Appendix K

Rehabilitation Plan

Rehabilitation Plan & Guidelines

Mount Emerald Wind Farm

Report prepared for RPS Australia Asia Pacific (Cairns) for MEWFPL
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Simon Gleed

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Report prepared for RPS Australia Asia Pacific (Cairns) on behalf of MEWFPL

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The conclusions and recommendations contained in this document reflect the professional opinion of the author based on the data and information supplied and available at the time of the work. The author has used reasonable care and professional judgment in the interpretation and analysis of the data. The conclusions and recommendations must be considered within the agreed scope of work, and the methodology used to perform the work, both of which are outlined in this report.

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1.0 INTRODUCTION

1.1 Overview

The Mount Emerald Wind Farm site provides important habitat and refuge areas for threatened plants and animals. A majority of the project site is in an undisturbed condition and holds high levels of ecological integrity. The project area is covered by remnant vegetation, with the most conspicuous disturbances to land being a result of the 275 kV powerline infrastructure and its associated access tracks, and the unsealed Kippen Road at the northern end and base of the wind farm site.

Construction of the Mount Emerald Wind Farm will result in a range of new impacts being introduced to the site. A prominent impact will be the creation of the road and cabling network, plus the wind turbine generator (WTG) construction pads. Roads and access tracks are proposed to be cleared to a width of 10 m at the construction stage. Wider clearing will be required in some situations to allow for adequate manoeuvring space for large machinery and trucks.

Following initial clearing and use of the roads and access tracks for construction, it is envisaged that the linear clearing features will be allowed to naturally regenerate to a narrower width of approximately 4-5 m, or the narrowest width to practicably allow for access and maintenance of the wind farm infrastructure.

The Mount Emerald Wind Farm site is unique in many respects because of its high altitude position in the landscape and the special flora and vegetation values the dissected ridge country holds south of the 275 kV powerline. Given this special setting and the potential for slow plant establishment in rehabilitated areas, a series of rehabilitation trials are proposed to be established within the wind farm site.

Natural regeneration of native plants (plant succession) is one aspect of rehabilitating disturbed land. Because of the special characteristics and landscape context of the wind farm site, natural regeneration could be slow to establish or may not be successful in some instances. Intervention by way of introducing appropriately selected native plants through the application of seed is another method that could improve rehabilitation results and speed up the time in which plants establish on formerly cleared land.

This rehabilitation plan provides strategies and guidelines for mitigating clearing impacts to vegetation. The plan details areas of the wind farm site which require specific treatments and plant selection. Information is provided on the collection and management of native plant seeds, which will be required progressively throughout construction, operation and at the decommissioning stages.

1.2 Project Description

Mount Emerald Wind Farm Pty Ltd (MEWFPL) proposes to construct and operate a wind farm located approximately 20 km SSW of Mareeba on the Atherton Tablelands in north Queensland at the northern extent of the Herberton Range mountainous area.

The nature of the project requires wind energy to be harnessed efficiently and effectively therefore the Wind Turbine Generators (WTG's) are located on high points through the project site. The northern half of the site has broad, rolling hills, with dissected areas found in ravines and gorges; whereas the land to the south of the existing 275 kV powerline is markedly rugged and steeply dissected, rendering the highest points a series of narrow ridges and rocky knolls with steep drop-offs on adjacent slope faces.

The primary access from Springmount Road to the wind farm will be along Kippen Drive at the base of the site. From the end of the flat section of Kippen Drive, the access will ascend the hills into the wind farm site at higher elevation.

The wind farm will consist of up to a maximum of 53 WTG's, which will be approximately 80 m high and with 55 m diameter rotor blades. The wind farm will provide energy to feed into the main electricity grid infrastructure currently provided by the 275 kV Chalumbin to Woree powerline.

WTG's will be connected to each other by a network of tracks, some of which will accommodate underground cabling. Other infrastructure and facilities to be constructed within the wind farm project site include a contractors site compound, a lay-down area, a substation, and an associated substation operation and management building. The location of the works and layout of the wind farm infrastructure are shown in **Figure 1**.

The primary components, infrastructure and areas of the wind farm which will require varying levels of rehabilitation at the construction, operation and decommissioning stages include:

- WTG foundations and surrounding machinery manoeuvring space;
- Wind monitoring towers;
- Access roads (including Kippen Drive management area), interconnecting tracks and underground cabling network;
- Hard stands and lay down areas;
- Substation;
- Site compounds and O & M building;
- Storage areas, machinery yards and car parking areas;
- Watercourse crossings and remedial rehabilitation sites around existing 275 kV infrastructure.

1.3 Purpose and Objectives of the Rehabilitation Plan

This Rehabilitation Plan describes the strategies and actions that apply to mitigating the impacts of vegetation clearing and disturbance in the Mount Emerald Wind Farm project site. The purpose of this Rehabilitation Plan is to provide guidance on appropriate measures to reinstate vegetation and native plant cover on cleared and disturbed land by achieving the following objectives:

- Adopt a philosophy of continuous improvement for rehabilitation and habitat enhancement.
- Identify areas for rehabilitation and assign priorities for treatment.
- Rehabilitate areas progressively
- Collect, acquire, manage and store adequate quantities and appropriate species of native plant seed throughout the construction, operation and decommissioning stages of the wind farm.
- Apply the most appropriate techniques and practices for rehabilitation on a site-specific basis.
- Translocate and manage threatened plants, grass trees and cycads where feasible.
- Establish trial rehabilitation plots in areas which are accessible and able to be monitored.

- Continuously maintain rehabilitation areas to a standardwhich excludes significant weed incursions and promotes healthy growth and development of native vegetation.
- Monitor rehabilitation areas and maintain records and data which will be used to inform improved rehabilitation practices.
- Compile timely reporting which identifies successful and unsuccessful rehabilitation.
- Respond quickly and take actions to remediate unsuccessful rehabilitation areas, serious weed incursions and incidences of plant mortality or patchy vegetation establishment.
- Review the Rehabilitation Plan on an annual basis and make document and treatment amendments as required and approved.

1.4 Duration of Rehabilitation Plan

This Rehabilitation Plan is effective for the construction, operation and decommissioning stages of the Mount Emerald Wind Farm.

A major review of the plan is to be undertaken every five (5) years. Intermediate reviews of the plan are to be made annually or at any time when an amendment is deemed necessary to take into account unforeseen or unplanned circumstances or significant changes.

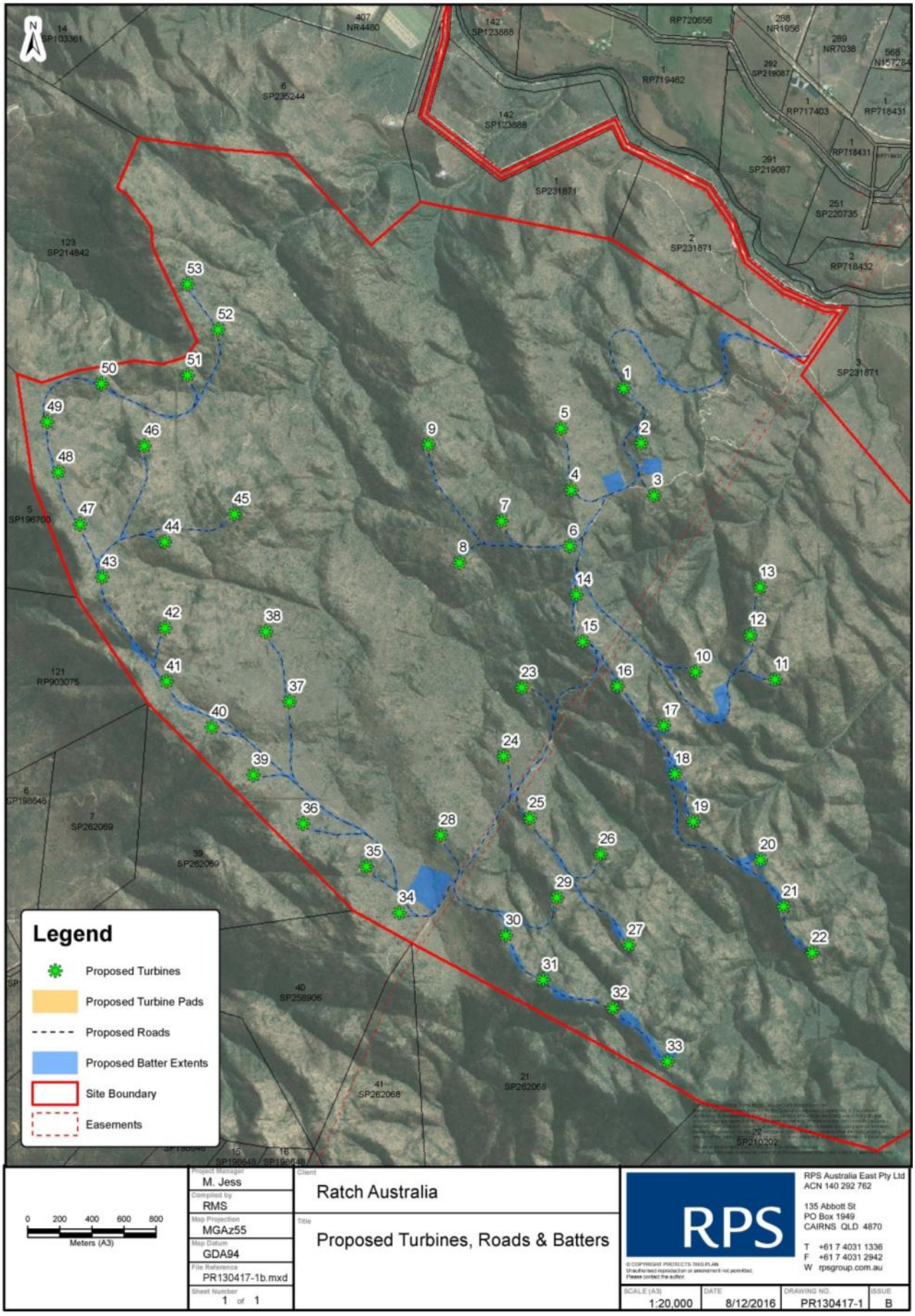


Figure 1. Layout of the Mount Emerald Wind Farm

2.0 EXISTING ENVIRONMENT

The Mount Emerald Wind Farm site is located at the northern limit of the Herberton Range and immediately north of Mount Emerald. The landscape is characterised by steeply dissected hills, rocky terrain and areas of precipitous ravines and narrow ridges. The broad geology of the site is mapped as the Walsh Bluff Volcanics, which comprises fine-grained rhyolite.

2.1 Vegetation

The predominant vegetation cover over the project site is a mosaic of sclerophyll woodlands, shrublands and heathlands.

Common trees of the woodlands include Lemon-scented Gum (*Corymbia citriodora*), Yellow Stringybark (*Eucalyptus mediocris*), Range Bloodwood (*C. abergiana*), Ironbark (*E. drepanophylla*), Dead Finish (*E. cloeziana*), Cypress Pine (*Callitris intratropica*), Silver-leaf Ironbark (*E. shirleyi*), Orange Jacket (*C. leichhardtii*), White Stringybark (*E. reducta*), and *E. lockyeri*. The dominant grasses are usually Kangaroo Grass (*Themeda triandra*) and *Arundinellasetosa*, with *Cleistochloa subjuncea* on very rocky soils at higher elevation on ridges and amongst rocky outcrops. Woodlands are most frequent over broad slopes, flats and rolling hills with less dissected surfaces. Low, sparse woodlands and shrublands develop on ridges and in exposed conditions.

Low woodlands and shrublands are characterised by many species, but typically include Sheoak (*Allocasuarina littoralis*), Grass Trees (*Xanthorrhoea johnsonii*), *Eucalyptus lockyeri*, Wattle (*Acacia aulacocarpa*), *Homoranthus porteri*, *Grevillea glossadenia*, and stunted forms of Range Bloodwood (*Corymbia abergiana*). Shrublands are generally found in relation to the ridge environment where thin rocky soils prevail. The endangered shrub *Melaleuca uxorum,* is found on the boundary of this vegetation type with slightly taller woodlands, but is also found in association with the montane heathland and rock pavements described below.

Heathlands have a special and diverse group of plants which include species such as Broom Bush (*Jacksonia thesioides*), Grass Tree (*Xanthorrhoea johnsonii*), *Gompholobium nitidum*, wattles *Acacia calyculata* and *A. whitei*, grasses *Cleistochloa subjuncea*, Kangaroo Grass (*Themeda triandra*) and *Cymbopogon bombycinus*. Taller woody plants in this community include emergent stunted forms of *Eucalyptus lockyeri* and *E. mediocris*, shrubs such as *Grevillea glossadenia* and *Homoranthus porteri*; and compact shrublets such as *Cryptandra debilis*, *Mirbelia speciosa* subsp. *ringrosei*, *Pseudanthus ligulatus*, *Zieria whitei*, *Boronia occidentalis* and others. The critically endangered *Acacia purpureopetala* and *Prostanthera clotteniana* grow in this vegetation type. It is referred to as montane heathland, because of its structure and reliance on high elevation aspects and very thin soils.

A feature of the montane heathland and shrublands at high elevation is the presence of rock pavements and areas of poorly vegetated rock outcrops. This particular habitat supports few large plant species because of the near-absence of soil or growth medium on their surfaces. The soil that does develop is trapped in rock hollows, scoops and crevices between rock plates and boulders, and is developed from small plants such as lichens, mosses and the remains of rock ferns. This plant matter integrates with weathered rock material to form a soil that has the texture of peat, where in wetter times the absorbent nature of the medium is able to store water for longer periods. Plants on rock pavements include the Resurrection Plant (*Borya septentrionalis*), *Pseudanthus ligulatus*, scattered shrubs of *Grevillea glossadenia*, *Plectranthus* species (including the threatened *P. amoenus*) and occasionally, sentinel specimens of Cypress Pine (*Callitris intratropica*). Grasses are sparsely represented and can include Five Minute Grass (*Tripogon*

loliiformis), *Cymbopogon bombycinus* and *Eriachne humilis*. *Eriachne mucronata* is often found around the edges of rock pavements,with some pavements entirely covered by Firegrass (*Schizachyrium pachyarthron*).

Woodlands in the centre of the site grow on relatively flat land where soil has a high clay content and in places, is slowly drained. These flat areas are often interspersed with sections of rock plates or pavements, and occasionally rocky outcrops with low relief. Typical trees of these woodlands include *Corymbia leichhardtii*, *Eucalyptus lockyeri* and *Callitris intratropica*. As the land ascends into gently rolling hills, trees such as *C. citriodora* (Lemon-scented Gum) and *E. cloeziana* (Dead Finish) become more frequent. The ground layer of these woodlands is dominated by Kangaroo Grass (*Themeda triandra*) and in some areas near watercourses, by *Pseudopogoantherum contortum*. The Grass Tree *Xanthorrhoea johnsonii* is usually well-represented and occasionally forms a secondary shrub layer. As the ground becomes drier in northern aspects of the site, Ironbark trees (*Eucalyptus drepanophylla*) become more common.

Degraded non-remnantvegetation is associated with the lowest hill sections of the wind farm site and adjacent to both sides of Kippen Drive. Scattered trees of Molloy Box (*Eucalyptus leptophleba*) and Poplar Gum (*E. platyphylla*) overtop a weedy and degraded shrub and ground layer. Native grasses such as *Heteropogon contortus* (Black Speargrass) are common, but most grasses are weeds - the most characteristic being the priority weed Grader Grass (*Themeda quadrivalvis*).

2.2 Significance of the Ridge Environment and Key Plant Habitats

The high altitude ridges in the wet tropics bioregion section of the site south of the 275 kV powerline are sensitive environments and serve as important habitats for plants and the poorly represented montane heathlandand shrubland mosaic found mostly around 900 m ASL. Here the cloud base is a determinant of the moisture regime in relation to plants and their exposure to extreme conditions.

The land south of the 275 kV powerline holds the highest levels of species diversity and endemism, where many species are restricted to and have adapted to the harsh environment of exposed high elevation points on ridges, rock pavements and areas of skeletal soil. This montane habitat supports six species of plants which are listed as critically endangered, endangered and vulnerable under Queensland and Commonwealth legislation. Many other species, not listed under legislation, are restricted to the montane heathland along and on the edges of narrow ridges and rock pavement areas.

The rugged nature of the land with steep rocky slopes, bare rock pavements, outcrops and cliffs provides a unique environment for plants, and it is these characteristics which act as a refuge and reduces the effects of the severity and intensity of bush fires due to the low levels of flammable material such as grasses. Consequently, the conservation significant plants are found almost exclusively in fireproof habitats and niches. The protection from fire is a critical attribute, which renders most of the ridge tops and rock pavements as significant habitats where many threatened plants are able to persist.

3.0 REHABILITATION PRINCIPLES AND PURPOSE

3.1 Continuous Improvement and Habitat Enhancement

The unique landscape setting and environmental values of the Mount Emerald Wind Farm site warrant a specific and targeted approach to landscape rehabilitation. Some sections of the wind farm site will pose challenges in terms of the approaches to rehabilitation and the success rates and timeframes in which vegetation cover becomes established or colonises a site through natural regeneration.

Because of these challenges, generic approaches to rehabilitation and revegetation; for example, widespread use of improved pasture grasses and legumes is not recommended.

The very high levels of natural integrity within the project site will necessitate a strategic approach to species selection and site treatments.

Extremes of climate will be a determinant of the success of rehabilitation. Long periods of dry weather and wind-shearing could slow growth of direct-seeded plots, or even prevent seeds from germinating. Rehabilitation success rates are likely to fluctuate.

3.2 Minimise Disturbance

Minimising the area of disturbance during the construction stage, throughout operation and at the decommissioning stage will require less area of land to be rehabilitated. This will result in more manageable rehabilitation areas, higher success rates and decreased time until the vegetation has established over the disturbed land.

Deep excavation will entirely remove the soil seed bank and render the re-application of topsoil less effective. Weeds will have a far greater chance of invading a significantly excavated site than one which has been selectively and carefully worked by machinery. Wherever feasible, limit the depth and extent of soil excavation to the absolute minimum.

3.3 Purpose of Rehabilitation

Landscape rehabilitation aims at restoring native vegetation cover over sections of land that have been disturbed during the construction, operational and decommissioning stages of the wind farm. The main objectives of rehabilitation are to stabilise the disturbed ground surface by establishing plant cover; and to restore a vegetation community that is ecologically functional and self-sustaining.

Ultimately, and over a period of time which may take over five years to establish, the restored vegetation is to be of a similar floristic composition and structure as the adjacent remnant community on a similar landform. The restored vegetation is to be free of weeds and alien plants, and able to persist in the landscape without intervention or assistance.

4.0 REHABILITATION GUIDELINES

The following notes are not intended to be prescriptive, and are to be used as guidelines to the main practices involved in site rehabilitation. All rehabilitation practices are to be specific to individual rehabilitation areas in the Mount Emerald Wind Farm site.

4.1 Seed Collection and Management

Prior to construction and progressively throughout the operational and decommissioning stages of the wind farm project, a native seed collection and management program is to be implemented. The following will need to be considered:

1. Seed will need to be collected from close-by (local provenance) and from vegetation types represented on the wind farm site. Seed should be continuously collected from within the wind farm and adjacent areas over time. Sources from the adjacent mountain ranges can also be considered if the source vegetation types match those found in the wind farm site. For example, the proposed offset site would be a suitable and supplementary location to collect native plant seed subject to appropriate botanical advice.
2. The need for forward planning of seed requirements is crucial. Some species only set seed once a year or less frequently.
3. Seed collection should be progressive and ongoing. Large quantities are likely to be required.
4. Under typical seed collecting circumstances, the whole fruit is taken from the plant and the seed is separated from the capsule of fruit. Seed should be cleaned (separated from capsules and chaff).
5. All seed collections must be labelled with the species name (scientific), date of collection, location (including GPS coordinates), name of collector and additional notes if considered useful. It can be helpful to retain two or three seed pods or capsules with the seed to aid identification if the identity of the species is uncertain.
6. Seed should only be collected from healthy plants growing in healthy vegetation. Avoid collecting seed from weak looking shrubs and trees, diseased plants and plants growing amongst serious weed infestations. Collect from a range of the same species to maximise genetic diversity.
7. Collect seeds from many species and do not rely on a few abundant seeding plants. For example, *Acacia simsii* (Sim's Wattle) supplies good, easy to collect seed crops, which should be collected when opportunities arise. But other species are equally as important to collect to maintain diversity within the seed stock, so different species can be used for different rehabilitation situations.
8. Take photos of fruits and seeds of different species - this can be helpful for identification and training. Keep field notes about flowering and fruiting times, big seed crops or poor crops.
9. Do not collect seed from vines unless absolutely sure the species is native. There are very few vines which grow on the Mount Emerald Wind Farm site, with identified species *Pandorea linearis* and *Clematocissus opaca* (mostly south of the 275 kV powerline) and *Psydrax attenuata*, *Cassytha filiformis* and a *Parsonsia* sp. (found in woodlands over the site). Some exotic vines and creeping pasture legumes are serious environmental weeds, and occur along Kippen Drive. DO NOT collect from this area unless absolutely certain the species is native, in which case, the seed should be restricted in use to Kippen Drive.
10. Do not collect seed from pasture, agricultural lands or gardens.

11. Seek expert botanical advice if uncertain of a species' status as native or weed.
12. Collect seed from unusual species such as those found along the ridges south of the 275 kV powerline. A number of these plants are particular to the montane heathland and will be required for rehabilitation around WTG in the high elevation zone.
13. Process collected seed as soon as possible. Prior to storage, the seed should be naturally air dried (i.e. do not store wet seed after rain). The seed should remain untreated.
14. Seed should be stored in zip-lock bags or air-tight plastic containers in a freezer. Label all seed collections and containers.
15. Develop a Seed Collection and Management database and maintain up-to-date records (Refer to later notes). An example of the data fields are: unique consecutive batch number (for future reference), species name, common name, growth form, location (descriptive), location (coordinates), date of collection, name of collector, quantity collected (weight), threatened status (if any), appropriate rehabilitation sites within wind farm to use, notes regarding pre-treatment (if any), notes on viability (ease of germination in nursery environment, response to direct-seeding, and issues with problematic germination - low viability, recalcitrant), and other notes as deemed useful and informative to furthering the knowledge of the species.

4.2 Species Selection

All plants species to be used in rehabilitation of the Mount Emerald Wind Farm are to be native to Australia and selected from the range of naturally occurring species from similar vegetation types found in the vicinity of the Mount Emerald Wind Farm site. Seed and plant supplies are to be sourced from a local provenance.

Introduced pasture grasses, legumes and shrubs are not permitted to be used for rehabilitation within the wind farm site. Most of these species become problematic, weedy, displace native vegetation, and are difficult to eradicate. A schedule of appropriate plant species is given later in this rehabilitation plan.

It is the responsibility of the proponent of the Mount Emerald Wind Farm to ensure adequate supplies of seed of the appropriate species and provenance are available for rehabilitation. This will require a strategic and long-term commitment to seed collection and management.

4.3 Seed Provenance (Origin)

Exotic or introduced plant species (not native to Australia) are NOT to be used in rehabilitation work above Kippen Drive. Non-native pasture legumes, grasses or improved pasture species are prohibited. Introduction of these species in seed mixes will be recorded as a non-compliance with the Environmental Code of Practice of the Mount Emerald Wind Farm.

Landscaping - internal compounds: the use of cultivated varieties of common horticultural plants of domestic commerce are not to be used in "landscaping" works around building and compound infrastructure. Landscape architects must refer to the consulting botanist for species recommendations in these situations.

Within the wind farm operational area above Kippen Drive, all seeds or plant products for rehabilitation are to be native and sourced from the region bounded by the high elevation country to the west of Oaky Valley extending into Toys Creek and the northern hills around Baal Gammon, the northern slopes of Mount

Emerald, and from within the wind farm itself. Additional locations can be considered and must be approved by the consulting botanist or Environmental Officer.

4.4 Seed Field Collection

It is recommended to collect seed for a species from at least 20 different parent plants to maintain genetic quality and ensure higher rates of seed in good physical condition (i.e. are insect and disease free, and have high levels of viability). For rare species, where less than 20 plants may be found, seed collection should be minimal. Aim at harvesting about 30 percent of the seed from each plant. If the plant is extremely rare, do not take the seed.

Seed collecting in the wild involves taking (removing) the fruit (capsules or pods, etc.) from a living plant, as the fruits contain the seeds. Harvesting should only be undertaken when the seed viability of a bulk of the collection is likely to be at its highest. One way of determining when the right time to harvest is by looking at a range of capsules (e.g. *Eucalyptus*), pods (e.g. *Acacia* and legumes) or follicles (e.g. *Grevillea*, *Hakea*) on the plant and seeing whether some of these fruits have started to split open. These types of fruit split open at maturity along fine lines called sutures, at which time the seed is released from the opening. If seed is being released, then it is a preferable time to collect.

The colour of the fruit is another indicator of maturity. Generally, immature fruits are green and may be fleshy and soft. Mature or maturing fruit turns brown and slightly woody in many sclerophyll plants.

For small collections of special or rare plants, appropriately mature fruits can be hand-picked from the plant and stored in the field in paper bags. Avoid storing harvested fruits of sclerophyll plants in plastic bags or containers (except for final storage in a freezer) as these promote condensation moisture to develop, which can cause moulds or other diseases to contaminate the seed.

For large, bulk collections of fruits (*Eucalyptus* and *Corymbia* and some *Acacia*), fruiting branches are pruned from the tree or shrub and stored in the field in either large, breathable finely woven cloth bags, or placed on a tarpaulin and the edges pulled up around the fruit collection.

It is important when using pruning equipment (secateurs, parrot beak pruners, pruning saws) to ensure that the equipment is disinfected to prevent the introduction or spread of plant pathogens. Equipment should be dipped and thoroughly cleaned in methylated spirits prior to use, and between working in different areas.

4.5 Seed Drying

After collection in the field, the fruits should be allowed to dry naturally in a freely ventilated, covered but well-lit area. As much of the bulk vegetative material such as leaves and branches should be pruned from the fruits and discarded. Fruits can be transferred to shallow flat-bottomed plastic drying trays/boxes lined with dry newspaper. The newspaper helps wick moisture away and facilitates the seed cleaning process. ALL seed collections must be labelled and dated.

Collections of fruits in tarpaulins should be transferred to the same drying area and similarly have the extraneous leaf and branch matter removed and discarded. The fruits can remain on the tarpaulin, with the edges raised to prevent seed loss.

Fruits stored at the drying stage as described above are left to gradually dry, split open (dehisce) and release the seed. Periodic gentle shaking and agitation of the container helps release seeds from the fruit.

When the majority of the fruits have dehisced, they can be sieved using a fine gauze, and the empty fruit capsules or pods progressively discarded.

The time required for the fruits to release the seeds depends on a number of factors, such as the size of the fruit, the species, and the prevailing drying conditions of air-flow, temperature and humidity. Fruits collected at an immature stage may not dehisce, or if they do, may release sterile seeds.

Beware of vermin during this stage and protect seed collections from mice as well as insects (borers) as deemed fit.

4.6 Seed Storage

Store dried seeds in zip-lock bags, each labelled with the minimum of species name, date collected and location of collection. Enter label details into database or spreadsheet (see later notes).

Seeds can be stored in a chest freezer. Temperatures around -18° C will kill insect larval stages if seed is stored for a minimum of 48 hours. Seed can remain stored in a freezer and will probably retain viability longer (several years for *Acacia* and *Eucalyptus* species).

4.7 Seed Viability

Healthy seed should only be collected and stored, as they have higher viability and the capacity to germinate (germinability).

Seed that is dried up and shrivelled and contains insects (borer holes) is unlikely to germinate. Seeds which are not fully developed in the capsule or pod are also unlikely to germinate. For example, if the seed of wattles (*Acacia* species) are green, it is a good indication the fruit is not fully mature - wattle seeds are mostly black or brown and have hard seed coats.

The seed of some groups of plants such as *Grevillea* have papery or thin seed coats, which can usually be easily broken or cut in half. The inside of a seed (endosperm) with good viability is generally white and firm. Spongy, soft or hollow seeds with brown or black endosperm may be of poor quality or insect damaged and are unlikely to germinate.

Floating seeds in a small container of water is an easy and effective way of determining viability. Healthy seeds will sink, and poor quality seeds will float. This test is best for heavier seeds such as wattles and a few Eucalypts such as Lemon-scented Gum (*Corymbia citriodora*). However, very fine seed of species such as Yellow Stringybark (*Eucalyptus mediocris*), or papery seed (e.g. *Grevillea glauca*), may float and give a false result.

Some species of grass need to be stored for a number of months to break their dormancy; however some species also lose their viability if stored for more than 12 months. Therefore, it may be beneficial to sow grass seed after approximately 8 months of storage. Kangaroo Grass (*Themeda triandra*) is thought to require 12 months of storage to overcome seed dormancy.

4.8 Records for Seed Collection and Storage

A records management system (spreadsheet or database) for seed collection should be designed and regularly maintained and updated with descriptive and quantitative data.

Table 1 outlines the important records and information required to be kept for seed collections and storage.

Table 1. Records data for seed collection and storage.

Category (field name)	Description	Example data entry
Collection identification number	Unique and consecutive running number that identifies each batch of seeds.	0001, 0002, 0003, etc.
Plant species	The scientific name of the plant species.	*Acacia purpureopetala*
Collection date	The date the seed was collected.	21 July 2016
Date of storage	The date the seeds were cleaned and then stored.	22 July 2016
Treatment before storage	Describe treatment (if any) before storage.	Removed from pods.
Storage method	How the seed was stored.	Freezer, in zip -lock bag.
Collector	Name of the person who collected the seed.	Patti Smith
Species description	Short description of species.	Prostrate shrub 25 cm tall.
Species unknown	If species is not known, record as "No" and keep seed pod or capsule and branch specimen for future reference. Forward specimen to botanist for confirmation. Photograph specimen in wild.	Yes
Plants sampled	Approximate number of plants from which the seed was collected.	4
Number collected	Approximate number of seeds collected by weight for bulk collection or number if infrequent species.	40 seeds
Population origin	Are seeds collected from naturally occurring populations or from plantation/nursery crops within wind farm site.	Natural
Site name	A name that allows others to find site.	Between WTG 30 and 31
Coordinate datum	Coordinate datum (preferred GDA94 or WGS84)	GDA94
Coordinate location	GPS coordinates (preferred UTM easting and northing format).	E 328301 N 8098861
Elevation	GPS elevation.	991 m
Natural species frequency	Whether the species is abundant, common or rare.	Very rare
Topography - landform	Description of topography and landform.	Narrow ridge in dissected hills.
Geology	Description of predominant geology.	Rhyolite
Soil	Description of soil texture and structure	Rocky lithosol
Vegetation type	Description of vegetation type and dominant species.	Montane heath on edge of low woodland with *Corymbia abergiana*, *Eucalyptus lockyeri*, *Grevillea glossadenia* and *Homoranthus porteri*.
Restriction on use	Is the species restricted for use at a particular site/area within the wind farm?	Restricted to use between WTG 30 and 31.
Notes	Presence of flowers and buds, heavy crop, unusual timing, etc.	Flowers observed, only few ripe pods.

4.9 Topsoil Management

All soils on the wind farm site are thin, low in fertility and a scarce resource.

Topsoil contains seeds (soil seed bank) of the surrounding native woodlands and vegetation communities. One of the important objectives of rehabilitation of the Mount Emerald Wind Farm site is to allow for natural regeneration to take place along track edges and around WTG footings. Re-spreading topsoil can assist and promote natural regeneration.

During construction when topsoil is being excavated and moved, it should be handled with the intention of re-spreading it as close to the original site where it was taken. This may necessitate stockpiling at relatively short intervals along tracks to avoid mixing soil types and creating stockpiles that are too large. Clearing of additional vegetation to make room for soil stockpiles is not permitted, unless specific authorisation is granted by the Environmental Officer.

Soil stockpiles should be no higher than 1.0 m and should be re-spread within the shortest possible timeframe following construction. Stockpiles older than one year are likely to have considerably lower levels of seed viability.

Excavated soil from weed contaminated sites is NOT to be re-spread. Weed contaminated soil stockpiles are to be quarantined and signage placed in clear view to alert machinery operators that the soil is not be moved or re-spread without authorisation from the Environmental Officer.

4.10 Site Preparation

By default, a majority of the rehabilitation areas will be in the form of the constructed tracks or shaped edges of WTG footings. Turn-out drains, perimeters of site compounds and lay-down areas will also be present.

The ground to be rehabilitated should not be smoothed and compacted. A roughened surface is required to accept seed and capture seed rain from neighbouring remnant vegetation. Any surface treatment with machinery should work parallel with the natural ground contours and not direct or concentrate water flow into one location so that rill and surface erosion is minimised and avoided.

Soil loss from the prepared rehabilitation site will usually result in the loss of seed, which effectively lowers the success rates and quantities of germination and plant establishment. Supplementary erosion and sediment control measures may need to be implemented in some rehabilitation areas.

Additional site preparation in the form of deep ripping is not recommended given the rocky substrate. However, where soil compaction may have occurred, surface scarification may be required. Some sites may require light surface dressing with machinery such as graders to prepare a surface more conducive to access and site treatment. In these circumstances, the lightest machinery capable to efficiently undertake the work is to be used. In most situations the rehabilitation areas will be left in the form following construction and no further disturbance is recommended.

As outlined above, re-spreading topsoil should occur as soon as possible following construction. This will increase the chances of seed germination from the soil seed bank, and helps retain any soil microbial activity that is important in developing healthy soil ecosystems. Seed with relatively short viability (e.g. annual grasses and forbs) also has an improved opportunity to germinate from soil that has been stockpiled for relatively short periods.

4.11 Rehabilitation Timing

It is difficult to prescribe an exact time when rehabilitation of a site should take place; however, a number of important factors usually dictates timing. The following should be considered:

- Do not rehabilitate in very dry times and after a very long period of no rain when the ground is completely devoid of moisture.
- Avoid rehabilitating prior to the prevailing fire season (often October to December, but use local fire information as a guide).
- Avoid re-spreading topsoil and direct-seeding prior to imminent heavy rainfall and storms.
- Direct-seed after heavy rainfall events have tapered off.
- Direct-seeding synchronised with maturing of fruit/seed of woodland trees (*Eucalyptus* and *Corymbia*) may have better results.
- Brush-matting (see later notes) when shrubs or trees are in fruit (not flowering or budding) may improve results.
- Only use tubestock planting in moist soil and where follow-up rain is expected.
- Transplant and translocate plants (cycads, grass trees) quickly when good soil moisture is available. Do not transplant during very hot and dry weather.
- Re-spread topsoil as soon as possible after initial stockpiling.

4.12 Natural Regeneration

This is the process where vegetation is allowed to colonise the edges of disturbed areas without assistance or with very limited human intervention. It can be an effective method, but the results are dependent on a number of factors such as availability of seed in the soil seed bank, plus the quantity of seed remaining/stored in the soil.

Areas which have been deeply excavated or scalped are likely to hold considerably less seed in the soil. It is important therefore to re-spread topsoil over the disturbed area within the shortest possible timeframe following initial disturbance or clearing.

Natural regeneration can be "assisted" by direct-seeding the site with a range of appropriately selected species.

Weed control should be undertaken only as a last resort, as herbicide application is likely to kill most seedlings with could be obscured by grasses. Good weed management in the first place should ensure weed control is kept to the absolute minimum. Early intervention and manual removal of serious grass weeds as they emerge can be effective.

4.13 Direct-seeding

This is the process of spreading plant seeds by broadcasting across the rehabilitation site. In a typical scenario, a number of different species are included in the seed mix. The wind farm site can be adequately direct-seeded by hand application.

When broadcasting seed in the direct-seeding, the seed should be mixed with a bulking carrier, which helps with more even and wider distribution of the seed.

A range of carriers can be considered - all should be guaranteed free from weeds and pathogens. Some carriers includegypsum which has the added benefit of being heavier and will bind to the seed and can improve soil structure by improving the texture of clay soils. The gypsum should be very lightly moistened at the time of mixing with the seed and spreading.

Some seed may need to be treated prior to application. The seed of wattles (*Acacia* spp.) requires softening or scarifying to accelerate germination. A simple method is to pour boiling water over the seed in a container and allow to cool down for four hours or overnight. Seed should then be sown as soon after treatment as possible. *Eucalyptus* seed does not require treatment.

Avoid direct-seeding prior to imminent heavy rainfall and storms, as the seed is likely to be washed from the surface.

4.14 Brush-matting

This technique involves retaining cleared vegetation (especially shrubs) and re-spreading it over the cleared site following construction. The branches or shrubs may be holding fruits, which can disperse seeds back into the site.

The method may have limited success and is reliant on seed being present of the cleared vegetation; nevertheless, the additional function this method introduces into a site is that the branches act as capture points for leaves and seed from adjacent intact vegetation. It can help build soil, reduce erosion and adds a level of naturalness back into an otherwise cleared site.

4.15 Tubestock Planting

This technique requires a comparatively higher level of preparation and maintenance than other, more passive methods of rehabilitation. It involves planting nursery grown seedlings directly into a prepared site. Generally, fertiliser is added to the plant and it is watered - at least at the planting stage.

Given the remoteness of many sections of the wind farm, tubestock plating is probably better reserved for specialist, trial plots close to infrastructure, where water is available and plants can be tended on a more frequent basis.

This method could be considered for trial plots around site compounds. It is also applicable to transplanting specimens of threatened species, grass trees and cycads - all of which will require a relatively high level of maintenance and tensing until the plants are established and able to persist in the landscape unassisted.

All tubestock should be fully sun-hardened and ideally grown from seed as opposed to cuttings or other asexual methods of propagation. However, exceptionally threatened plants such as *Prostanthera* could be trialled through cuttings, given the rarity of the species on the site.

4.16 Plant Translocation

This is a specialised technique involving removing the living plant with its roots intact from the wild and replanting it at a specifically selected recipient site. The method adopts aspects of nursery grown plants in tubestock and pots and therefore requires similar levels of maintenance and tending. The success rates of this method are unproven for many sclerophyll plants and it is generally reserved for threatened species and other plants of conservation interest (e.g. cycads, grass trees and orchids).

A dedicated Translocation Plan has been prepared for the Mount Emerald Wind Farm.

4.17 Hydro-mulching

Hydro-mulching has obvious direct benefits in terms of surface stabilisation; however, the method is prone to a number of inefficiencies and can prove to be problematic in sensitive environments. It is not recommended for use south of the 275 kV powerline because this area is the most sensitive in terms of its high-end ecological integrity and the prevalence of key habitats for threatened plants.

One of the main problems with hydro-mulching is the difficulty in guaranteeing the seed mix does not contain weed seed. Despite its widespread use on road batters in the wet tropics bioregion, virtually all applications have introduced the weedy vine Siratro (*Macroptilium atropurpureum*), which once established is impossible to eradicate.

If hydro-mulching is to be used, it is to be confined to the batter faces created on the northern slopes close to Kippen Drive, and only as a last resort. Any hydro-mulched sites will need to be closely monitored for weed emergence and excessive weed outbreaks recorded as a non-compliance.

4.18 Weed Control and Maintenance

Weeds, especially grasses, prevent or retard the growth of seedlings by out-competing native species for soil nutrients. It is critical therefore to control and manage weeds in all rehabilitation sites.

The Weed Management Plan for the Mount Emerald Wind Farm forms the base document for managing weeds at previously degraded areas as well as at rehabilitation sites. The key objective is to prevent weeds from entering and establishing in rehabilitation sites. Early intervention and control is critical.

4.19 Fire Management

Fire is to be excluded from all rehabilitation sites for a period no less than five (5) years from the time of the original rehabilitation treatment. This time period will allow regenerating vegetation to establish, and grow to a stage of being self-regenerating (flowering and fruiting) and able to contribute seed to the soil seed bank.

5.0 REHABILITATION AREAS

The Mount Emerald Wind farm site has been partitioned into 6 rehabilitation areas. The areas are based on similarities of broad landscape and vegetation characteristics such as topography, degree of surface relief and dissection, elevation, vegetation type and flora composition. These areas are shown inn **Figure 2**. The general descriptions and rehabilitation objectives for each area are given in the following section.

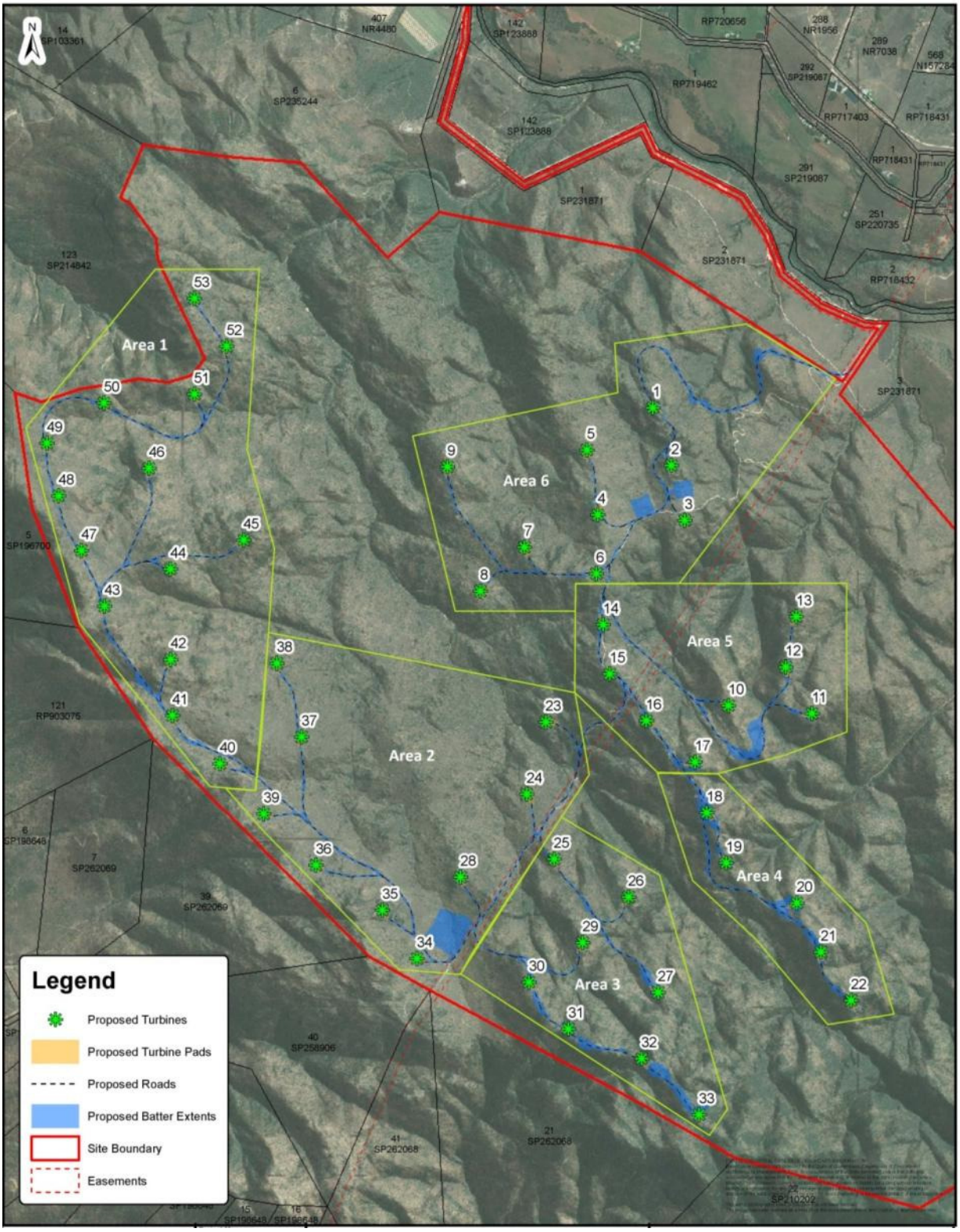
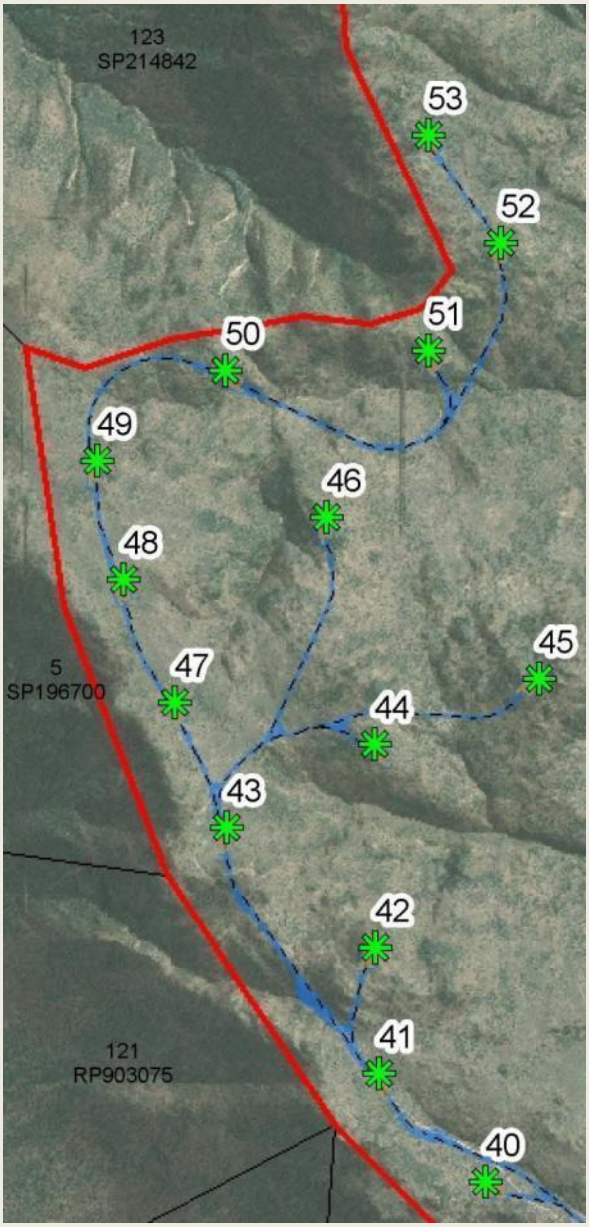


Figure 2. Rehabilitation areas for the Mount Emerald Wind Farm.

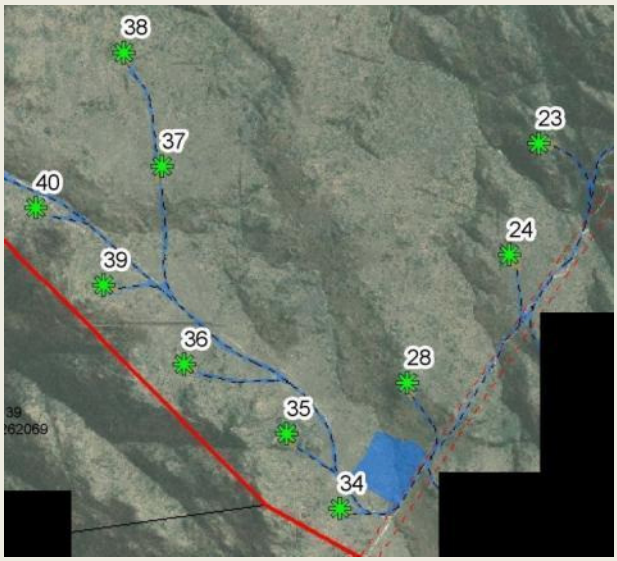
5.1 Rehabilitation Area Descriptions

The plant species in **Table 2** are recommended for specific site situations in relation to the Mount Emerald Wind Farm layout. In situations where tracks or WTG positions have changed due to topographical constraints or repositioning, a review of the group of species for a particular location may have to be made. The species selection is derived from field-based surveys. Species selections are for "arrays" of WTGs, for example, if a string of WTG's occurs on aridge with a continuous tract of vegetation of the same species composition, then the same species are applied.

Table 2.Descriptions of rehabilitation areas.

REHABILITATION AREA 1	
	**AREA DESCRIPTION** Includes WTG's 40 to 53. All tracks and cabling between WTG's. **ENVIRONMENTAL FEATURES** Rolling hills with minor areas of rock outcrop. Clay soils start to develop around southern section of rehabilitation area. Shallow to moderately incised drainage line crossings near WTG 50 and WTG 51. Elevated rocky area around WTG 53 with different species composition. Common trees include *Corymbia citriodora* and *Eucalyptus mediocris*. Large trees of Cypress Pine (*Callitris intratropica*) near WTG 51 close to watercourse crossing. Dominant grass is *Themeda triandra* (Kangaroo Grass). *Arundinella setosa* and *Heteropogon triticeus* (Giant Spear Grass) are also common in places. **REHABILITATION RECOMMENDATIONS** Use field-based observations to determine species composition. Apply specific plant species to unique vegetation types and habitats: watercourse banks, rocky outcrops, flat, clay areas (close to WTG 40 and 41). Do not clear large Cypress Pine trees (*Callitris intratropica*) near watercourse crossing south of WTG 51 or other areas where large specimens of this species are encountered. Avoid clearing any large-class trees (Eucalypts >30 cm dbh, non-Eucalypts >20 cm dbh). Allow and promote natural regeneration of track edges. Limit use of herbicides to absolute minimum and only when necessary. Weed control should be site and species specific and undertaken in accordance with the MEWF Weed Management Plan. Transplant grass trees (*Xanthorrhoea johnsonii*).

REHABILITATION AREA 2



AREA DESCRIPTION

Includes WTG's 23, 24, 28, 34 to 40, Substation and Substation O&M Building.

All tracks and cabling between WTG's.

Spot remedial works under 275 kV powerline.

ENVIRONMENTAL FEATURES

Surrounding rolling hills with isolated and low sections of rock outcrop.

Rock plates and pavements interspersed in flat area.

Large area of relatively flat land with pale, clay soils and slow drainage in some parts.

Well-formed watercourse lined with *Lophostemon grandiflorus* trees.

Open woodland dominated by *Corymbia leichhardtii*, *Callitrisintratropica* and *Eucalyptus lockyeri*. Patches of *E. shirleyi* low woodland. Grass trees (*Xanthorrhoea johnsonii*) are common and form a secondary shrub layer.

Dominant grass is *Themeda triandra* (Kangaroo Grass). In wetter areas adjacent to watercourse, *Pseudopogoantherum contortum* is common. *Schizachyrium pachyarthron* (Fire Grass) over rock plates and pavements.

REHABILITATION RECOMMENDATIONS

Use field-based observations to determine species composition.

Apply specific plant species to unique vegetation types and habitats: watercourse banks, rocky outcrops, flat, clay areas.

Do not clear large *Lophostemon grandiflorus* trees (>20 cm dbh) along watercourse near Substation O&M Building.

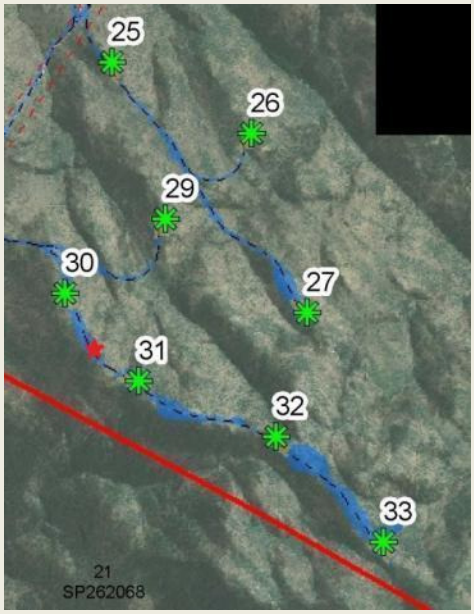
Avoid clearing any large-class trees (Eucalypts >30 cm dbh, non-Eucalypts >20 cm dbh).

Allow and promote natural regeneration of track edges.

Limit use of herbicides to absolute minimum and only when necessary. Weed control should be site and species specific and undertaken in accordance with the MEWF Weed Management Plan.

Transplant grass trees (*Xanthorrhoea johnsonii*).

REHABILITATION AREA 3



AREA DESCRIPTION

Includes WTG's 25 to 27 and 29 to 33 on elevated ridges south of the 275 kV powerline.

All tracks and cabling between WTG's.

ENVIRONMENTAL FEATURES

High elevation ridges (narrow) and dissected hills.

Exposed, wind-swept montane heathland vegetation (stunted trees and shrubs) between WTG 30 and 33.

Concentration of threatened plants and important habitats for ***Acacia purpureopetala*** **(red star on map)**, ***Grevillea glossadenia*** and ***Homoranthus porteri*** between WTG 30 and 31.

Large area of rock pavements between WTG 30 and 32.

Well-developed woodlands south-east of WTG 32 with large class trees.

Shrubland, low woodland and montane heathland dominated by *Acacia aulacocarpa*, *Eucalyptus lockyeri*, *Corymbia abergiana* and *Homoranthus porteri*. Grass trees (*Xanthorrhoea johnsonii*) are common on ridges.

Dominant grasses are *Themeda triandra* (Kangaroo Grass) and *Cleistochloa subjuncea*. Key ground layer species include *Gompholobium nitidum*, *Jacksonia thesioides*, *Zieria whitei*, *Sannantha angusta* and *Grevillea dryandri*.

REHABILITATION RECOMMENDATIONS

Detailed botanical investigation required prior to clearing and rehabilitation.

Use field-based observations to determine species composition.

Apply specific plant species to unique vegetation types and habitats: montane heathland and rocky outcrops.

Do not clear narrow sections of ridge between WTG 30 and 32.

Avoid clearing any large-class trees (Eucalypts >30 cm dbh, non-Eucalypts >20 cm dbh).

Brush-matting material and direct-seeding species to be taken from same ridges and immediately adjacent areas only.

Allow and promote natural regeneration of track edges.

Do not use herbicide between WTG's 30 and 33 - this is a critical environmentally sensitive area.

Transplant grass trees (*Xanthorrhoea johnsonii*).

REHABILITATION AREA 4

AREA DESCRIPTION

Includes WTG's 18 to 22 on elevated ridges south of the 275 kV powerline.

All tracks and cabling between WTG's.

ENVIRONMENTAL FEATURES

Key habitat for threatened plants just north of WTG 18 (***Melaleuca uxorum***) (red arrow).

Habitat for ***Grevillea glossadenia*** along most of ridge.

Large-class trees on south-western slopes and edges of ridge (*Callitris intratropica* and *Eucalyptus reducta*).

Potential habitat for ***Prostanthera clotteniana*** (critically endangered).

Mixture of low woodlands, shrublands and heathland. Taller woodlands on south-west slopes. Ridge vegetation dominated by *Corymbia abergiana*, *Eucalyptus lockyeri*, *E. mediocris*. Sections of taller *E. reducta*.

Heathy shrub layer of *Jacksonia thesioides*, *Acacia calyculata* and *Xanthorrhoea johnsonii* (Grass Tree)

Main grasses include *Themeda triandra* (Kangaroo Grass) and *Cleistochloa subjuncea*, with *Lepidosperma laterale* (Flat Sedge) under *E. reducta*.

REHABILITATION RECOMMENDATIONS

Detailed botanical investigation required prior to clearing and rehabilitation.

Avoid clearing any large-class trees (Eucalypts >30 cm dbh, non-Eucalypts >20 cm dbh), especially old Cypress Pines (*Callitris intratropica*) and Range Bloodwood (*Corymbia abergiana*).

Brush-matting material and direct-seeding species to be taken from same ridges and immediately adjacent areas only.

Direct-seed open rocky areas with *Acacia calyculata*, *Jacksonia thesioides*, *Themeda triandra*, *Cymbopogon bombycinus* and *Xanthorrhoea johnsonii*.

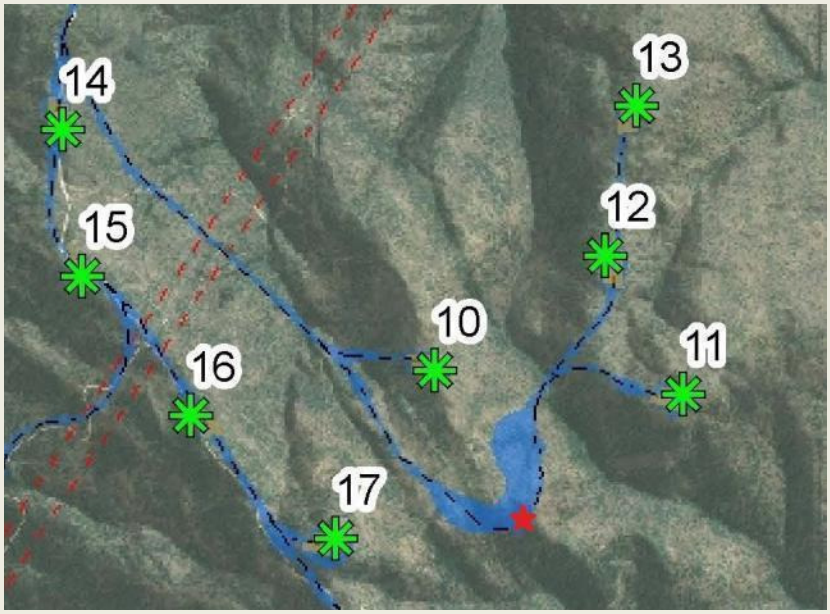
Supplement seed mix with locally occurring legumes (*Hovea nana*, *Galactiatenuiflora*, *Cajanus marmoratus*, *C. confertiflora*, *Crotalaria montana*).

Allow and promote natural regeneration of track edges.

Do not use herbicide between WTG's 18 and 22 - this is an environmentally sensitive area.

TranslocateGrass Trees (*Xanthorrhoea johnsonii*).

REHABILITATION AREA 5



AREA DESCRIPTION

Includes WTG's 10 to 17 on exposed eastern hills.

All tracks and cabling between WTG's.

Watercourse crossing under powerline and west of WTG 16.

ENVIRONMENTAL FEATURES

Sections of heathland with *Pseudanthus ligulatus* and *Borya septentrionalis* on rock pavements.

Threatened plants (*Prostanthera clotteniana* and *Grevillea glossadenia*) on ridges and around rock pavements.
Location of ***Prostanthera clotteniana*** (critically endangered) on track u-bend SSE of WTG 10 - **red star on map**.

Grevillea glossadenia along existing track under powerline, at WTG 10 and between WTG 11 and 13.

Large groves of mature and very well-developed cycads (*Cycas media*) in valley east of WTG 10.

Woodlands of *Corymbia abergiana* (on ridges), *Eucalyptus cloeziana*, *E. lockyeri*, *E. mediocris* and *Callitris intratropica*. *E. reducta* near WTG 17 and in some eastern gullies and dissected slopes.

Disjunct occurrence of woodland with *Eucalyptus pachycalyx* south-east of WTG 15.

At higher elevation, often a heathy shrub and ground layer with *Acacia calyculata*, *Xanthorrhoea johnsonii*, *Melaleuca borealis* and *Borya septentrionalis* on rock pavements.

Common grasses include *Themeda triandra* (Kangaroo Grass), *Cymbopogon bombycinus*, *Cleistochloa subjuncea* (rock outcrops), and *Arundinella setosa* and *Mnesithearottboellioides* (both under woodland).

REHABILITATION RECOMMENDATIONS

Pre-clearing survey for threatened plants prior to clearing and rehabilitation.

Avoid clearing any large-class trees (Eucalypts >30 cm dbh, non-Eucalypts >20 cm dbh), especially old Cypress Pines (*Callitris intratropica*), Range Bloodwood (*Corymbia abergiana*) and *Eucalyptus pachycalyx* (Pumpkin Gum).

Brush-matting material and direct-seeding species to be taken from same ridges and immediately adjacent areas only.

Avoid clearing groves of Cycads (*Cycas media*) in the valley east of WTG 53.

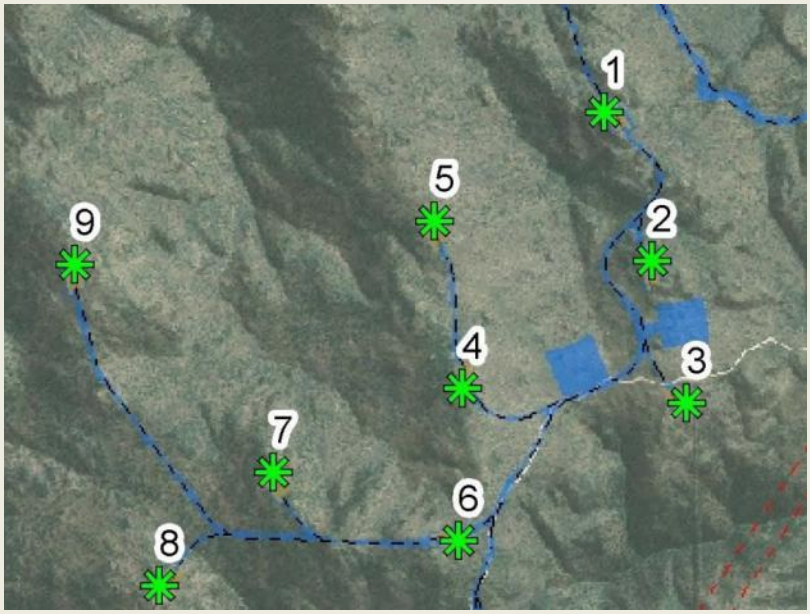
Allow and promote natural regeneration of track edges.

Only use herbicide as a last resort in this rehabilitation area - this is an environmentally sensitive zone.

Transplant grass trees (*Xanthorrhoea johnsonii*) and cycads (*Cycas media*).

Control priority weeds at watercourse crossing (*Melinis minutiflora*, *Cenchrus polystachyum*, *Urochloa decumbens*).

REHABILITATION AREA 6



AREA DESCRIPTION

Includes WTG's 1 to 9.

All tracks and cabling between WTG's.

Approach tracks from Kippen Drive and the northern slopes.

Contractors Site Compound and Laydown Area.

ENVIRONMENTAL FEATURES

Rolling hills with woodlands.

Sections of flat land interspersed with rock plates and pavements.

Incidences of priority weeds (Grader Grass - *Themeda quadrivalvis*) on northern approach track from Kippen Drive.

Woodlands of *Corymbia leichhardtii*, *Eucalyptus cloeziana*, *E. lockyeri*, *Callitris intratropica* with a heathy shrub layer of *Acacia calyculata*, *Jacksonia thesioides*, *Exocarpos cupressiformis* and *Xanthorrhoea johnsonii* (Grass Tree). Some areas of ironbark (*E. drepanophylla*) and Variable-barked Bloodwood (*Corymbia erythrophloia*).

Flat areas dominated by Kangaroo Grass (*Themeda triandra*). Woodlands on slopes and hills with a grassy ground layer of *T. triandra*, *Mnesithea rottboellioides*, *Arundinella setosa* and *Heteropogon triticeus*. Weedier native grasses such as *H. contortus* at lower elevation in hills and around Kippen Drive.

Main population area for ***Plectranthus amoenus*** around WTG's 1 to 3.

Outlier population of ***Homoranthus porteri*** on rock pavement at WTG 7.

REHABILITATION RECOMMENDATIONS

Translocate specimens of *Plectranthus amoenus*.

Control priority weeds in rehabilitation area: *Melinis minutiflora* (Molasses Grass), *Themeda quadrivalvis* (Grader Grass). Prevent spread of Grader Grass further into site.

Limit site disturbance at rock pavement sites (habitat for *Plectranthus amoenus*).

Progressively control weeds on Kippen Drive management area and replace with direct-seeded wattle thickets.

Decrease use of herbicide at rehabilitation sites until thickets of wattles have established.

Allow and promote natural regeneration of track edges.

Translocate Grass Trees (*Xanthorrhoea johnsonii*).

5.2 Rehabilitation Plant Species Schedule

A rehabilitation plant species schedule is given in **Appendix A**. The plant species in the schedule may be suitable for rehabilitation in various parts of the wind farm site. The list is not inclusive and is intended as a guide. In all rehabilitation scenarios, particularly in important habitats such as south of the 275 kV powerline, site based observations of the flora composition of the adjacent remnant vegetation should provide the most accurate indication of the most appropriate species to be used at the rehabilitation site.

6.0 REHABILITATION MONITORING

The effectiveness of rehabilitation will be measured and assessed by designing and implementing a monitoring program. The purpose of monitoring is to measure successful rehabilitation and also record unsuccessful rehabilitation. The information gained from monitoring observations and records will inform the development of improved techniques and site treatments.

Rehabilitation areas are to be monitored from fixed plots twice yearly to assess the levels of success of the treatment and the development of vegetation on previously cleared land. Data will be compared to the adjacent remnant, undisturbed vegetation community from which baseline vegetation condition and composition information will be recorded.

6.1 Monitoring Components

The following monitoring components will be recorded and assessed for a period of five (5) years commencing at the start of the operational stage of the wind farm:

- Photographic record (fixed photo points: north, south, east west, ground cover, others).
- Percentage ground cover (living plants, leaf litter, rock, bare ground, coarse woody debris).
- Ratio of woody plants to grasses (functional groups).
- Species composition.
- Species dominance (if recordable).
- Recruitment of native species (species, prevalence, common species, thicket formation).
- Presence of threatened species (from resprouting or seeding).
- Successful versus unsuccessful species germination in direct-seeded plots.
- Plant mortality.
- Weeds (cover, species, type: grasses, broadleaf, vines, shrubs).
- Pathogens and insects (dieback, sooty mould, thrips, lerps-physillids, mealy bugs, borers).
- Fire influence and damage (regrowth after fire).
- Animal damage (wallabies, pigs, bettongs).
- Human damage (trampling, new tracks, off-target herbicide application, vandalism) .
- Natural damage (desiccation/drought, wilting, dieback, frost, wind burn).

6.2 Monitoring Sites

Fixed monitoring sites are to be established across the wind farm where rehabilitation takes place. Monitoring sites are to account for discrete vegetation communities. The monitoring site locations given in **Table 3** are given as a guide and are provisional. Refining the location of the sites can occur at the field-based level.

Baseline floristic and vegetation data for the adjacent remnant community at each monitoring site will need to be compiled.

Table 3.Provisional location of rehabilitation monitoring sites.

Site ID	Location	Rehabilitation situation and baseline vegetation
R001	Terminus of Kippen Drive where it meets the base of the hills of the wind farm site.	Weed degraded road verges with priority weeds (Grader Grass). Non-remnant vegetation. Regrowth with *Melaleuca viridiflora*.
R002	Near WTG 3 and Contractors Site Compound	Remnant woodland of *Corymbia leichhardtii*, *Eucalyptuslockyeri*, *E. shirleyi*, *Callitris intratropica*. With a heath ground and lower shrub layer of *Themeda triandra*, *Jacksonia thesioides*, *Acaciacalyculata* and *Xanthorrhoea johnsonii*. Weed-free at pre-construction.
R003	Near WTG 7	Remnant woodland with rock pavements. Woodland of *Eucalyptus cloeziana*, *Callitris intratropica*, *Corymbia citriodora* and *C. leichhardtii*. Ground and shrub layers include *Themeda triandra*, *Arundinella setosa*, *Jacksonia thesioides*, *Acacia calyculata* and *Xanthorrhoea johnsonii*. A healthy, disjunct population of *Homoranthus porteri* grows on a rock pavement close to WTG 7. Weed-free at pre-construction.
R004	Near WTG 18	Ridge with sections of rock pavement and remnant low woodland to shrubland of *Eucalyptus lockyeri*, *E. mediocris*, *E. reducta* on west-facing slopes, *Corymbia abergiana*, *C. citriodora* and *Callitris intratropica*. Shrub and ground layers include *Themeda triandra*, *Grevillea glossadenia*, *Jacksonia thesioides*, *Acacia calyculata* and *Xanthorrhoea johnsonii*. *Melaleuca uxorum* is north of WTG 18 site just below wind monitoring tower. Site is prone to hot fires. Weed-free at pre-construction.
R005	Near substation O & M building	Remnant woodland over relatively flat land interspersed with rock plates. Woodland of *Corymbia leichhardtii*, *Callitris intratropica*, *Eucalyptus shirleyi* with *E. lockyeri*. Ground layer of *Themeda triandra*, *Arundinella setosa*, *Jacksonia thesioides*, *Acacia humifusa* and *Xanthorrhoea johnsonii*. Weed-free at pre-construction.
R006	Between WTG 30 and 33	Remnant montane heathland on narrow ridge at high elevation. Adjacent to low woodland and shrubland complex. Location of important populations of *Homoranthus porteri* and close to *Acacia purpureopetala*. Remnant species include *Acacia calyculata*,*A. aulacocarpa*, *Jacksonia thesioides*, *Grevillea dryandri*, *Zieria whitei*, *Sannantha angusta*, *Boronia occidentalis*, *Leptospermum neglectum*, *Mirbelia pungens*, *M. speciosa* subsp. *ringrosei*, *Grevillea glossadenia*, *Homoranthus porteri*, *Pseudanthus ligulatus*, *Gompholobium nitidum*, *Themeda triandra*, *Cleistochloa subjuncea*, *Cymbopogon bombycinus* and *Xanthorrhoea johnsonii*.
R007	Near WTG 47	Remnant woodland of *Corymbia citriodora*, *C. leichhardtii*, *Jacksonia thesioides*, *Xanthorrhoea johnsonii*, *Themeda triandra* with *E. mediocris*.

6.3 Monitoring Surveys

Detailed botanical surveys are to be completed every six (6) months following construction and during the monitoring period. The purpose of the surveys is to record the species composition and recruitment into rehabilitation areas at the fixed rehabilitation monitoring sites.

6.4 Rehabilitation Performance Indicators

The following descriptions of indicators of rehabilitation success and establishment of vegetation on cleared land will be used to inform improved techniques, methods and treatments for rehabilitation areas.

Natural regeneration: after construction is completed, the cleared width of tracks is colonised incrementally by native vegetation until a track width of 5 m is achieved. Areas of weeds do not constitute rehabilitation vegetation cover.

Erosion and surface stability: twelve (12) months after rehabilitation treatment, erosion should be minimal and adequately managed by rehabilitation and erosion and sediment control, or a combination of both if deemed necessary. Rill erosion should be minimal with a maximum tolerance of 100 mm depth. There should be zero tunnel erosion. Surface runoff is managed to a level where rehabilitation surfaces retain topsoil, collect leaf litter and other plant matter, and have active plant growth.

Ground cover: twelve (12) months after rehabilitation treatment, the ground has 70% vegetative cover (grasses, shrubs and forbs) or greater when compared with the adjacent remnant vegetation of the same type as the pre-disturbed area. For example, if the adjacent remnant condition ground cover is measured as 60%, then the rehabilitation site should have 70% of that cover (i.e. 42% ground cover comprising grasses, shrubs and forbs).

Species composition: the plant species composition is a reflection of diversity, which contributes to ecological function. Twelve (12) months after the rehabilitation treatment, the species composition at the rehabilitation site should consist of two species or greater of grasses, shrubs and forbs found in the adjacent remnant vegetation of the same type as the pre-disturbed area.

Species recruitment: the recruitment into rehabilitation sites of key species of different vegetation and habitat types as outlined in this document is an indication of potentially successful establishment and development of rehabilitated vegetation. Similarly, the presence and recruitment of threatened species into a rehabilitation site is a positive outcome and can demonstrate the development of niche habitats. Threatened species such as *Grevillea glossadenia* may colonise rehabilitation sites with rocky soils near and south of the 275 kV powerline.

Species resilience and mortality: twelve (12) months after rehabilitation treatment, plants in the rehabilitation area should be actively growing and demonstrating good signs of establishment. There should be no signs of wilting, dieback, atypical deciduousity, foliage discoloration or disease. Mortality rates should be no higher than 5% for a single species.

Weeds: twelve (12) months after rehabilitation treatment, there should be no evidence of priority weeds as identified in the Weed Management Plan for the Mount Emerald Wind Farm. Other deleterious weeds with a wider distribution in woodlands on the site such as Praxelis (*Praxelis clematidea*) and Red Natal Grass (*Melinis repens*) are not to occupy an area greater than 5% of the rehabilitation site's total area. Successive monitoring events should record a decline in the presence of any weed species when compared to the previous monitoring event.

Kippen Drive access point: the section of Kippen Drive which constitutes part of the management area of the Mount Emerald Wind Farm is to be progressively rehabilitated along both road verges. Twelve (12) months following completion of construction, all linear sections of Grader Grass (*Themeda quadrivalvis*) and other priority weeds as identified in the Weed Management Plan for the Mount Emerald Wind Farm do not reach a stage of flowering and setting seed.

Grader Grass is regularly controlled by scheduled slashing and herbicide application (if necessary) and replacement of this weed by thickets of wattles (*Acacia simsii*, *A. holosericea* and *A. leptostachya*, plus other native species) is evident for a minimum of 50% of the length of the management area. After three (3) years following construction, Grader Grass along the management section of Kippen Drive and incidences within the wind farm is to be excluded or adequately managed to a stage where the grass is no longer problematic. At this stage, thickets of wattles and other native species are the dominant vegetation cover in the Kippen Drive management area.

Habitat reinstatement: habitat for flora and fauna is maintained or reintroduced at the rehabilitation site. This includes the presence of intact rocky outcrops, tree hollows, large-class woody debris (fallen logs). Plant species diversity is included in this performance indicator, and the greater the plant diversity, the greater the value of the site as habitat for flora and fauna. Low diversity sites where for example, one or two plant species take dominance (e.g. *Acacia* species) should be assessed as to whether remedial planting or seeding is required to bolster species diversity. Vegetation thinning may also be considered for dense and tall stands of wattles, where the thickets preclude further species recruitment, but should only be undertaken after consultation with an appropriately skilled botanist or ecologist.

Increase in critical habitat: Any area increases in functional critical habitat for threatened plants will be recorded as a positive rehabilitation outcome. Decreases in areas of this type of habitat, plus decreases in areas of undisturbed vegetation types will be recorded as a non-compliance.

Translocation: plants identified as potential candidates for translocation within the site become established and able to survive without intervention at the recipient site.

6.5 Monitoring Indicator Plants

The species outlined in **Table 4** are found at various locations around the wind farm site in remnant types of undisturbed vegetation, and can act as indicators of vegetation development and habitat function. The column labelled *importance* provides an indication of the species' occurrence within the vegetation type, and can be used as guide for rehabilitation monitoring. The list is not inclusive. For example, the presence of *Cryptandra debilis* in heathland vegetation as a recruited species is a strong indication of functional habitat development at the rehabilitation site. See also more inclusive species information in **Appendix A**.

Table 4.Selected plant species found in the wind farm site and their habitats.

Species	Form	Landscape habitat	Importance
Acacia aulacocarpa	Shrub	Around and on rock pavements and tops of rocky drop-offs.	Key species
Acacia calyculata	Shrub	Ridges, woodlands, track edges.	Key species
Acacia flavescens	Tree	Taller woodlands adjacent to ridges (see *Eucalyptus reducta*).	Key species
Acacia multisiliqua	Shrub	Woodlands and track edges.	Desirable
Acacia nesophila	Shrub	Woodlands with grassy ground layer.	Desirable
Acacia purpureopetala	Shrub	Ridge top under thickets of *Homoranthus porteri* and *A. aulacocarpa* between WTG 35 and 36.	Desirable
Acacia whitei	Shrub	High elevation ridges and edges of rock pavements.	Key species
Allocasuarina inophloia	Tree	Patchily distributed, but associated with montane heathlands and rocky, exposed areas.	Desirable
Allocasuarina littoralis	Tree	Patchily distributed on ridges and flatter areas.	Key species
Alloteropsis semialata	Grass	Woodlands and track edges.	Desirable

Species	Form	Landscape habitat	Importance
Arundinella setosa	Grass	Woodlands and track edges.	Key species
Bursaria incana	Shrub	Woodlands and track edges.	Desirable
Bursaria tenuifolia	Tree	Restricted to rocky bank environment of watercourses.	Key species
Cajanus confertiflorus	Shrub	Woodlands and track edges.	Desirable
Callitris intratropica	Tree	Around rock pavements and rocky areas. Open woodlands.	Key species
Cleistochloa subjuncea	Grass	Frequent grass of very rocky soil areas and ridges.	Key species
Coronidium newcastlianum	Forb	All areas.	Optional
Corymbia abergiana	Tree	Ridges and edges of woodlands at high elevation.	Key species
Corymbia citriodora	Tree	Woodlands and track edges.	Key species
Corymbia erythrophloia	Tree	Mainly in woodlands on the northern slopes of the wind farm site.	Desirable
Corymbia leichhardtii	Tree	North of the 275 kV powerline, less so south of powerline.	Key species
Chrysopogon fallax	Grass	Woodlands	Key species
Cryptandra debilis	Shrub	Rock pavements and rocky outcrops.	Desirable
Cymbopogon bombycinus	Grass	Woodlands, ridges and rocky soil areas.	Desirable
Dianella nervosa	Grass-like	Woodlands and track edges.	Desirable
Eucalyptus cloeziana	Tree	Woodlands and track edges.	Key species
Eucalyptus drepanophylla	Tree	Woodlands in north of site and scattered south of powerline.	Desirable
Eucalyptus lockyeri	Tree	Ridges and track edges.	Key species
Eucalyptus mediocris	Tree	Woodlands, track and ridge edges.	Key species
Eucalyptus reducta	Tree	Denser/taller woodlands and protected slopes, track edges.	Desirable
Eucalyptus shirleyi	Tree	Around the substation and O & M building and north of the 275 kV powerline. Less common on ridges south of powerline.	Key species
Gompholobium nitidum	Shrub	Ridges and woodlands - with heath component.	Desirable
Grevillea dryandri	Shrub	Woodlands and ridges, also in montane heath.	Desirable
Grevillea glauca	Tree	Woodlands and track edges.	Desirable
Grevillea glossadenia	Shrub	Ridges and track edges.	Key species
Heteropogon triticeus	Grass	Woodlands	Key species
Homoranthus porteri	Shrub	Ridge between WTG 35 and 39, also at WTG 66.	Desirable
Jacksonia thesioides	Shrub	Woodlands, ridges and around rock pavements.	Key species
Lophostemon grandiflorus	Tree	Dominant tree of rocky watercourses.	Key species
Melaleuca borealis	Grass	Track edges, rock pavements.	Key species
Melaleuca viridiflora	Tree	Clay soil areas in centre of site. Sporadic in woodlands.	Desirable
Pseudopogoantherum contortum	Grass	Clay soils adjacent to watercourses.	Key species
Schizachyrium pachyarthron	Grass	Rock pavements, flat rocky areas in woodlands.	Key species
Setaria surgens	Grass	Track edges, woodlands.	Desirable
Themeda triandra	Grass	Woodlands, edges of rocky outcrops.	Key species
Xanthorrhoea johnsonii	Grass Tree	Widespread as secondary shrub layer species.	Key species

6.6 Review and Evaluation of the Rehabilitation Plan

The Mount Emerald Wind Farm Rehabilitation Plan has a currency for the life of the project and includes the stages of construction, operation and decommissioning. A major review of the plan will be undertaken after a period of five (5) years from construction.

Updates, amendments and corrections to the plan will be made annually to reflect changes to rehabilitation areas, techniques and treatments applied and other related matters as relevant at the time of review.

It is the responsibility of the Principal Contractor and the Environmental Officer to instigate the review process and contribute to the review.

Changes, modifications and amendments to the plan may be required on an annual basis, or earlier if necessary. These changes should reflect improved management actions and rehabilitation techniques.

6.7 Reporting and Recordkeeping

An annual Rehabilitation Quality Assurance report is to be compiled, which will report on the following:

- Descriptions of the rehabilitation treatments used in mitigating impacts to cleared land.
- A complete record of all plant species used for rehabilitation, and broken down to the rehabilitation site level.
- Rehabilitation site mapping showing the location and identifying name of each rehabilitation and monitoring site.
- The specific treatment in which the species were applied. This information is to include the data associated with seed collection, which should be extracted from the seed collection management database.
- An annotated photographic catalogue of all rehabilitation sites. Photos are to be taken from fixed positions within the monitoring plots.
- The baseline remnant vegetation information including detailed stratified descriptions of the adjacent vegetation community to each rehabilitation site.
- The indicators used to measure and assess rehabilitation performance and vegetation development at formerly cleared sites.
- Records of plant mortality as well as records of species dominance or good performance at a site.
- Records of non-compliance (off-target weed control, vehicle damage etc).
- Records of weeds being introduced by contractor revegetation methods (e.g. Siratro in hydro-mulch mixes).
- Recommendations for corrective actions, and if implemented prior to the annual report, the dates, types and effectiveness of the corrective actions.
- An annual rehabilitation audit report by an independent monitoring botanist or suitably qualified person.

7.0 ROLES AND RESPONSIBILITIES

The Principal Contractor, contractors, sub-consultants and personnel have a responsibility to minimise the area of disturbance during construction, operation and decommissioning of the Mount Emerald Wind Farm to maintain the area of land requiring rehabilitation at the minimum which is able to be adequately and efficiently managed.

7.1 Principal Contractor

The Principal Contractor of the Mount Emerald Wind Farm project is responsible for:

- Implementing and updating this Rehabilitation Plan.
- Managing and directing the progressive and on-going collection and supply of appropriate plant species for use in rehabilitation.
- Prioritising rehabilitation of areas according to this Rehabilitation Plan.
- Ensuring the best techniques of rehabilitation are applied to respective areas.
- Ensuring skilled and qualified contractors and workers are engaged in rehabilitation.
- Providing specific training relating to the unique environmental characteristics of the wind farm site and how they relate to the specialised rehabilitation approaches.
- Ensuring the highest possible quality of rehabilitation is achieved through continuous improvement and adoption of best practice.
- Maintaining records of inductions and training given to contractors, sub-consultants and workers.
- Implementing a rehabilitation monitoring program and compiling scheduled monitoring reports in accordance with this rehabilitation plan.
- Investigating and taking corrective actions in relation to poor rehabilitation performance and unsuccessful approaches to rehabilitation.

7.2 Contractors, Sub-consultants and Personnel

Contractors, sub-consultants and personnel engaged in work practices related to rehabilitation of the wind farm site are responsible for:

- Fulfilling duties as directed by the Principal Contractor in relation to site rehabilitation.
- Identifying significant habitats for flora and fauna, and ensuring rehabilitation work methods are of a standard that avoids or minimises harm to the natural environment.
- Undertaking site-specific land rehabilitation inductions and training before commencing work. All inductions must be signed off by the Principal Contractor after completion.
- Complying with the Rehabilitation Plan requirements as directed by the Principal Contractor.
- Reporting to the Principal Contractor weed outbreaks or modification of rehabilitation areas.
- Requesting further advice and clarification from the Principal Contractor in relation to seed collection and species selection, uncertainties and knowledge gaps before proceeding with the related task.
- Ensuring the equipment and products used for land rehabilitation is legal, in safe working condition, hygienically clean and is free of weed seed and pathogens.

APPENDIX A

Rehabilitation Plant Schedule

TREES		
Species	**Common Name**	**Notes**
Acacia flavescens	Primrose Ball Wattle	In sheltered woodlands often with *Eucalyptusreducta*.
Allocasuarina inophloia	Hairy Oak	Tree of high elevation areas and rocky soils mostly south of powerline and in western parts of site.
Allocasuarina littoralis	Black She-oak	A tree of disturbance areas as well as wind-battered ridges and slopes. Widespread but diffuse distribution in more rugged woodlands. Key species.
Alphitonia excelsa	Red Ash	Woodlands in the centre of the site on flatter ground.
Callitris intratropica	Cypress Pine	In all woodlands, particularly where rocky outcrops and rock pavements occur. Rare directly on ridges, but found along edges. Key species.
Corymbia citriodora	Lemon-scented Gum	In all woodlands but less frequent directly on ridges, where it is replaced by *Corymbia abergiana*, *Eucalyptuslockyeri* and *E. mediocris*. Key species.
Corymbia erythrophloia	Variable-barked Bloodwood	Confined more towards the drier northern slopes and aspects of the wind farm site. Also found as scattered trees in the interior.
Corymbia intermedia	Pink Bloodwood	Found in more sheltered woodlands south of the powerline with longer-term moisture availability. Often associated with *Eucalyptusreducta*.
Corymbia leichhardtii	Rustyjacket	Widespread tree of woodlands and a key species in many areas. Less frequent or absent from ridges south of the 275 kV powerline. Common north of the powerline.
Eucalyptus cloeziana	Dead Finish/Gympie Messmate	Widespread in most woodlands, and particularly closer to the powerline. Key species.
Eucalyptus crebra	Ironbark	Confined more towards northern hills of wind farm site. rare south of the powerline.
Eucalyptus lockyeri	No common name	Widespread in a range of woodlands from the north adjacent to the access track and south of the powerline, where it is a key species of the ridges.
Eucalyptus mediocris	Inland White Mahogany (often called Yellow Stringybark in NQ)	Widespread and similar in distribution to *E. lockyeri*. Key species.
Eucalyptus pachycalyx	Pumpkin Gum	Restricted distribution to woodlands on rocky soils near the powerline.
Eucalyptus reducta	White Stringybark	Woodlands in gullies and wetter slopes. Mostly found south of the powerline.
Eucalyptus shirleyi	Silver-leaf Ironbark	Occurs in patches, but is most common in centre of site north of powerline. Scattered trees along ridges.
Ficus obliqua	Fig	Usually a lithophyte (growing on rocks) in woodland drainage lines.
Larsenaikia ochreata	Native Gardenia	Woodlands, rocky ridges and occasionally on or near rock pavements. Widespread but occasional species.
Lophostemon grandiflorus	Northern Swamp Box	Use at watercourse crossings and along rocky drainage lines. Key species on watercourses.

TREES (continued)		
Species	**Common Name**	**Notes**
Lophostemon suaveolens	Swamp Mahogany	Scattered distribution in woodlands and near watercourses on clay soils.
Melaleuca monantha	Minute-leaved Paperbark	Unusual and patchy distribution from northern slopes to an occurrence south of the powerline near WTG 48. In open woodlands. Also common along Kippen Drive.
SHRUBS		
Species	**Common Name**	**Notes**
Acacia aulacocarpa	Hickory Wattle	Key species of exposed rock pavements, outcrops and ridges south of powerline. Scattered in northern areas.
Acacia calyculata	A wattle	Very common in all woodlands and settings. Key species.
Acacia holosericea	Silky Wattle	Found along Kippen. Not in wind farm site. Restrict use to Kippen Drive and lower northern slopes.
Acacia humifusa	A wattle	Rocky soils often near or on rock pavements.
Acacia leptostachya	Townsville Wattle	Isolated along Kippen Drive. Not found in wind farm footprint. Good for use along Kippen Drive.
Acacia multisiliqua	A wattle	Scattered woodland species.
Acacia nesophila	A wattle	Scattered woodland species.
Acacia simsii	Sim's wattle	Thicket forming wattle of disturbed woodlands and track edges. Would be well-suited for use along Kippen Drive and northern tracks. Limit use south of powerline.
Acacia umbellata	Umbellata Wattle	Patchy distribution, sometimes on shallow clay soils near rock pavements, but locally common.
Acacia whitei	A shrub	Restricted to high elevation ridges south of the powerline. key species in relation to threatened plants.
Alyxia spicata	Chain Fruit	A scrambling shrub of rocky outcrops and fire-protected niches. Sometimes found growing in association with *Homalium brachybotrys*, old *Callitris intratropica* trees, *Maytenus disperma* and other semi-vine thicket species.
Breynia oblongifolia	Dwarf Apple	Woodlands across the site.
Bursaria incana	Prickly Pine	Widespread but scattered in all woodlands.
Bursaria tenuifolia	Sweet Boxthorn	Use on banks of watercourses and drainage lines. Key species in this situation.
Cajanus confertiflorus	A shrub	Scattered but locally common in grassy woodlands more to the north of the powerline.
Dodonaea lanceolata var. *subsessilifolia*	Hop Bush	Widespread species of all woodlands and situations. tends to respond to disturbance.
Cryptandra debilis	No common name	Rock pavements and exposed ridges at higher elevation. key indicator species of healthy vegetation development.
Gastrolobium grandiflorum	Heart-leaf Poison Bush	Scattered but common in patches across site. More frequent south of powerline.

SHRUBS (continued)		
Species	**Common Name**	**Notes**
Gompholobium nitidum	Gompholobium	Common species of heath vegetation on ridges and higher woodlands. Grows in association with *Jacksoniathesioides* and *Grevillea dryandri*. Key species.
Grevillea glauca	Bushman's Clothes Pegs	Woodland species - responds well to direct seeding individual seeds planted in ground just after wet season.
Grevillea glossadenia	A shrub	Restricted to south of the powerline of just north of it. Key species of rocky soils.
Grevillea parallela	Beefwood	Woodland species across the site.
Hibbertia stirlingii	No common name	Rock pavements and exposed ridges in the western section of the site.
Homoranthus porteri	No common name	Thicket forming shrub mainly south of powerline on ridge between WTG35 to 39. Outlier population near WTG 66. Grows on rock pavements and very rocky, almost bare surfaces.
Indigofera bancroftii	No common name	Restricted to high elevation ridges and very rocky sites mainly south of the powerline, but scattered in the north of the site.
Indigofera pratensis	Forest Indigo	Scattered in woodlands across the site.
Jacksonia thesioides	Broom Bush	Widespread in woodlands across site and important species of ground layer of heath vegetation. Key species.
Leptospermum amboinense	Teatree	Thicket forming shrub on exposed rocky ridges south of powerline and at high elevation.
Leptospermum neglectum	Teatree	Shrub of exposed ridges south of powerline and in heath vegetation at high elevation.
Melaleuca borealis	No common name	An important shrub of rock pavement areas and their perimeters. Found mostly near and south of the powerline. Key species.
Melaleuca uxorum	No common name	Very restricted species found just north of WTG 18 on an exposed rocky ridge.
Melaleuca viridiflora	Broad Leaf Paperbark	Woodlands and clay soil areas in centre of site, where it is a key species.
Mirbelia speciosa subsp. *ringrosei*	Mirbelia	Restricted to Rehabilitation Area 3 at high elevation. Shrub of heath vegetation and exposed ridges. Indicator species of habitat function.
Persoonia falcata	Geebung	Woodlands across most aspects of the site.
Petalostigma banksii	Quinine Bush	Mostly in open woodlands at base of northern slopes and along Kippen Drive. Rare in interior of wind farm site.
Petalostigma pubescens	Quinine Bush	Often a stunted shrub of woodlands - widespread.
Pimelea sericostachya	Pimelea	Woodlands and slopes across the site.
Platysace valida	Platysace	Woodlands - widespread, but more common to south of site on rocky soils.

SHRUBS (continued)		
Species	**Common Name**	**Notes**
Pogonolobus reticulatus	Medicine Bush	Woodlands mainly north of the powerline on rolling hills.
Pseudanthus ligulatus	No common name	Rock pavements, heath and high elevation ridges. Key indicator species of vegetation health and development.
Pultenaea millarii	A shrub	Woodlands across the site, although more common in marginally protected woodlands with *E. reducta*. Also found in heath vegetation.
Sannantha angusta	No common name	Grows on exposed ridges south of powerline mostly between WTG 30 and 33 at high elevation. Indicator species of heathland health.
Zieria whitei	No common name	Exposed ridges and rocky areas south of the powerline at high elevation. Indicator species of good vegetation development.
GRASSES		
Species	**Common Name**	**Notes**
Arundinella setosa	Reed Grass	Widespread in woodlands but not on ridges or rock pavements. Key species.
Cleistochloa subjuncea	No common name	Ridges and rocky slopes. Key species.
Cymbopogon bombycinus	Silky Oilgrass	Woodlands, prefers rocky soils. Key species. Sometimes common on ridges.
Eragrostis schultzii	Blacksmith Grass	Frequent grass found in open areas of woodlands as well as around and on rock pavements and also semi-disturbed areas.
Eriachne mucronata	Mountain Wanderrie Grass	Rocky sites in woodlands across the site. Often around rock outcrops.
Eriachne pallescens	Wanderrie Grass	Woodlands with very rocky soils.
Grewia retusifolia	Dog's Balls	Woodlands across the site.
Heteropogon triticeus	Giant Spear Grass	Widespread in woodlands but not on ridges or rock pavements. Key species.
Mnesithea rottboellioides	Northern Cane Grass	In well-developed woodlands usually under *Eucalyptusreducta*.
Schizachyrium pachyarthron	Fire Grass	Rock pavements and fringes, flat and hard ground. Usually in sparse woodland. Key species in some areas.
Themeda triandra	Kangaroo Grass	Widespread throughout woodlands and on ridges. Seed may require storage for one year to break dormancy. Transplant new plants after/during wet season flushes. Key species.
Triodia microstachya	Spinifex	Flat surfaces in open woodland with sand-clay soils near the centre of the site (around WTG's 39 to 34).

OTHER PLANTS		
Species	**Common Name**	**Notes**
Borya septentrionalis	Resurrection Plant	On rock pavements in scoops and crevices. key indicator species of vegetation development. Should be trialled for translocation.
Cajanus marmoratus	No common name	Leguminous creeper of developed woodlands across the site.
Clematocissus opaca	Vine	Found in rocky outcrops and along rocky ridges - mostly south of the 275 kV powerline. Fleshy fruit, would add diversity to rehabilitation treatment.
Coronidium newcastlianum	White Everlasting Daisy	Widespread through all woodlands and ridges.
Cycas media	Cycad	Restricted but common in some locations. Important groves of mature specimens in valley east of WTG 16. Transplant all specimens where possible in adjacent areas.
Davallia denticulata	Rabbit's Foot Fern	Found tucked away in sheltered rock crevices usually along ridges. Candidate for translocation.
Dendrobium speciosum	Rock Orchid	Occasionally found nestled in rock crevices at high elevation. Candidates for translocation.
Dianella nervosa	Flax Lilly	More developed woodlands across the site.
Durabaculum undulatum var. *undulatum* (Syn. *Dendrobium undulatum*)	Golden Orchid	Usually found on rocks or in low branches of trees on watercourses and seasonal drainage lines. Candidates for translocation.
Drynaria rigidula	Basket Fern	A lithophytic fern of rock outcrops, but sometimes found in trees. Candidate for translocation.
Galactia tenuiflora	No common name	Leguminous creeper of woodlands across the site.
Hovea nana	Hovea	Exposed ridges and rocky outcrops mainly south of the powerline at high elevation. Key indicator species of healthy vegetation development.
Lepidosperma laterale	Flat Sedge	Grass-like plant found in well developed and more sheltered woodlands often under *E. reducta*.
Lomandra multiflora	Mat Rush	Woodlands across the site, more common in northern areas.
Moss, lichen and fern patches	Soil builders	Translocate patches of thick moss, fruticose and foliose lichens and rock ferns (*Cheilanthes* spp.) to nearby rock pavements and crevices during wet weather.
Plectranthus spp.	Plectranthus	Almost exclusively found on rock pavements. Potentially good candidates for translocating.
Polycarpaea spirostylis	Copper Plant	Restricted to rock pavements and more frequent south of the powerline. Candidate for translocation.
Sedopsis sp. (Bulimba Station)	Bulimba Pinks	Tiny plant restricted to rock pavements usually at high elevation. Translocate onto nearby rock pavements.
Xanthorrhoea johnsonii	Grass Tree	Widespread throughout woodlands and on ridges. Transplant all specimens where possible in adjacent areas.
Xerochrysum bracteatum	Yellow Everlasting daisy	Woodlands of rolling hills. Widespread but diffuse.