



# Castle West Wind Energy Facility 'Plant Rescue and Protection Plan'

## De Aar, Northern Cape

February 2022

CLIENT

savannah  
environmental

Prepared by:




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Report Name	Castle West Wind Energy Facility 'Plant Rescue and Protection Plan'
Reference	Castle WEF – Plant Rescue Plan
Submitted to/Client	
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Declaration	<p>The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.</p>

## DECLARATION

I, Martinus Erasmus, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Martinus Erasmus

Environmental Consultant

The Biodiversity Company

February 2022

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## 1 Introduction

### 1.1 Background

The Biodiversity Company was commissioned to undertake the plant rescue plan for the Castle Wind Farm project. The authorised Castle West Wind Energy Facility (WEF) falls north-east De Aar, Northern Cape. The energy facility comprises of 24 wind turbines (with an additional 9 alternatives), an on-site 132 kV substations, a powerline linking to the existing Eskom transmission infrastructure (Hydra), underground cables linking the turbines to the substations, operations and maintenance compound area, storage area and internal access roads to each turbine.

The Biodiversity Company was commissioned to develop a Plant Rescue and Protection Plan to meet the requirement of the issued Environmental Authorisation (EA). The EA stipulates that a Plant Rescue and Protection Plan must be included in the final project Environmental Management Programme (EMPr), and it must allow for the maximum transplant of conservation important species from areas to be transformed. The plan must be implemented prior to the commencement of the construction phase.

Any provincially or nationally protected plants that must be disturbed in some manner due to project activities require translocation or destruction permits. Provincial permits are obtained as per chapters 6 and 10 of the Northern Cape Nature Conservation Act No. 9 of 2009, and national permits are obtained as per chapter 2 of the Threatened or Protected Species (TOPS) Regulations (*Government Gazette* No. 29657 of 23 February 2007), published in terms of the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004). Protected tree species that must be disturbed in any manner require permits in line with Section 24 of the National Forests Act, 1998 (Act 84 of 1998).

Conservation important species, or Species of Conservation Concern (SCC), are nationally important biodiversity resources that must be protected in order to sustain South Africa's rich biodiversity heritage and functioning ecosystem services. SCC do not generally require translocation or destruction permits unless a specific species is also listed as a protected species. However, the correct handling of these species is of critical importance and as such these processes must follow the recommendations and guidelines contained within this plan.

## 1.2 Aim of the Plan

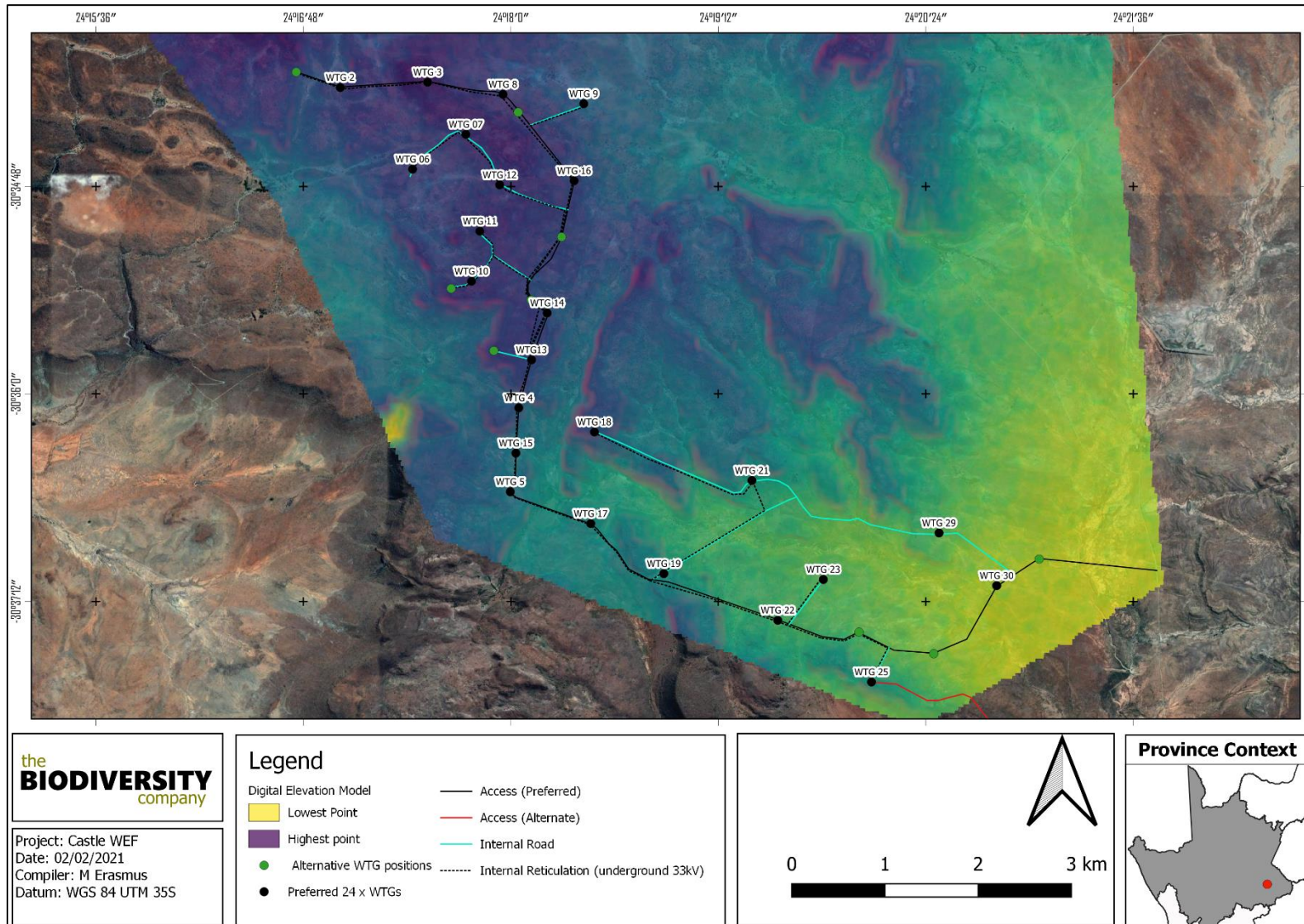
The aim of the plan is to provide guidance on the search and rescue of plant species, especially protected species and SCC, within all planned development areas - in order to prevent any unnecessary losses of these important species. Important plant species are generally threatened due to overexploitation (usually from illegal trade or harvesting), or habitat loss as a result of anthropogenic activities. The aim of plant rescue actions is always to sustainably maintain as many individuals of a plant population in as close proximity to the original area and habitat as possible, in order to minimise the fragmentation of populations which may lead to genetic erosion due to the restricted movement of pollen.

It is important to note that *in-situ* conservation (conserving a species within its original range without any disturbance) is strongly preferred over search and rescue operations, which have associated risks and can result in the erosion of the inherent genetic diversity and characteristics of that species (SANBI, 2016). *In-situ* conservation must be guided by an Ecological or Biodiversity Management Plan. This ideal form of conservation is made possible when developers are able to adjust the development layout in such a way that avoids sensitive plant species, and this must be followed up with well managed operational phase programmes that ensure the continued protection of the species within the project footprint.

If *in-situ* conservation is impossible, due to the nature of the development and associated activities, then translocation may be seen as an important tool in biological conservation (Griffith *et al*, 1989). However, it is critical to ensure that the practices followed are conducted responsibly and by suitably qualified and permitted specialists guided by a well-developed plan.

## 1.3 Location

The location of interest, referred to as the project area, comprises the entire development footprint including associated buffers. Figure 1-1 and Figure 1-3 below presents a map of the project area overlaid with the key proposed project infrastructure.



**Figure 1-1** Map illustrating the location of the Castle WEF and the associated planned infrastructure

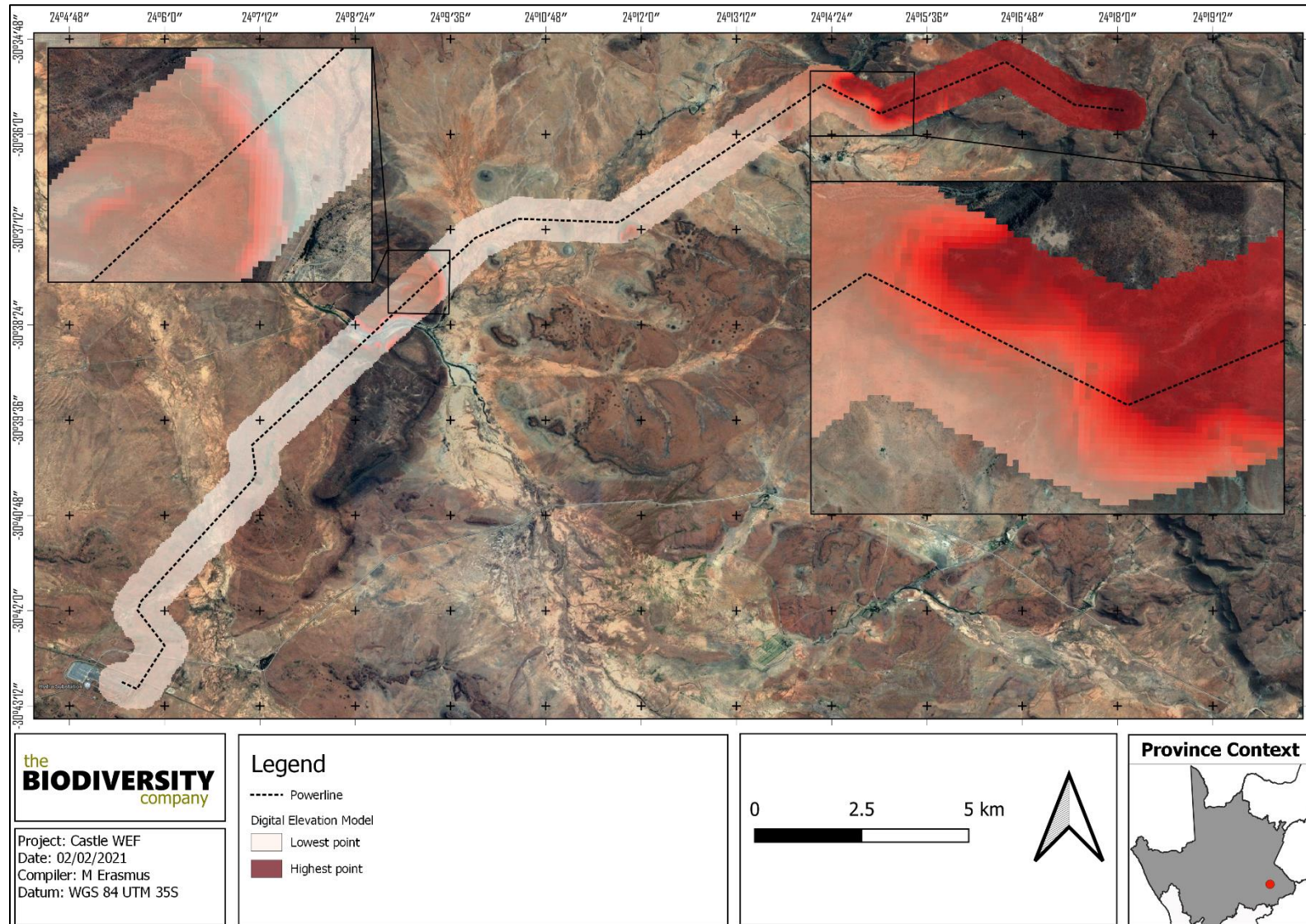


Figure 1-2 Map illustrating the powerline for the Castle WEF.



## 1.4 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 1-1 are applicable to the current project in terms of biodiversity and ecological support systems. The list below, although extensive, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Of particular relevance to Plant Rescue and Protection operations are the following published forms of legislation:

- National:** The published Threatened or Protected Species (TOPS) Regulations (*Government Gazette* No. 29657 of 23 February 2007), and TOPS List (*Government Gazette* No. 30568 of 14 December 2007). Both published in terms of the National Environmental Management: Biodiversity Act (NEMBA), 2004 (Act 10 of 2004). As per NEMBA, 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. Where a restricted activity, among many other points, is defined as: hunting, catching, capturing, or killing any living specimen; or picking parts of, or cutting, chopping off, uprooting, damaging or destroying any specimen. Refer to [this website](#) for permitting information and contacts.
- National:** The published List of Protected Tree Species (*Government Gazette* No. 44204 of 1 March 2021), under the National Forests Act, 1998 (Act 84 of 1998). According to this act, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the National Department of Forestry, Fisheries and the Environment (DFFE).
- Provincial:** The published Northern Cape Nature Conservation Act No. 9 of 2009. As per the act no person may, without a permit – pick, import, export, transport, possess, cultivate, or trade in a specimen of a specially protected plant (Schedule 1). The same applies to protected plants (Schedule 2), subject to Section 50 of the act. Where the term ‘Pick’ is defined as: to collect, cut, chop off, to take, gather, pluck, uproot, break, damage or to destroy.

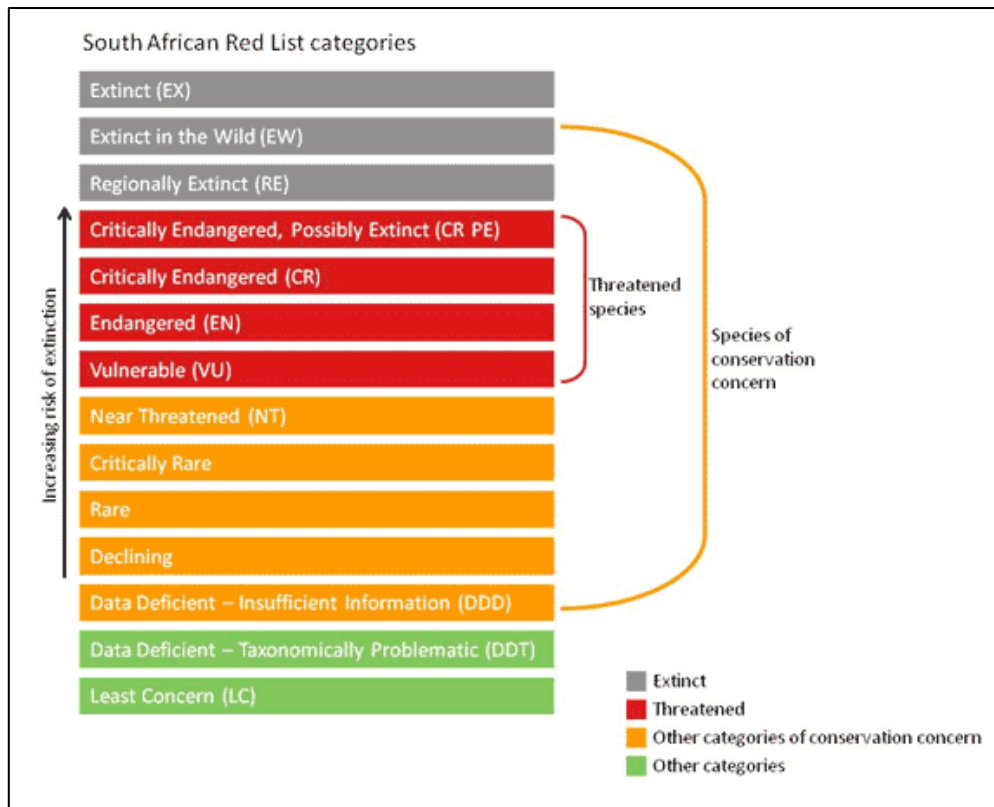
**Table 1-1** *A list of key legislative requirements relevant to biodiversity and conservation in the Northern Cape, within the context of the Plant Rescue and Protection Plan*

Region	Legislation
<b>International</b>	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management: Biodiversity Act (NEMBA) (Act No. 10 of 2004)
	The National Environmental Management: Protected Areas Act (NEMPA) (Act No. 57 of 2003)
<b>National</b>	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (Act No.101 of 1998)
	South Africa’s National Biodiversity Strategy and Action Plan (NBSAP), 2015-2025

Provincial	Northern Cape Nature Conservation Act No. 9 of 2009
	Northern Cape Planning and Development Act No. 7 of 1998

### 1.5 Listing of Red and Orange List Plant Species

In accordance with the National Red List of South African Plants website, managed and maintained by the South African National Biodiversity Institute (SANBI), an SCC is species that has a high conservation importance in terms of preserving South Africa's rich biodiversity. This classification covers a range of red list categories as illustrated in Figure 1-3 below.



**Figure 1-3 Threatened species and Species of Conservation Concern (SANBI, 2016)**

South Africa has adopted the International Union for Conservation of Nature’s (IUCN) Red List Categories and Criteria (IUCN, 2012) to provide an objective, rigorous, and scientifically founded system that is used to identify and categorise red-list species and therefore highlight those species that are in need of critical conservation action. A regularly updated list of all indigenous plant species and their red list status is available from the SANBI Red List of South African Plants website: <http://redlist.sanbi.org/>. The conservation status of plants indicated on the Red List of South African Plants website represents the status of the species within South Africa's borders. The current global conservation status of a plant can be found on the IUCN Red List of Threatened Species website: <http://www.iucnredlist.org>.

## 2 Relevant Flora Species

The flora species summarised in this section are those that must be relocated to safe natural areas within the property that will not face any disturbance. In some instances, it may be necessary to relocate species to the nearest formally protected area, such as in the case that no in-tact and healthy area of the current property will remain available post-development.

Protected plant and tree species were identified during the January 2022 project area ecological walkdown, and some location points are provided. Plant species are present and as such the plant species discussed in Table 2-2 below are those that have been identified as occurring within the project area either during the fieldwork or previously by Todd in 2014. List of plant species of conservation concern which were recorded by Simon Todd (2014) is presented in Table 2-1, the author notes that. The density of these species was generally low, except for *Aloe broomii* which was abundant in the western section of the site.


**Table 2-1**      **Listed plant species**



Family	Species	NC Nature Conservation Act No. 9 Of 2009	Threat status
AIZOACEAE	<i>Stomatium pluridens</i>	Protected	LC- regional endemic
APOCYNACEAE	<i>Pachypodium succulentum</i>	Protected	LC-Endemic to SA
	<i>Aloe broomii</i> var. <i>broomii</i>	Protected	LC
ASPHODELACEAE	<i>Gonialoe variegata</i> ( <i>Aloe variegata</i> )	Protected	LC
	<i>Aloe claviflora</i>	Protected	LC
BRASSICACEAE	<i>Boscia albitrunca</i>	Protected	LC-Protected Tree Nationally
EUPHORBIACEAE	<i>Euphorbia crassipes</i>	Protected	LC- regional endemic

The collection of seed from those specimens that are fruiting during the rescue period should be undertaken in conjunction with the translocation operations. The species included as part of the seed collection action should also include those that are not necessarily of conservation concern but will be useful for any rehabilitation efforts or for minimising the loss of species diversity within the region.


Plant species of interest were observed within the project area and individual specimens that will be impacted by project activities should be relocated in order to preserve the plant diversity of the region and to assist in land rehabilitation operations. These species are all geophytes or bulbous plants, plants with underground storage organs, which are typically uncommon and sparsely distributed. The plants are discussed as additional considerations alongside those in Table 2-2 below. This table also presents a description of the species as well as recommended methods for species-specific removal and relocation/re-planting techniques. The plants were observed within the priority areas as per Table 2-2.


**Table 2-2 Summary of target flora species for the Plant Rescue and Protection Plan pertaining to the Castle WEF facility**

Family	Scientific Name	Common Name	Protection or Red-List Status	Description and Translocation Recommendations	Photograph
ASPARAGACEAE	<i>Ledebouria</i> sp.	African Hyacinths	Protected Plant, Schedule 2	<p><b>Description:</b> Small perennial herb that grow from bulbs (geophytes). <i>Ledebouria</i> species often have spotted, textured leaves and only small flowers are produced on loose unbranched racemes (flower cluster). Flower in spring and early summer (Sept. to Feb.).</p> <p><b>Translocation:</b> Plants can be easily dug out from the ground with a small to large spade. Dig deep below the root system and remove the entire system and bulb with the soil around it. When re-planting ensure entire bulb is below ground.</p> <p><b>Habitat:</b> Full sun and well-drained sandy soil. Minimal water requirements.</p>	

<p><b>AIZOACEAE</b></p>	<p><i>Stomatium pluridens</i></p>	<p>N/A</p>	<p>Protected Plant, Schedule 2</p>	<p><b>Description:</b> A poorly known species. A compact succulent plant with flowers that normally open in the afternoon.</p> <p><b>Translocation:</b> Shallow root system and therefore easily dug out with a small spade. Entire root system must be removed with surrounding earth. A very small amount of gritty and free-draining compost can be used when re-planting.</p> <p><b>Habitat:</b> Rock outcrops and rocky flats.</p>	
<p><b>CAPPARACEAE</b></p>	<p><i>Boscia albitrunca</i></p>	<p>Shepherd's Tree</p>	<p>Nationally Protected Tree</p>	<p><b>Description:</b> A small to medium-sized tree reaching heights of 7 m. It has a dense, round to spreading crown. The trunk is distinctly smooth and white or whitish grey with bare stems. The leathery, grey-green leaves are arranged in clusters and the flowers are yellowish green and heavily scented (flowers July to Nov). The fruit is 10 mm in diameter, yellowish, and smooth.</p> <p><b>Translocation:</b> Smaller trees (seedlings and saplings, dia. &lt; 15 cm) can be removed by digging out the tree with spades or machinery, removing as much of the in-tact root system as possible. Larger mature trees may be too difficult and cumbersome to transplant, in this case cuttings and seeds must be collected and stored/propagated appropriately. Commercially</p>	

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				<p>available rooting powder can be applied to transplanted trees and cuttings. The tree is known to be hardy and drought resistant and can be propagated and grows from both shoot and root cuttings.</p> <p><b>Habitat:</b> Dry areas with low rainfall. Full sun. Sandy, clay, loam, or brack/saline well-drained soil types. Low water requirements.</p>	
<p><b>EUPHORBIACEAE</b></p>	<p><i>Euphorbia crassipes.</i></p>	<p>Kleinvingerpol</p>	<p>Protected Plant, Schedule 2</p>	<p><b>Description:</b> A herb with main body of the plant 4–6 in. long and thick, often half buried in the ground and bearing numerous fleshy branches. Spines can be seen growing on the plant. A milky sap will be seen if damaged.</p> <p><b>Translocation:</b> Plants can be easily dug out from the ground with a small to large spade. Dig deep below the root system and remove the entire system and bulb with the soil around it. Seeds/Cuttings can be used for propagation</p> <p><b>Habitat:</b> In stony ground at gravelly flats, full sun and well-drained sandy soil. Minimal water requirements.</p>	

<p><b>AMARYLLIDACEAE</b></p>	<p><i>Ammocharis coranica</i>.</p>	<p>Karoo lily</p>	<p>Protected Plant, Schedule 2</p> <p><b>Description:</b> A summer-growing bulb and grows to a height of 200 to 350 mm, when flowering. This species has a bulb, 150–200 mm in diameter and covered in thinly layered tunics. Each bulb consists of 9–15 green leaves, broadly strap-shaped and sickle shaped, 300–450 mm long, with toothed margins. Leaves lie flat on the surface of the soil.  <a href="http://pza.sanbi.org/ammocharis-coranica">http://pza.sanbi.org/ammocharis-coranica</a>.</p> <p><b>Translocation:</b> Plants can be easily dug out from the ground with a small to large spade. Dig deep below the root system and remove the entire system and bulb with the soil around it. When re-planting ensure entire bulb is below ground</p> <p><b>Habitat:</b> Grows in a variety of soils. It prefers sandy soils, open flat areas and full sun. This bulb species thrives in dry areas and can stay alive though long periods of drought.</p>	
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ASPHODELACEAE

*Aloe broomii*

Snake aloe

Protected  
Plant,  
Schedule  
2


**Description:** a short-stemmed, aloe reaching a height of 1.5 m, including the inflorescence. It is usually solitary, but occasionally the heads divide to form groups of up to 3 rosettes. The leaves are green, with reddish brown teeth along the margins, and are arranged in a dense rosette.  
(<http://pza.sanbi.org/aloe-broomii>).

**Translocation:** It can easily be transplanted. Sowing fresh seeds which are potted several times may yield success. Seed treated with the fungicide Apron C (a.i. metalaxyl) and sow in summer. More info at (<http://pza.sanbi.org/aloe-broomii>).

**Habitat:** Found in the arid areas of South Africa, found on rocky slopes in hilly parts of the central interior of southern Africa at altitudes of 1000-2000 m





<p><b>ASPHODELACEAE</b></p>	<p><i>Aloe        claviflora</i></p>	<p>Cannon aloe</p>	<p>Protected        Plant,        Schedule        2</p>	<p><b>Description:</b> Often found growing in clumps. Normally stemless, except in old plants growing horizontally. Does not have erect rosettes like most Aloe sp. Rosettes face outward, giving them a characteristically asymmetric shape. The leaves are firm, leathery and are greyish green, up to 200 mm long, and have sharp brown spines along the margins        (<a href="http://pza.sanbi.org/aloe-claviflora">http://pza.sanbi.org/aloe-claviflora</a>).</p> <p><b>Translocation:</b> It can easily be transplanted. Sowing fresh seeds which are potted several times may yield success.</p> <p><b>Habitat:</b> Found in the arid areas of South Africa, in habitats ranging from flat stony ground, well-drained sandy expanses and raised rocky outcrops and hills.</p>	 <p>© Werner Voigt</p>
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ASPHODELACEAE

*Gonialoe  
variegata*

Partridge  
breast aloe

Protected  
Plant,  
Schedule  
2

**Description:** A dwarf Aloe sp usually found in groups. The leaves arranged in three ranks of 6-8 leaves each, have a ridge or keel along the lower surface and are without spines or prickles. Leaves are either deep green in good years or chocolate brown when plants have experienced drought with white markings, spots or blotches that form irregular transverse bands.

(<http://pza.sanbi.org/gonialoe-variegata>)

**Translocation:** It can easily be transplanted. Best grown from seeds which be sown as fresh as possible, otherwise the seeds are parasitized by small crawling insects. The best time for sowing is in the summer from October to December. Use coarse river sand and cover seeds lightly, then keep moist. Treat seeds with a long-lasting fungicide.

**Habitat:** Found mostly in groups, in partial shade among low karoo bush, generally in hard ground, in rocky crevices or in between rocks



© Werner Voigt

<p><b>APOCYNACEAE</b></p>	<p><i>Pachypodium succulentum.</i></p>	<p>Kambroo</p>	<p>Protected Plant, Schedule 2</p> <p><b>Description:</b> A dwarf shrub, which grows 0.6 to 1 m tall, the stem is swollen at the base and turnip-shaped, up to ± 200 mm in diameter, and half buried. It produces several branches and has spines. White to crimson, star-shaped flowers at the tips of the branches in spring and early summer (September and December).</p> <p><b>Translocation:</b> Easy to cultivate, and can be propagated by stem cutting and by seeds. Cuttings should be taken while in active growth during the summer growing season, for the best chance of successful rooting. Allow the cutting to dry out for 5 days, before placing them in rooting medium. Sow seeds in spring or early summer, in well-drained soil, and keep warm and damp until germination.  <a href="http://pza.sanbi.org/pachypodium-succulentum">http://pza.sanbi.org/pachypodium-succulentum</a></p> <p><b>Habitat:</b> Normally occurs in rocky grassland, koppies, steep hills and succulent scrub vegetation</p>	
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### 3 Recommended Translocation Procedure and Actions

As discussed above, *in-situ* conservation is strongly preferred over search and rescue operations. SANBI (2016) also discusses that translocated individuals may harm other plant species within the receiving environment through the transmission of pathogens and/or parasites, and translocation may lead to changes in the species itself.

If development layouts cannot be altered to avoid SCC and protected species within the project footprint area, the priority must be to translocate these individuals to new areas within the current property that will not be affected by development activities. In cases where threatened plants cannot be translocated to areas within the current property, a specialist botanical expert should be consulted and it may be necessary to re-plant the species in the nearest protected area, or a demarcated offset area, under controlled conditions.

Table 3-1 below outlines the specific actions that should be followed when considering the end-to-end procedure for plant search and rescue operations.

**Table 3-1 Summary of recommended actions pertaining to the plant rescue and protection plan for the Castle WEF**

Aspect	Actions
Nursery	In the case that a large number of plants must be translocated to an area that is far away, an on-site nursery facility must be erected prior to removal for the holding of rescued plant material. Nursery facilities should be established where healthy natural habitat will not be affected and where there is easy access to clean water. The nursery must be fenced off, demarcated, and inaccessible to livestock and natural herbivores so as to avoid the loss of species.
	Soil, compost, and other propagation media used must be locally sourced, organic, and weed free.
	The area where rescued plants are stored and maintained must be kept free of species that are considered weeds, and Alien Invasive Plant Species (AIP).
	Plants must be protected from excessive sun, dust, and wind.
	Plants should be monitored for pests, but no hazardous or poisonous pesticides are to be used. Organic or physical methods may be used for control.
Plant Material Removal & Collection	An Environmental Control Officer (ECO) and specialist botanist must be present during plant collection to guide the collection process and to ensure that the correct species are collected. The specialist will also help ensure that any species requiring collection are not accidentally missed.
	Plants with underground storage organs (bulbs, corms, tubers etc.) must be removed carefully from the ground without causing excessive damage to the roots. Before lifting, loosen the soil or wedge apart rocks working from a circle of at least 20 cm away from the base of the plant, working inwards but not closer than 5 cm from the plant base with a sharp narrow object (garden spades or small hand picks are ideal). Once the soil is loosened the organ can be removed carefully by hand. The organs must be sprayed with a little water and can be placed in paper bags for short-term storage.
	For plants with underground storage organs, the depth of the organ in the soil must be recorded when the plant is removed. This will be important for replanting as the plant must be replanted to the same approximate depth.
	Seed can be collected from specimens and used for cultivation. This will be vital for species that do not relocate well or for large and mature tree species. Seeds must be stored in a suitable manner (often specific to the species) until required for cultivation or seeding. Seeds could possibly be provided to a local nursery for germination purposes.
	Succulent species (plants with fleshy leaves and stems that store water) may not respond positively to being transplanted as a whole specimen. Cuttings can be taken from these species and then transplanted. It is important that a clean and disinfected straight edged knife be used for cuttings and that the 'wet' portion of the cutting is given time to dry prior to being planted.
	All plant material collected must be labelled with the species name or at least the genus, habitat collected from, location (GPS coordinates) and date.
Each plant removed must be handled, packed, and stored under conditions most suitable for that species. Removed plants must be protected from windburn and physical damage during transport. Plants must not be subjected to excessive sun exposure or water logging (overwatering). Keep roots continuously moist and do not disturb or shake the plant excessively. Period of transport must be minimised as much as possible.	

<b>Planting</b>	Planting must occur during the growing season, which in the case of this area will be during September and October. Plants should be watered immediately after planting to help bind soil particles to the roots. Do not overwater plants.
	Plants must be planted in a space with fine-scale habitat features that are similar to the area where they were collected (similar plants and landscape features in the vicinity).
	The re-planting site must not contain overly compacted soil or waterlogged soil. <i>In-situ</i> soil must be naturally compacted with good natural drainage so that the plant roots can expand out easily and naturally.
	The size of the planting hole must be large enough to ensure that the entire root system is covered, <b>except</b> in species where part of the underground storage organ (bulb) must be exposed. Generally, holes should be at least 10 cm wider than required.
	Carefully firm down the soil around the base of the plant once it is in a new position (do not over compress). Allow the plant to resprout naturally after sufficient rains and do not water after the initial watering.
	Plants that were found in shade or semi-shade must not be planted in full sun, and conversely, plants that were found in full sun must not be planted in shade or semi-shade. I.e., re-plant flora in the same exact micro-habitat as it was found in.
<b>Establishment</b>	The planting and cultivation of seed is considered a specialist discipline and a horticulturalist must be consulted in order to advise on the most appropriate procedure to be followed, which will largely be species specific.
	The growth and establishment of replanted species must be monitored to ensure their survival. It is recommended that the plants be monitored once a week until establishment to ascertain the efficacy and success of the relocation process. The species and the number of surviving individuals must be recorded.
	Some species or specimens may lose their leaves after relocation, or only the storage organ may be present during the planting. Therefore, the location of the planted specimens must be clearly demarcated to be ensure that they can be monitored.
	The emergence/growth of AIPs should be monitored in conjunction and must be removed in the appropriate manner as per the AIP Management Plan. The soil disturbances caused as a result of the translocation process may stimulate the growth of AIP seedbanks.

### 3.1 Nursery Facilities

Nursery facilities must be established if at least one of the following three scenarios exists:

- The search and rescue operation is conducted during the dry season (anytime between March and July/August). Re-planting must occur during the growing season (ideally in September or October), and if plants are removed outside of this season they should be stored in a protected and closely monitored nursery facility and then re-planted in the wild when the growing season begins;
- A large number of plants are removed and need to be replanted in an area that is far away or logistically difficult to reach. i.e., individual plants will be out of the soil for a long period of time (longer than 24 hours). In this case a nursery facility will need to be set up to support plants until they can be quickly and correctly transplanted; and
- An appropriate re-planting area has not been identified, but the plants need to be removed so that clearing and construction can begin. In this case plants must be stored in the nursery facility until an appropriate re-planting area has been identified.

The nursery facilities will need to facilitate the effective maintenance of recovered material until the growing season begins and adequate transportation and re-planting measures have been planned and put in place. Standard horticultural practices pertaining to these facilities would include, among others: fertilization, irrigation, and pest control. The size of each facility should be catered to the number of plants that need to be stored, but a general guideline is an approximate area of 2 000 to 3 000 m<sup>2</sup> (four tennis courts). Each facility must be fenced securely with shade cloth fencing and with one clean water point supplied per site and placed on a site with a gentle even slope - for drainage purposes.

A qualified horticulturalist should be enlisted to help manage the nursery facility and mitigate the effects of transplant shock (stress that stunts natural root growth and plant functioning). The nursery should be placed in an area where natural habitat will not need to be cleared or affected in any way.

If it is not possible to set-up a nursery facility within the project area, then an existing nursery or horticultural facility in close proximity to the area could be utilised for space rental, plant maintenance and the temporary storage of the plant material, until such a time as the plant material is required to be taken back to the source area (project area) for re-planting.

### 3.2 Search and Rescue Considerations and Mitigations

The following principles apply in terms of plant rescue and protection:

- An ideal scenario would be to allocate at least one month during late August to October, before project land clearing commences, in order to dispatch search and rescue teams to remove and immediately re-plant all necessary species to within pre-allocated safe areas within the property. This would minimise stress and eliminate the need for nursery facilities;
- Permits will be required from the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (provincially protected plants), and/or the Department of Forestry, Fisheries and the Environment – previously DEA and DAFF (TOPS plants and/or protected trees), in order to translocate or destroy any protected species identified within the project area, even if they do not leave the property. The permits must be obtained prior to the undertaking of any search and rescue operations. One may refer to [this 2015 document](#) for a guideline of the relevant permit offices and contacts (note: some of the contacts may be outdated or otherwise now incorrect);
- The search and rescue operation of plant species should be undertaken within the development footprint prior to the commencement of land clearing and construction, by a qualified ECO assisted by a specialist Botanist or horticulturalist;
- The timing of search and rescue activities should align with the onset of the growing season. i.e., plant removal should occur between September and February to maximise the opportunity of finding and identifying all species that need to be translocated;
- Take special care not to damage the plant parts (especially the root system) when digging around and under the plant. Dig at least 20 cm away from the base of the plant and as deep as possible below the plant. Smaller geophytes should be completely removed with as much soil still intact around the roots as possible (forming a soil ball), it should remain in this undisturbed state until replanting;
- Plant damage during removal and transport is one of the leading possible causes for transplant failure, especially if the root system is damaged (Gauthier *et al*, 2014);
- Once a plant has been removed, avoid disturbing the roots as much as possible. Do not shake the roots or bump them against anything and do not remove any of the soil around the roots as this will shock the plants system;

- When moving the plant roots and possible bulb, keep them slightly moist to avoid sections of the root drying out and becoming damaged. Keep as much of the root as possible and do not cut away any segments;
- All individuals that are translocated must be assigned a number for record keeping and monitoring purposes. Each individual plant must be photographed before removal, tagged with a unique number or code, and the GPS position recorded using a hand - held GPS device;
- If the plant has been temporarily housed in the nursery they must be re-planted back in the wild during the growing season, this should be 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;
- The re-planting site must be as similar as possible to the original site. The soil in the new area must be free draining (sandy) and not overly compacted. Gently compact the soil around the base of the newly planted specimen by hand and water it to help bind the new soil. Over the first two to three weeks the plant must be closely monitored, and a little water must be added every few days if the soil dries out;
- Re-planting holes must not be too small, this will crowd the roots and result in transplant failure. The plant must be dug to the exact same depth as it was recorded from its original site;
- Do not use fertiliser unless administered by a qualified botanist or horticulturalist. Excessive and/or incorrect fertiliser use can result in root 'burn'. Most soils are fertile enough to support plant growth over a period of several years without supplemental nutrients;
- The position of the rescued and re-planted individual/s must be recorded to aid in the future monitoring of the plant – a critical component of the process;
- The site where the plants are relocated to must not be one that is likely to be developed in the future;
- Do not prune the stems/branches of the transplanted specimen, unless advised by a qualified botanist or horticulturalist (as in the case that a limb is dead, damaged, or diseased);
- The ECO is to give permission to clear vegetation only once all search and rescue operations are completed;
- The collecting of any plants or their parts must be strictly. Staff should be informed of the legal and conservation implications of harvesting plants from the wild, as part of the environmental induction training and as per the mitigations including the EMPr. Signs should be erected to indicate the prohibition of the collecting of species;
- Any sensitive habitats and areas outside of the project development footprint should be clearly demarcated as 'no-go' areas during the construction and operational phases to avoid accidental impacts; and

- Any SCC or protected plants close to the development zone that will remain in place may not be damaged, disturbed, destroyed, or removed. These plants should be clearly marked, and the areas cordoned off as no-go areas.

## 4 Monitoring

Appropriate monitoring is crucial to ensure the overall success and sustainability of the relocation process. Data captured from these events is also considered highly valuable as it can be shared with institutions and future projects to advise on best-practice methods and practices to avoid. The following monitoring protocols must be followed:

- All assessment area clearing should be monitored as it proceeds to ensure that as many SSC and protected plants are rescued as possible;
- It is recommended that the relocated plants be monitored once a week until establishment (approximately two months, but transplanted trees can take up to three years to recover from transplant stresses) to ascertain the efficacy and success of the relocation process. The species and the number of surviving individuals must be recorded;
- Photos must be included in a progress report for each specimen to show the before (original location), during (in nursery and/or transport), and after (replanted in the natural area) state of the plant; and
- Post-relocation monitoring should take place for at least two years after the process has been completed.

## 5 Concluding Remarks

This Plant Rescue and Protection Plan was developed for the Castle WEF as a requirement of the issued environmental authorization. Several plants were identified within the area that will need rescue. These plants, as well as any additional SCC or protected flora that are observed within the development footprint, must be removed and relocated according to this rescue plan.

It is important to consider that not all of the relocated individuals may survive, but by implementing the recommended actions as provided in this report it is possible to reduce the level of loss. Therefore, all recommendations within this report must be adhered to so as to ensure an effective and successful plant rescue and translocation effort. .



## 6 References

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