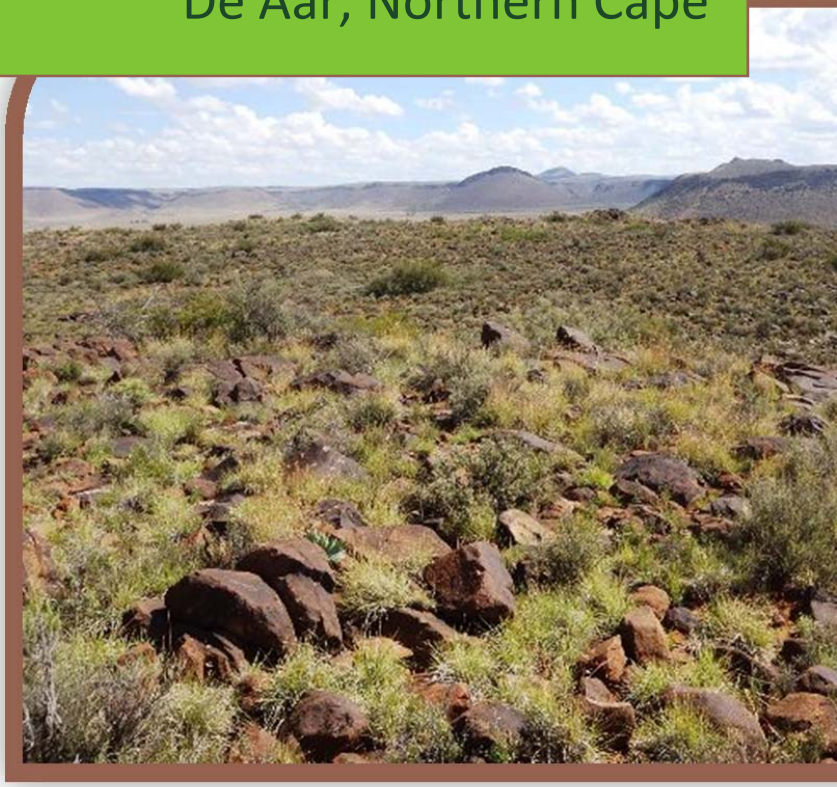
PLANT RESCUE PLAN

Longyuan Mulilo Maanhaarberg Wind Energy Facility, De Aar, Northern Cape



David Hoare Consulting cc

PREPARED BY:
Dr David Hoare
Postnet Suite #116
Private Bag X025
Lynnwood Ridge, 0040
tel: (012) 804 2281
fax: 086 550 2053

PREPARED FOR:
Longyuan Mulilo De Aar Wind Power (Pty) Ltd
PO Box 50,
Cape Town International Airport
Cape Town 7525
Tel: (021) 934 5278
Fax: (021) 935 0505

Executive Summary

This document provides a management plan for the rescue of listed plants for the Longyuan Mulilo Maanhaarberg Wind Energy Facility, De Aar, Northern Cape.

The first section provides a summary of the Acts that apply to listing of plants on site. It also provides a summary of the approach used for listing threatened plants in South Africa and responsible people are explained.

The next section provides a list of all the species of concern that have been recorded to date on site, followed by images and information on each species found on site so that they may be easily identified in the field by the parties responsible for implementing the rescue plan.

Conservation principles for the handling of species of conservation concern are outlined. This provides a framework for the actions required for transplanting rescued plants.

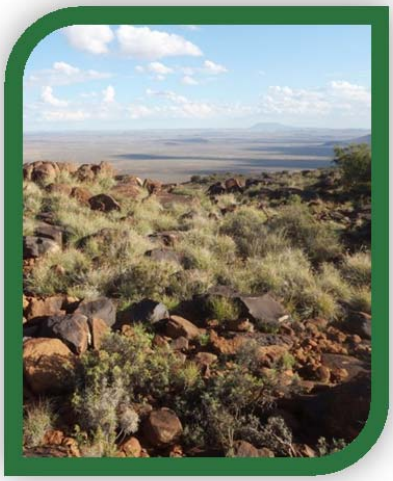
The next section provides detailed steps for the rescue and handling of listed plants. Responsible entities are also identified for each step.

The final section gives an outline of monitoring requirements for determining the success of the plant rescue operation.

Contents

Overview

This document presents the Plant Rescue Plan for the authorised Longyuan Mulilo Maanhaarberg wind energy facility on the farms Smauspoort 130 and Zwartkopjes Portion 2 of 131 near De Aar, Northern Cape. The Environmental Impact Assessment (EIA) process for the authorized facility was undertaken by DJ Environmental Consultants. In accordance with the Environmental Authorisation (EA), a Plant Rescue Plan has been compiled and will be included in the EMPr.



Purpose of the Plant Rescue Plan

The purpose of the plant rescue plan is:

- provide guidance on search and rescue of species of conservation concern.

Legal framework

National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)

In terms of the Biodiversity Act, the developer has a responsibility for:

- The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations).
- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity.
- Limit further loss of biodiversity and conserve endangered ecosystems.

Chapter 4 of the Act relates to threatened or protected ecosystems or species. According to Section 57 of the Act, "Restricted activities involving listed threatened or protected species":

- A person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7.

Such activities include any that are “of a nature that may negatively impact on the survival of a listed threatened or protected species”.

National Forests Act (Act 84 of 1998)

Regulations published for the National Forests Act (Act 84 of 1998) as amended, provide a list of protected tree species for South Africa. According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that '*no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister*'.

Northern Cape Nature Conservation Act, No. 9 of 2009

This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. The Act provides lists of protected species for the Province. Of particular relevance to the current site are the species within the following families and genera: *Amaryllidaceae*, *Asclepiadaceae*, *Iridaceae*, *Aloe* except *Aloe ferox*, *Mesembryanthemaceae* and *Orchidaceae*. All species protected under the provincial legislation need to be specified on any clearing permit applications for the site.

Listing of Red and Orange List plant species

South Africa has adopted the IUCN Red List Categories and Criteria to provide an objective, rigorous, scientifically founded system to identify Red List species. A published list of the Red List species of South African plants (Raimondo et al. 2009) contains a list of all species that are considered to be at risk of extinction. This list is updated regularly to take new information into account, but these are not published in book/paper format. Updated assessments are provided on the SANBI website (http://redlist.sanbi.org/). According to the website of the Red List of Southern African Plants (http://redlist.sanbi.org/), the conservation status of plants indicated on the Red List of South African Plants Online represents the status of the species within South Africa's borders. The global conservation status, which is a result of the assessment of the entire global range of a species, can be found on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species: http://www.iucnredlist.org. The South African assessment is generally used for projects within the South African territory.

Historical occurrences of threatened plant species were obtained from the South African National Biodiversity Institute (http://posa.sanbi.org) for the quarter degree square/s within which the study area is situated. Habitat information for each species was obtained from various published sources. The probability of finding any of these species was then assessed by

comparing the habitat requirements with those habitats that were found, during the field survey of the site, to occur there.

Responsible persons

Rescue of sensitive plant species during the construction and operational phases of the project will be dependent on a number of project personnel. These are listed below:

The Developer

This refers to the project proponent, Longyuan Mulilo De Aar Wind Power. They will be responsible for the following:

1. Ensure that the requirements set out in this management plan are adhered to and implemented;
2. Allocate the responsibilities assigned to the Environmental Control Officer (ECO) to an independent suitably qualified individual prior to the start of construction activities on site; and
3. Provide all principal contractors working on the project with a copy of this management plan as part of tender contract documentation to allow the contractors to cost for its requirements within their respective construction contracts.

The Engineer

The engineer of the proposed development will be responsible for the overall implementation of the management plan during the construction phase of the project. To effectively implement the plant rescue plan, the engineer must be aware of the findings, mitigation measures and conclusions of the Final EIA report, the requirements of the EA, the EMPr, and this management plan.

The Environmental Control Officer (ECO)

The ECO is responsible for monitoring and verifying the implementation of the management plan during the construction phases of the project. To effectively implement the management plan, the ECO must be aware of the findings, mitigation measures and conclusions of the Final EIA Report, the EA, and this management plan.

The Contractor

The contractor, being any directly appointed company or individual undertaking the implementation of works, will be responsible for complying with the management plan at all times during the construction phase.

Species of concern that occur on site

This section provides an outline of the existing status of the site with respect to the occurrence of any species of concern or any other plant species that are deemed worthy of rescue prior to construction. The purpose is to provide an indication of the identity of such species and their probable location on site.

Listed species observed on site

Two protected and/or listed plant species were encountered on site, sometimes within the footprint of proposed infrastructure and other times in nearby areas. These two species are as follows:

- Protected trees: the species, *Boscia albitrunca* (pictured above), was encountered in various places on site.
- Red / Orange List plant species: the species, *Boophone disticha*, listed as Declining, was encountered relatively regularly on site, in some places within the footprint of proposed infrastructure.
- Species protected according to Provincial Act: a number of succulent or geophyte plants were seen on site that are protected according to Northern Cape Nature Conservation Act, No. 9 of 2009, including *Aloe broomii*, *Stapelia olivacea*, *Adromischus trigynus*, *Stomatium* sp., *Haworthia* sp. and *Anacampseros albidiflora, Albuca setosa*, *Drimia intricata*, *Ornithogalum* sp. nov., *Kleinia longiflora*, *Pachypodium succulentum* and *Euphorbia caterviflora*.

Guide to species for rescue

This section provides images of species that are anticipated to require rescue to aid in the identification of such species on site.

Boscia albitrunca

Boophone disticha

Aloe broomii

Stomatium sp.

Stapelia olivacea

***Haworthia* sp.**

Adromischus trigynus

Conservation principles for species of conservation concern

This section provides some basic principles of conservation of species of conservation concern that may affect the removal of plants from the wild and the translocation of these plants into new suitable habitats.

Principles

- *In situ* conservation is preferable to *ex situ* conservation. Removing a population from its natural habitat and placing it under artificial conditions results in the erosion of the inherent genetic diversity and characteristics of that species.
- In order to ensure the persistence of a population, it is imperative that the ecological processes maintaining that population persist.
- Translocation of Red Data species is an unacceptable conservation measure since the translocated species may have undesirable ecological effects. For example, alterations to habitat by translocated species may be harmful to other species and translocations may lead to transmission of pathogens or parasites (Hodder & Bullock, 1997). Translocation may result in rapid changes in the species itself (Conant, 1988). Translocations are expensive and rarely successful (Griffith et al., 1989). Success entails not only survival of the translocated individuals but also establishment of a self-sustaining, viable population able to reproduce and adapt to changing environmental conditions (Milton et al., 1999).
- Suitable habitat adjacent to known populations of Red List plant species has a high probability of being colonized.

The implications of these principles are as follows:

- Rescued plants, if re-planted back in the wild, should be placed as close as possible to where they were originally removed.
- Re-planting into the wild must cause as little disturbance as possible to existing natural ecosystems.

Potential for relocation of plants

Plant relocation must take into account the principles of conservation set out in the next section of this report.

- *Boophone disticha* is a bulb and will readily transplant as will any of the other geophytes seen on site.
- Most of the succulent plants seen on site are small and will easily transplant.
- *Boscia albitrunca* is more difficult to transplant, but may be cultivated off-site using truncheons from removed plants. These can be used to some degree in rehabilitation efforts. Most trees and shrubs are not suitable for translocation on account of their deep rooting systems. The loss of these individuals must be accepted as an outcome of the development.

Plant rescue plan

This section provides details on the actions that are required to rescue any listed plant species from the path of development and what steps are to be taken to house them temporarily and then to place them back into suitable habitats.

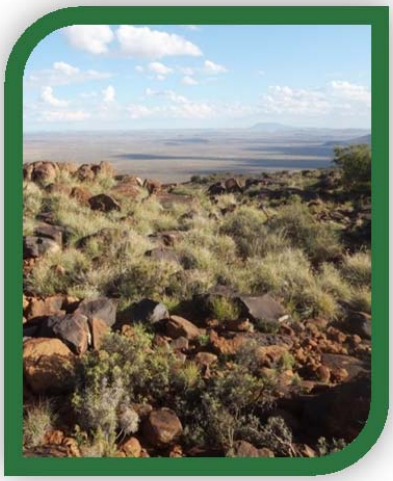
Plant rescue activities required

Before construction commences at the site, the following actions must be taken:

Action	*Responsible person*
Initial identification of all listed species that may occur within the project area. This is largely covered in this report and in the walk-through survey report, but can be supplemented by observations on site by the ECO prior to construction.	Botanist / ECO
The footprint of proposed development must be marked out prior to breaking ground. (It is assumed that this will follow a phased approach and that not all areas will be marked simultaneously. An example would be pegging out the route of a section of road to be constructed prior to earth-moving equipment beginning work on construction. While this section is being developed, the survey team will be pegging out the next section of road.)	Contractor / Engineer / Developer
Identification of all listed species that may occur within marked out areas (within the footprint of proposed infrastructure). The pegged out area must be walked and any listed species recorded.	ECO / qualified botanist
Search and rescue operation of all listed species within the development footprint. For each individual plant that is rescued, the plant must be photographed before removal, tagged with a unique number or code and a latitude longitude position recorded using a hand-held GPS device. The plants must be planted into a container to be housed within a temporary nursery on site or immediately planted into the target habitat. If planted into natural habitat, the position must be marked to aid in future	Qualified botanist / horticulturalist

monitoring of that plant.	
Rescued plants housed in temporary nursery may be used in one of two ways: (1) transplanted into suitable natural habitats near to where they were rescued, or (2) used for replanting in rehabilitation areas. Receiver sites must be matched as closely as possible with the origin of the plants and, where possible, be placed as near as possible to where they originated.	ECO / qualified botanist
For the protected tree,* Boscia albitrunca*, if any individuals are to be destroyed, the following steps must be taken: one or more truncheons must be taken from the individual to be destroyed. These must be treated with growth hormone powder on the cut end and planted in a growth medium. Once established, these must be planted into rehabilitation areas close to the site where they were originally removed.	Horticulturalist
Any listed plants close to the development servitude that will remain in place must be marked clearly and may not be defaced, disturbed, destroyed or removed. They should be cordoned off with construction tape or similar barrier and marked as no-go areas.	ECO / qualified botanist
ECO to give permission to clear vegetation only once all search and rescue operations have been completed.	ECO
The ECO should monitor construction activities in sensitive habitats to ensure that impacts within these areas are kept to a minimum.	ECO
The collecting of plants by unauthorized persons should be prevented and signs stating so should be placed at the entrance to the site.	Developer

Monitoring requirements



The following monitoring activities are recommended as part of the plant rescue plan:

- Preconstruction walk-through survey to list the identity and location of all listed and protected species. This walk-through survey has already been undertaken. The report provides an indication of the number of individuals of each listed species that are likely to be impacted by the proposed development. Subsequent changes to infrastructure positions results in areas that have not been properly searched and it is unknown whether these areas will impact upon listed species or not.
- Construction phase monitoring by the ECO to determine whether any listed species will be affected and provide a full account of the number of individuals of each species that are affected.
- Post-construction monitoring of plants relocated during search and rescue to evaluate whether the intervention was successful or not. This should be undertaken on a three-monthly basis for two years after transplanting in order to evaluate the success thereof.

References / further reading

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