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**SCOPING ASSESSMENT OF SITE FOR  
PROPOSED UYEKRAAL WIND ENERGY  
FACILITY NEAR SALDANHA, CAPE WEST  
COAST: ECOLOGY**

Compiled for: Savannah Environmental, Johannesburg

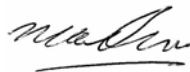
Client: Creative-Renewable-Energy-Solutions (Pty) Ltd  
("CRENERSOL")

8 November 2010

**DECLARATION OF INDEPENDENCE**

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence and include an abbreviated Curriculum Vitae.

I, N.A. Helme, do hereby declare that I am financially and otherwise independent of the client and their consultants, and that all opinions expressed in this document are substantially my own.



NA Helme

**Abridged CV:**

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Since 1997 I have been based in Cape Town, and have been working as a specialist botanical consultant, specialising in the diverse flora of the south-western Cape. Since the end of 2001 I have been working on my own and trade as Nick Helme Botanical Surveys.

A selection of work undertaken in the general area over the last few years is as follows:

- Botanical Scoping study of proposed Wind Energy Facility near Britannia Bay (Savannah Environmental 2010)
- Botanical Scoping study of proposed Kerrifontein Wind Energy Facility near Darling (EEU, UCT 2010)
- Botanical Scoping and Impact Assessment of proposed Rheboksfontein WEF near Darling (Savannah Environmental 2010)
- Botanical Scoping and Impact Assessment of proposed West Coast One WEF, near Vredenburg (Savannah Environmental 2010)

- Botanical Scoping and Impact Assessment of proposed St Helena Hills development (DJ Environmental 2009)
- Botanical Impact Assessment of Portion 4 of Farm 560, Yzerfontein (EnviroLogic 2009)
- Botanical Impact Assessment of Portion 9 of Farm 957, Saldanha (EnviroLogic 2008)
- Botanical Sensitivity study of Portion 4 of Farm Yzerfontein 560 (De Villiers family 2008)
- Botanical Scoping and Impact Assessment of proposed overnight sites in the West Coast National Park (SANParks 2008 & 2010)
- Botanical Scoping and Impact Assessment of proposed Wind Energy Facility near Hopefield (Savannah Environmental 2008 & 2009)
- Botanical Impact Assessment of proposed development on Portion 87 of the Farm Witteklip 123, Vredenburg (CCA Environmental 2008)
- Fine Scale Vegetation Mapping and Conservation Planning for Saldanha Municipality (CapeNature & SANBI, 2006 - 2007)
- Botanical Assessment of Rem. Erf 460 Ptn A, St Helena (Envirodinamik 2007)
- Baseline botanical assessment of Portion 5 of the Farm Duyker Eiland 6, St Helena (Johan Neethling Environmental Services 2006)
- Specialist Botanical input for the proposed expansion of the St Helena Urban Edge (CK Rumboll 2006)
- Botanical Assessment of Phases 4-9, Sandy Pt Heights, St Helena (EnviroLogic 2006)
- Botanical Scoping and Impact Assessment of proposed Blaauzicht Estate, St Helena (CCA 2004 and Glasshouse Consultants 2005)
- Botanical Assessment of Erf 24, St Helena (Envirodinamik 2005)

## **EXECUTIVE SUMMARY**

This baseline and scoping assessment of the vegetation and general ecology was commissioned in order to help inform the planning and development application process for a proposed Wind Energy Facility (WEF) east of Saldanha and southeast of Vredenburg, on the Cape west coast. The study area consists of Portion 4 of the Farm Langeberg 187 and Portion 1 of the Farm Uyekraal 189. The total study area is about 541ha in extent and lies west of the R27 on flat terrain. The proposal is to install up to 22 wind turbines, internal access roads and underground cabling, plus a short connection to the existing 132kV powerline that crosses the study area.

The study area falls within the Saldanha Municipality, which is an acknowledged centre of plant endemism (an area with many localised species) within the Cape Floristic Region. The study area is within the mapping domain for the Fine Scale Vegetation Mapping project (FSP) for the Saldanha area (Helme & Koopman 2007), and is also within the conservation planning domain of the same project (Pence 2008). The latter indicates that about 15% of the site (the westernmost part) is designated as a terrestrial Critical Biodiversity Area (CBA), which means that it is considered to be an inappropriate area for development. The CBA corresponds exactly with the portion of the site that still supports natural vegetation (about 95ha), while the remainder of the site (some 545ha) has been recently or previously cultivated and supports no significant natural vegetation.

A single vegetation type is present on site. Saldanha Flats Strandveld is classified as an Endangered vegetation type in terms of the National Spatial Biodiversity Assessment and as Vulnerable in the Draft National List of Threatened Ecosystems.

The unploughed western part of the site (about 95ha in extent) is very likely to support a number of plant Species of Conservation Concern, including a few regional endemics, and none of these are likely to be found elsewhere on site. This area is of High sensitivity and conservation value and should not be developed or disturbed, and should instead be formally conserved and actively managed for conservation. This part of the site is also likely to be the most important area from an insect and vertebrate point of view, and may support a number of threatened reptiles.

The previously cultivated portion of the site is deemed to be of Low botanical and ecological sensitivity and presents no botanical or ecological constraints to the proposed development.

In terms of the construction of a 22 turbine wind energy facility on the site the following potentially negative ecological issues have been identified, and will require assessment at the Impact Assessment phase:

- Direct loss of Endangered Saldanha Flats Strandveld vegetation and possible associated Species of Conservation Concern at the construction phase (turbine foundations and crane standpads; internal access roads)
- Temporary loss of vegetation at the construction phase (laydown areas; cabling; disturbance around turbines; power line connection and installation)
- Indirect ecological impacts at the operational phase (introduction of invasive alien ants and plants; fragmentation of natural habitat and existing identified ecological corridors).

The following potentially positive ecological impacts have been identified:

- Opportunity to formally conserve 95ha of important natural habitat on site (basically an on-site conservation contribution), preferably as a Contract Reserve with CapeNature's Stewardship Program. Note that this will only occur if the landowners are willing to engage with the applicant and CapeNature.
- Opportunity to fund and implement an Operational Environmental Management Plan (OEMP) for the entire site, and especially for the priority conservation area, focussing on alien vegetation control and limitations on grazing by stock.

The low sensitivity area on site (about 545ha in extent) presents a viable opportunity for the construction and operation of a wind energy facility that would have negligible botanical or ecological impact. If development can be restricted to the area of Low sensitivity (identified in Figure 4) the direct impact on natural vegetation will be minimised, and will not be ecologically significant.

Development within the High sensitivity area (*i.e.* area of Endangered natural vegetation; about 95ha) is **not** recommended, as the serious botanical and ecological impacts which will occur cannot be effectively mitigated. The four proposed turbines (numbered 19-22) and the associated infrastructure in this

part of the site should thus be dropped (if no further space is available) or relocated to Low sensitivity areas (if space is available on site), with a buffer of at least 30m from any High sensitivity areas.

**TABLE OF CONTENTS**

<b>Introduction &amp; Study Area</b>	<b>1</b>
<b>Terms of Reference</b>	<b>1</b>
<b>Limitations, Assumptions &amp; Methodology</b>	<b>1</b>
<b>Study Area &amp; Regional Context</b>	<b>2</b>
<b>Overview of the Vegetation</b>	<b>4</b>
<b>Plant Species of Conservation Concern</b>	<b>7</b>
<b>Habitat Sensitivity</b>	<b>7</b>
<b>Ecological Drivers</b>	<b>9</b>
<b>General Ecology</b>	<b>9</b>
<b>Issues Identified</b>	<b>10</b>
<b>Recommendations for the Planning Stage</b>	<b>11</b>
<b>Conclusions</b>	<b>12</b>
<b>References</b>	<b>12</b>

## **1. INTRODUCTION AND STUDY AREA**

This baseline and scoping assessment of the vegetation and general ecology was commissioned in order to help inform the planning and development application process for a proposed Wind Energy Facility (WEF) east of Saldanha and southeast of Vredenburg, on the Cape west coast. The study area consists of Portion 4 of the Farm Langeberg 187 and Portion 1 of the Farm Uyekraal 189. The total study area is about 541ha in extent and lies west of the R27 on flat terrain. The initial proposal is to install up to 22 wind turbines, internal access roads and underground cabling, plus a short connection to the existing 132kV powerline that crosses the study area.

## **2. TERMS OF REFERENCE**

The terms of reference for this study were as follows:

- Describe the vegetation on the site, and note the presence or likelihood of locally and regionally endemic plant species, and any Species of Conservation Concern.
- Assess the local (Saldanha peninsula) and regional (SW Cape) conservation value of the site, especially in light of the National Spatial Biodiversity Assessment and Fine Scale Conservation Planning (FSP) products (NSBA, Rouget *et al* 2004; Pence 2008).
- Provide a general assessment of the ecology of the site (excluding avifauna).
- Provide recommendations regarding the suitability of the area for the proposed development, suggest mitigation measures that could reduce identified impacts, including the identification of any no go areas of high sensitivity, and suggest management guidelines for all areas.
- Make reference to any relevant elements of the standard CapeNature TOR for biodiversity specialists.

## **3. LIMITATIONS, ASSUMPTIONS AND METHODOLOGY**

No fieldwork was specifically conducted for this project, as I have worked extensively in the area (*e.g.* Helme 2006, Helme 2010, Helme & Koopman 2007), including on the site immediately to the north (Helme 2006). Familiarity with the area means that I am able to interpret the satellite imagery accurately, especially when I have first hand knowledge of similar habitats on the adjacent property. In addition, I was able to reference the groundtruthed fine scale vegetation map for the area (Helme and Koopman 2007), which is much more accurate than the SA vegetation map (Mucina & Rutherford 2006) in this area. I

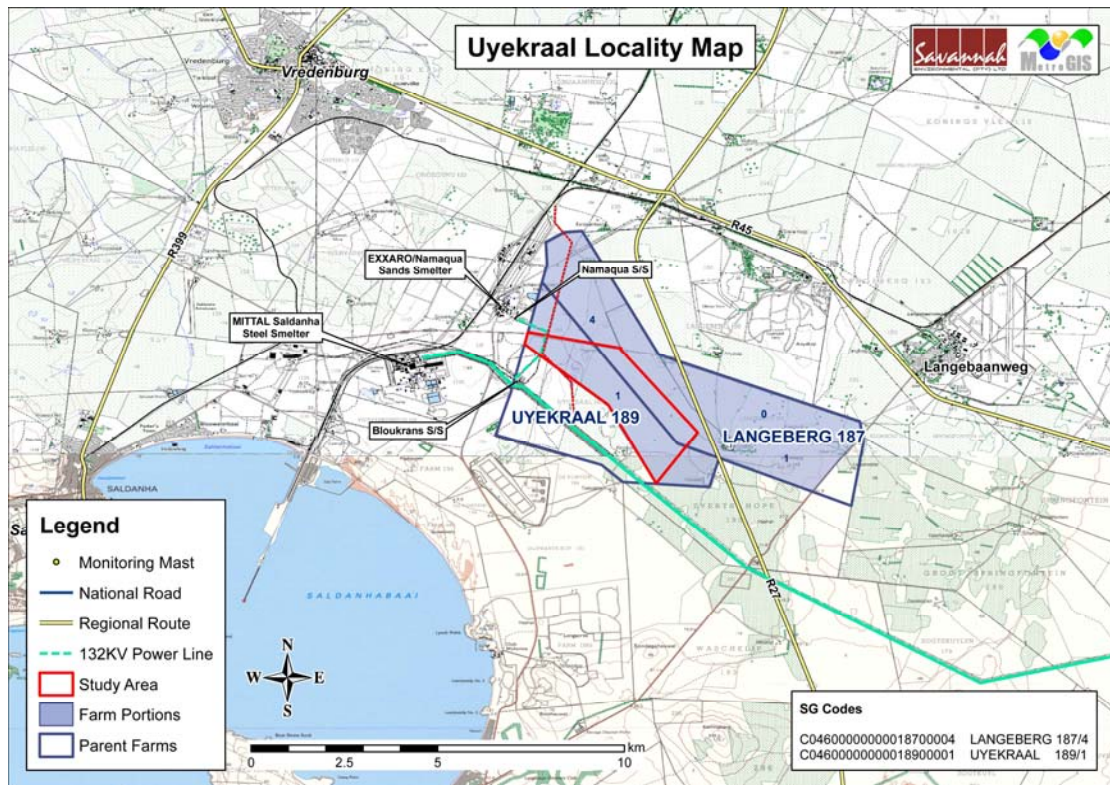
was also able to refer to the Fine Scale Conservation Plan for the area (Pence 2008), and the Critical Biodiversity Area map is taken from this source.

Conservation value and sensitivity of habitats are a product of species diversity, rarity of habitat, degree of habitat degradation, rarity of species, ecological viability and connectivity, vulnerability to impacts, and reversibility of threats.

The author was able to access the GIS based rare species information (CapeRares database) maintained by CREW (based at SANBI, Kirstenbosch), which helped supplement the species information in this report. Confidence levels in the broad brush botanical sensitivity mapping are regarded as high. No assessment of the avifauna of the site is provided as it is understood that this will be addressed in another specialist report.

#### **4. STUDY AREA AND REGIONAL CONTEXT**

The approximately 541ha study area is largely flat, and there are no streams or wetlands on the site. The soils are generally sandy, and are probably neutral to slightly alkaline, due to the extensive presence of calcrete (visible as piles of stone around the site). Small surface exposures of calcrete (aka limestone) occur in the western portion and this is presumably why this area was never completely ploughed. Four small fields (11ha in total extent) were cultivated in the western area, presumably in areas with slightly deeper soils, but these have not been cultivated for some time and partial rehabilitation has occurred. It would appear (from the pattern of trails evident on the imagery) that the natural vegetation in the western part is used for grazing of livestock, and small parts of the area are heavily trampled, especially around water points.



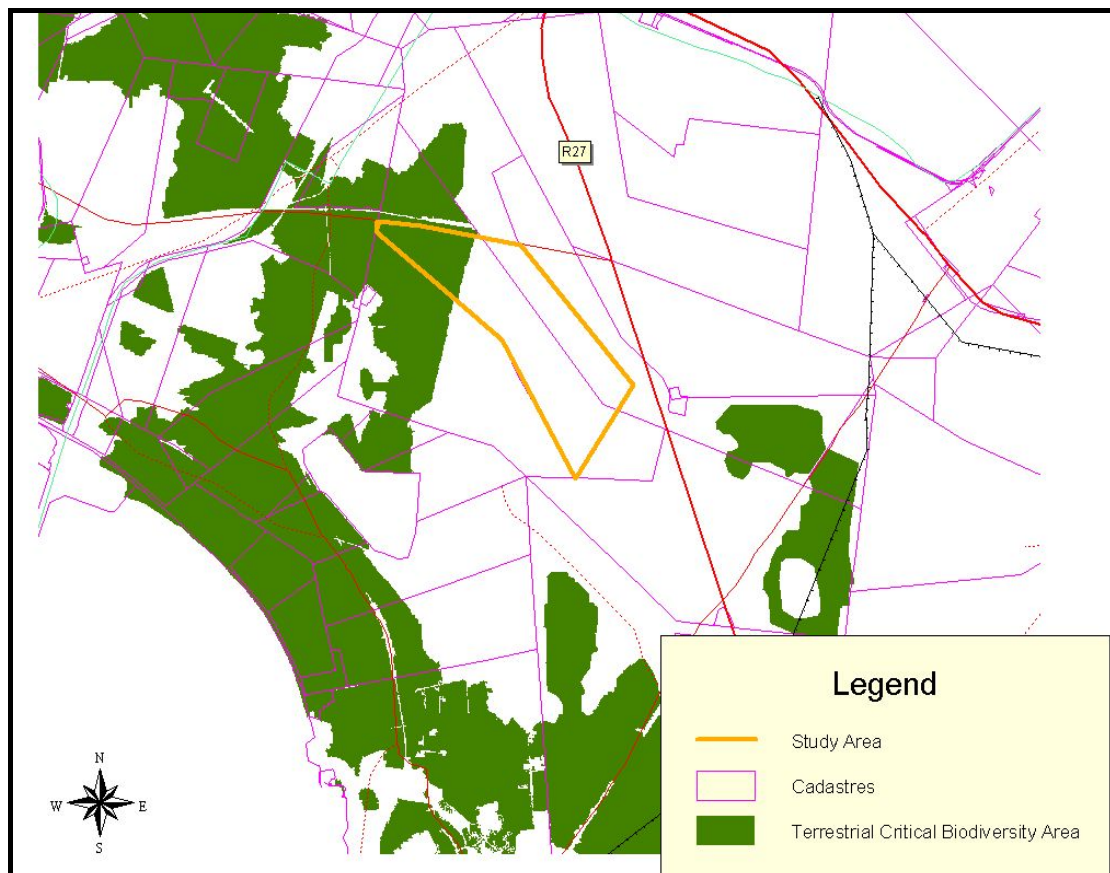
**Figure 1:** Map showing the study area southeast of Vredenburg.

Good natural rehabilitation has occurred in a small area that was previously strip cultivated. Woody alien vegetation is a very minor problem throughout the study area, and the primary woody invasive aliens are *Acacia saligna* (Port Jackson willow) and *Acacia cyclops* (rooikrans). The cultivation of cereals and other annual crops on the bulk of the site has naturally introduced a wide range of alien annuals, many of which dominate the partly disturbed edges of the remaining natural vegetation.

The site lies within the Fynbos biome and the Cape Floristic Region (CFR). The CFR is one of only six floristic regions in the world, and is the only one confined to a single country. It is also by far the smallest floristic region, occupying only 0.01% of the world's land surface, and supporting about 9000 plant species - almost half of all the plant species in South Africa. At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Most of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. The latest data from the Red listing process recently undertaken for South Africa is that 67% of the rare or threatened plant species in the country occur only in the Fynbos biome, and these

total over 1800 species (Raimondo *et al* 2009)! It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species. Developments in this area thus need to take this into account.

The study area is part of the greater West coast region, and lies within the Saldanha peninsula bioregion. This bioregion has a fairly distinct flora, and unusually large numbers of locally and regionally endemic plant species, as well as plant Species of Conservation Concern.



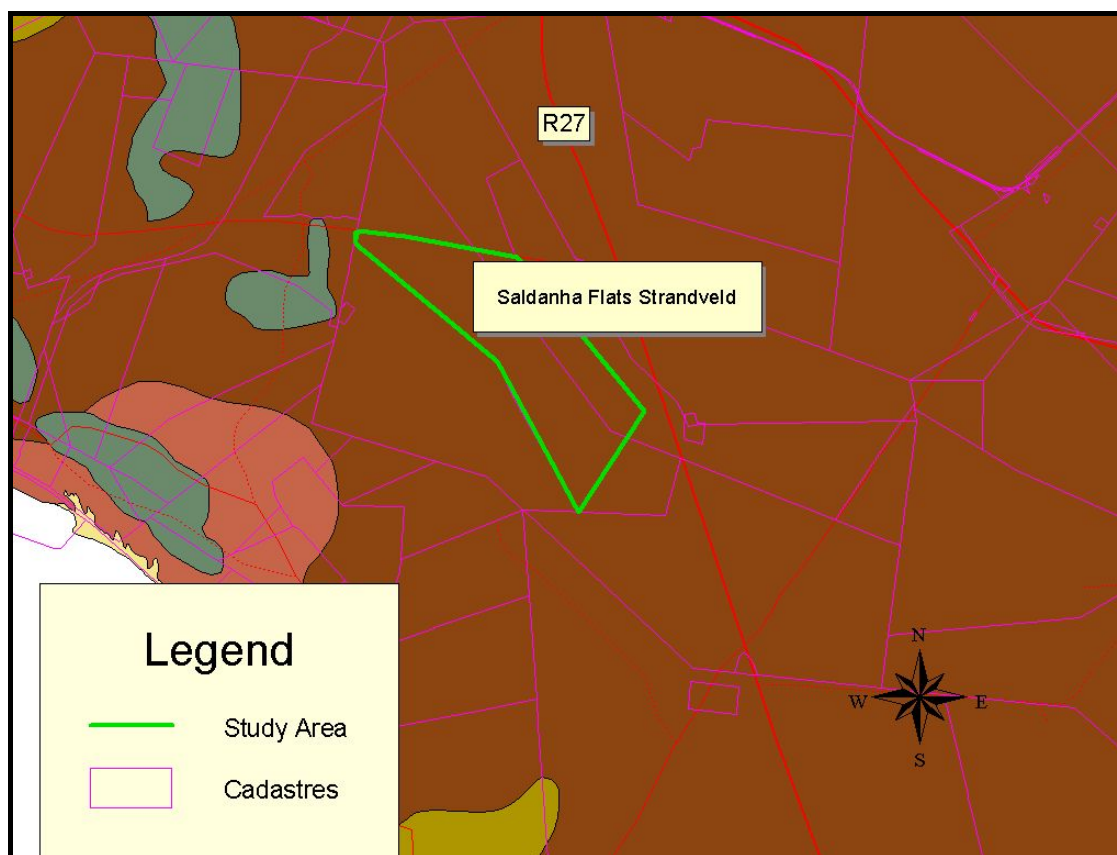
**Figure 2:** Extract of Saldanha Fine Scale Conservation Plan (Pence 2008) showing that the western section of the site is a terrestrial Critical Biodiversity Area.

The study area is within the planning domain for the Saldanha Fine Scale Conservation Plan (Pence 2008). This important reference indicates that the western 15% of the site is a terrestrial Critical Biodiversity Area (CBA), as shown in Figure 2. Critical Biodiversity Areas are regarded as essential areas for the achievement of regional conservation targets, and are designed to ensure minimum land take for maximum result. It should be noted that the explanation

for selecting patches of previously cultivated land (four small fields) on this part of the site as CBA is that it has an important ecological connectivity function (mainly north - south) and incorporates Endangered habitat (Pence 2008).

## 5. OVERVIEW OF THE VEGETATION

As can be seen from Figure 3 there was originally (prior to disturbance) a single primary vegetation type on site - Saldanha Flats Strandveld. Agriculture has now destroyed the natural vegetation on about 85% of the site, but natural or largely natural vegetation is present on about 15% of the site.



**Figure 3:** Extract of Fine Scale Vegetation map for the area (Helme & Koopman 2007), showing that a single vegetation type originally occurred on the site.



**Plate 1:** View of High Sensitivity Saldanha Flats Strandveld in the western part of the study area (photo taken June 2007).

Indigenous plant species likely to be present include *Putterlickia pyracantha*, *Euclea racemosa* (sea guarrie), *Searsia laevigata* (dune taaibos), *Euclea acutifolia* (large leaf guarrie), *Willdenowia incurvata* (sonkwasriet), *Othonna cylindrica*, *Euryops thunbergii*, *Helichrysum dasyanthum*, *Salvia lanceolata* (sandsalie), *Eriocephalus racemosus* (kapokbos), *Asparagus capensis* (katdoring), *Diosma hirsuta* (buchu), *Chasmanthe aethiopica* (cobraflower), *Cissampelos capensis*, *Zygophyllum morgsana* (slaaibos), *Cotyledon orbiculata* (plakkies), *Ruschia tumidula*, *Thamnochortus erectus* (wyfieriet), *Othonna amplexicaulis*, *Cybistetes longifolia* (malgaslelie), *Lachenalia bulbifera* (viooltjie), *Microlooma sagittatum* (bokhorinkies), *Othonna coronopifolia*, *Muraltia spinosa* (skilpadbessie), *Oxalis flava* (suuring), *Oxalis obtusa*, *Trichogyne repens*, *Aspalathus hispida*, *Manulea altissima*, *Gymnodiscus capillaris*, *Oxalis luteola*, *Nemesia bicornis*, *Trachyandra divaricata*, *Amellus* sp., (astertjie), *Ursinia anthemoides*, *Hermannia myrrhifolia* (poprosie), *Hermannia scordifolia*, *Lepidium* sp., *Ehrharta calycina*, *Cynanchum africanum* (melktou), *Tetragonia fruticosa* (kinkelbossie), *Tetragonia chenopodioides*, *Aspalathus quinqueflorus*, and *Chrysanthemoides incana* (grey bietou). Alien species include *Erodium moschatum* and various annual grasses. Woody alien vegetation is not a feature of most of this area.

## Cultivated Areas

The diversity of natural vegetation in the previously cultivated areas is not surprisingly very low, and the community is heavily dominated by a few weedy species, some of which are alien invasive weeds of disturbed areas. The most prevalent indigenous species include *Cynodon dactylon* (kweekgras), *Galenia fruticosa*, *Oncosiphon suffruticosum* (stinkkruid), *Leysera gnaphalodes* (glastee), *Gymnodiscus capillaris*, *Ehrharta* sp. (polgras), and *Exomis microphylla* (brakbos), with a few specimens of the persistent *Lycium ferocissimum* (kraaldoring) on the edges of the lands. Common alien species include the herb *Erodium moschatum* (cranesbill) and grasses such as *Avena* (oats), *Bromus diandrus* (brome) and *Lolium* sp. (rye grass). Additional species that may occur on the less disturbed edges of the cultivated lands include *Cyanella orchidiformis*, *Aspalathus acuminata*, *Ehrharta calycina*, *Muraltia spinosa* (skilpadbessie), *Calobota angustifolia* (fluitjiesbos), *Ruschia* sp., *Conicosia pugioniformis* (vetkousie), *Trichogyne repens*, *Carpobrotus edulis* (suurvy), *Trachyandra divaricata* (duinekool), and *Willdenowia incurvata* (sonkwasriet).

### 5.1 Plant Species of Conservation Concern

Plant Species of Conservation Concern would be likely to occur only within the areas of natural vegetation on this site (High sensitivity area in Figure 4).

Potential plant Species of Conservation Concern on this site may include *Muraltia harveyana* (Vulnerable; Raimondo et al 2009), *Gladiolus caeruleus* (Near Threatened; Raimondo et al 2009), *Nenax hirta* ssp. *calciphila* (Near Threatened; Raimondo et al 2009) and *Limonium capense* (Near Threatened; Raimondo et al 2009). Most of these species are restricted to the area between St Helena and Yzerfontein, and in some cases to even smaller areas.

Plant Species of Conservation Concern recorded on the adjacent property (Helme 2006) include *Lampranthus foliosus* (Endangered), *Passerina filiformis* ssp. *glutinosa* (Near Threatened), *Arctopus dregei* (Vulnerable), *Otholobium bolusii* (Near Threatened), and *Agathosma thymifolia* (Vulnerable). All of these are also likely to occur on the study site.

No distribution map of the rare species is provided, as all the Species of Conservation Concern are likely to occur in the High Sensitivity area mapped in Figure 4. Provided that their habitat is conserved and disturbance is minimised,

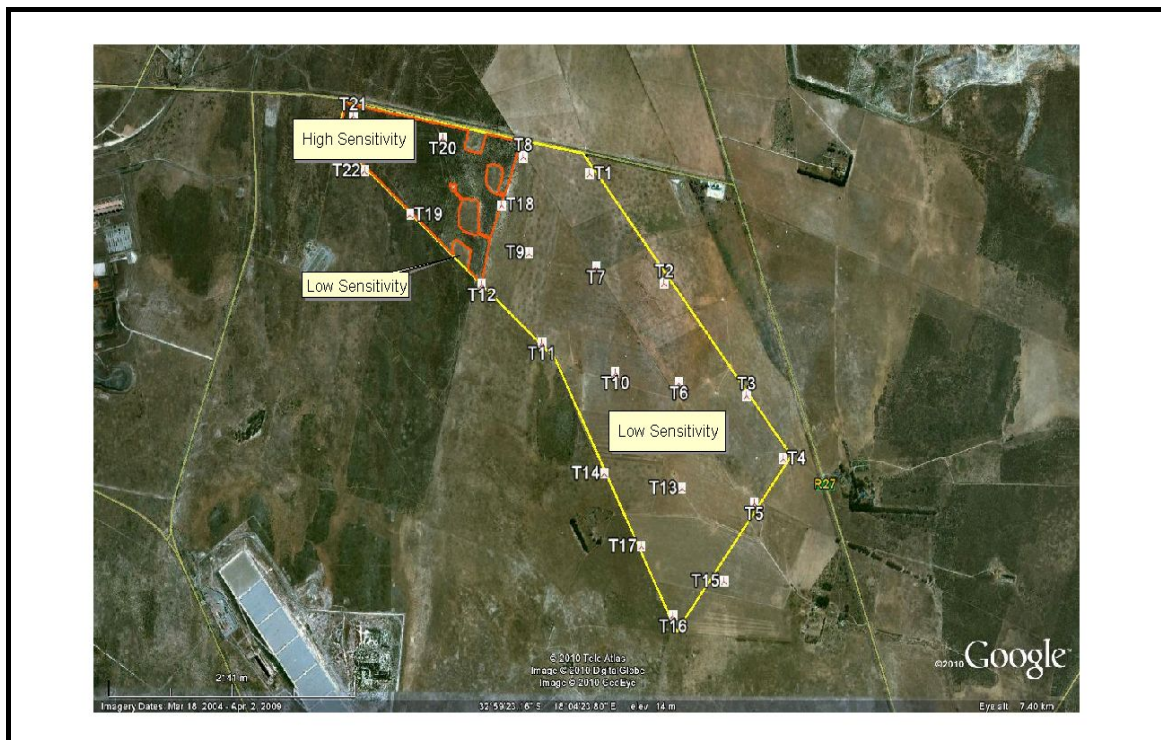
and the ecological processes that sustain them (pollinators, seed dispersers, etc.) are in place, then these species should persist in this area.

There is a moderate to high likelihood that other rare or threatened plant species may occur in this area, but a spring survey would be necessary to ascertain this.

## 5.2 Habitat Sensitivity

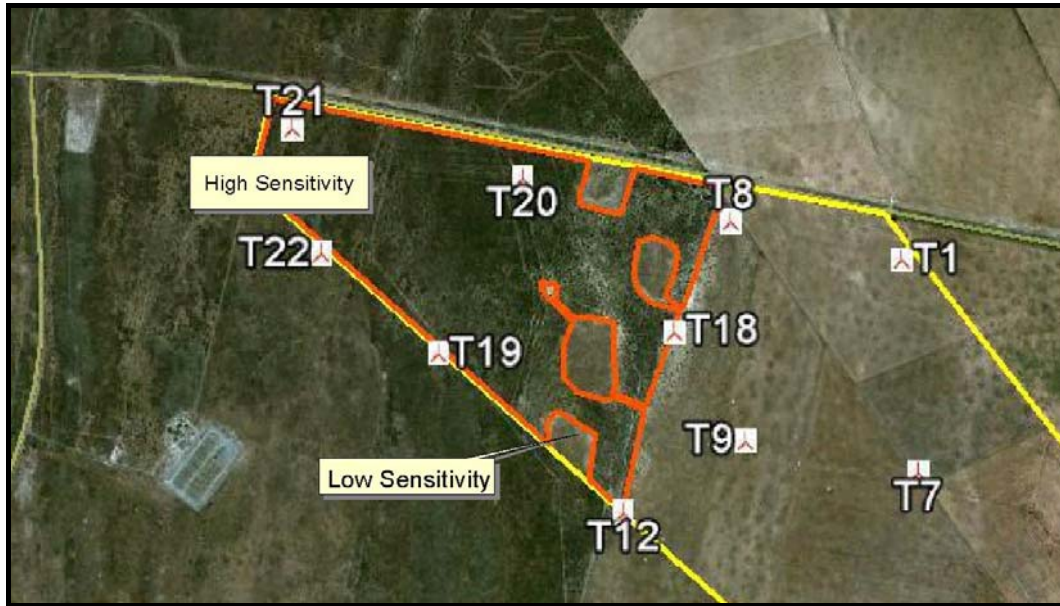
Disturbance on the site includes cultivation, grazing and trampling by livestock, and light alien vegetation invasion. The most heavily disturbed areas are those that have been regularly ploughed and sown with crops, and these include most of the areas mapped as Low sensitivity in Figure 4. Low sensitivity areas are not likely to support any plant Species of Conservation Concern. Figure 5 is an enlargement of the western area, showing the High sensitivity area in more detail.

All High sensitivity areas on site are designated Critical Biodiversity Areas (Pence 2008), support Saldanha Flats Strandveld (an Endangered vegetation type) in medium to good condition, and may support viable populations of a number of plant Species of Conservation Concern.



**Figure 4:** Botanical Sensitivity map of the site (yellow boundary). High sensitivity areas are outlined in orange, and are restricted to the western parts of the site. Note that four smaller patches within the main High sensitivity area are

deemed to be of Low sensitivity, as these are previously cultivated areas. Note that the lines are available as Google Earth kmz files.



**Figure 5:** Detail of the western area, showing areas of High botanical sensitivity (orange outline), with four smaller patches of Low sensitivity within this western area.

It is important to note that even the four smaller patches of Low sensitivity in Figures 4 & 5 were mapped as CBAs in the Fine Scale Conservation Plan (Pence 2008; see Figure 2). The primary reasons for this were because this area has an important ecological connectivity function – connecting intact areas to the north and south of the site, and because the area supports an Endangered vegetation type.

### 5.3 Ecological Drivers

**Fire** is acknowledged to be one of the primary drivers of Fynbos ecosystem dynamics (de Villiers et al 2005), but is neither important nor desirable in Strandveld habitat such as that found on site. This greatly simplifies management of the site. The other key driver of habitat dynamics on site is probably **soil type** (including depth and degree of rockiness), although this cannot be manipulated, and is not further discussed.

### 5.4 General Ecology

Provided that the existing areas of natural habitat on site are maintained the proposed project should have no significant negative impact on the mammals, reptiles, amphibians or insects on site. These areas are clearly demarcated in

Figure 5. The remainder of the site is has been heavily disturbed by agriculture and is likely to support only generalist species that are capable of surviving in virtually any open habitat, and these species are not likely to be impacted by the proposed infrastructure, and should be able to persist in the cultivated areas between the turbines. In this respect the natural (undisturbed) vegetation can be regarded as a good surrogate for the overall ecology on site, and the natural vegetation thus has not only a High botanical sensitivity (or conservation value) but also a High ecological sensitivity.

Tortoises are likely to be amongst the most vulnerable vertebrates on the site, and may occur in significant numbers. The most likely species is the widespread angulate tortoise (*Chersina angulata*). Chameleons are also likely to occur within the natural vegetation on site, but in relatively low numbers. A number of threatened reptiles may occur on site, most of which are likely to be found primarily in the areas of natural vegetation, and these may include the silvery dwarf burrowing skink (*Scelotes bipes*). Many of the reptiles (especially the skinks and lizards) are likely to be associated with the scattered patches of exposed calcrete that are present in the western parts of the site, as these outcrops provide the shelter they need. Damage to these outcrops should thus be avoided.

Many insects are important plant pollinators, and some are very specific in terms of what plant species they visit or feed on, and are also very sensitive to habitat fragmentation or disturbance. The most sensitive species are already likely to have disappeared from the cultivated parts of the site. This means that generally one should try to minimise disturbance to all areas of remaining natural vegetation on site, as these patches are likely to be important habitat refuges for insects.

## **6. ISSUES IDENTIFIED**

In terms of the construction of a 22 turbine wind energy facility on the site the following potentially negative ecological issues have been identified, and will require assessment at the Impact Assessment phase:

- Direct loss of Endangered Saldanha Flats Strandveld vegetation and possible associated Species of Conservation Concern at the construction phase (turbine foundations and crane standpads; internal access roads)

- Temporary loss of vegetation at the construction phase (laydown areas; cabling; disturbance around turbines; power line connection and installation)
- Indirect ecological impacts at the operational phase (introduction of invasive alien ants and plants; fragmentation of natural habitat and existing identified ecological corridors).

The following potentially positive ecological impacts have been identified:

- Opportunity to formally conserve significant priority areas of natural habitat on site (basically an on-site conservation contribution), preferably as a Contract Reserve with CapeNature's Stewardship Program.
- Opportunity to fund and implement an Operational Environmental Management Plan (OEMP) for the entire site, and especially for the priority conservation area, focussing on alien vegetation control and limitations on grazing by stock.

## **7. RECOMMENDATIONS FOR THE PLANNING STAGE**

Various design and management elements need to be thought about upfront and preferably built into the proposal in order to mitigate what could otherwise be significant negative ecological impacts, and at the same time to enhance the potential positive outcomes of the proposed project (and thus the likelihood of authority approval).

- Disturbance, in the form of all permanent and temporary construction and infrastructure, should be restricted to the approximately 545ha of Low Sensitivity area identified in Figures 4 and 5.
- No development is recommended in the High sensitivity areas identified in Figure 4. The preliminary layout shows four turbines in this area (numbers 19-22) and these should thus ideally be relocated to Low sensitivity areas (if there is sufficient space on site) or dropped altogether (if there is not space).
- The High sensitivity areas on the site should ideally become a formal conservation area (preferably as Contract Reserve with CapeNature's Stewardship Program, but this would require an agreement between the applicant and the landowners, and with CapeNature).
- No infrastructure should be located within 30m of any High sensitivity area, and in this regard 3 proposed turbines (numbers 8, 12, and 18) and their associated infrastructure should be moved slightly further east.

## 8. CONCLUSIONS

- About 85% of the site (Low sensitivity area in Figures 4 & 5; about 545ha) presents a viable opportunity for the construction and operation of a wind energy facility that might not have major negative environmental impacts.
- If development can be concentrated in the areas of Low sensitivity (identified in Figures 4 & 5) the direct impact on natural vegetation will be minimised.
- Development within High sensitivity areas (*i.e.* 95ha identified in Figures 4 & 5) is **not** recommended, and the associated negative impacts cannot be effectively mitigated and further investigation will be required during the EIA phase.
- Detailed construction and operational phase mitigation may be required in order to safeguard the vegetation in the sensitive areas during development and the operational phase, depending on the proposed turbine and infrastructure layout. This should be outlined by the botanist at the Impact Assessment (IA) phase. Standard IA methodology should be used for rating impacts, and all potential impacts identified in the current Scoping study should be assessed, along with any others that may become apparent. It is unlikely that a field visit will be necessary at the IA stage if all infrastructure is kept at least 30m from identified High sensitivity areas, but will become necessary if any infrastructure is located within the High sensitivity area.

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