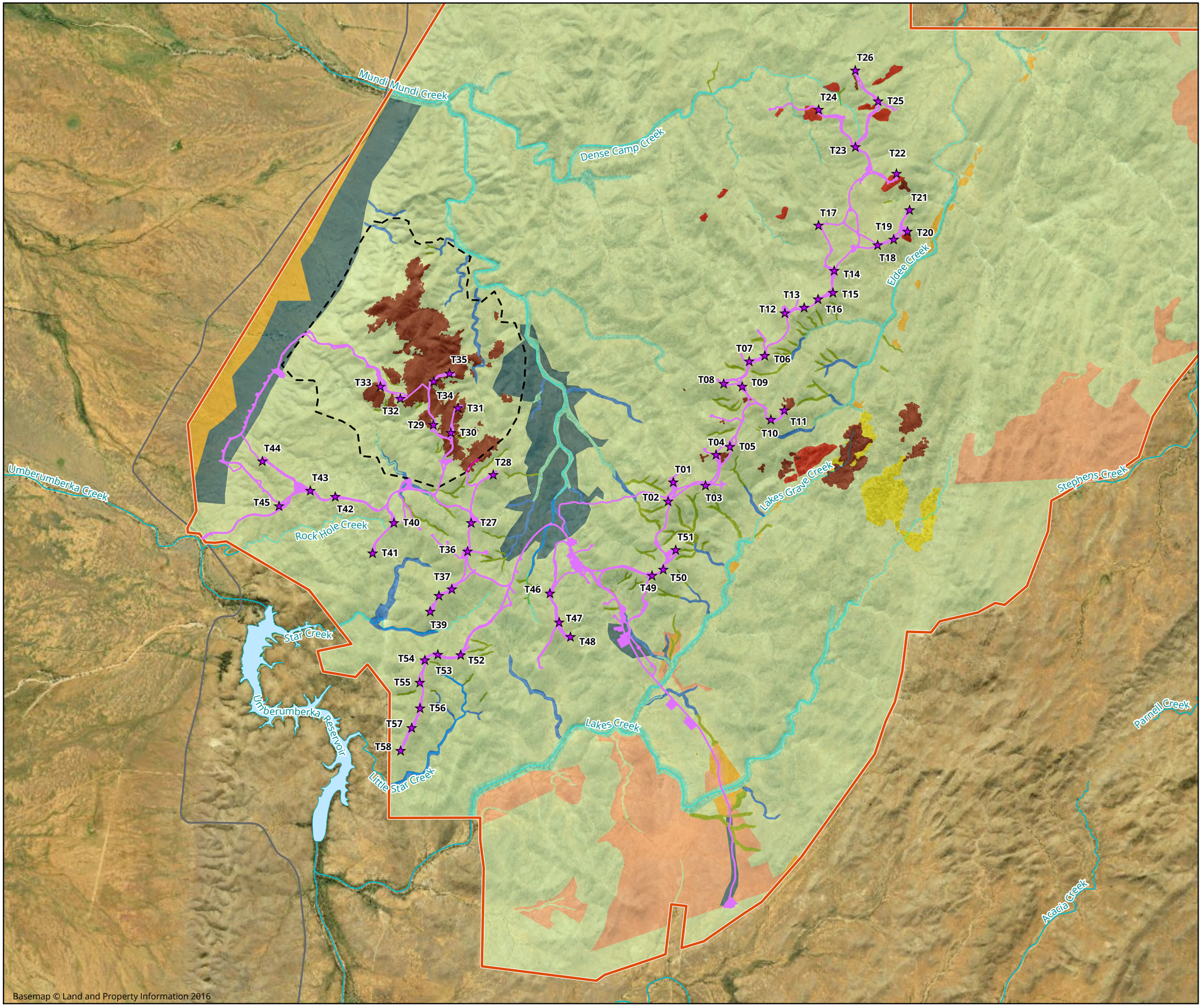
Scale: 1:125,000@ A3

Coordinate System: GDA 1994 MGA Zone 54

biosis

N

Matter: 26380
Date: 13 December 2018,
Checked by: RW, Drawn by: jturner, Last edited by: jturner
Location:\\bio-data-01\matters$\26300s\26380\Mapping\26380_VMP



Legend

- VMP area
- Goat fence
- Infrastructure
- Pre-existing road
- Turbine

Management zone / Vegetation community

- MZ1: Black Bluebush Shrubland (PCT153)
- MZ2: Black Oak – Western Rosewood – Blue Bush/Saltbush (PCT60)
- MZ3: Bluebush shrubland (PCT155)
- MZ4: Chenopod shrubland (PCT156)
- MZ5: Chenopod – Red Mallee Woodland/shrubland (VEG2)
- MZ6: Mulga-Dead Finish (PCT123)
- MZ7: Mulga/Red Mallee Shrubland (VEG1)
- MZ8: Porcupine Grass Sparse Woodland (PGSW) (PCT359)
- MZ9: Prickly Wattle open shrubland (PCT136)
- MZ10: River Red Gum Woodland of rocky creeks (PCT234)
- MZ11: River Red Gum Open Woodland of intermittent watercourses (PCT41)

Figure 2.2 – Infrastructure, vegetation and management zones

0 1 2

Kilometers
Scale: 1:62,500@ A3
Coordinate System: GDA 1994 MGA Zone 54

biosis

N

Matter: 26380
Date: 13 December 2018,
Checked by: RW, Drawn by: jturner, Last edited by: jturner
Location:\\bio-data-01\matters$\26300s\26380\Mapping\26380_VMP

2.2.2 Significant vegetation communities:

Significant vegetation communities within the Silverton Wind Farm have been identified and described by NGH Environmental (2008a, 2008b, 2016) and Biosis (2018d). These include:

- Porcupine Grass - Red Mallee - Gum Coolibah hummock grassland / low sparse woodland on metamorphic ranges on the Barrier Range, Broken Hill Complex Bioregion – (PGSW) (PCT359) which is listed as a critically endangered ecological community (CEEC) (NSW Scientific Committee 2010) under the *Biodiversity Conservation Act 2016*.
- Mulga / Red Mallee Shrubland on Rocky Slopes of the Barrier Range (an undescribed vegetation community).
- Chenopod – Red Mallee Woodland /Shrubland on Gravelly Lower Slopes (an undescribed vegetation community).

Information on significant communities will be included in site inductions (Section 4.1.1).

2.2.3 Priority weeds

Introduced plant species previously documented within the study area are detailed in Appendix 2. The study area has a low incidence of weeds however, a number of invasive weeds have been recorded.

Priority weed species for the Silverton Wind Farm, including NSW state and regional priority weeds, Weeds of National Significance (WoNS), and environmental weeds considered to pose a threat to native vegetation are listed in Appendix 3. These include species recorded from the study area, immediately adjacent to the study area or predicted to occur in the area (NGH Environmental 2017). Priority weeds include:

- The NSW State and regional priority weed African Boxthorn *Lycium ferocissimum* (WLLS 2017) recorded from the study area.
- The NSW State and regional priority weed Mesquite *Prosopis* spp. has the potential to occur within the study area (NGH Environmental 2017).
- Environmental weeds including Saffron Thistle *Carthamus lanatus*, Patterson's Curse *Echium plantagineum* and the introduced annual grasses Roughtail *Rostraria pumila*, Arabian Grass *Schismus barbatus* and additional species listed in Appendix 3.
- Other regional weeds (species of concern) recorded from the local area that may occur include Brassica *Brassica tournefortii,* Common Sowthistle *Sonchus oleraceus,* Ward's Weed *Carrichtera annua,* Barley Grass *Hordeum leporinum,* Brome grass *Bromus* spp. and Winged Sea Lavender *Limonium lobatum* (WLLS 2017).

Information on these species and what to do if they are found within the study area will be included in site inductions as per Section 4.1.1.

2.2.4 Threatened flora

Two species of regional significance, Curly Mallee *Eucalyptus gillii* and White Cypress Pine *Callitris glaucophylla* have been recorded within the study area (NGH Environmental 2008a, 2008b).

There are an additional three threatened plant species (species listed under either the NSW *Biodiversity Conservation Act 2017* (BC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)) which have been identified as having the potential to be affected by the Silverton Wind Farm works (NGH Environmental 2008a, 2008b) these include: Showy Indigo *Indigofera longibractea*, Yellow-keeled Swainsona *Swainsona flavicarinata* and Creeping Darling Pea *Swainsona viridis.* Additionally, there are unconfirmed records of Purple Wood Wattle *Acacia carneorum* on the flats of the Mundi Mundi sandplain

surrounding Silverton Wind Farm (Blore 2008). It has not been found on the hills. This species is listed as vulnerable under both the BC Act and the EPBC Act.

Information on these species will be included in site inductions as per Section 4.1.1.

2.3 Fauna

Fauna surveys undertaken by NGH Environmental (2008a, 2008b, 2016, 2018) documented a combined total of 148 vertebrate fauna species. Detailed lists of the species are contained in the cited reports. They include 20 species of mammals; 101 birds; 26 reptiles and one frog. Six of the recorded mammals are introduced species.

Details on fauna habitat are also provided in the cited documents and the BRDMP, GMP and the PGSWRP.

2.3.1 Threatened fauna

Twenty-three species of threatened vertebrate fauna have been recorded at the site or are considered likely to occur there. These are species listed under a category of threat under either or both of the BC Act and the EPBC Act. The threatened fauna species and habitat types are set out in Table 2-2. The species may be found outside these habitat types, but are most likely to be associated with the communities outlined. Key issues related to potential effects of the wind farm on significant fauna and management aimed at minimising impacts are addressed in detail in the BRDMP and BBAMP.

Information on the Barrier Range Dragon will be included in site inductions (Section 4.1.1) as per the BRDMP.

Table 2-1 Summary of BC and EPBC Act fauna species recorded, or likely to occur in the study area

Scientific name	Common name	BC Act	EPBC Act	Habitat type(s)
Birds				
Stictonetta naevosa	Freckled Duck	Vul		River Red Gum Woodland (both communities)
Hamirostra melanosternon	Black-breasted Buzzard	Vul		All vegetation communities
Hieraaetus morphnoides	Little Eagle	Vul		All vegetation communities
Falco hypoleucos	Grey Falcon	End		All vegetation communities
Circus assimilis	Spotted Harrier	Vul		All vegetation communities
Cacatua leadbeateri	Pink Cockatoo	Vul		All vegetation communities
Calamanthus campestris	Rufous Fieldwren	Vul		Mulga Dead Finish Woodland
Pyrrholaemus brunneus	Redthroat	Vul		Bluebush shrubland
Certhionyx variegatus	Pied Honeyeater	Vul		All vegetation communities
Grantiella picta	Painted Honeyeater	Vul	Vul	All vegetation communities
Epthianura albifrons	White-fronted Chat	Vul		Bluebush shrubland
Melanodryas cucullata cucullata	Hooded Robin	Vul		Mulga Dead Finish Woodland / River Red Gum Woodland (both communities) / Bluebush shrubland
Daphoenositta chrysoptera	Varied Sittella	Vul		Mulga Dead Finish Woodland

Scientific name	Common name	BC Act	EPBC Act	Habitat type(s)
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vul		Mulga Dead Finish Woodland
Diamond Firetail	Stagonopleura guttata	Vul		Mulga Dead Finish Woodland / River Red Gum Woodland (both communities) / Bluebush shrubland
Mammals				
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vul		All vegetation communities
Chalinolobus picatus	Little Pied Bat	Vul		All vegetation communities
Nyctophilus corbeni	Corben's Long-eared Bat	Vul	Vul	All vegetation communities
Vespadelus baverstocki	Inland Forest Bat	Vul		All vegetation communities
Mormopterus eleryi	Bristle-faced Freetail Bat	End		All vegetation communities
Reptiles				
Ctenophorus mirrityana	Barrier Range Dragon	End		Rock outcrops within all vegetation communities
Delma australis	Marble-headed Snake-lizard	End		PGSW
Cyclodomorphus melanops	Southern Spinifex Slender Blue-tongue Lizard	End		PGSW

2.3.2 Pest fauna species

A number of introduced fauna species occur at the site and are likely to be having deleterious impacts on the native flora and fauna (NGH Environmental 2008a, 2008b, Biosis 2018c). They are listed in Table 2-2. These pest fauna species have the potential to significantly impact restoration measures implemented under this VMP. In 2008, foxes and rabbits were recorded in low abundance, likely due to drought and lack of ground cover due to grazing pressure (NGH Environmental 2008a). Feral Goats were found to be abundant and widespread, and evidence of their grazing was found within areas of PGSW and the broader area (NGH Environmental 2008a).

Table 2-2 Summary of exotic fauna species recorded in the study area

Scientific name	Common name
Vulpes vulpes	Red Fox
Felis catus	House Cat
Oryctolagus cuniculus	Rabbit
Canis familaris	Dog
Capra hircus	Goat
Ovis aries	Sheep

3 Vegetation Management

3.1 General approach

This VMP provides a guide to the vegetation management required for the operation of the Silverton Wind Farm, particularly the infrastructure and asset maintenance activities. These activities will be undertaken in coordination with the GE Operating and Maintenance program and Manual (GE 2018b) and in accordance with the Silverton Wind Farm Operation Agreement (GE 2018a).

Key vegetation management goals across all management zones will include:

- Maintain the vegetation in accordance with the service requirements detailed in Table 1-1.
- Ensure that the ongoing maintenance activities have minimal impact on the integrity of retained vegetation, and in particular PGSW.
- Take all reasonable steps to ensure the Silverton Wind Farm operation and maintenance activities do not introduce onto the premises weeds, pest animals and pest insects.
- Maintain at current levels, with scope to eradicate, all NSW state and regional Priority Weed species (WLLS 2017).
- Implement an annual weed management program with a strong focus on high impact areas and weed seed vector routes within the study area. Weed management will be implemented at a minimum one and three months post construction and quarterly thereafter; and one and three months after significant rain events (>25 millimetres) or more frequently as required following inspections.
- Assess all temporary disturbance areas twice-yearly and one and three months after significant rain events (>25 millimetres) for the first 3 years following disturbance and implement restoration measures as required. Subsequent monitoring will be outlined in the revised VMP and BAMP as per Section 1.7.
- All biomass generated via Asset Protection Zone (APZ) establishment and maintenance (as per Table 4-1 specifications) will be distributed in areas of high erosion potential as brush matting.
- Monitor vegetation management actions and review actions as required, in accordance with the VMP and BAMP.
- Actions will be documented via the Inspection Checklist as provided as Appendix 4.

Vegetation management actions specific to vegetation management zones (as defined in below) are outlined in Table 3-1. Specific management actions relating to the above goals are detailed in Section 4.

A summary of VMP management actions including reference to relevant performance criteria/tasks, responsibilities and timing is provided in Section 5.

3.2 Vegetation management zones

The delineation of Vegetation Management Zones was determined based on vegetation communities. This was to allow for efficiency in tailoring rehabilitation/restoration measures and weed and pest animal management approaches within a vegetation community. Using this attribute, eleven management zones have been identified within the study area.

The location and extent of each zone is provided in Figure 2 and a description is provided in Table 3-1 below. A summary of the vegetation management requirements relating to operational maintenance and infrastructure for each zone is also provided in Table 3-1. All vegetation management actions specific to PGSW will be covered within the PGSWRP and the BAMP.

3.2.1 Limitations and assumptions

Clearance impacts on vegetation have been calculated using the final 'as constructed' survey data provided by GE/Catcon on the 2 October 2018, combined with data captured during on-site monitoring of construction by Biosis.

Table 3-1 Management zones

Management zone	Area in hectares (ha)	Description	Area of wind farm works impact in hectares (ha)	Number of Turbines	VMP Management requirements
Management Zone 1: Black Bluebush low open shrubland (MZ 1)	273.1	MZ 1 contains Black Bluebush low open shrubland (PCT153) in moderate condition. MZ1 has a number of unmapped ephemeral drainage lines feeding to the sub catchments of Mundi Mundi and Umberumberka Creeks.	**0.02**	0	As per the specific management actions detailed in Sections 4 and 5.
Management Zone 2: Black Oak – Western Rosewood – Blue Bush/Saltbush (MZ 2)	17.9	MZ 2 contains Black Oak – Western Rosewood – Blue Bush/Saltbush (PCT60) in a moderate condition. The vegetation type is primarily located in the Lake Creek sub catchment.	**0.00**	0	There are no specific management actions for MZ2.
Management Zone 3: Bluebush shrubland (MZ 3)	881.3	MZ 3 contains Bluebush shrubland on stony rises and downs in the arid and semi-arid zones (PCT155) in a moderate condition. Two occurrences of this PCT have been recorded in the south of the study area, primarily in the lower reaches of the of Mundi Mundi Creek sub catchments.	**18.16**	0	As per the specific management actions detailed in Sections 4 and 5.
Management Zone 4: Chenopod shrubland (MZ 4)	2254.2	MZ 4 contains a Bladder Saltbush shrubland on stony plains and downs of the arid zone (PCT156) in a moderate condition and is currently managed as grazing land. This PCT has been recorded in the southern and eastern portions of the study area associated with the riparian zones of Stephens Creek, Eldee Creek, Lakes Grave Creek and Lakes Creek.	**1.67**	0	As per the specific management actions detailed in Sections 4 and 5.
Management Zone 5: Chenopod – Red Mallee Woodland,/shrubland (MZ 5)	121.4	MZ 5 contains Chenopod – Red Mallee Woodland,/Shrubland (VEG2), in a moderate condition. Two occurrences of this PCT have been recorded within the study area associated with the riparian zone of Lakes Grave Creek and Lakes Creek.	**0.00**	0	There are no specific management actions for MZ5.

Management zone	Area in hectares (ha)	Description	Area of wind farm works impact in hectares (ha)	Number of Turbines	VMP Management requirements
Management Zone 6: Mulga-Dead Finish (MZ 6)	27437.8	MZ 6 contains Mulga-Dead Finish on stony hills mainly of the Channel Country and Broken Hill Complex Bioregions (PCT123) in a moderate condition and is currently managed as a vegetated grazing land.	**147.09**	54	As per the specific management actions detailed in Sections 4 and 5.
Management Zone 7: Mulga/Red Mallee Shrubland (MZ 7)	57.0	MZ 7 contains Mulga/Red Mallee Shrubland (VEG1) in a moderate condition and is currently managed as a vegetated grazing land.	**0.88**	0	As per the specific management actions detailed in Sections 4 and 5.
Management Zone 8: PGSW (MZ 8)	347.9	MZ 8 contains PGSW (PCT359) in moderate condition. The management zone is currently surrounded by a goat exclusion fence with scope to protect this vegetation from intense herbivory by feral, domesticated and native fauna.	**6.39**	4	As per the specific management actions detailed in Sections 4 and 5 and the specific requirements of the PGSWRP.
Management Zone 9: Prickly Wattle open shrubland (MZ 9)	102.6	MZ 9 contains Prickly Wattle open shrubland of drainage lines on stony rises and plains of the arid climate zone (PCT136) in a moderate condition where it is limited to surface drainage lines and ephemeral creek lines with the study area.	**1.04**	0	As per the specific management actions detailed in Sections 4 and 5.
Management Zone 10: River Red Gum of rocky creeks (MZ 10)	125.7	MZ 10 contains River Red Gum of rocky creeks in the ranges of the arid climate zone (PCT234) in a moderate condition. Distribution of the vegetation type is limited to major water courses and their associated riparian zones of the study area.	**1.35**	0	As per the specific management actions detailed in Sections 4 and 5.
Management Zone 11: River Red Gum Open Woodland of intermittent watercourses (MZ 11)	471.3	MZ 11 contains River Red Gum open woodland of intermittent watercourses mainly of the arid climate zone (PCT41) in a moderate condition. Distribution of the vegetation type is limited to major water courses and their associated riparian zones of the study area.	**0.38**	0	As per the specific management actions detailed in Sections 4 and 5.

Clearance impacts on vegetation have been calculated using the final data provided by GE-CATCON on 2 October 2018.

4 Specific management actions

4.1 Asset management and post-construction maintenance works

4.1.1 Site inductions

All employees and contractors working at Silverton Wind Farm will undergo site induction training relating to biodiversity management issues. In particular, inductions must include:

- Information provided on vegetation communities detailed in Section 2.2.1. This will include general vegetation descriptions.
- Information provided on the presence and localities of threatened species habitat and significant vegetation communities as detailed in Section 2.2.4 (threatened flora), 2.3.1 (threatened fauna), 2.2.2 (significant vegetation communities).
- Fact sheets provided highlighting NSW DPI priority weed species (detailed in Section 2.2.3).
- Information provided on the need for strict hygiene protocols to reduce the potential introduction and/or spread of invasive flora and fauna species (detailed further in section 4.1.2)
- Information on speed restrictions to reduce mortality of Barrier Range Dragons
- Information on the management of Feral Goats
- Details of fire response plans (as detailed in the BAMP)

An example induction checklist is included in Appendix 4 of the BAMP

All GE contract and subcontractor staff are responsible for working in accordance with this VMP and are required to identify potential environmental impacts and implement and maintain control measures, procedures and constraints accordingly. These will be documented in accordance with the BAMP.

Spatial data identifying threatened species/habitat and significant vegetation communities will be provided to all personnel undertaking maintenance works. Spatial data will be updated as new information arises.

4.1.2 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 Silverton Wind Farm.

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 5. 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
  - 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.

4.1.3 Protection of vegetation

Exclusion fencing was erected around the majority of the PGSW by the General Purpose leaseholder Blore in May 2014 as part of the Mundi Mundi Conservation Project funded by the Total Grazing Pressure Program, Western Local Land Services (LLS). The fence was erected to temporarily exclude and manage goats for the purposes of protecting PGSW and endangered Barrier Range Dragon. Under the funding agreement, PGSW fencing maintenance is the responsibility of the leaseholder but no timeframes are specified.

The integrity of the fencing will be monitored by GE quarterly and after severe weather events (e.g. rainfall events greater than 25 millimetres). GE will notify the Leaseholder of any required maintenance. GE will work with the leaseholder and will ensure fences are maintained and any damage is repaired within two weeks of notification.

Further detail pertaining to the protection and rehabilitation of PGSW are provided with the Recovery Plan for the community (PGSWRP) and the BAMP.

Fencing of additional areas of sensitivity (e.g. rehabilitation/revegetation areas) will be implemented as required where goat herbivory impedes restoration measures implemented under this VMP. Fencing will be to the standard outlined in the GMP.

4.1.4 Asset and infrastructure vegetation clearance and maintenance specifications

Vegetation clearance and maintenance specifications relating to wind farm assets and infrastructure are detailed in Table 4-1. This includes Asset Protection Zone (APZ) requirements. These will be considered in conjunction with Essential Energy's Vegetation Management Plan (2018).

Where applicable, a site specific Tree Management Plan (Essential Energy 2018) will be designed to address unique site conditions. Such a plan requires the completion of an Essential Energy approved risk assessment.

GE will provide spatial data for all threatened species/habitat and significant vegetation communities and mapped vegetation communities to all maintenance staff. Spatial data will be kept updated.

The following objectives will be met as part of any vegetation clearance and maintenance activities:

- Where clearing is required, it will be limited to the extent outlined in Table 4.1.
- Any native vegetation (including dead trees and woody debris) removed will be used in restoration areas to stabilise soils and aid in vegetation rehabilitation (see Section 4.1.8).
- Maintenance access will be limited to the use of already cleared areas. Where it is necessary to cross vegetated areas for access:
  - Trees and shrubs will be avoided were possible
  - Fallen timber and rock outcrops will be avoided where possible
  - Mapped areas of PGSW and Barrier Range Dragon habitat will be avoided.
  - Threatened species will be avoided.
- If disturbance is such that landforms are destabilised and an erosion risk created, these areas will be rehabilitated as set out in section 4.2.

GE are to notify Vegetation Management Contractors and the Project Ecologist of vegetation clearance and maintenance activities so that post clearance placement of biomass can be undertaken in accordance with Section 4.2.2.

Monitoring of vegetation clearance and maintenance areas will be undertaken by the Project Ecologist within 1 month of notification of works and following the completion of any biomass redistribution by the Vegetation Management Contractors in accordance with Section 4.2.2.

Table 4-1 Asset and infrastructure vegetation clearance and maintenance specifications (from Essential Energy 2018).

Asset type	Vegetation maintenance and clearance requirements / asset protection zone specifications
Fenced Assets and Pad-mounted Substations	Fenced asset in rural areas should retain a Vegetation Buffer Zone of three metres free of highly flammable trees and shrub species. Grasses and small low-flammable shrub species are acceptable within the zone. Internal fenced area is to be free of all vegetation. In bushfire prone areas, major substations are to have a total 10 metre APZ established surrounding the boundary fence, where only maintained lawn or grasses are permitted.
Stays	Vegetation is to be cleared to a width of five metres (2.5 m either side) along the line of the stay and for a radius of two metres around the stay peg. Deep disturbance of soil at the stay position is to be avoided. This is to maintain the integrity of the insulated portion of the stay wire.

Asset type	Vegetation maintenance and clearance requirements / asset protection zone specifications
Poles, Structures, Stay wires and attachments	A minimum vegetation clearance of two metres is to be achieved in all directions around the pole, structure, stay wire or any attachment on a pole or structure. Vegetation trimming is to be conducted to meet the Australian Standard 4373 Pruning of amenity trees.
Transmission Towers	A minimum clearance of three metres of vegetation clearance is to be achieved in all directions around the structure of a tower or a 12 metre radius from the centre of the tower (whichever is greater).
Existing Power lines	Based on regulations and industry guidelines (ISSC 2016). Clearance requirements are to be based upon the type of cabling installed. These are detailed in Section 5 of Essential Energy (2018).

4.1.5 Road upgrades and maintenance

For all roads within the VMP study area, road inspections and maintenance works will be undertaken in accordance with Silverton Wind Farm – Road Upgrade and Maintenance Strategy Methodology Statement (CATCON 2017a) on a 6-monthly basis (Table 1), and maintenance implemented as required. Additional inspections will be undertaken after significant rain events (>25 millimetres), farmers' works that affect or alter the roads, significant traffic movements and the like.

GE will provide spatial data for all threatened species/habitat and significant vegetation communities and mapped vegetation communities to all maintenance staff. Spatial data will be kept updated.

Inspection checklists and maintenance activity records will be provided to the Vegetation Management Contractor and the Project Ecologist. An inspection checklist is provided in Appendix 4.

For all areas uphill of or adjacent to PGSW (Figure 3), or in rocky outcrops or artificial Barrier Range Dragon habitats as mapped in the BRDMP, tracks will be inspected by GE staff monthly and after significant rainfall events (>25 millimetres) or weekly in areas where construction is continuing.

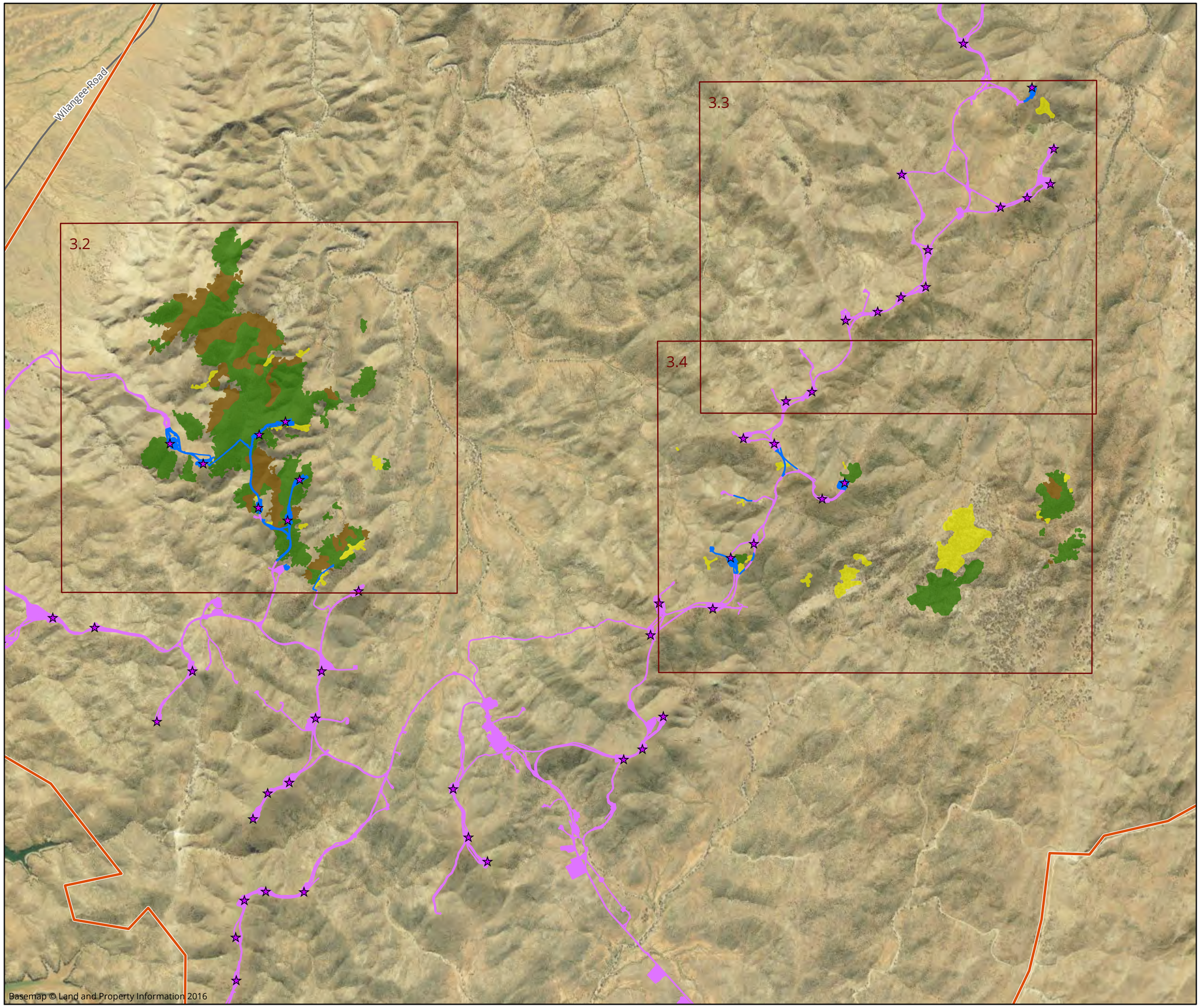
Road upgrade and maintenance activities are to include the servicing of supporting road side drainage assets. Any degraded erosion control or sediment structures identified within the site will be reinstated back to construction standards detailed in Catcon (2017b) and in accordance with Landcom (2004).

In addition, the following measures will be implemented:

- Disturbance associated with any upgrade and maintenance activities will be limited to the existing road, drainage and batter areas.
- There will be no impact to areas of adjacent vegetation communities and habitat.
- Threatened species will be avoided.
- Stockpiles (including spoil material) will be stored in areas that are of less than 10% slope.
- Stockpiles (including spoil materials) will only be placed in previously disturbed areas.
- Stockpiles will be stabilised.
- Stockpiles will not be placed in areas where they may be blown or washed into drainage lines.
- Erosion and sediment controls will be implemented where there is a risk of runoff occurring
- Stockpiles or excavated material will not be placed on top of any existing rocky outcrops or artificial Barrier Range Dragon habitats as mapped in the BRDMP.

- Stockpiles or excavated material will not be placed uphill of or adjacent to areas of PGSW (as shown in Figure 3).

The location of stockpiles will be supplied to Vegetation Management Contractors and the Project Ecologist. All biomass and spoil derived via road and batter upgrades will be monitored for opportunistic weed seed germination and treated as a part of the annual weed management program in accordance with section 4.3. Site inspections will be undertaken by the Project Ecologist twice-yearly for 3 years and 1 and 3 months after significant rain events, or for areas of environmental sensitivity (uphill of or adjacent to PGSW or in rocky outcrops or artificial Barrier Range Dragon habitats) following any maintenance activities to ensure compliance.



Legend

- Study area
- Turbine
- Infrastructure with no PGSW downslope
- Infrastructure with PGSW downslope

PGSW structural variants

- Porcupine grass with eucalypts
- Porcupine grass only
- Eucalypts only

Figure 3.1 – Infrastructure with PGSW downslope - overview

0 1,000 2,000

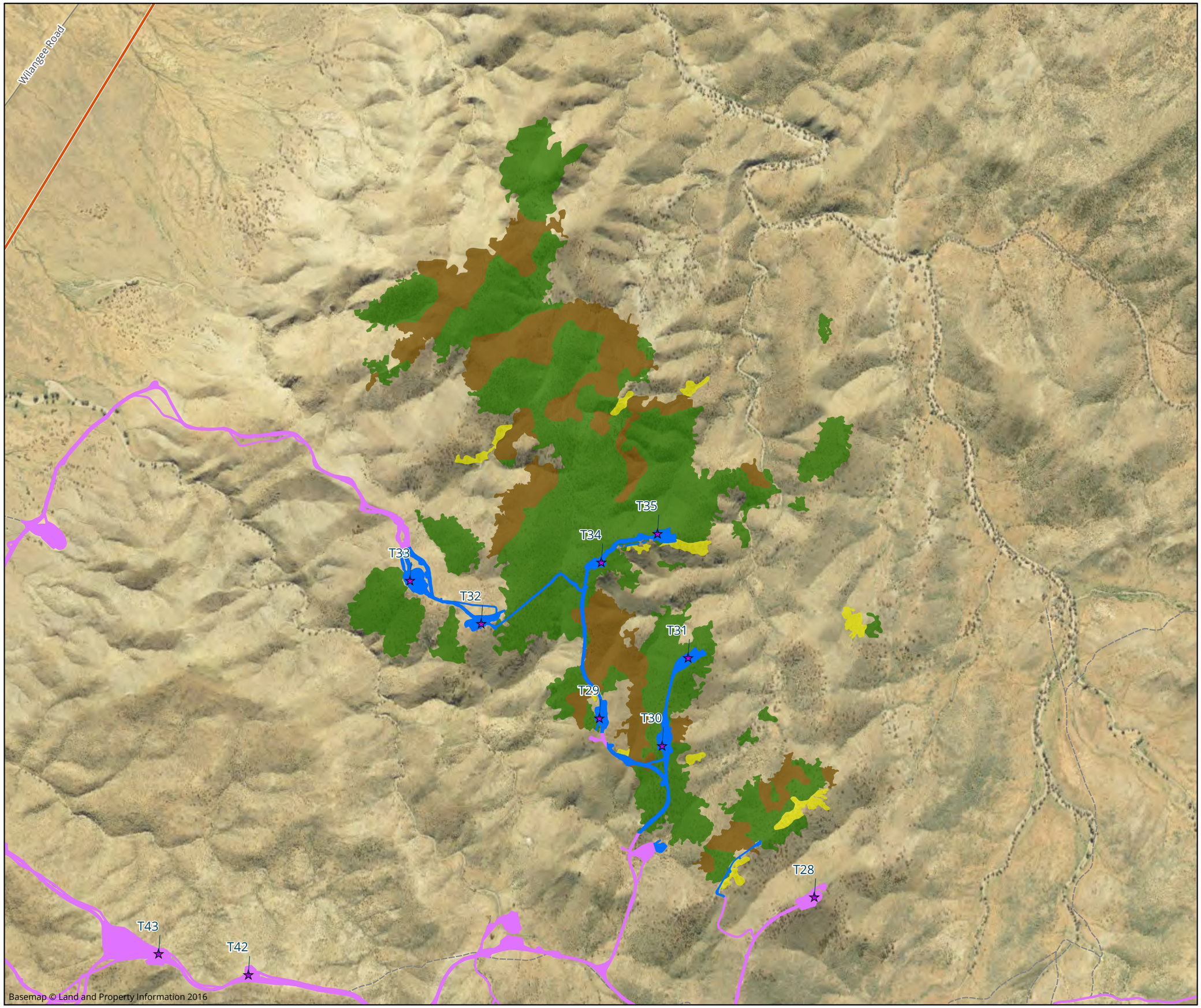
Metres

Scale 1:37,500 @ A3

Coordinate System: GDA 1994 MGA Zone 54

N

Matter 26380
Checked by , drawn by ARL
Last edited by jturner on 12 December 2018
Location:
\\bio-data-01\matters$\26300s\26380\Mapping\26380_PGSW_GMP



Legend

- Study area
- Turbine
- Infrastructure with no PGSW downslope
- Infrastructure with PGSW downslope

PGSW structural variants

- Porcupine grass with eucalypts
- Porcupine grass only
- Eucalypts only

Figure 3.2 – Infrastructure with PGSW downslope - west

0 1,000

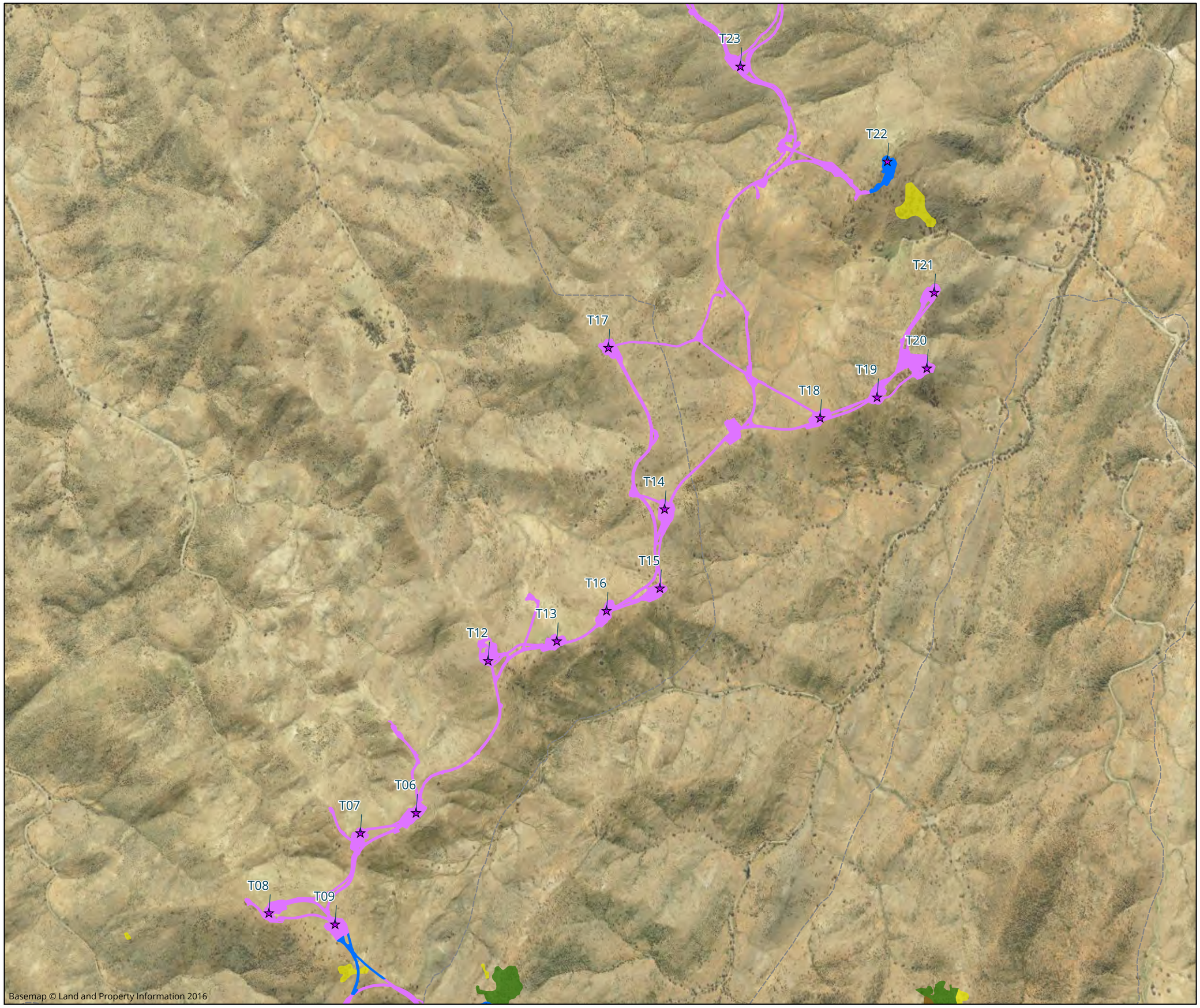
Metres

Scale 1:17,500 @ A3

Coordinate System: GDA 1994 MGA Zone 54

N

Matter 26380
Checked by , drawn by ARL
Last edited by jturner on 12 December 2018
Location:
\\bio-data-01\matters$\26300s\26380\Mapping\26380_PGSW_GMP



Legend

- Study area
- Turbine
- Infrastructure with no PGSW downslope
- Infrastructure with PGSW downslope

PGSW structural variants

- Porcupine grass with eucalypts
- Porcupine grass only
- Eucalypts only

Figure 3.3 – Infrastructure with PGSW downslope - north-east

0 1,000

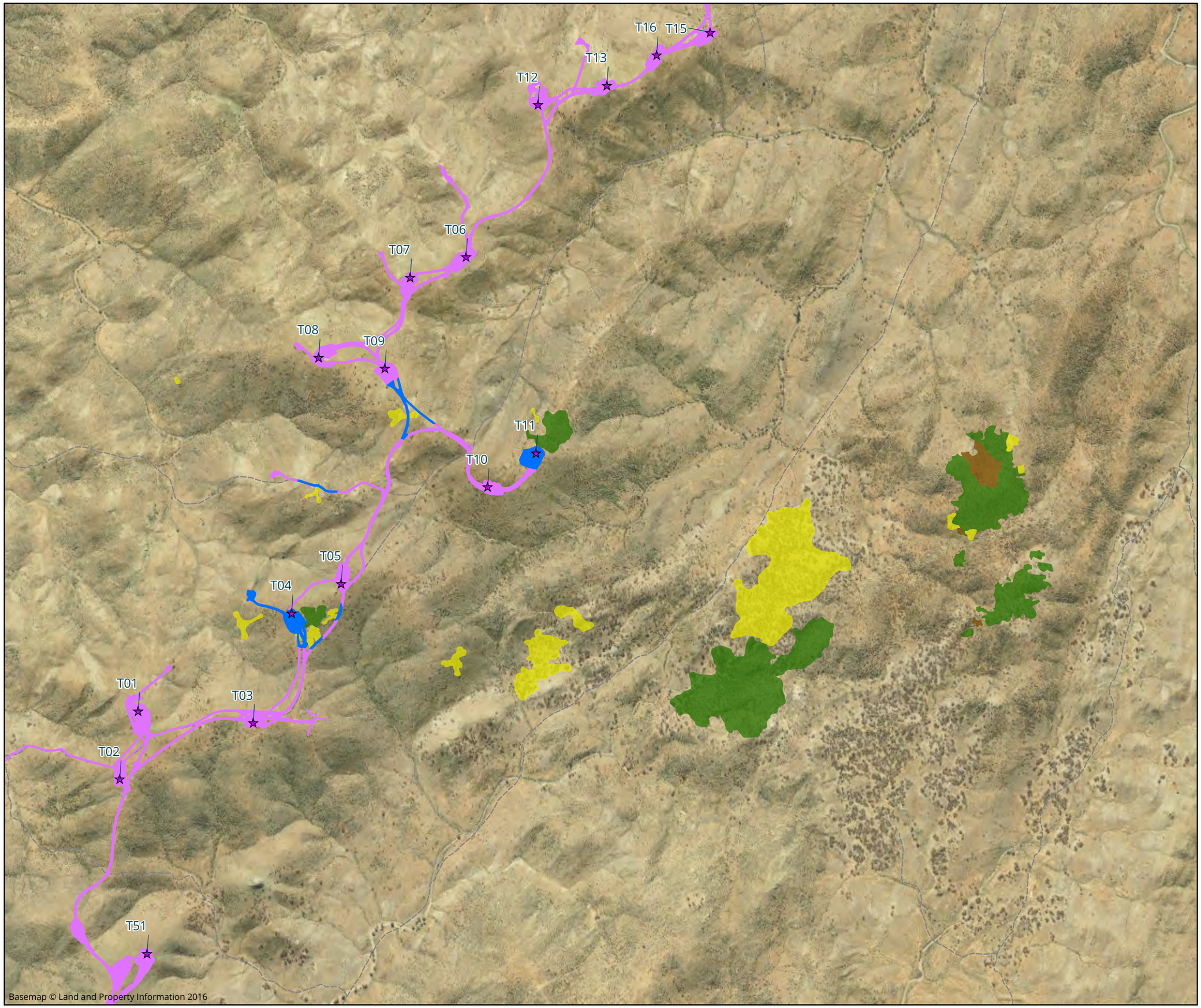
Metres

Scale 1:17,500 @ A3

Coordinate System: GDA 1994 MGA Zone 54

N

Matter 26380
Checked by , drawn by ARL
Last edited by jturner on 12 December 2018
Location:
\\bio-data-01\matters$\26300s\26380\Mapping\26380_PGSW_GMP



Legend

- Study area
- Turbine
- Infrastructure with no PGSW downslope
- Infrastructure with PGSW downslope

PGSW structural variants

- Porcupine grass with eucalypts
- Porcupine grass only
- Eucalypts only

Figure 3.4 – Infrastructure with PGSW downslope - south-east

0 1,000

Metres
Scale 1:17,500 @ A3
Coordinate System: GDA 1994 MGA Zone 54

N

Matter 26380
Checked by , drawn by ARL
Last edited by jturner on 12 December 2018
Location:
\\bio-data-01\matters$\26300s\26380\Mapping\26380_PGSW_GMP

4.1.6 Drainage

Within the Silverton Wind Farm, drains supporting access tracks will be inspected by GE staff as part of access road and batter maintenance (section 4.1.5) on a 6-monthly basis (Table 1), and maintenance implemented as required. Additional inspections will be undertaken after significant rain events (>25 millimetres), farmers' works that affect or alter the roads, significant traffic movements and the like. Any additional stormwater drains will be visually inspected annually and excessive silt build up and trash removed as required (GE 2018a).

GE will provide spatial data for all threatened species/habitat and significant vegetation communities and mapped vegetation communities to all maintenance staff. Spatial data will be kept updated.

Inspection checklists and maintenance activity records will be provided to the Vegetation Management Contractor and the Project Ecologist. An inspection checklist is provided in Appendix 4.

Any degraded drainage structures identified within the site will be reinstated back to construction standards detailed in Catcon (2017b) and in accordance with Landcom (2004). Maintenance activities to include clearing drains of sediment; clearing drains of excessive vegetation and obstacles; filling scours or regrading drain to hard surface material with consideration to be had for revegetation or other forms of scour protection; clearing drains of excessive weed infestations (Catcon 2017a).

Silt removed as part of drainage mitigation works will be placed locally in previously disturbed areas (bunded where required) or as specified further below. It will not be distributed throughout the site. Additional methods for stockpiling are outlined in section 4.1.5 above.

Silt/sediment removed from tracks and drains for maintenance activities will not be placed or pushed into areas uphill of or adjacent to PGSW (Figure 3) or in rocky outcrops or artificial Barrier Range Dragon habitats as mapped in the BRDMP. Tracks in these areas requiring regrading will be in-sloped as appropriate to reduce risk of sediment movement into adjacent vegetation. Silt/Sediment requiring removal will be moved to an existing disturbed area away from areas uphill of or adjacent to PGSW and away from rocky outcrops or artificial Barrier Range Dragon habitat.

The location of stockpiles will be supplied to Vegetation Management Contractors and the Project Ecologist. All biomass and spoil derived via drain maintenance will be monitored for opportunistic weed seed germination and treated as a part of the annual weed management program in accordance with section 4.3. Site inspections will be undertaken by the Project Ecologist twice-yearly for 3 years and 1 and 3 months after significant rain events, or for areas of environmental sensitivity, following any maintenance activities to ensure compliance.

4.2 Restoration of vegetation and habitat

4.2.1 Restoration of vegetation and habitat in temporary disturbance areas

Rehabilitation works required as part of the construction approvals will be completed by CATCON as detailed in the *Silverton Wind Farm Site Rehabilitation Plan* (Appendix 6).

Once construction rehabilitation works have been completed by CATCON and written approval that works have been complete provide by Jacobs, ongoing monitoring of areas rehabilitated as part of the Silverton Wind Farm Works will be the responsibility of GE.

The location of all temporary disturbance areas arising from the Silverton Wind Farm Works will be provided to GE by CATCON. GE will implement monitoring and documentation as detailed below.

At a minimum, for the first three years following rehabilitation of temporary disturbance, the site will be monitored by the Project Ecologist on a twice-yearly basis (every six months) and 1 and 3 months after

significant rain events (>25 millimetres) to assess regeneration success and soil stability. Subsequent monitoring will be as per the BAMP.

Monitoring will include an assessment of:

- Weed infestations and required weed management.
- Drainage conditions (including evidence of ponding or scouring).
- Evidence of erosion/instability that requires stabilisation.
- Where stabilisation measures are already installed, whether stabilisation measures are adequate.
- Whether regeneration is occurring and adequate (whether natural or supplemented).
- Requirements for follow up rehabilitation activities including weed control, pest animal control (including fencing), soil stabilisation and seeding/revegetation, if required.
- Photo(s) of the site.

An inspection checklist is included in Appendix 4.

If necessary, a restoration plan will be developed and implemented for disturbed areas where regeneration fails or is likely to require additional support. This may occur where erosion or grazing pressures require mitigation, or where regeneration may be limited by microsite conditions, seed availability due to loss or mixing of topsoil, or lack of sufficient seed supply.

Further restoration of temporary disturbance areas will be implemented through rehabilitation and revegetation works where required using strategies appropriate to the location and condition of the area disturbed. Restoration of pre-existing vegetation cover levels will be a goal of rehabilitation where possible. However, it is accepted that in some areas this will not be achievable such as where there is insufficient topsoil to support vegetative growth. Therefore, in steep rocky areas with limited top soil and vegetation cover, stabilisation will be the objective. In flatter terrain or where vegetation cover currently occurs, restoring vegetation cover will be the objective.

Revegetation will use of seed collected from the local area (as detailed in Section 4.2.4) appropriate to the vegetation community. Due to the infrequency of rainfall within the study area and skeletal soils, seeding is recommended as a revegetation measure (over planting). Seeding with local species adapted to the climatic conditions is intended to allow for regeneration to occur when conditions for germination and establishment are climatically appropriate. Hydro seeding will be used for all slopes <10%. For slopes ≥10%, hydro mulch will be used. Follow up watering will be implemented if required. Details on plant species selection and timing of rehabilitation works will be included in the site restoration plan.

Weed management will be implemented at all sites in accordance with Section 4.3 below.

Where soil stabilisation is required to assist revegetation, brush matting biomass will be considered in accordance with Section 4.2.2 below. Where brush matting is not available or not adequate, other measures e.g. weed free mulch, or geotextiles) will be used.

Where pest animals including Feral Goats are impeding restoration works, additional control measures including fencing of restoration areas will be considered in accordance with section 4.1.3 of this VMP and the GMP. Additional Goat control measures, if required, will be undertaken in accordance with the GMP.

All rehabilitation and revegetation works are will be undertaken by a suitably qualified and experienced bush regeneration contractor.

General operations will not require any further disturbance. However emergency maintenance or similar may require localised disturbance. For any new temporary disturbance areas arising from the wind farm

maintenance works, disturbed ground will be stabilised and rehabilitated in line with Appendix 6 as soon as practical after the completion of works. At a minimum, topsoil will be reinstated if possible, and landforms stabilised (using rocks, logs and other measures e.g. bunds and swales if required) to ensure soil retention. Priority will be given to allowing natural regeneration where topsoil is sufficient and implementing additional soil stabilisation and revegetation as required. Monitoring and rehabilitation will be undertaken where required in accordance with the methodologies outlined above.

4.2.2 Brush matting and placement of biomass

To assist with the stabilisation of soils and establishment of native vegetation, all native biomass generated during APZ creation and asset maintenance will be placed in areas prone to disturbance and of low regeneration potential post construction works. These areas will be identified as part of ongoing maintenance inspections (e.g. Table 1-1) and ongoing monitoring activities. Notification of clearance/maintenance works will be provided by GE to Vegetation Management Contractors and Project Ecologist and follow up distribution of biomass undertaken by the Vegetation Management Contractor within 1 month of notification.

Special consideration will be made to collect material laden with woody unopened fruits or capsules for placement in these areas. Biomass will not be removed post native seed germination as the skeletal remains act as erosion control devices, a temporary natural mulch layer and provides a protective environment from opportunistic herbivory.

For retention of woody brush matting biomass in steep or heavily disturbed locations, material may be secured via 'U' shaped pegs.

The location of biomass placement areas will be mapped and documented in works plans by the Vegetation Management Contractors and supplied to GE and the Project Ecologist. Sites will subsequently be inspected as part of twice-yearly monitoring undertaken by the Project Ecologist (and 1 and 3 months following significant rain events) and follow up management implemented in accordance with Section 4.2 as required.

4.2.3 Natural regeneration

The encouragement of natural regeneration of species and pre-existing vegetation communities will be the most effective form of site restoration within the study area as:

- Seeds and propagules exist within the seed bank.
- Species of local provenance are better adapted to the environmental conditions in the area.
- Re-establishment of the community will follow natural patterns of re-colonisation and succession.
- Soil fauna, fungal and microbial populations that are essential to a healthy plant growing environment are already present.
- Opportunity for revegetation is limited due to the arid climate and skeletal soil profiles within the study area.

Appropriate monitoring and vegetation management must be carried out in natural regeneration areas as actions such as soil disturbance may also result in the establishment of weed populations. Monitoring will be undertaken twice-yearly by the Project Ecologist in accordance with Section 4.2.1 and the checklist in Appendix 4.

Where natural regeneration fails, rehabilitation measures including soil stabilisation and seeding will be considered. These will be undertaken in accordance with Sections 4.2.1 (rehabilitation and revegetation), 4.2.2 (brush matting and biomass placement) and 4.2.4 (collecting of seed) of this VMP.

Weed control will be undertaken in accordance with Section 4.3.

4.2.4 Collecting of seed

To provide for the installation of local provenance flora species, seed will be collected from within or immediately surrounding the study area. The list of species recorded from the study area (Appendix 2) will be used as a guide to aid selection of species.

Time will be allocated to seed collection for the project to allow for seasonal variations in seed production. Depending on timing, this may include collecting seed more than to 12 months in advance of revegetation works. Due to the ephemeral nature of many species in their growth/flowering/seeding habits, seed collection will be prioritised during recruitment and growth periods following significant rain events. Collection of additional seed from adjoining areas of retained vegetation may be required (depending on seasonal variations in seed production) to ensure adequate genetic diversity is maintained.

Seed collection and storage will be carried out in accordance with the FloraBank Guidelines (www.florabank.org.au), by experienced and licenced seed collectors/ecologists.

Additional written approvals for seed collection may be required when collecting from outside of the study area.

Further information in relation to seed collection is provided as Appendix 1.

4.3 Weed management

Scheduled maintenance activities have the potential to introduce and promote the spread of weeds and pathogens within the study area. Under the NSW Biosecurity Act 2015 (Biosecurity Act) landowners and occupiers are under legal obligations to manage weed species 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.*

As such GE, in dealing with weeds present within the study area, is obliged under the general biosecurity duty to prevent, eliminate and minimise the risk of potential biosecurity impacts.

NSW state and regional priority weeds and other environmental weeds recorded from the site or with the potential to occur within the site are listed in Appendix 3. This includes exotic species considered to have either a high risk of dispersing and becoming established in adjacent native vegetation, or have the potential to cause significant ecological harm. This list will be updated if additional species are identified.

Initially, priority weed species locations will be collated and mapped using records from previous surveys (NGH Environmental 2008a, 2008b, 2016) where available. Additional spatial data will be collected during monthly monitoring by GE operational staff and supplemented by opportunistic records by the Project Ecologist during baseline surveys in spring 2018 (Biosis 2018b). This mapping will be used to identify priority weed management locations for NSW state and regional priority weeds. Spatial data on weed locations will be shared between GE, the Project Ecologist and Vegetation Management Contractor and updated as required.

To ensure threatened species are not impacted by weed management works, GE will provide spatial data for all threatened species/habitat to all Vegetation Management Contractors. Spatial data will be kept updated. Vegetation Management Contractors will not use chemical or mechanical control methods in areas where threatened species may be impacted by such actions. Manual control methods which avoid impact to threated species will be implemented where mechanical and/or chemical methods are not appropriate.

To maintain low weed densities across the study area, an annual weed management program will be implemented, with all known locations and identified risk areas within the Silverton Wind Farm works areas treated as per obligations outlined in Western Local Land Service (2017). Recommended methods for control of environmental weeds recorded on site, along with priority species, are outlined in Appendix 3. A summary of the required works and indicative frequency is outlined in Table 4-2. An operational checklist for weed management activities is provided as Appendix 4. This will be submitted with weed control works sheets after each site visit by the Vegetation Management Contractor.

Other priority species also listed in Appendix 3 will be treated within and immediately adjacent to the asset and infrastructure areas shown in Figure 2, with priority given to treating areas in proximity to key environment assets, particularly PGSW. Treatments will be undertaken quarterly at a minimum with additional treatment one and three months post significant rain events (>25 millimetres) (to mitigate opportunistic weed seed germination and flowering events) and additionally as required based on maintenance inspections.

To safeguard against the introduction of new invasive plant species, a seasonal monitoring program will be implemented in coordination with the weed management program. This will include twice-yearly site inspections by the Project Ecologist or more frequently as required e.g. 1and 3 months after significant rain events (>25 millimetres)or if required following maintenance inspections. Details pertaining to the frequency and timing of monitoring are provided with the BAMP. Monitoring reports will be submitted by the Project Ecologist annually.

Table 4-2 Annual weed management summary

Maintenance Activity	Key areas	Frequency
Baseline mapping of NSW DPI Priority Weeds	Seek mapping of priority weeds from previous reporting Map populations of NSW priority weeds observed during baseline surveys in Spring 2018. Spatial data will be distributed between GE, Vegetation Management Contractor and Project Ecologist.	By March 2019
Control of targeted NSW state and regional priority weeds	Mapped priority weed locations. Any new infestations/priority weed locations found during routine inspections.	Ongoing, all year. Refer to Appendix 3 for timing for individual species.
Control of other priority herbaceous and perennial weed species	Roadsides, roadside batters, all temporary disturbance areas (including soil/subgrade stockpile areas), riparian zones and waterway crossings (including creek lines and ephemeral drainage lines), asset surrounds and carparks, gates and cattle grates, fence lines, and beneath and adjacent to existing power cables to manage temporary disturbed areas and exotic seed rain.	Ongoing program. At a minimum treatments will be undertaken quarterly and 1 and 3 months post significant rain events (>25 mm) (to mitigate opportunistic weed seed germination and flowering periods) and as required based on maintenance inspections.

Maintenance Activity	Key areas	Frequency
Monitoring	Mapped priority weed locations, temporary disturbance areas/restoration areas, and all asset/infrastructure maintenance areas.	Twice-yearly site inspections by the Project Ecologist or more frequently as required e.g. 1and 3 months after significant rain events (>25 mm) or if required following maintenance inspections
Mapping updates	Spatial data will be updated with any new infestations/priority weed locations and shared between GE, Vegetation Management Contractor and Project Ecologist.	Ongoing, all year.

4.4 Monitoring and reporting

Details pertaining to all aspects of vegetation monitoring including anticipated performance criteria in relation to restoration and rehabilitation, weed management and invasive species management is outlined in the BAMP.

Site inspection checklists will be completed each site visit by GE staff, Vegetation Management Contractors and the Project Ecologists. In addition, annual reports will be prepared by the Vegetation Management Contractors and Project Ecologist as outlined in Table 5.1.

Spatial data for threatened species/priority weed locations and temporary disturbance areas will be updated as new information arises and shared with all relevant personnel (GE, Project Ecologist, and Vegetation Management Contractors).

Annual monitoring and reporting will be followed by a review of the management approach, by the Project Ecologist in consultation with GE Renewable Energy and the Vegetation Management Contractors, to evaluate the performance of management actions and to inform potential adaptive management responses. The aim of these reviews is to continually improve on-ground management and ecological outcomes. Annual reports will be submitted to the OEH.

A comprehensive review of monitoring and management will be undertaken after three years, particularly to ensure there is a net gain in the conservation value of PGSW. This review will update management recommendations if required. The BAMP and associated plans will be reviewed in consultation with OEH and DPE.

4.5 Record keeping and management

The results of inspections and monitoring detailed in Section 5 and outlined in Table 5.1 will be stored safely by GE and be readily accessible for auditing. This will include:

- All monitoring, inspection and compliance reports
- Correspondence with public authorities
- Induction and training records
- Reports on incidents impacting on biodiversity values and follow-up action.
- Spatial data

5 Vegetation management actions and performance criteria

A summary of VMP management actions, relevant performance criteria/tasks, responsibilities and timing are provided as Table 5.1 (baseline performance criteria) and 5.2 (ongoing performance criteria). These actions follow the numbering in Appendix 3 of the BAMP but include specific reference to relevant VMP sections as required.

Table 5-1 Baseline management actions and performance criteria

No.	Management Action	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
1.6	**Site inductions**	Biodiversity information will be included as part of the site induction for all contract and subcontract staff working within the study area as per Section 4.1.1. Up to date spatial data identifying threatened species/habitat and significant vegetation communities will be provided to all personnel undertaking maintenance works.	Inductions completed for all contract and subcontract staff Staff aware of key vegetation values and issues as per Section 4.	Induction sheets and associated support materials developed.	GE operational staff/Project Ecologist	Initial site inductions conducted December 2018
1.7	**Hygiene protocols**	Strict hygiene protocols implemented to reduce the potential introduction or spread of invasive flora and fauna species as per Section 4.1.2.	No new invasive species introduced.	Inspection checklists submitted.	Project Manager / all site personnel	Ongoing
1.8	**Baseline weed mapping**	Weed populations documented as per Section 4.3.	Locations of all known occurrences of exotic flora, particularly NSW DPI priority weeds (Table A2-1 in Appendix 2 of the VMP), will be recorded and collated into a mapping shapefile.	Mapping shapefile distributed.	Project Ecologist	March 2019

No.	Management Action	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
			Shapefiles will be distributed to GE and Vegetation Management Contractors.			
1.12	**Baseline temporary disturbance area mapping**	Temporary disturbance areas documented as per Section 4.2.1.	Locations of all temporary disturbance areas will be recorded and collated into a mapping shapefile. Shapefiles will be distributed to GE and Vegetation Management Contractors.	Mapping shapefile distributed.	Project Ecologist	February 2019

Table 5-2 Ongoing management actions and performance criteria

No.	Management Action	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
2.1	**Site inductions**	Biodiversity information will be included as part of the site induction as per Section 4.1.1.	Inductions completed for all contract and subcontract staff Staff aware of key vegetation values and issues as per Section 4.	Signed induction sheets completed and submitted	GE operational staff	Ongoing
2.2.1	**Monitor fencing and work with General Purpose leaseholder to maintain fencing to exclude Feral Goats**	Fence lines will be inspected quarterly and documented via inspection checklist. Fences will be maintained through agreement with the leasholder.	Fences are maintained and any damage repaired within two weeks of notification.. Vegetation protected.	Inspection checklists submitted. Document completion of fencing	GE operational staff / General Purpose leaseholders/ fencing contractor	Fence lines will be inspected quarterly and documented via inspection checklist. Repairs will be made within 2 weeks.
2.2.2	**Implement any required additional fencing to exclude Feral**	Additional fencing implemented for areas of sensitive vegetation as required where restoration measures implemented	Sensitive restoration areas protected from Feral Goat pressures as required.	Maintenance activity records submitted. Inspection checklists	GE operational staff / fencing contractor	New fences will be implemented as required. Fence lines will be inspected quarterly and documented via inspection checklist.

No.	Management Action	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
	Goats	under the VMP are impeded (e.g. by Feral Goat grazing pressure/trampling) as per Section 4.1.3. Monitoring implemented.		submitted.		
2.3	**Maintain WF sub station and Operational and Maintenance facility security fences, gates and locks**	Security fences, gates and locks inspected.	Security fences, gates and locks maintained.	Inspection checklists submitted.	GE operational staff / leaseholders	Wind farm substation and operation and maintenance facility fences and gates inspected 6-monthly.
2.8.1	**Vegetation clearance, maintenance**	Vegetation clearance and maintenance activities will be undertaken as per the specifications described in Table 1 1 and the objectives outlined in Section 4.1.4.	Vegetation clearance confined to defined specifications. Vegetation Management Contractors and Project Ecologist notified of works.	Clearance and maintenance dates documented.	GE / Essential Energy	Inspections on 6-12 monthly basis pending seasonal requirements
2.8.2	**Vegetation clearance biomass placement**	All removed native vegetation and biomass will be placed in areas likely to be prone to localised surface erosion and scouring as per Section 4.2.2.	All native biomass produced by clearance activities placed in appropriate area. GE and Project Ecologist will be notified of works and spatial locations supplied.	Works Sheets Submitted. Spatial files supplied.	Vegetation management contractor	Within 1 month of clearance and maintenance activities.
2.8.3	**Vegetation clearance, monitoring**	Monitoring of vegetation clearance areas and biomass placement areas for compliance, presence of threatened species and	Vegetation clearance confirmed to be confined to defined specifications. Biomass placement appropriate.	Ecological inspection checklists submitted.	Project Ecologist	Within 1 month of notification of works and following the completion of any biomass redistribution

No.	Management Action	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
		priority weeds as per Section 4.2	Any populations of threatened species or priority weeds identified and targeted for future management.	Spatial files for any threatened species/priority weeds supplied to GE and Vegetation Management Contractors.		by the Vegetation Management Contractors. Biomass distribution areas subsequently monitored twice-yearly for first 3 years, also 1 and 3 months after significant rain events.
2.9	**Monitoring of roads and drainage**	Inspection of all managed road assets and supporting roadside drainage facilities as per Section 4.1.5.	Road assets and supporting roadside drainage maintained. No impact to PGSW or Barrier Range Dragon habitat. No impact to threatened species.	Inspection checklists submitted.	GE operational staff	Sites will be inspected twice-yearly for first 3 years, also 1 and 3 months after significant rain events. Areas uphill of or adjacent to PGSW, or in rocky outcrops or artificial Barrier Range Dragon habitats will be inspected monthly and after significant rainfall (>25 mm) events or weekly in areas where construction is continuing.
2.10.1	**Monitoring of road and road side drainage maintenance activities.**	Monitoring of road and roadside drainage for maintenance compliance, presence of threatened species and priority weeds as per Section 4.1.5 and 4.1.6.	Works confirmed to be confined to defined specifications. Sediment/silt placement appropriate. Any populations of threatened species or priority weeds identified and targeted for future management.	Ecological inspection checklists submitted. Spatial files for any threatened species/priority weeds supplied to	Project Ecologist	Twice-yearly for first 3 years, also 1 and 3 months after significant rain events.

No.	Management Action	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
				GE and Vegetation Management Contractors.		
2.10.2	**Management of road and road side drainage maintenance**	Any damage to road assets and supporting drainages will be repaired to construction standards as per Section 4.1.5 Silt removed as part of road and drainage works is locally stored on disturbed ground (bunded where required) and not distributed throughout the site.	Road assets and supporting roadside drainage maintained. No impact to PGSW or Barrier Range Dragon habitat. Silt / Spoil appropriately sited and location provided to Vegetation Management contractors and Project Ecologist.	Maintenance activity records submitted.	GE operational staff	Ongoing as required.
2.11.1	**Monitoring of tracks and hardstands above PGSW**	Increased visual monitoring of track and hardstand areas in areas uphill of or adjacent to PGSW	Works confirmed to be confined to defined specifications. Sediment/silt placement appropriate.	Ecological inspection checklists submitted.	Project Ecologist	Twice-yearly for first 3 years, also 1 and 3 months after significant rain events. Within 1 month following any maintenance activities.
2.11.2	**Management of road and road side drainage maintenance above PGSW and in BRD habitat**	Stockpiles and excavated material including sediment removed from tracks and drains for maintenance activities will not be placed uphill of or adjacent to areas of PGSW or in rocky outcrops or artificial Barrier Range Dragon habitats.	Road assets and supporting roadside drainage maintained. No impact to PGSW or Barrier Range Dragon habitat. Silt / Spoil appropriately sited and location provided to Vegetation Management contractors and Project Ecologist.	Maintenance activity records submitted.	GE operational staff	Ongoing as required.

No.	Management Action	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
2.12	**Hygiene protocols**	Strict hygiene protocols implemented to reduce the potential introduction or spread of invasive flora and fauna species as per Section 4.1.2 of this VMP Hygiene checklist completed (Appendix 5).	Hygiene implemented. No new invasive species introduced.	Inspection checklists submitted.	Project Manager / all site personnel	Ongoing
2.13	**Weed monitoring**	Inspections of • mapped priority weed locations • temporary disturbance areas • restoration areas • all other asset/infrastructure maintenance areas.	Any new weed incursions mapped for inclusion in weed management program. Spatial data will be updated with any new infestations/priority weed locations and distributed between GE, Vegetation Management Contractor and Project Ecologist.	Site inspection checklists submitted. Mapping shapefile prepared and shared between GE / Project Ecologist / Vegetation Management Contractor. Annual monitoring report submitted.	GE operational staff/ Project Ecologist	Ongoing observations by GE staff. Twice-yearly site inspections by the Project Ecologist or more frequently as required e.g. 1and 3 months after significant rain events (>25 mm) or if required following maintenance inspections
2.14	**Weed control**	Weed control works will be implemented in accordance with Section 4.3.	Priority weeds limited to current cover levels. New weeds identified and treated.	Weed management operational checklists submitted.	Vegetation management contractor / Project Ecologist	Ongoing.

No.	Management Action	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
				Weed Control Works Sheets submitted.		
2.15	**Monitoring of temporary disturbance areas**	Temporary disturbance areas monitored for regeneration success and soil stability.	Assess regeneration success and soil stability. Implement restoration (action no 2.16) as detailed below as required.	Site inspection checklists submitted. Annual monitoring report submitted.	Project Ecologist	Sites will be inspected twice-yearly for first 3 years, also 1 and 3 months after significant rain events
2.16	**Restoration including rehabilitation and revegetation**	Site rehabilitation will be implemented in accordance with Section 4.2. Disturbance areas rehabilitated with topsoil reinstated where possible and landform stabilised as soon as possible following disturbance. Additional restoration implemented as required.	Initial rehabilitation implemented. Restoration Plan implemented as required. Site restored.	Site inspection checklists submitted. Restoration actions and outcomes documented in Annual Report.	Project Ecologist with input from Vegetation Management Contractors and GE staff as required.	Ongoing as required. Sites will be inspected twice-yearly for first 3 years, also 1 and 3 months after significant rain events
2.25	**Review of VMP management actions.**	Annual review of VMP management actions as per Section 4.4.	Review annual reports. Update management actions as appropriate	Annual works plan prepared.	Project Ecologist in consultation with GE and Vegetation Management Contractor	Annually

No.	Management Action	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
2.26	**Review of BAMP**	Comprehensive review of BAMP and supporting management plans	Review all monitoring data and assess the response of biodiversity values to modified site management. Update management recommendations as appropriate in consultation with OEH to ensure there is a net gain in the conservation value of PGSW.	Reviewed BAMP and supporting plans submitted	GE/ Project Ecologist	January 2022

6 References

AGL 2017. Overview Environmental Management Strategy. Accessed 30/04/2017, https://www.agl.com.au/-/media/AGL/About-AGL/Documents/How-We-Source-Energy/renewable_energy/Silverton-Wind-Farm/Doc1-Overall-Environmental-Management-Strategy.pdf?la=en&hash=82322FC1BC6FD5934FE019135C5FEA9E5141FC72

Biosis 2018a. Silverton Wind Farm: Barrier Range Dragon Management Plan. Report for Prepared for GE Renewable Energy – Projects and Services. Author: Smales, I. Biosis Pty Ltd.

Biosis 2018b. Silverton Wind Farm: Biodiversity Adaptive Management Plan. Draft Report for GE Capital. Author: Woodward R. Biosis Pty Ltd, Albury. Project Number 26380.

Biosis 2018c. Silverton Wind Farm: Bird and Bat Adaptive Management Plan. Report for Prepared for GE Renewable Energy. Author: Smales, I. Biosis Pty Ltd. Project Number 26357.

Biosis 2018d. Silverton Wind Farm: Goat Management. Plan. Draft Report for GE Renewable Energy. Author: Clancy R. Biosis Pty Ltd, Albury. Project Number 26380.

Biosis 2018e. Silverton Wind Farm: Porcupine Grass Sparse Woodland Recovery Plan. Draft Report for GE Capital. Author: Woodward R, Price P. & Hilliar S. Biosis Pty Ltd, Albury. Project Number 26380

Blore 2008. *Mundi Mundi Range and Belmont Plains Conservation Program*. Groundcover Program Application to Western CMA 2008

Catcon 2018. *Silverton Wind Farm Site Rehabilitation Plan*. Prepared by G. House. Doc no.: J880-PLN-040. Revision 0.

Catcon 2017a. *Silverton Wind Farm – Road upgrade and maintenance strategy*. Level B1 Doc No.: B1-2-5. Revision 3.

Catcon 2017b. *Construction Environmental Management Plan for the Silverton Wind Farm Works – 58 WTG GE*. Document Number: J880-Plan-06, Revision F.

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

DPI 2011. Noxious and Environmental Weed Control Handbook. *A Guide to Weed Control in Non-crop, Aquatic and Bushland Situations*, 5th 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 2018. Weeds. Accessed 16/04/2018, https://www.dpi.nsw.gov.au/biosecurity/weeds

Essential Energy 2018. *Operational Procedure - Vegetation Management Plan, 6 February 2018 Issue 10*. Accessed 17/04/2018, https://www.essentialenergy.com.au/our-network/managing-the-network/vegetation

GE 2018a. *Operational and Maintenance Agreement.* General Electric International Inc.

GE 2018b. *Operational and Maintenance Manual.* General Electric International Inc.

GE 2018c. *Silverton Wind Farm – Site Management Plan.* General Electric International Inc.

ISSC 2016. ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets. Industry Safety Steering Committee. Accessed 15/12/2017, https://www.resourcesandenergy.nsw.gov.au/energy-supply-industry/pipelines-electricity-gas-networks/electricity-networks/safety/ISSC3-guideline-for-managing-vegetation-near-power-lines.pdf

Keith DA & Tozer MG 2012. The influence of fire, herbivores and rainfall on vegetation dynamics in the mallee: a long term experiment. *Proceedings of the Linnean Society of New South Wales* 134: A39-A54.

Landcom 2004. *Managing Urban Stormwater: Soils and Construction*. New South Wales Government, 2004

NGH Environmental 2008a. *Proposed development of Stage 1, Silverton Wind Farm, far western New South Wales. Biodiversity Assessment Final, March 2008.* Report for Silverton Wind Farm Developments Pty Ltd. Authors Sass S & Marshall B. NGH Environmental, Bega, NSW.

NGH Environmental 2008b. *Proposed development of Stage 1, Silverton Wind Farm, far western New South Wales. Biodiversity Addendum Final, Nov 2008.* Report for Silverton Wind Farm Developments Pty Ltd. Authors Sass S & Simpson K. NGH Environmental, Bega, NSW.

NGH Environmental 2016. *Silverton Wind Farm: Modification 3 report, July 2016.* Report for Silverton Wind Farm Developments Pty Ltd. Authors Marshall B, Mills J, Blomfield J, Arens N & Heinze B. NGH Environmental, Bega, NSW.

NGH Environmental 2017. Construction Biodiversity Management Plan: Silverton Wind Farm Connection Works. Authors Maynard D, Jones C. and Fania L. NGH Environmental, Bega, NSW

NGH Environmental 2018. *Silverton Wind Farm – Bird and Bat Baseline Surveys - Summary of all results combined.* Report for AGL Energy Limited.

NSW Scientific Committee 2010. *Porcupine Grass - Red Mallee - Gum Coolabah hummock grassland / low sparse woodland in the Broken Hill Complex Bioregion - critically endangered ecological community listing – final determination.* NSW Office of Environment and Heritage, Sydney, Australia. Accessed 8/11/2017 < http://www.environment.nsw.gov.au/determinations/porcupinegrassFD.htm >

OEH 2017a. *Vegetation Information System: Classification*. Accessed 8/11/2017, < http://www.environment.nsw.gov.au/research/Visclassification.htm >.

OEH 2017b. *Vegetation Information System: Flora Survey*. Accessed 18/12/2017, <https://www.environment.nsw.gov.au/asmslightprofileapp/account/login?returnUrl=http%3a%2f%2fwww.environment.nsw.gov.au%2fAtlasApp%2fdefault.aspx >.

OEH 2011. *Conservation Management Notes: Managing bushland and wildlife habitat - Seed collecting*. Office of Environment and Heritage. Accessed 17/04/2018, http://www.environment.nsw.gov.au/resources/cpp/SeedCollecting.pdf

Ralph M. 1993. *Seed collection of Australian native plants for revegetation, tree planting and direct seeding.* Fitzroy, Vic.

Western Local Land Service (WLLS) (2017) *Western Regional Strategic Weed Management Plan 2017-2022.* State of New South Wales.

Appendices

Appendix 1 Seed collection and propagation methods

Seed collection methods

To minimise negative impacts associated with seed collection, no more than 10% of the total seed available at the site (and from individual plants) will be collected in any one year (Ralph 1993). General considerations for seed collection include:

- Collect seed from as many individual plants as possible to maximise genetic diversity.
- Collect from stands or groups of plants rather than isolated plants, even if they carry large amounts of seed.
- Neighbouring plants are likely to be related so ensure that seed is collected from plants across the entire area.
- Collect approximately equal amounts of seed from each plant.
- Collect seed from various parts of the plant (not just those easily accessible).
- Label each batch of seed collected with:
  - Species
  - Location
  - Date collected and collector's name
  - Number of plants collected from
  - Details on position in the landscape, percentage of seed ripe, soil type, other relevant details.
- Seed may be collected from tall trees by utilising fallen limbs and branches, or using a long-handled pruner. Seed on small trees and shrubs can be collected using secateurs or pruners, hand-picked, or the branches hand-stripped. A drop-sheet or tarpaulin under the plant can be used to catch fallen seeds and fruit when branches are shaken. For species which release their seed very quickly upon ripening (such as wattles and bush-peas), it may be worthwhile to tie paper bags or nylon stockings around the branches before the seed pods ripen (OEH 2011).

Timing of seed collection

- Timing of seed collection is a critical consideration and is mostly dependant on when seed matures and how long the seed remains on the plant after maturity. The peak seed collection period in NSW usually occurs from October to December, however local conditions may lead to variations in timing from year to year (Ralph 1993). This is particularly the case in the arid zone, where large infrequent rainfall events also provide cues for the recruitment of plants through flushes of biomass, fruits and seeds (Keith & Tozer 2012).

Key indications of seed maturity include:

- Colour changes of fruits, seed heads or cones
- Seed or fruit hardness
- Dryness of fruits
- Ease of removal

- Opening of fruits
- Another consideration of seed collection is that many plants flower over a long period of time and therefore contain seeds of varying maturity. It is important to only collect the mature seed and a second or third visit to the plant may be required to allow time for all seed to mature.

Appendix 2 Flora species recorded in the study area

Notes to tables:

Status – EPBC Act:
CE – Critically Endangered
EN – Endangered
VU – Vulnerable

Status – BC Act:
E1 – endangered species (Part 1, Schedule 1)
E2 – endangered population (Part 2, Schedule 1)
E4 – presumed extinct (Part 4, Schedule 1)
E4A – critically endangered
V – vulnerable (Part 1, Schedule 2)

Source of Records
A – Biosis (Biosis 2018d)
B - NGH Environmental (2008b)
C – NGH Environmental (2008a)
D – PGSW TS determination (NSW SC 2010)
E – VIS flora survey database (OEH 2017c)
F – PGSW PCT description (OEH 201b)

Weed status:
* WoNS
# NSW State priority weed (WLLS 2017)
^ NSW regional priority weed (WLLS 2017)
~ NSW other regional weed/species of concern (WLLS 2017)

Table A.2-1 Flora species recorded within the study area

Scientific name	Common name	EPBC Act	BC Act	Source					
				A	B	C	D	E	F
Native species									
Abutilon fraseri	Dwarf Lantern-flower				x	x			
Abutilon leucopetalum	Desert Chinese Lantern			x	x	x			
Acacia aneura	Mulga Wattle			x	x	x	x		x
Acacia euthycarpa	Wallowa				x	x			
Acacia oswaldii	Umbrella Wattle				x	x			
Acacia salicina	Willow Wattle						x		x
Acacia* sp. aff. *havilandiorum	Needle Wattle				x	x			
***Acacia* spp.**	Mulga sp. 2				x				
Acacia tetragonophylla	Curara, Kuara, Dead Finish			x	x	x	x	x	x
Acacia victoriae	Prickly Wattle			x		x	x	x	x
Actinobole uliginosum	Flannel Cudweed					x			
Alectryon oleifolius	Boonaree, Inland Rosewood			x		x			
Alectryon oleifolius* subsp. *canescens	Western Rosewood				x				
Amyema maidenii				x		x			
Amyema maidenii* subsp. *maidenii	Nyinkin				x				
Amyema miraculosum* subsp. *boormanii	Pale leaf Mistletoe				x				
Amyema preissii	Wireleaf Mistletoe			x		x			

Scientific name	Common name	EPBC Act	BC Act	Source					
				A	B	C	D	E	F
Arabidella trisecta					x				
Aristida nitidula	Flat-awned Threeawn			x					
***Aristida* spp.**					x				
Asperula conferta					x				
Atriplex angulata	Angular Saltbush						x	x	x
Atriplex limbata					x				
Atriplex lindleyi					x				
Atriplex pumilio	Mat Saltbush			x					
***Atriplex* spp.**					x				
Atriplex stipitata	Mallee Saltbush			x	x	x			x
Atriplex suberecta	Sprawling Saltbush				x				
Atriplex vesicaria	White Top					x	x		x
Austrostipa drummondii	Drummond's Speargrass				x				
Austrostipa nitida	Balcarra Speargrass				x				
Austrostipa scabra	Rough Spear-grass				x	x			
***Austrostipa* spp.**	Tarvine				x	x			
Boerhavia dominii	Variable Daisy			x					
Brachyscome ciliaris	Hard-head Daisy				x	x			
Brachyscome lineariloba					x	x			
Bulbine semibarbata	Leek Lily				x	x			
Calandrinia eremaea					x				
***Calandrinia* spp.**	Purslane				x				
Calotis hispidula	Bogan Flea			x	x	x			
Cassinia laevis	Cough Bush				x				
Cheilanthes austrotenuifolia	Rock fern			x					
Cheilanthes lasiophylla	Woolly Cloak-fern			x					
Cheilanthes sieberi* subsp. *sieberi	Mulga Fern					x	x		x
Chenopodium curvispicatum					x				
Chenopodium desertorum	Frosted Goosefoot			x		x	x	x	x
Chrysocephalum apiculatum	Common Everlasting				x				
Chthonocephalus pseudevax	Ground-heads				x				
Convolvulus graminetinus					x				
Crassula colorata					x				
Crassula sieberiana	Australian Stonecrop				x				
Cullen cinereum	Hoary Scurf-pea				x				
Cymbopogon ambiguus	Lemon Grass, Scent Grass			x		x	x	x	x
Cynoglossum australe					x				

Scientific name	Common name	EPBC Act	BC Act	Source					
				A	B	C	D	E	F
Cyperus gymnocaulos					x				
Daucus glochidiatus	Australian Carrot				x	x	x		x
Dianella porracea	Blue Flax-Lily				x				
Dissocarpus paradoxus	Cannonball Burr			x		x			
Dodonaea lobulata	Narrow-leaf Hop-bush				x	x			
Dodonaea viscosa* subsp. *angustissima	Lobed Leaf Hop Bush					x	x		x
Einadia nutans	Climbing Saltbush			x		x			
Enchylaena tomentosa	Ruby Saltbush			x	x	x	x	x	x
Enneapogon cylindricus	Jointed Nineawn						x		x
***Eragrostis* spp.**					x				
Eremophila oppositifolia* subsp. *oppositifolia	Weeooka				x	x			
Eremophila serrulata					x				
Eremophila sturtii	Turpentine				x				
Eriochloa crebra	Cup Grass			x					
Erodium crinitum	Blue Crowfoot				x				
Erodium crinitum	Blue Heron's-bill				x	x			
Eucalyptus camaldulensis	River Red Gum				x				
Eucalyptus dumosa	Dumosa Mallee				x				
Eucalyptus gillii	Curly Mallee				x				
Eucalyptus intertexta	Gum Coolibah			x	x	x	x	x	x
Eucalyptus socialis	Red Mallee			x	x	x	x	x	x
Euphorbia drummondii	Caustic Weed			x	x				
Glycine clandestina	Twining Glycine			x		x			
Goodenia fascicularis	Silky Goodenia				x				
Goodenia pinnatifida					x				
Goodenia pusilliflora	Small-flower Goodenia				x	x			
Grevillea striata	Beefwood				x				
Gypsophila tubulosa					x				
Hakea leucoptera	Silver Needlewood				x				
Hibiscus sturtii* var. *sturtii	Hill Hibiscus			x					
Hyalosperma semisterile					x				
Isoetopsis graminifolia	Grass Cushions				x				
Ixiochlamys cuneifolia	Silverton Daisy				x				
Juncus flavidus					x				
Leiocarpa semicalva* subsp. *semicalva	Hill Everlasting				x				
Leiocarpa tomentosa					x				
Leiocarpa websteri					x				

Scientific name	Common name	EPBC Act	BC Act	Source					
				A	B	C	D	E	F
Lemooria burkittii					x				
Lepidium papillosum	Warty Peppercress				x	x			
Lepidium phlebopetalum					x				
Lycium australe	Australian Boxthorn				x				
Lysiana exocarpi					x				
Maireana brevifolia	Small-leaf Bluebush				x				
Maireana georgei	Slit-wing Bluebush				x				
Maireana pyramidata	Black Bluebush				x	x	x		x
Maireana sclerolaenoides	Woolly-fruit Bluebush				x	x			
Maireana sedifolia	Pearl Bluebush			x	x	x			
Maireana trichoptera	Hairy-wing Bluebush				x	x			
Maireana triptera	Three-wing Bluebush				x	x			
Marsdenia australis	Doubah, Native Pear, Cogola Bush			x					
Millotia perpusilla	Tiny Bow-flower				x				
Minuria cunninghamii					x				
Myoporum montanum	Western Boobialla				x				
Myoporum platycarpum* subsp. *perbellum					x				
Myriocephalus rhizocephalus	Woolly-heads				x	x			
Olearia decurrens					x				
Olearia muelleri	Mueller's Daisy Bush				x				
Olearia pimeleoides					x				
Omphalolappula concava	Burr Stickseed				x	x			
Ophioglossum polyphyllum	Adder's Tongue				x				
Osteocarpum acropterum* var. *deminuta					x				
Oxalis perennans	Grassland Wood-sorrel			x		x			
Parietaria debilis	Native Pellitory				x				
Paspalidium constrictum					x				
Pittosporum angustifolium	Weeping Pittosporum				x	x			
Plagiobothrys plurisepaleus					x				
Plantago turrifera					x				
Podolepis capillaris	Invisible plant			x	x	x			
Pterocaulon sphacelatum	Fruit-salad Plant				x				
Ptilotus obovatus	Smoke Bush, Cotton bush			x	x	x	x	x	x
Pycnosorus pleiocephalus					x				
Rhagodia spinescens	Spiny Saltbush, Berry Saltbush			x	x	x			
Rhagodia ulicina	Spiny Goosefoot			x					
Rhodanthe microglossa	Clustered Sunray				x	x			

Scientific name	Common name	EPBC Act	BC Act	Source					
				A	B	C	D	E	F
Rhodanthe moschata					x				
Rhodanthe polygalifolia					x				
Rhodanthe pygmaea	Pygmy Sunray				x	x			
Rhyncharrhena linearis	Purple Pentitrope				x				
Rostellularia adscendens* var. *latifolia					x				
Rytidosperma caespitosum	White Top				x				
Sclerolaena brachyptera	Short-winged Copperburr				x				
Sclerolaena decurrens	Green Copperburr				x				
Sclerolaena diacantha	Grey Copperburr				x	x			
Sclerolaena lanicuspis	Woolly Copperburr				x	x			
Sclerolaena obliquicuspis	Limestone Copperburr					x	x	x	x
Sclerolaena patenticuspis	Spear-fruit Copperburr			x					
Sclerolaena tricuspis	Streaked Copperburr				x				
Senecio glossanthus					x				
Senecio gregorii					x				
Senecio magnificus	Tall Yellow-top				x				
Senna artemisioides* subsp. X *artemisioides	Silver Cassia				x	x	x		x
Setaria paspalidioides	Bristle Grass			x					
Sida corrugata	Variable Sida				x				
Sida intricata	Twiggy Sida				x				
Sida petrophila	Rock Sida			x	x	x	x	x	x
Solanum ellipticum	Potato Bush				x	x			
Solanum parvifolium* subsp. *parvifolium					x				
Solanum petrophilum	Rock Nightshade				x				
Solanum quadriloculatum	Tomato Bush				x	x			
Solanum sturtianum	Thargomindah Nightshade			x			x	x	x
Stenopetalum lineare	Narrow Thread-petal				x	x			
Stuartina hamata					x				
Swainsona fissimontana	Broken Hill Pea				x				
Tetragonia moorei	Annual Spinach				x	x			
Teucrium racemosum	Grey Germander				x				
***Teucrium* spp.**	Germander				x				
Themeda triandra	Kangaroo Grass				x				
Thysanotus baueri					x				
Thysanotus patersonii	Twining Fringe-lily				x				
Triodia scariosa	Porcupine Grass			x	x	x	x	x	x
Tripogon loliiformis	Five Minute Grass				x				

Scientific name	Common name	EPBC Act	BC Act	Source					
				A	B	C	D	E	F
Vittadinia cervicularis	Annual New Holland Daisy				x				
Vittadinia cuneata	Fuzzweed			x					
Wahlenbergia communis	Tufted Bluebell			x		x			
Wahlenbergia gracilenta					x				
Zygophyllum apiculatum	Pointed Twin-leaf				x	x			
Zygophyllum eremaeum					x				
Zygophyllum iodocarpum	Violet Twin-leaf				x	x			
Zygophyllum ovatum	Dwarf Twin-leaf				x	x			
Exotic species									
Acetosa vesicaria	Bladder Dock						x		
Alyssum linifolium					x				
Arctotheca calendula	Capeweed				x				
Brassica tournefortii~					x				
Bromus diandrus~	Great Brome				x				
Carrichtera annua~	Ward's Weed				x				
Carthamus lanatus	Saffron Thistle				x	x			
Cenchrus setaceum	Fountain Grass					x			
Centaurea melitensis	Maltese Cockspur				x				
Chenopodium murale	Nettle-leaf Goosefoot				x				
Chloris virgata	Feathertop Rhodes Grass					x			
Echium plantagineum	Patterson's Curse				x	x			
Erodium cicutarium	Common Storksbill				x				
Erodium malacoides					x				
Hedypnois rhagadioloides	Cretan Weed					x			
Herniaria cinerea	Hairy Rupturewort				x				
Hordeum leporinum~	Barley Grass				x				
Hypochaeris glabra	Smooth Catsear				x				
Lamarckia aurea	Goldentop				x				
Limonium lobatum~	Winged Sea Lavender				x				
Lycium ferocissimum#*^	African Boxthorn				x	x			
Lysimachia arvensis	Scarlet Pimpernel				x				
Malva parviflora	Small-flowered Mallow				x				
Medicago minima	Woolly Burr Medic				x				
Mesembryanthemum nodiflorum	Small Ice Plant				x				
Rostraria pumila	Roughtail				x				
Salvia verbenaca	Vervain				x				
Schismus barbatus	Arabian Grass				x				
Silene nocturna					x				

Scientific name	Common name	EPBC Act	BC Act	Source					
				A	B	C	D	E	F
Sisymbrium erysimoides	Smooth Mustard				x	x			
Sonchus oleraceus~	Common Sowthistle				x				
Tagetes minuta	Stinking Rodger					x			
Taraxacum officinale	Dandelion					x			
Urtica urens	Small Nettle				x				
Verbascum virgatum	Twiggy Mullein					x			
Vulpia myuros	Rat's Tail Fescue				x				

Appendix 3 Weed management measures

Standard methods

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

- Use a range of weed management methods such as slashing (physical and mechanical control) as well as a range of herbicides (to avoid herbicide resistance).
- 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 VMP 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 *Noxious and Environmental Weed Control Handbook. A Guide to Weed Control in Non-crop, Aquatic and Bushland Situations, 5th Edition* (DPI, 2011) 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 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 (2011) document cited above will 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 Australian Pesticides and Veterinary Medicines Authority (APVMA). The use of herbicide as part of this VMP 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).

Species specific control for priority and environmental weeds recorded within the study area are provided in Notes to table:

Weed status (DPI 2018):

* WoNS

\# NSW State priority weed

^ NSW regional priority weed

~ NSW other regional weed/species of concern

Table A.3-2 Priority and environmental weed management measures

Weed Species	Relevant biosecurity duty*	Biosecurity obligation	Initial treatment	Follow up control
African Boxthorn#*^ ***Lycium ferocissimum***	Regional Recommended Measure.	Land managers should mitigate spread from their land.	Cut/paint, scrape/paint and apply 'neat' 360g/L Glyphosate based herbicide to actively growing stems in accordance with Offlabel permit: PER9907. Larger infestations can be chemically treated by the use of a using a Triclopyr 300 g/L + Picloram 100 g/L e.g. Grazon® DS based product at a dilution rate of 500 mL per 100 L of water.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water.
Arabian Grass ***Schismus barbatus***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove or chemically treat deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water (1:100). May require brushcutting or slashing to promote new growth prior to application.	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/Ltr of water
Feathertop Rhodes Grass ***Chloris virgata***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove or chemically treat deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water (1:100). May require brush cutting 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/Ltr of water
Fountain grass ***Cenchrus setaceum***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove or chemically treat deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr 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/Ltr of water

Weed Species	Relevant biosecurity duty*	Biosecurity obligation	Initial treatment	Follow up control
Mesquite[#*^] ***Prosopis species***	Regional Recommended Measure.	Land managers should mitigate the risk of the plant being introduced to their land, the land should be kept free from the plant.	Manually/mechanically remove small infestations. **Mature plants**: Chemically treat by use of Basal bark/cut stump application apply at a dilution rate of 1.0 Litre in 60 Litres of diesel. **Seedling control** : Chemically treat (spray) using Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L based product e.g. Grazon Extra® at a dilution rate of 350 mL in 100 L of water	Monitor for seedlings. Hand remove in areas of high regeneration potential, spot spray where applicable
Mexican Poppy ***Argemone mexicana***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Mature plants and seeds to be bagged and removed from site. Hand remove or spray deseeded specimens with 2,4-D LV ester 680g/L (Estercide® Xtra) at a rate of 800 mL to 1.15 L per ha.	Monitor for seedlings. Hand remove remove seedlings or spot spray with 2,4-D LV ester 680g/L (Estercide® Xtra) at a rate of 800 mL to 1.15 L per ha.
Paterson's Curse[#] ***Echium plantagineum***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Small individual specimens can be grubbed out and composted on site. Chemically treat by either using a 360g/L Glyphosate based herbicide at a diluted at a rate of 500–700 mL in 100 L of water or broadleaf selective herbicide (Metsulfuron-methyl 600 g/kg) at a rate of 5 g in 100 L of water.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water.
Rosy Dock ***Acetosa vesicaria***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Mature plants and seeds to be bagged and removed from site. Chemically treat deseeded specimens using rates based on the APVA Off label permit: 9907 - 360g/L Glyphosate based herbicide at a diluted rate of 15ml/Ltr of water.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water. Germination stimulated by

Weed Species	Relevant biosecurity duty*	Biosecurity obligation	Initial treatment	Follow up control
				disturbance. Reduce stock movement and civil works within key areas of infestation.
Roughtail ***Rostraria pumila***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Manually/mechanically remove small infestations or chemically treat deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr 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/Ltr of water
Saffron thistle# ***Carthamus lanatus***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove in area of high regeneration potential ensuring that all propagules have been removed and disposed of off-site. Chemically treat using a 625 g/L 2,4-D amine product at a dilution rate of 110–170 mL per 150 L of water.	Hand remove seedlings or spot spray via suggested method.
Various **Annual and perennial grass and herbaceous species including** ***Brassica tournefortii~, Bromus spp~, Hordeum leporinum~, Hedypnois rhagadioloides*** **and** ***Sonchus oleraceus~.***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove or chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water (1:100)	Monitor for seedlings. Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water
Wards Weed~ ***Carrichtera annua***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance /	Hand remove in area of high regeneration potential ensuring that all propagules have been removed and disposed of off-site. Chemically treat using rates based on the APVA Off label permit: 9907 - 360g/L	Soil disturbance will stimulate germination. Control all new infestations and treat to prevent seed set.

Weed Species	Relevant biosecurity duty*	Biosecurity obligation	Initial treatment	Follow up control
		vegetation clearing	Glyphosate based herbicide at a diluted rate of 15ml/Ltr of water.	
Winged Sea Lavender~ ***Limonium lobatum***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove small infestations and/or chemically treat using rates based on the APVA Off label permit: 9907 - 600 g/L Metsulfuron-methyl based herbicide at a diluted rate of 10 grams per 1 Litre of water plus surfactant.	Hand remove seedlings/shooting nodes or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water.

.

Notes to table:

Weed status (DPI 2018):

* WoNS

NSW State priority weed

^ NSW regional priority weed

~ NSW other regional weed/species of concern

Table A.3-2 Priority and environmental weed management measures

Weed Species	Relevant biosecurity duty*	Biosecurity obligation	Initial treatment	Follow up control
African Boxthorn[#*^] ***Lycium ferocissimum***	Regional Recommended Measure.	Land managers should mitigate spread from their land.	Cut/paint, scrape/paint and apply 'neat' 360g/L Glyphosate based herbicide to actively growing stems in accordance with Offlabel permit: PER9907. Larger infestations can be chemically treated by the use of a using a Triclopyr 300 g/L + Picloram 100 g/L e.g. Grazon® DS based product at a dilution rate of 500 mL per 100 L of water.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water.
Arabian Grass ***Schismus barbatus***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove or chemically treat deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water (1:100). May require brushcutting or slashing to promote new growth prior to application.	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/Ltr of water
Feathertop Rhodes Grass ***Chloris virgata***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove or chemically treat deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water (1:100). May require brush cutting 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/Ltr of water

Weed Species	Relevant biosecurity duty*	Biosecurity obligation	Initial treatment	Follow up control
Fountain grass ***Cenchrus setaceum***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove or chemically treat deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr 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/Ltr of water
Mesquite[#*^] ***Prosopis species***	Regional Recommended Measure.	Land managers should mitigate the risk of the plant being introduced to their land, the land should be kept free from the plant.	Manually/mechanically remove small infestations. **Mature plants**: Chemically treat by use of Basal bark/cut stump application apply at a dilution rate of 1.0 Litre in 60 Litres of diesel. **Seedling control** : Chemically treat (spray) using Picloram 100 g/L + Triclopyr 300 g/L + Aminopyralid 8 g/L based product e.g. Grazon Extra® at a dilution rate of 350 mL in 100 L of water	Monitor for seedlings. Hand remove in areas of high regeneration potential, spot spray where applicable
Mexican Poppy ***Argemone mexicana***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Mature plants and seeds to be bagged and removed from site. Hand remove or spray deseeded specimens with 2,4-D LV ester 680g/L (Estercide® Xtra) at a rate of 800 mL to 1.15 L per ha.	Monitor for seedlings. Hand remove remove seedlings or spot spray with 2,4-D LV ester 680g/L (Estercide® Xtra) at a rate of 800 mL to 1.15 L per ha.
Paterson's Curse[#] ***Echium plantagineum***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Small individual specimens can be grubbed out and composted on site. Chemically treat by either using a 360g/L Glyphosate based herbicide at a diluted at a rate of 500–700 mL in 100 L of water or broadleaf selective herbicide (Metsulfuron-methyl 600 g/kg) at a rate of 5 g in 100 L of water.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water.

Weed Species	Relevant biosecurity duty*	Biosecurity obligation	Initial treatment	Follow up control
Rosy Dock ***Acetosa vesicaria***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Mature plants and seeds to be bagged and removed from site. Chemically treat deseeded specimens using rates based on the APVA Off label permit: 9907 - 360g/L Glyphosate based herbicide at a diluted rate of 15ml/Ltr of water.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water. Germination stimulated by disturbance. Reduce stock movement and civil works within key areas of infestation.
Roughtail ***Rostraria pumila***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Manually/mechanically remove small infestations or chemically treat deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr 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/Ltr of water
Saffron thistle# ***Carthamus lanatus***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove in area of high regeneration potential ensuring that all propagules have been removed and disposed of off-site. Chemically treat using a 625 g/L 2,4-D amine product at a dilution rate of 110–170 mL per 150 L of water.	Hand remove seedlings or spot spray via suggested method.
Various **Annual and perennial grass and herbaceous species including** ***Brassica tournefortii~, Bromus spp~, Hordeum leporinum~,*** ***Hedypnois rhagadioloides*** **and** ***Sonchus oleraceus~.***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove or chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water (1:100)	Monitor for seedlings. Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water

Weed Species	Relevant biosecurity duty*	Biosecurity obligation	Initial treatment	Follow up control
Wards Weed~ ***Carrichtera annua***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove in area of high regeneration potential ensuring that all propagules have been removed and disposed of off-site. Chemically treat using rates based on the APVA Off label permit: 9907 - 360g/L Glyphosate based herbicide at a diluted rate of 15ml/Ltr of water.	Soil disturbance will stimulate germination. Control all new infestations and treat to prevent seed set.
Winged Sea Lavender~ ***Limonium lobatum***	General biosecurity duty	Minimise – Treatment required to prevent spread likely to result following disturbance / vegetation clearing	Hand remove small infestations and/or chemically treat using rates based on the APVA Off label permit: 9907 - 600 g/L Metsulfuron-methyl based herbicide at a diluted rate of 10 grams per 1 Litre of water plus surfactant.	Hand remove seedlings/shooting nodes or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/Ltr of water.

Appendix 4 VMP Operational checklist

Inspection checklist				
Infrastructure maintenance	**Frequency**	**Date undertaken**	**Required action (Y/N)**	**Comments**
PGSW goat exclusion fencing	Quarterly and after severe weather events (e.g. rainfall events greater than 25 millimetres)			
Facility and asset fencing and gates	Twice-yearly			
Road and road side drainage maintenance (outside areas of significant environmental sensitivity) **Road and road side drainage maintenance in areas of significant environmental significance (uphill of or adjacent to areas of PGSW or in rocky outcrops or artificial Barrier Range Dragon habitats).**	Twice-yearly and after significant rain events (>25 mm), farmers' works that will affect or alter the roads, or significant traffic movements Monthly and after significant rainfall (>25 mm) events OR weekly in areas where construction is continuing.			
Vegetation management and APZ maintenance : trimming	**Frequency**	**Date undertaken**	**Required action (Y/N)**	**Comments**
Roads, batters and road side drainage	Twice-yearly (or as required by EE)			

Inspection checklist				
Turbine and built infrastructure e.g. office, substations)	Twice-yearly (or as required by EE)			
Fenced Assets and pad-mounted transformer	Twice-yearly (or as required by EE)			
Towers	Twice-yearly (or as required by EE)			
Existing Power lines	Twice-yearly (or as required by EE)			
Riparian zone and waterway crossings	Twice-yearly (or as required by EE)			
Vegetation management and APZ maintenance : Weeds and weed control	**Frequency**	**Date undertaken**	**Required action (Y/N)**	**Comments**
Mapped priority weed locations	Quarterly and 1 and 3 months after >25 mm rain events			
Roads, batters and road side drainage	Quarterly and 1 and 3 months after >25 mm rain events			
PGSW fence line and access	Quarterly and 1 and 3 months after >25 mm rain events			
Turbine and built infrastructure e.g. office, substations)	Quarterly and 1 and 3 months after >25 mm rain events			
Fenced Assets and pad-mounted transformer	Quarterly and 1 and 3 months after >25 mm rain events			

Inspection checklist				
Towers	Quarterly and 1 and 3 months after >25 mm rain events			
Existing Power lines	Quarterly and 1 and 3 months after >25 mm rain events			
Riparian zone and waterway crossings	Quarterly and 1 and 3 months after >25 mm rain events			
Temporary disturbance areas (See also Vegetation management: Temporary disturbance restoration area inspections below)	Quarterly and 1 and 3 months after >25 mm rain events			
Stockpiles/sediment storage locations	Quarterly and 1 and 3 months after >25 mm rain events			
Vegetation management: Temporary disturbance restoration area inspections	**Frequency**	**Date undertaken**	**Required action (Y/N)**	**Comments**
Location identifier: **Location description:** **Lat:** **Lon:** **MZ#**				
Drainage conditions (ponding/scouring)	Twice-yearly and 1 and 3 months after >25 mm rain events			
Weed infestations and required weed management	Twice-yearly and 1 and 3 months after >25 mm rain events			
Evidence of erosion/instability that requires stabilisation	Twice-yearly and 1 and 3 months after >25 mm rain events			

Inspection checklist				
Where stabilisation measures are already installed, whether stabilisation measures are adequate	Twice-yearly and 1 and 3 months after >25 mm rain events			
Whether regeneration is occurring and adequate (whether natural or supplemented)	Twice-yearly and 1 and 3 months after >25 mm rain events			
Evidence of pest animals and required control (including fencing)	Twice-yearly and 1 and 3 months after >25 mm rain events			
Photo(s) of the site	Twice-yearly and/or after >25 mm rain events			

Appendix 5 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			Brakes	
	Struts & stabilisers		Interior / Cabin	*Remove items for disposal/cleaning*	
	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	

Appendix 6 Silverton Wind Farm Site Rehabilitation Plan

SITE REHABILITATION PLAN

Project Name:	**Silverton Wind Farm**
Doc No.:	**J880-PLN-040**

CURRENT REVISION		
Revision:	**Reason for Revisions:**	**Date of Revision**
0	Issued for Construction	
Prepared by:	G. House	7.08.18
Reviewed by:	R. Sharp	17.08.18
Approved by:	P. Busolin	22.08.18

Revision History:

Rev	Reason for Revision	Date	Prepared	Reviewed	Approved
0	Issued for Construction	7.08.18	G. House	R. Sharp	P. Busolin

Notes:

Circulation:

Name	Reason for Circulation	Date Issued	No. of Copies

Notes:

CONTENTS

1.0 INTRODUCTION

1.1 Project Outline

Located 5km from Silverton and 25km north-west of Broken Hill, the Silverton Wind Farm comprises 58 3.4MW GE turbines, a 33kV electrical reticulation system (overhead and underground), a 33kV Substation, 25km of Overhead 220kV transmission line to Broken Hill and approximately 75km on internal formed roads.

Construction is being undertaken through a GE-CATCON consortium covering engineering, procurement and construction activities.

The Silverton Wind Farm is a critical infrastructure project under section 75C of the Environmental Planning and Assessment Act 1979.

1.2 Purpose

The Site Rehabilitation Plan is intended to:

1. provide a documented approach to the rehabilitation of disturbed areas as required by Project Approval (Mod 3) of 22 December 2016 under Schedule 2, Clause 36 Progressive Rehabilitation, which outlines the following requirements:

   The Proponent must:

   (a) *Rehabilitate all areas of the site not proposed for future disturbance progressively, that is, as soon as reasonably practicable following construction;*

   (b) *Minimise the total area exposed at any time;*

   (c) *Employ interim rehabilitation strategies to minimise dust generation, soil erosion and weed incursions on parts of the site that cannot yet be permanently rehabilitated.*

2. provide the Client details of management processes and procedures, and a trackable programme of rehabilitation works;
3. articulate measures to be undertaken to achieve required rehabilitation of disturbed areas;
4. provide a framework for inspection and approval of site rehabilitation works; and
5. nominate relevant parties and personnel involved in the application and approval of relevant rehabilitation methodologies and processes.

1.3 Conduct and Implementation

The Site Rehabilitation Plan will be implemented in stages covering all aspects of construction and ground disturbance, including:

- Underground HV Electrical reticulation routes;
- Overhead HV Electrical Transmission pole and Met Mast access tracks;
- Turbine hardstands;
- Site laydown and equipment storage/movement areas;
- Internal road network and waterway crossings;
- Construction infrastructure and buildings; and
- Operational infrastructure and buildings.

2.0 REFERENCES

- Project Approval – Modification 3, dated 22 December 2016
- J880-PLN-006 *Construction Environmental Management Plan* (Rev 0) and Sub Plans (dated 16 April 2018)
- *Erosion and Sediment Control Plans*
- *Biodiversity Management Plan* (Rev 1, dated 20 February 2018)
- Protection of the Environment Operations Act 1997
- NSW Environmental Protection Regulations (Various)

3.0 METHODOLOGIES AND PROCESSES

3.1 Underground HV Electrical Reticulation Routes

All trenches for installation of HV electrical cabling between turbines and overhead lines will be rehabilitated as soon as practicable following testing and approval of the installed infrastructure. Rehabilitation processes will involve:

- Where possible, contour ground surface to replicate original form;

  On steeper slopes with significant side-fall where trench lines have been benched, such benches will be retained and rehabilitated as described. It is considered that attempting to reinstate the natural contour in such areas may incur further disturbance to sensitive areas (Porcupine Grass Sparse Woodland), could not be successfully stabilised, and could be unsafe to attempt.
- Replacement of excavated topsoil containing local seed, etc.;
- Placement of naturally occurring materials - rock and timber - for erosion and sediment control and to replicate pre-construction conditions;

  On steeper slopes rock and timber will be arranged across the slope as rock barriers or diversion banks to reduce flow velocity and direction.
- Light scarification of soil surface to relieve compaction and facilitate seed generation; and
- Where necessary, place natural barriers at road crossings to exclude vehicular traffic from travel along trench lines.

It should be noted that landowner requirements and preferences are not relevant to HV electrical cable routes, except for fence line crossings.

If necessary, fences will be reinstated on original alignments.

Photo: Underground HV electrical trench between T34 and T35 (Area 7): Bench to be retained and rehabilitated to minimise disturbance to Porcupine Grass Sparse Woodland.

Photo: Underground HV electrical trench between T07 and T08: Rehabilitated with rock barriers or diversion banks installed to control and disperse any downhill water flow.

Photo: Underground HV electrical trench between overhead line and T52: Rehabilitation complete.

3.2 Overhead HV Electrical Transmission Pole and Met Mast Access Tracks

Access tracks to overhead transmission poles and permanent met masts will be required for maintenance purposes for the life of the Wind Farm.

- The finish will reflect a 'dry weather 4WD access' standard and will incorporate erosion control devices on slopes;
- Erosion control devices could include 'whoa boys', 'roll overs' or 'diversion banks' (essentially different names for the same structure).

  Landholders will be consulted regarding relevant size and spacing of these structures, based on local knowledge of rainfall events and land characteristics.
- 'Turnout drains' off-track sides to divert water away from track; and
- Where necessary, removal of overburden from track sides to aid in water dispersal.

The photographs below are examples of HV transmission pole access tracks to be rehabilitated.

3.3 Turbine Hardstands

Access to turbines and hardstands (including the blade laydown area) will be required for monitoring and maintenance purposes for the life of the Wind Farm.

Hardstands have been constructed from compacted soil and rock and topped with a gravel road base, as per relevant design standards and requirements.

- Rehabilitation of hardstands will involve contouring of the hardstand surface to disperse water to a suitable exit point where surface flow effects will be minimised. Where necessary, rock chutes will be constructed to prevent erosion of the hardstand at the exit point, and rock formations installed at the base of chutes to disperse water; and
- Grade of hardstand surface shall be in the order of 1%.

3.4 Site Laydown and Equipment Storage/Movement Areas

Temporary construction laydown and equipment areas have been established at various locations across the site. In general terms, they have been sighted in areas requiring minimal disturbance to the natural environment.

Likewise, heavy vehicle turn-around areas have been sited to ensure minimal disturbance. Rehabilitation of these areas will involve:

- Where necessary, ripping of ground surface to relieve compaction and to assist with 'keying-in' of topsoil;
- Replacement of excavated topsoil containing local seed, etc.;
- Placement of naturally occurring materials - rock and timber - for erosion and sediment control, and to replicate pre-construction conditions;
- Light scarification of soil surface to relieve compaction and facilitate seed generation; and
- Where necessary, place natural barriers at road entry/exit points to exclude vehicular traffic from travel on rehabilitated areas.

NOTE: At the request of the relevant Landholder, the former concrete batch plant site will not be reinstated to former condition and will be utilised by the landowner for pastoral practices.

Photo: Rehabilitated storage/traffic turn-around area.

Photo: Equipment laydown area with stockpiled topsoil, awaiting rehabilitation.

3.5 Internal Road Network and Waterways Crossings

The 75km of internal access roads constructed as part of the project will be required for monitoring and maintenance purposes for the life of the Wind Farm.

Roads have been constructed from compacted soil and rock and topped with a gravel road base, as per relevant design standards and requirements.

- Rehabilitation works on the internal road network will involve the installation of erosion control structures etc. as per the approved Erosion and Sediment Control Plans;
- Creek crossings (Lakes Creek and Lakes Grave Creek) will have the road surface reinstated to level with creek bed so as not to obstruct flow and treated/topped with a stabiliser; and
- Additional works may be considered pursuant to a formal road report, if undertaken.

Photo: Lakes Creek Road crossing

3.6 Construction Infrastructure and Buildings

Other than the construction office complex and storage containers, there are no construction buildings or infrastructure.

- All demountable office buildings and facilities and electrical and plumbing infrastructure will be removed from the site, including the storage area adjacent to the office complex;
- All storage containers will be removed from the site;
- Unless otherwise required by the Client or relevant Landholder, security fences will be removed from site; and
- Unless otherwise required by the Client or relevant Landholder, benched carpark sites, container storage areas, and office compound laydown areas may be reinstated to replicate pre-construction conditions.

3.7 Operational Infrastructure and Buildings

Permanent infrastructure and buildings consist of:

- Operations and Maintenance Facility; and
- Electrical Substation.

Both facilities will be subject to reinstatement and rehabilitation measures as set out in specific design plans and Erosion and Sediment Control Plans.

Photo: Electrical Substation, with rehabilitation works commenced.

Photo: Operations and Maintenance Facility, with rehabilitation works commenced.

3.8 Other Considerations

3.8.1 Habitat Enhancement – Barrier Range Dragon

As per the *Barrier Range Dragon Management Plan* (a sub-plan of the *Biodiversity Management Plan*), excess "…rocks and boulders that cannot be used as part of the works will be placed within the disturbance area at locations where they are adjacent potential dragon habitat".

Where such conditions exist, and it is practical to do so without excess disturbance to the natural environment, this work will be undertaken at the direction of relevant environmental specialists.

3.8.2 Revegetation

As per the *Biodiversity Management Plan*, Clause 5.7 *Collecting and Propagating Seed*, "When appropriate and if practical, seed will be collected from native woodland vegetation that is cleared in the disturbance area and used for rehabilitation purposes".

An amount of wattle seed (primarily *Acacia Victoriae*) has been collected. However wide spread drought conditions have severely reduced the availability of seed.

The same conditions would also reduce successful re-establishment of vegetation from seed.

CATCON is presently investigating the possibility of engaging local Landcare, for growth of seed as tube-stock for re-introduction to the site when conditions have stabilised.

4.0 RECORDS AND APPROVALS

Rehabilitation requirements for all locations will initially be assessed and documented by CATCON's Environmental Coordinator and passed to Jacobs Environmental Management Technical Lead for agreement and/or modification.

The form of that documentation will be a simple schedule for the various aspects listed above, with locations and required action, etc.

These will be 'live' documents, subject to update as rehabilitation works progress.

In addition, environmental records from regular CATCON internal inspections and from external Environmental Consultant's inspections are used for indicative trends throughout the construction process.

Once the agreed rehabilitation works have been undertaken, Jacobs Environmental Management Technical Lead will be required to give written approval of the works as being complete.

5.0 RESPONSIBLE PERSONNEL AND LANDHOLDERS

The following personnel are responsible for the completion of rehabilitation works:

- CATCON: Geoff House, Environmental Co-ordinator (0419 686 205);
- Jacobs: Damien Wagner, Environmental Management Technical Lead (0421 557 870); and
- Environment & Heritage Partners: Richard Sharp, CATCON's Environmental Consultant (0457 303 596).

The following Landholders are relevant parties to any necessary negotiations:

- BELMONT Station: John Blore;
- NINE MILE Station: Greg Lawrence; and
- PURNAMOOTA Station: D & C Langford.

6.0 APPENDICIES

APPENDIX A:	Weekly Environmental Inspection Checklist
APPENDIX B:	Fact Sheet: Acacia Victoriae
APPENDIX C:	Rehabilitation Schedules – Underground HV Trenches and HV Pole Access Tracks/Site Rehabilitation

APPENDIX A: Weekly Environmental Inspection Checklist

catcon civil & allied technical construction

Civil & Allied Technical Construction
598-600 South Rd, Angle Park SA 5010
Ph. 08 8347 1888 Fax. 08 83471877
Email. catcon@catcon.com.au Web. http://catcon.com.au

Weekly Environmental Inspection STWF-29

Site:		**Date:**
Inspection Personnel:		

PERFORMANCE INDICATOR
All environmental risks are being managed in accordance with the Construction Environmental Management Plan.
To be completed at least weekly at random work sites.
C = COMPLIANT NC = NON-COMPLIANT N/A = NOT APPLICABLE

ASPECT AND CRITERIA	C	NC	N/A	COMMENTS
VISUAL AMENITY				
Tracks and roads built to preserve the visual amenity.	☐	☐	☐	
Impacts from artificial lighting (Night Shift works) acceptable.	☐	☐	☐	
Dust plumes not visible from public areas.	☐	☐	☐	
Signage acceptable.	☐	☐	☐	
NOISE AND VIBRATION				
All works carried out within permitted hours of operation.	☐	☐	☐	
EPA notification for extraordinary works under permit.	☐	☐	☐	Refer EPA files
Plant and equipment is fitted with appropriate noise abatement devices (Mufflers, Silencers, etc.).	☐	☐	☐	
Beepers or squawkers set to suitable levels.	☐	☐	☐	
Potentially affected residents and operators informed/updated.	☐	☐	☐	Silverton Community Consultative Committee Meetings
Blasting operations carried out in accordance with requirements - Air Blast Overpressure and Ground Vibration.	☐	☐	☐	Blasting Contractor's records
No complaints from sensitive receptors.	☐	☐	☐	
AIR QUALITY				
Plant & equipment fitted with appropriate emission controls.	☐	☐	☐	
Water truck in operation where necessary.	☐	☐	☐	
Vehicles driven at appropriate speeds.	☐	☐	☐	
Minimal dust generation and movement.	☐	☐	☐	
Vehicles carrying raw materials covered.	☐	☐	☐	
SOIL AND WATER (Including ESC)				
Excess topsoil collected, stockpiled, protected.	☐	☐	☐	
No contamination of external watercourses.	☐	☐	☐	
No undue flow restrictions in watercourses.	☐	☐	☐	
No off-site release of sediments.	☐	☐	☐	
Minimal scouring on road edges or batters.	☐	☐	☐	
ESC measures installed and effective.	☐	☐	☐	

Form No: STWF-29	Rev: 0	Rev Date: June 18	Authorised by: Project Manager	Page 1 of 4
C:\Users\GeoffH\Desktop\ENVIRONMENTAL\FORMS\STWF-29 Weekly Environmental Inspection_R0.docx				

catcon civil & allied technical construction

STWF-29 Weekly Environmental Inspection

ASPECT AND CRITERIA	C	NC	N/A	COMMENTS
Evaluate and review ESC measures where necessary (i.e. Post-rainfall event).	☐	☐	☐	
Sediment fences at topsoil stockpiles (where necessary).	☐	☐	☐	
No erosion from surface water discharge.	☐	☐	☐	
HAZARDOUS SUBSTANCES				
All hazardous substances are correctly stored and marked.	☐	☐	☐	
Storage equipment complies with any legislative/licensing requirements.	☐	☐	☐	
Any spills have been cleaned up correctly and a.s.a.p.	☐	☐	☐	
MSDS registers available.	☐	☐	☐	
Bunding where required (Consider quantity and location).	☐	☐	☐	
Spill equipment available and stocked to appropriate levels.	☐	☐	☐	
No refueling within 50m of watercourse.	☐	☐	☐	
FLORA AND FAUNA (BIODIVERSITY)				
No evidence of harm to fauna.	☐	☐	☐	
No damage to flora outside work zones.	☐	☐	☐	
Open excavations appropriately covered or have means of egress/escape.	☐	☐	☐	
Open trenches checked for fauna prior to backfill.	☐	☐	☐	
Dragon 'Hotspots' delineated.	☐	☐	☐	
No disturbance to delineated Dragon 'Hotspot'.	☐	☐	☐	
Porcupine Grass Sparse Woodland flagged/ delineated.	☐	☐	☐	
Road and site disturbance minimized in Porcupine Grass - Red Mallee areas.	☐	☐	☐	
Hollow bearing trees buffered.	☐	☐	☐	
NOXIOUS PLANTS/WEEDS AND PEST ANIMALS				
All civil works equipment inspected on initial arrival.	☐	☐	☐	
No new/regrowth weeds preset in works area.	☐	☐	☐	
No pest animals observed on site.	☐	☐	☐	
Any weeds on site identified and treated as required.	☐	☐	☐	
WASTE MANAGEMENT				
Appropriate disposal of all waste.	☐	☐	☐	
No uncontrolled waste at work site.	☐	☐	☐	
Waste segregation practices where applicable.	☐	☐	☐	
Waste receptacles in good working order.	☐	☐	☐	
Waste Register updated and current.	☐	☐	☐	

catcon civil & allied technical construction

STWF-29 Weekly Environmental Inspection

ASPECT AND CRITERIA	C	NC	N/A	COMMENTS
LAND ACCESS AND SITE DISTURBANCE				
Disturbance confined to approved work area.	☐	☐	☐	
Exclusion zones delineated.	☐	☐	☐	
Vehicle movements confined to approved roads/tracks etc.	☐	☐	☐	
Property gates open/closed as necessary.	☐	☐	☐	
Local product used for civil works.	☐	☐	☐	
Stockpiles of appropriate size and location (visibility).	☐	☐	☐	
Cut-and-fill and batters stabilized.	☐	☐	☐	
Areas of upcoming works marked and sensitive areas delineated.	☐	☐	☐	
Ground Disturbance Permit clearances for 'new' works.	☐	☐	☐	
Property owners and relevant parties informed of works program and progress.	☐	☐	☐	Daily Coordination Reports
GREEN HOUSE GAS EMISSIONS				
Minimal exhaust emissions from plant & equipment.	☐	☐	☐	
All machinery inspection forms available for review.	☐	☐	☐	
All plant is in good operating order as per daily pre-starts/servicing.	☐	☐	☐	
No burning of any materials on-site.	☐	☐	☐	
Fuel usage records up-to-date and available.	☐	☐	☐	
HERITAGE: INDIGINOUS AND NON-INDIGINOUS				
No new Cultural Heritage items found on site.	☐	☐	☐	
Existing Heritage areas flagged/barricaded.	☐	☐	☐	
No disturbance to marked Heritage areas.	☐	☐	☐	
Ground Disturbance Permit clearances obtained.	☐	☐	☐	
REPORTING				
All environmental incidents recorded and reported.	☐	☐	☐	
All relevant reports available for inspection.	☐	☐	☐	
Inspection records available.	☐	☐	☐	
Environmental statistics and indicators recorded.	☐	☐	☐	Monthly HSE Report to Client

catcon civil & allied technical construction

STWF-29 Weekly Environmental Inspection

NOTATIONS FROM COMMENTS

ACTION ITEMS (Location and Description)	RESPONSIBLE PERSON / COMPANY	ACTIONED BY (Date)

Form No: STWF-29	Rev: 0	Rev Date: June 18	Authorised by: Project Manager	Page 4 of 4
C:\Users\GeoffH\Desktop\ENVIRONMENTAL\FORMS\STWF-29 Weekly Environmental Inspection_R0.docx				

APPENDIX B: Fact Sheet – *Acacia Victoriae*

NEW SOUTH WALES FLORA ONLINE

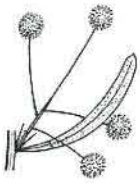
Acacia victoriae Benth.

Family **Fabaceae**
Subfamily **Mimosoideae**

Common name: elegant wattle, prickly wattle, gundabluie, Gundabluey, Bramble wattle, Alupa

Acacia victoriae Benth. APNI*

Synonyms: *Racosperma victoriae* (Benth.) Pedley APNI*
Acacia coronalis J.M.Black APNI*
Acacia decora var. *spinescens* Benth. APNI*
Acacia hanniana Domin APNI*
Acacia sentis Benth. APNI*
Acacia sentis var. *victoriae* (Benth.) Domin APNI*



Description: Erect or spreading shrub 2–7 m high; bark smooth, dark grey; branchlets ± terete, glabrous to densely hairy. Stipules ± spinescent, mostly 5–15 mm long with often only bases persisting on mature branchlets.

Phyllodes usually narrowly oblong to narrowly elliptic, ± straight to slightly curved, 2–8 cm long, 2–8 mm wide, glabrous to hairy, green to grey-green or glaucous, midvein prominent, lateral veins usually obscure, apex acute to obtuse with a mucro; 1 gland near base; pulvinus < 2 mm long.

Inflorescences 2–15 or sometimes more in an axillary raceme and sometimes 1 in axil of some phyllodes; axis 0.5–10 cm long; peduncles 6–18 mm long, slender, glabrous or sometimes hairy; heads globose, 10–30-flowered, 4–7.5 mm diam., pale yellow to ± white.

Pods straight to slightly curved or sometimes twisted, ± flat except raised over seeds, ± straight-sided and often irregularly slightly or more deeply constricted between seeds, 2–8 cm long, 9–16 mm wide, papery, glabrous; seeds transverse; funicle short and thick; aril small.

Habitat
Photo T.M. Tame

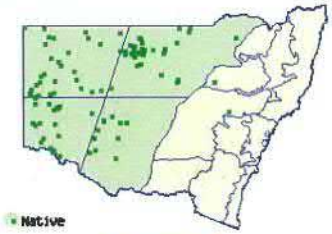
Other photo
Photo T.M. Tame

Herbarium Sheet

Flowering: September–December.

Distribution and occurrence: widespread in inland districts, chiefly west from Angledool. Collections of uncertain status (natural or cultivated) occur from the Central Western Slopes near Narromine and Trangie.

Grows in woodland communities in sandy and heavy clay soils, often along stream banks.
NSW subdivisions: NWP, SWP, NFWP, SFWP
Other Australian states: Qld Vic. N.T. S.A. W.A.



AVH map***

On his expedition through central Queensland, Mitchell named the Barcoo River the Victoria River, and the species name refers to Mitchell's name for the river. There are several subspecies of *Acacia victoriae* being assessed.

Text by P.G. Kodela
Taxon concept: P.G. Kodela & G.J. Harden (2002)

Key to the subspecies

1	Branchlets glabrous; immature and mature phyllodes glabrous.	subsp. *victoriae*
	Branchlets densely hairy; immature and mature phyllodes hairy.	subsp. *arida*

APNI* Provides a link to the Australian Plant Name Index (hosted by the Australian National Botanic Gardens) for comprehensive bibliographic data
***The AVH map option provides a detailed interactive Australia wide distribution map drawn from collections held by all major Australian herbaria participating in the Australian Virtual Herbarium project.

APPENDIX C: Rehabilitation Schedules – Underground HV Trenches and HV Poles Access Tracks/Site Rehabilitation

UNDERGROUND HV TRENCH REHABILITATION. 2 August 2018.

COLLECTOR GROUP 1. (Area 4).			
Location	**Requirement**	**Comments**	**CPP Status**
OHL to T1	Nil		CLOSED
T1 to T2		Catcon/Blore to determine final track requirements.	CLOSED
T1 to T3	Nil	Rehab completed.	CLOSED
T3 to T4	Full rehab required.		OPEN
T4 to T5	Full rehab required.		OPEN
OHL to T6	Nil	Cable under pole access track.	CLOSED
T6 to T7	Full rehab required.		OPEN
T7 to T8	Nil	Rehab completed.	CLOSED
T8 to T9	Nil	Cable under pole access track.	CLOSED
T9 to T10	Nil	Rehab completed.	CLOSED
T10 to T11	Partial rehab required.	Towards T11 end of run.	OPEN
OHL to T12	Partial rehab required.		OPEN
T12 to T13	Partial rehab required.		OPEN
COLLECTOR GROUP 2. (Area 5).			
OHL to T14	Nil	Rehab completed.	CLOSED
T14 to T15	Nil	Rehab completed.	CLOSED
T15 to T16	Full rehab required.		OPEN
OHL to T17	Nil	Rehab completed.	CLOSED
OHL to T18	Full rehab required.		OPEN
T18 to T19	Nil	Rehab completed.	CLOSED
T19 to T20	Full rehab required.		OPEN
T20 to T21	Full rehab required.		OPEN
OHL to T22	Partial rehab required.	Section - Pole 19B to Road MC27 (50m). Note : This is not formal access track for pole.	OPEN
OHL to T23	Full rehab required.		OPEN
T23 to T24	Full rehab required.		OPEN
T23 to T25	Full rehab required.		OPEN
T25 to T26	Full rehab required.		OPEN
COLLECTOR GROUP 3. (Area 7).			
OHL to T32	Nil	Rehab completed.	CLOSED
T32 to T33	Nil	Rehab completed. (Under road ?)	CLOSED
T32 to T34	Partial rehab required.	Remove flagging and pickets etc.	OPEN

T34 to T35	Full rehab required.		OPEN
T34 to T29	Nil	Rehab completed. (Under road).	CLOSED
T29 to T30	Partial rehab required.	Hill crossing closer to T30 end of run.	OPEN
T30 to T31	Nil	Rehab completed. (Under road).	CLOSED
OHL to T28	Nil	Rehab completed.	CLOSED
COLLECTOR GROUP 4. (Area 2).			
OHL to T27	Partial rehab required.	Part trench common with access track to pole.	OPEN
OHL to T36	Nil	Rehab completed.	CLOSED
T36 to T37	Nil	Rehab completed.	CLOSED
T37 to T38	Partial rehab required.	Under investigation - TBA.	OPEN
T38 to T39	Nil	Rehab completed.	CLOSED
OHL to T40	Nil	Rehab completed.	CLOSED
T40 to T41	Nil	Rehab completed.	CLOSED
OHL to T42	Nil	Rehab completed.	CLOSED
T42 to T43	Nil	Rehab completed.	CLOSED
T43 to T44	Nil	Rehab completed.	CLOSED
T43 to T45	Nil	Rehab completed.	CLOSED
COLLECTOR GROUP 5. (Area 6).			
OHL4 to T49	Nil	Rehab completed.	CLOSED
T49 to T50	Nil	Rehab completed.	CLOSED
T50 to T51	Nil	Rehab completed.	CLOSED
OHL to T46	Partial rehab required.	Rehab completed on "new" alignment. Original alignment to be corrected.	OPEN
T46 to T47	Partial rehab required.	Gully section - as detailed in email 27/7/18.	OPEN
OHL to T52	Nil	Rehab completed.	CLOSED
T52 to T53	Nil	Rehab completed.	CLOSED
T53 to T54	Nil	Rehab completed.	CLOSED
T54 to T55	Nil	Rehab completed.	CLOSED
T55 to T56	Nil	Rehab completed.	CLOSED
T56 to T57	Nil	Rehab completed.	CLOSED
T57 to T58	Nil	Rehab completed.	CLOSED
ALL AREAS - Installation of applicable signage at fence lines and roadsides re: Buried Cable.			

HV POLE ACCESS TRACK AND SITE REHABILITATION. 4 August 2018.

OHL 1 & OHL 2 (Areas 4 & 5).			
Pole No. & Location.	**Requirement**	**Comments**	**CPP Status**
OHL1P1B & OHL2P1B	Nil	Roadside. Access OK. Site rehab complete.	CLOSED
OHL1/2P2B	Erosion/flow control measures required.	Access opposite O&M Building.	OPEN
OHL1/2P3B	Erosion/flow control measures required.	"Belmont" property track Lim Hill to T2.	OPEN
OHL1P4B & OHL2P4B	Nil		CLOSED
OHL1P5B & OHL2P5B	Erosion/flow control measures required.	T1.	OPEN
OHL1/2P6B	Erosion/flow control measures requited.	Continuation from P5B.	OPEN
OHL1P7B & OHL2P7B	Erosion/flow control measures required.	T4.	OPEN
OHL1/2P8B	Nil		CLOSED
OHL1P9B & OHL2P9B	Nil	T8.	CLOSED
OHL1/2P10B	Nil	T7.	CLOSED
OHL1P11B & OHL2P11B	Erosion/flow control measures required. Rehab turn-around area behind poles.	Opposite T6.	OPEN
OHL1P12B & OHL2P12B	Track rough - grade/clean-up.	T12.	OPEN
OHL2P13B			
OHL2P14B	Nil	Roadside - access to T17.	CLOSED
OHL2P15B	Nil	Roadside - access to T17.	CLOSED
OHL2P16B	Nil	Continuation from 17B.	CLOSED
OHL2P17B	Nil	Roadside.	CLOSED
OHL2P18B	Nil	Roadside.	CLOSED
OHL2P19B	Nil	End of line.	CLOSED
OHL 3. (Area 7).			
OHL3P6T	TBA	Access not clear - to be checked. T32.	TBC
OHL3P5T	Nil	Roadside T29.	CLOSED
OHL3P4T	Nil	Roadside T29-T30 access road fork.	CLOSED
OHL3P3T	Erosion/flow control measures required. Rough towards pole end - grade/clean-up.	From T28 access road.	OPEN
OHL3P2T	Nil	T28.	CLOSED
OHL3P1T	Erosion/flow control measures required. Part shared with UG trench - refer also Trench Rehab list.	T27.	OPEN
OHL3P7A & OHL4P7A (*1)	Nil	Roadside T36.	CLOSED
OHL3/4P8A (*2)	Erosion/flow control measures required. Clear/compact top of track at P7A.	From OHL3P7A.	OPEN
OHL3/4P9A (*3)	Nil	Roadside MC04.	CLOSED

OHL3/4P10A (*4)	Nil	Roadside - Access to T46.	CLOSED
OHL3P11A	Nil	Substation.	CLOSED
OHL 4. (Area 2).			
OHL4P1A	Nil	T40.	CLOSED
OHL4P2A OHL4P3A	Erosion/flow control measures required. Clear/stabilise creek crossings.	From road MC08 (Valley).	OPEN
OHL4P4A OHL4P5A	Erosion/flow control measures required - towards pole ends of tracks.	From behind T36.	OPEN
OHL4P6A	Nil	T36.	CLOSED
OHL4P7A	Refer (*1) above.		
OHL4P8A	Refer (*2) Above.		
OHL4P9A	Refer (*3) Above.		
OHL4P10A	Refer (*4) Above.		
OHL4P11A	Nil	Substation.	CLOSED
OHL 5. (Area 6).			
OHL5P1Z	Nil	Substation.	CLOSED
OHL5P2Z	Nil	Roadside - Access to T46.	CLOSED
OHL5P3Z	Nil	Roadside MC04.	CLOSED
OHL5P4Z	Minor erosion/flow control measures required.	Off road MC04.	OPEN
OHL5P5Z	Nil	From T52 access road.	CLOSED
OHL5P6Z	Nil	From T52 access road.	CLOSED
METMASTS : All access tracks to metmasts to be treated in same manner as pole access tracks.			