Appendix G: Specialist Report(s)
Appendix G.1: Botanical and Biodiversity Assessment

Botanical and Biodiversity Assessment of a part of Remainder of Portion 10 of Farm Louw's Bos 502, Stellenbosch, Stellenbosch Municipality Western Cape Province

Botanical Surveys & Tours

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Prepared for GroenbergEnviro (Pty) Ltd

October 2024

National Legislation and Regulations governing this report

This is a 'specialist report' and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014, as amended.

Appointment of Specialist

David J. McDonald of Bergwind Botanical Surveys & Tours CC was appointed by GroenbergEnviro (Pty) Ltd to provide specialist botanical consulting services for the assessment of the area proposed for the installation of a solar energy facility on Re Portion 10 of Farm Louw's Bos 502, Stellenbosch, Stellenbosch Municipality, Western Cape Province.

Details of Specialist

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Expertise

Dr David J. McDonald:

- Qualifications: BSc. Hons. (Botany), MSc (Botany) and PhD (Botany)
- Botanical ecologist with over 40 years' experience in the field of Vegetation Science.
- Founded Bergwind Botanical Surveys & Tours CC in 2006
- Has conducted over 800 specialist botanical / ecological studies.
- Has published numerous scientific papers and attended numerous conferences both nationally and internationally (details available on request)

Curriculum Vitae – Appendix 3.

Independence

The views expressed in the document are the objective, independent views of Dr McDonald and the study was carried out under the aegis of, Bergwind Botanical Surveys and Tours CC. Neither Dr McDonald nor Bergwind Botanical Surveys and Tours CC have any business, personal, commercial or other interest in the proposed development apart from fair remuneration for the work performed.

Conditions relating to this report

The content of this report is based on the author's best scientific and professional knowledge as well as available information. Bergwind Botanical Surveys & Tours CC, its staff and appointed associates, reserve the right to modify the report in any way deemed fit should new, relevant or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of the report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must refer to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

Declaration of independence:

I David Jury McDonald, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
  - other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity; or
  - am not independent, but another specialist (the "Review Specialist") that meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;
- have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).

Signature of the specialist:

Bergwind Botanical Surveys & Tours CC	10 October 2024
Name of company	Date

CONTENTS

1. Introduction

Groenberg Enviro (Pty) Ltd appointed Bergwind Botanical Surveys and Tours CC to conduct a botanical-biodiversity assessment of the area of proposed for development of a solar energy facility on part of Remainder Portion 10 of Farm Louw's Bos 502, Stellenbosch (referred to further as the 'Study Area' or site).

The main purpose of the botanical-biodiversity assessment is to inform the environmental assessment process required to authorize the proposed solar facility development. The second important objective is to determine the condition and sensitivity of the indigenous vegetation and the level and significance of impact of the proposed development. The study is conducted in terms of the National Environmental Management Act (NEMA) (No.7 of 1998) as amended and the 2014 Environmental Regulations. and follows published guidelines for evaluating potential impacts on the natural vegetation in an area earmarked for some form of development (Brownlie, 2005; Cadman, 2016). The protocols published in 2020 for specialist assessments have been observed (SANBI, 2020). Note that a separate Terrestrial Biodiversity report has not been compiled due to significant overlap with this report.

2. Terms of Reference

The Terms of Reference are:

Undertake a site visit to the study area and compile a specialist report that addresses the following:

- ⇒ Comply with, the substantive content requirements outlined within Appendix 6 of GN R982, as amended1, which outlines the legal minimum content requirements for specialist studies in terms of the 2014 NEMA EIA Regulations;
- ⇒ The local and regional context of the vegetation communities and plant species within the affected areas with reference to the relevant biodiversity plans, bioregional planning documents, Environmental Management Frameworks etc.
- ⇒ The ecosystem status and conservation value of the vegetation communities, including the whether the potentially affected areas comprise critically endangered or endangered ecosystem(s) listed in terms of section 52 of the NEMBA;
- ⇒ Any rare or endangered species encountered or likely to be or have been present;
- ⇒ The presence of and proximity of the proposed site to protected area(s) identified in terms of NEMPAA and proximity to a Biosphere Reserve (where relevant).
- ⇒ Confirm the approximate area (m^2) of indigenous vegetation (as defined in the NEMA EIA Regulations) that would be cleared for the proposed project.
- ⇒ A description of the direct, indirect, residual and cumulative botanical impacts (both before and after mitigation) and an assessment of the significance of the impacts.

3. Study Area

3.1 Locality

The study area is located at the northern sector of Remainder Portion 10 of Farm Louw's Bos 502, Stellenbosch, that lies north of Annandale Road and northwest of the Stellenbosch Aerodrome in Stellenbosch Municipality, in the Boland of the Western Cape Province (Figures 1 & 2). The land is part of the Spier Wine Farm and is referred to the 'Study Area' or 'site'.

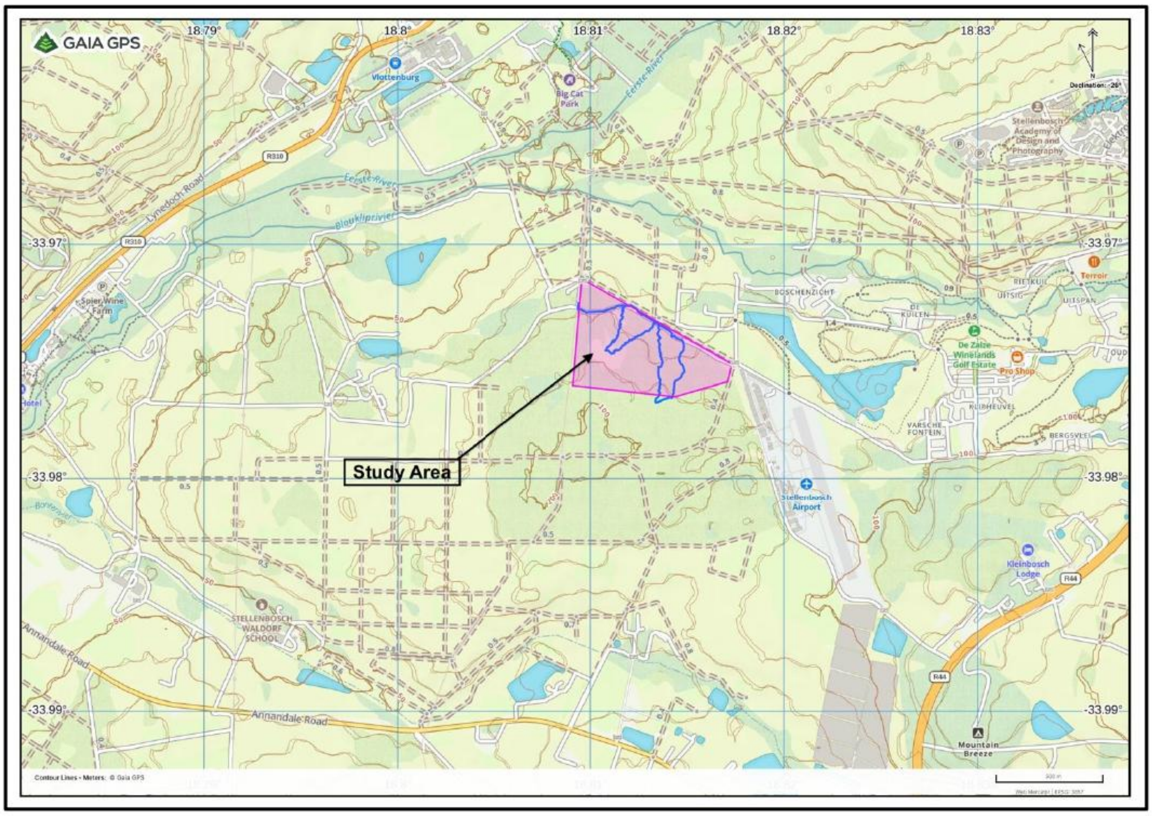

Figure 1. A topographical map of the area north of Annandale Road, Stellenbosch Municipality, indicating the study area (pink shading).

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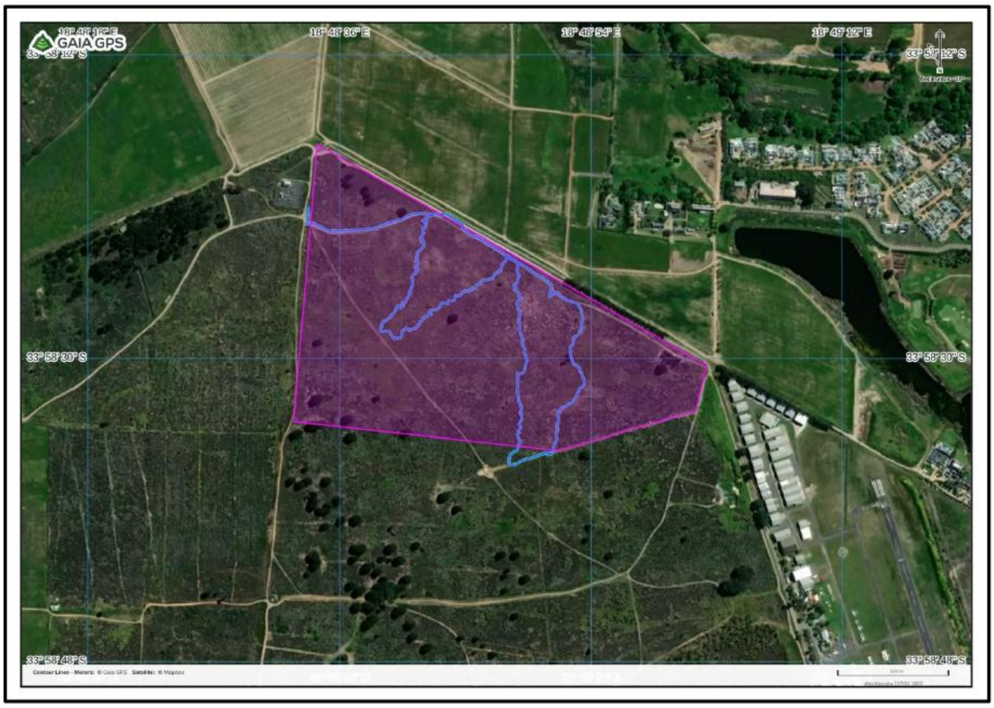

Figure 2. Aerial image (Google Earth ™) with the are proposed for the solar energy facility on part of Re Portion 10 Farm 502, Stellenbosch (purple shading). The irregular blue line represents the survey track.

3.2 Geology, Soils, Topography and Aspect

The site is underlain by granite of the Kuilsrivier Batholith of the Cape Granite (Figure 3) that gives rise to coarse sandy to loamy with a strong texture contrast (land type CA in Figure 4). The forms range from Glenrosa and Mispah, to prismacutanic and pedocutanic diagnostic horizons to red-yellow apedal soils (Rebelo *et al*., 2006). The soils can contain a considerable volume of moisture in winter and spring.

The highest point of the site is a little more than 90 m above mean sea level (m a.m.s.l.) and the lowest point is at 75 m a.m.s.l. (Figure 5). The gentle slope has a strong northerly to north-easterly aspect (Figure 6).

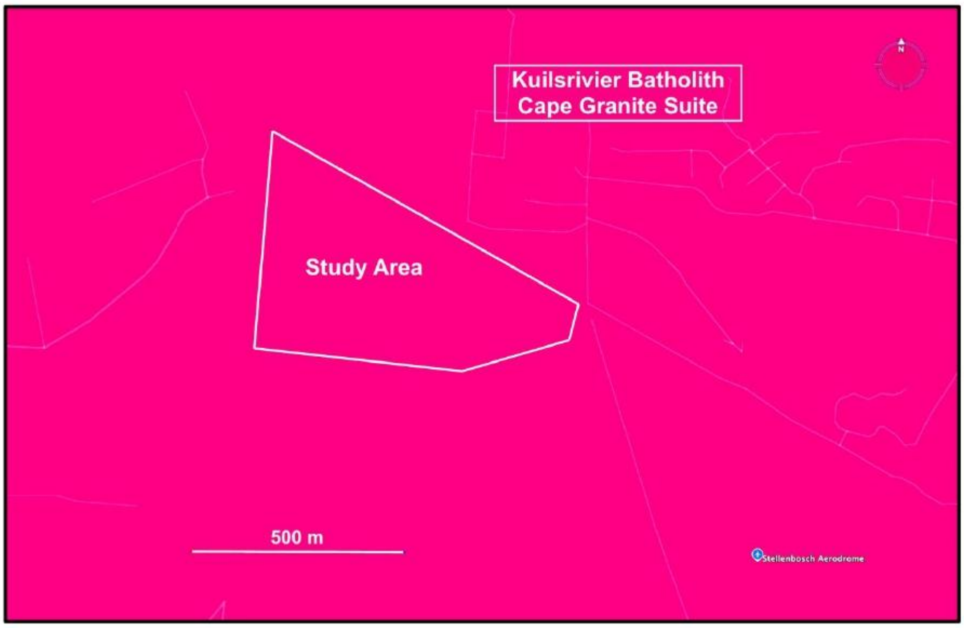

Figure 3. Geological Map (Council for Geoscience 1: 1 000 000) indicating the location of the Spier Solar study area lying entirely within an area underlain by the Kuilsrivier Batholith, Cape Granite Suite.

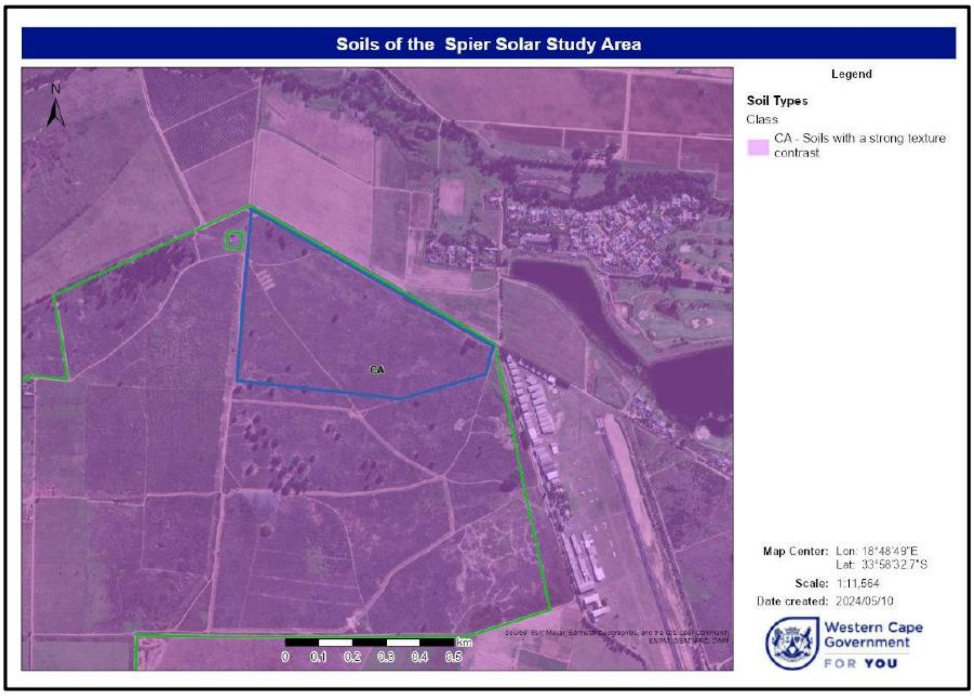

Figure 4. Soil type map showing that all the soils are essentially of one type.

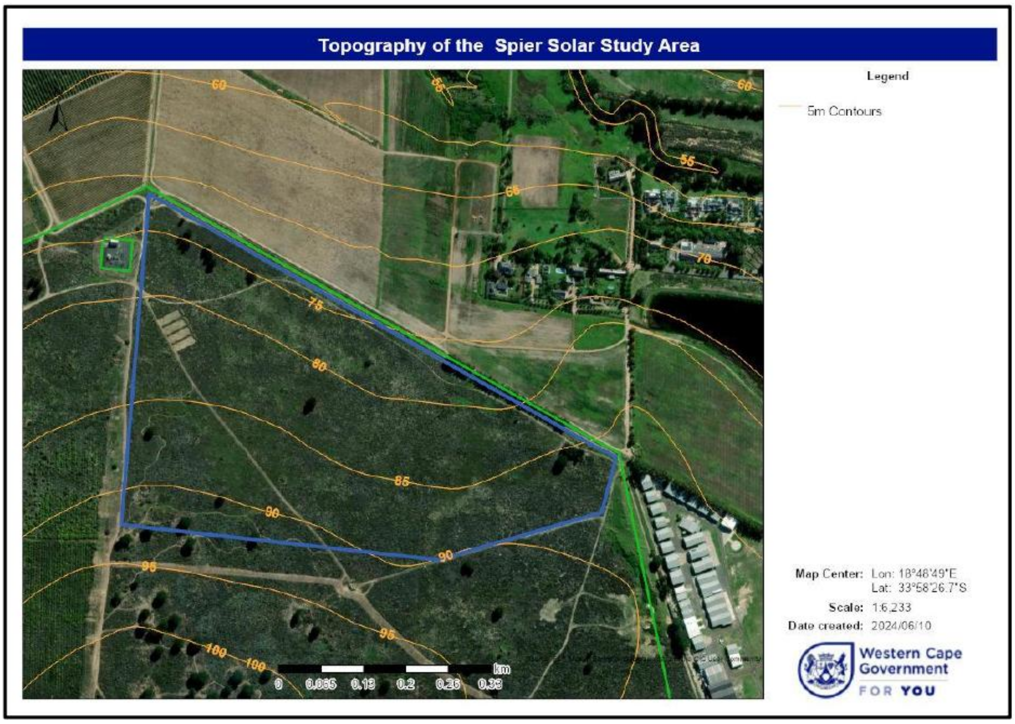

Figure 5. The study area ranges in altitude from 75 – 90 m a.m.s.l.

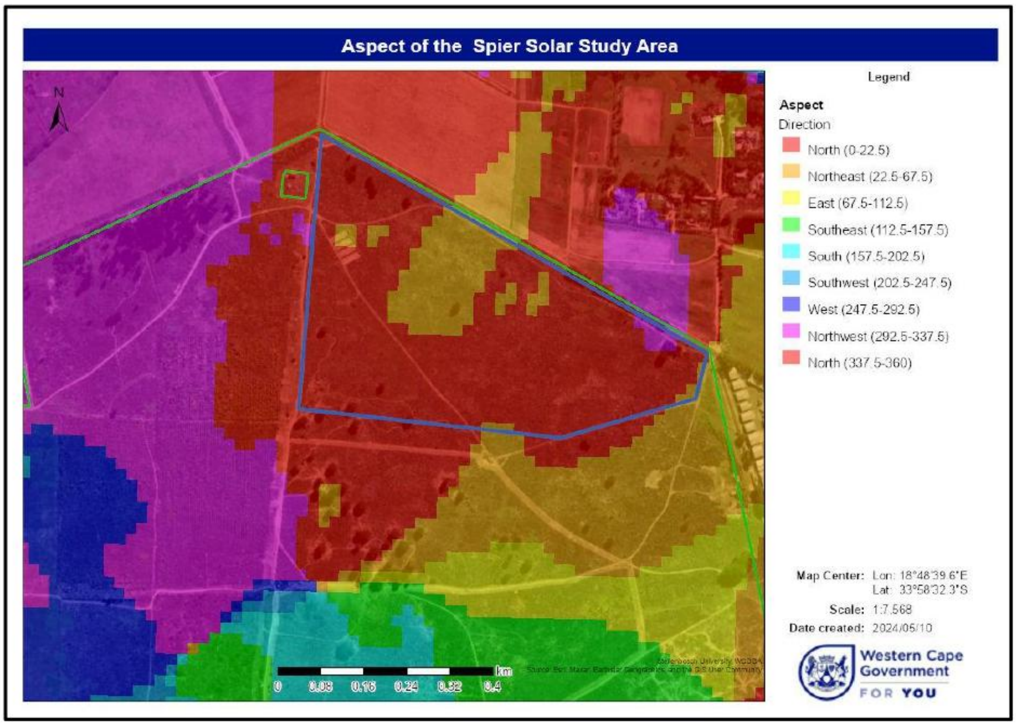

Figure 6. Map of aspects in the study area, showing that the principal aspect is north with a smaller area facing NE.

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3.3 Climate

The study area falls within the Winter Rainfall Region of the Western Cape Province. It experiences a Mediterranean-type climate with cool to cold, wet winters and hot, dry summers. The climate diagram for Swartland Granite Renosterveld (Figure 7) most closely approximates the climate of the study area.

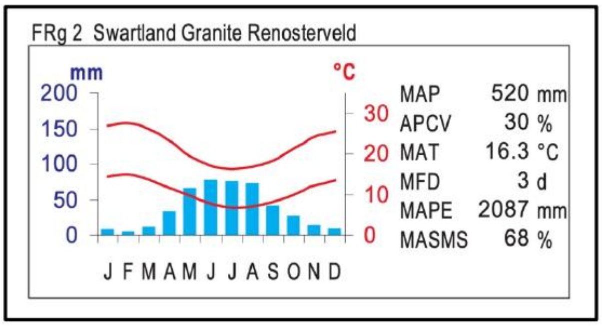

Figure 7. Climate diagram for Swartland Granite Renosterveld the original vegetation type in the study area (Rebelo *et al.* in Mucina & Rutherford, 2006) showing MAP – Mean Annual Precipitation; ACPV = Annual Precipitation Coefficient of Variance; MAT = Mean Annual Temperature; MFD = Mean Frost Days; MAPE = Mean Annual Potential Evaporation; MASMA = Mean Annual Soil Moisture Stress.

4. Methods

4.1 Field Sampling

The site was visited on 30 August 2024 at an optimal time (spring) after a winter period with above average rainfall.

The site was accessed from Annandale Road and the farm roads and then surveyed on foot. The survey track, with five waypoints, was recorded on a handheld Garmin ® GPSMap 66i as well as by using the Gaia GPS app on an iPhone XR. One-hundred-and-thirty-eight geo-coded photographs were taken of the site during the survey, for use when interpreting the vegetation and for illustration in this report. Notes were made at the five waypoints, as described below.

The National Vegetation Map (Mucina *et al.* 2005; SANBI, 2018, 2024 Beta) (referred to as VEGMAP) was used as the 'base-map' to determine the principal original vegetation type.

5. Limitations and Assumptions

The weather at the time of the survey was fine. As noted above, the season of the survey was ideal since it was well into spring and winter, with spring-flowering geophytes and annuals, where found, being easily identifiable. The vegetation varied in density but where dense, it did not limit access.

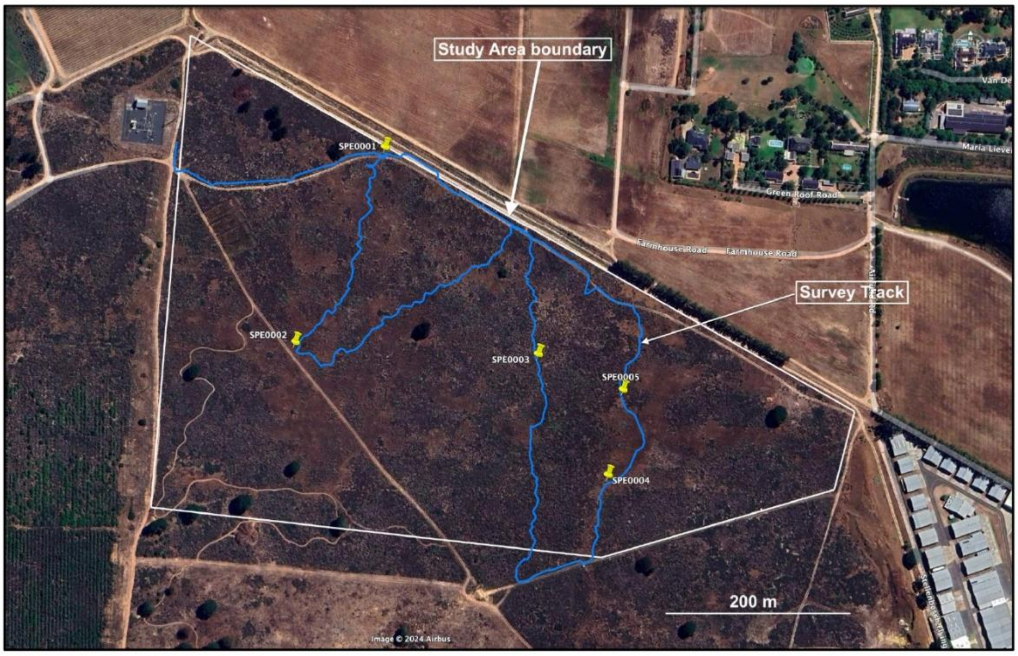

Figure 8a. Aerial (satellite) image from Google Earth Pro ™ of the study area (white boundary) with survey track (blue) and waypoints (yellow pins) (Image date: 11 February 2024).

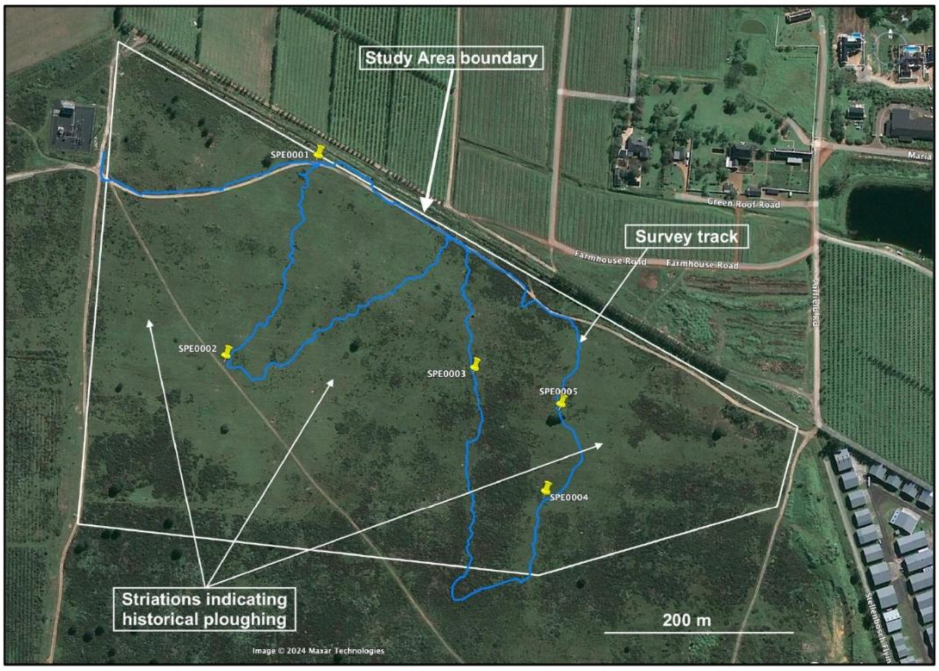

Figure 8b. Aerial (satellite) image from Google Earth Pro ™ of the study area (white boundary) with survey track (blue) and waypoints (yellow pins). Striations indicating historical ploughing are clearly visible (Image date: 11 September 2009).

6. Disturbance regime

Examination of aerial images (Figures 8a & 8b) of the site indicate that the vegetation present now has resulted from the entire study area having been ploughed in the past. This was determined from the striations in the satellite imagery (Google Earth Pro) (Figure 8b). It was confirmed in the field that the vegetation present is **secondary vegetation** and is **not undisturbed** Swartland Granite Renosterveld. All the original vegetation was historically removed, and the fallow vegetation has typically 'restored' to species-poor shrubland, that physically may resemble Swartland Granite Renosterveld, but it is not. The vegetation has with strong dominance of a few plant species in the Asteraceae and Thymelaeaceae and has a distinct lack of geophytes.

7. The Vegetation

7.1 The vegetation in context

According to the Vegetation map of South Africa, Lesotho, and Swaziland (Mucina, Rutherford & Powrie 2005; SANBI 2012; 2018, 2024 Beta), the vegetation that originally occurred at the proposed solar energy development site was originally Swartland Granite Renosterveld (Figure 9). This is a mosaic of grasslands/herblands and medium dense, microphyllous shrublands dominated by renosterbos. Small trees and tall shrubs are associated with heuweltjies and rock outcrops (Rebelo *et al.* 2006).

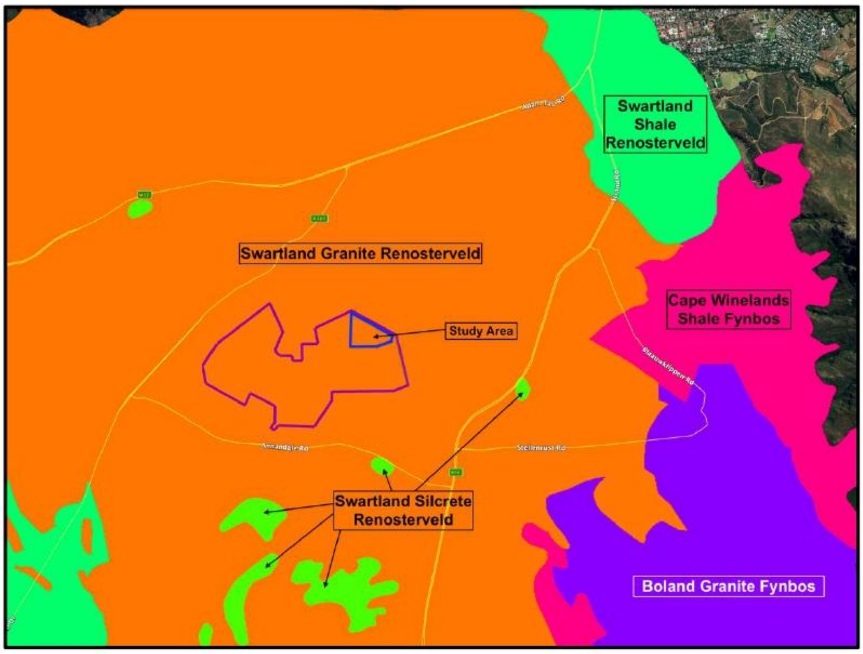

Figure 9. Portion of the *Vegetation map of South Africa, Lesotho, and Swaziland* (Mucina, Rutherford & Powrie 2005; SANBI, 2024 Beta) superimposed on a Google Earth ™ image, showing the single vegetation type in the study area: Swartland Granite Renosterveld.

7.2 The vegetation of the study area

The area proposed for the development of the Spier Solar Energy facility is part of a larger area of land that has been subject to agricultural practices since early colonial times (1652 onwards). Historically the study area would have supported Swartland Granite Renosterveld, a species-rich shrubland formation. This vegetation was all removed and striations indicative of ploughing were noted around Waypoint SPE0004 (see below).

The vegetation that is now found on the site is indisputably **secondary shrubland**. This shrubland is dominated by shrubby composites (Asteraceae) namely *Eriocephalus africanus* (kapokbos or wild rosemary), *Dicerothamnus rhinocerotis* (renosterbos) and *Seriphium plumosum* (slangbos) as well as *Passerina corymbosa* (Thymelaeaceae). These shrubs form a mid-dense to dense shrub stratum 1—1.5 m tall. A dense 'low stratum' or 'field stratum', < 0.4 m consists of mainly of grasses and other herbaceous plants, many of them being exotic weedy plant species (exotic grasses). The densely shrubby upper stratum forms a mosaic with open areas where grasses (notably *Cynodon dactylon*) are dominant and where mid-high to tall shrubs are absent. The reason for this mosaic pattern is not clear but is presumably due to localized differences in soil characteristics.

The site is generally free of alien invasive woody species. The only significant exotic trees are scattered stone pines (*Pinus pinea*).

Descriptions of the vegetation at five (5) waypoints follows:

Waypoint SPE0001: S 33° 58' 21.40" E 18° 48' 42.52"

Eriocephalus africanus is dominant at this location, with *Seriphium plumosum* the other common shrub. Other plant species recorded are given with different text colours (blue = upper stratum and green = lower stratum) indicating the stratum in which they occur:
Athanasia trifurcata, Bulbinella sp. Chrysocoma ciliata, Cotula sp., Cynodon dactylon, Dimorphotheca pluvialis, Ehrharta villosa, Helichrysum petiolare, Leysera gnaphalodes, Oxalis obtusa, Oxalis pes-caprae, Passerina corymbosa, Romulea sp., Rumex sp., Salvia africana-caerulea, Senecio (1), Senecio (2), Senecio burchellii, Struthiola myrsinites, Ursinia sp., Wachendorfia paniculata.

Figure 10. The dominant shrub in the upper stratum here is *Eriocephalus africanus* (kapokbos).

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Figure 11. *Seriphium plumosum* (slangbos), is dominant in places, forming mid-high dense patches.

Waypoint SPE0002: S 33° 58' 28.22" E 18° 48' 38.73"

This waypoint was recorded in the centre of the study area close to a two-spoor track that traverses the site from northwest to southeast (Figure 8). The vegetation is uniformly the same as that found at SPE0001, with some additional plant species, namely, *Aspalathus aculeata*, *Avena fatua*, *Cissampelos capensis*, *Osteospermum moniliferum*, *Oxalis purpurea*, *Psoralea hirta* and *Thesium* sp. The open grassy areas support scattered shrubs of *Passerina corymbosa*.

Figure 12. Near a two-spoor tracks that traverses the site, with mid-dense secondary vegetation and open areas see here (view NW).

Figure 13. View SE alongside the two-spoor track, showing *Passerina corymbosa* as the dominant shrub, with an understorey of grass.

Waypoint SPE0003: S 33° 58' 28.64" E 18° 48' 48.96"

At this part of the site, *Passerina corymbosa* is dominant with *Seriphium plumosum* being co-dominant. Very little *Eriocephalus africanus* is found here. This area has a large amount of dead plant matter. Additional plant species found here include *Conyza scabrida*, *Ficinia* sp., *Hermannia multiflora*.

Figure 14. At this waypoint, *Passerina corymbosa* and Seriphium plumosum, both species that are abundant due to disturbance.

Figure 15. View Neat Waypoint SPE0003, with old plants of *Passerina corymbosa* dominant.

Waypoint SPE0004: S 33° 58' 32.85" E 18° 48' 51.90"

This waypoint was located towards the eastern side of the study area in an extensive grassy area with only a few shrubs. Beyond this, to the east, the mid-high shrub stratum is dominated by *Passerina corymbosa*, with scattered shrubs of *Eriocephalus africanus* and patches of *Helichrysum petiolatum* throughout.

Remains of an old pine tree that was felled, were noted at this location. It was also 'boggy' underfoot at the time of the field survey, indicating a high water-table after the recent rains. *Romulea flava* was found growing on the wet soil.

Striations with low contours indicate the historical ploughing that occurred across the study area (Figure 18).

Figure 16. In some places the shrub was absent or very sparse, with grass dominant.

Figure 17. Evidence of felled alien invasive trees was found.

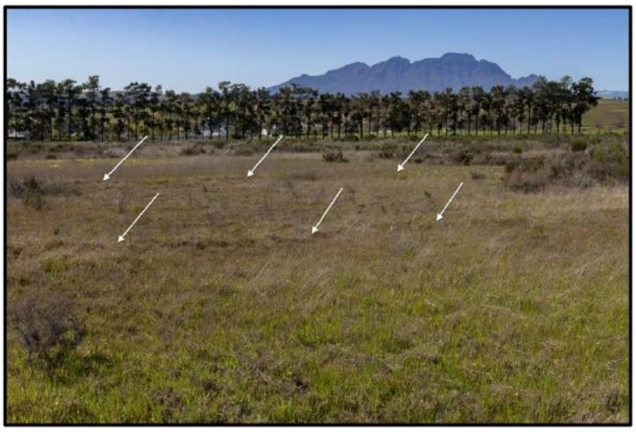


Figure 18. The low ridges (indicated by white arrows) because of historical ploughing are seen in the grassy areas where they are not masked by shrubs.

Waypoint SPE0005: S 33° 58' 29.88" E 18° 48' 52.53"

This waypoint was recorded at the remains of a large old *Phytolacca dioica* (Belhambra) tree. The tree had been felled and a large amount of wood debris was present. However, the tree was coppicing, and the leaves and fruit allowed for positive identification. Trees of *Acacia saligna* were also felled in this vicinity. The disturbance has encouraged the growth of a large stand of exotic Kikuyu grass (*Cenchrus clandestinus*). *Zantedeschia aethiopica* (arum lily) and *Carpobrotus edulis* (sour fig) were also recorded at this location.

Figure 19. Remains of a large tree of *Phytolacca dioca*, an exotic plant, that has been cut down.

Figure 20. Some resprouting branches of *Phytolacca dioca* (Belhambra).

Figure 21. Some areas of the site are dominated by Kikuyu grass (Cenchrus clandestinus).

8. Conservation status

8.1 National Threatened Ecosystems

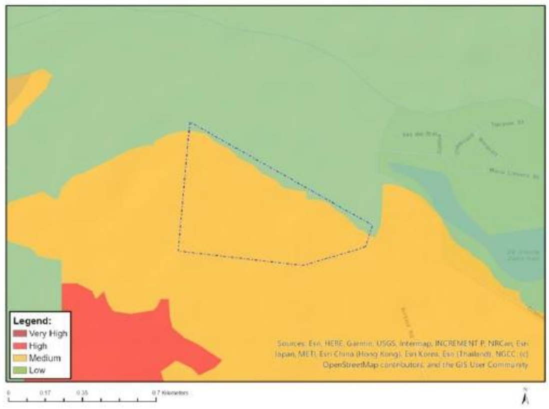
The only vegetation type, Swartland Granite Renosterveld, that historically occurred at the site is listed as **Endangered** A2b, A3, A3alt, B1(i), B1(iii) in the *Revised National List of Ecosystems Threatened and in need of Protection* (Government Gazette, 2022).

8.2 National Web-based Environmental Screening Tool

As required per protocol, the National Web-based Screening Tool was applied to the application area and the sensitivity determined for the Relative Plant Species Sensitivity Theme (Figure 22) and the Relative Terrestrial Biodiversity Sensitivity Theme (Figure 23).

8.2.1 Relative Plant Species Theme Sensitivity

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Lampranthus dilutus
Medium	Lampranthus filicaulis
Medium	Lampranthus leptaleon
Medium	Lampranthus peacockiae
Medium	Lampranthus scaber
Medium	Lampranthus sociorum
Medium	Lampranthus spiniformis
Medium	Antimima aristulata
Medium	Erepsia patula
Medium	Erepsia ramosa
Medium	Ruschia diversifolia
Medium	Ruschia geminiflora

Figure 22. Output for the Relative Plants Species Theme Sensitivity, indicating that the site has Medium to Low sensitivity.

Medium	Drosanthemum hispifolium
Medium	Xiphotheca lanceolata
Medium	Psoralea fascicularis
Medium	Liparia splendens subsp. splendens
Medium	Indigofera psoraloides
Medium	Aspalathus aculeata
Medium	Aspalathus araneosa
Medium	Aspalathus muraltioides
Medium	Rafnia lancea
Medium	Lebeckia plukenetiana
Medium	Podalyria argentea
Medium	Podalyria sericea
Medium	Leucadendron lanigerum var. lanigerum
Medium	Leucospermum hypophyllocarpodendron subsp. canaliculatum
Medium	Leucospermum hypophyllocarpodendron subsp. hypophyllocarpodendron
Medium	Protea burchellii
Medium	Diastella proteoides
Medium	Serruria brownii
Medium	Merciera tetraloba
Medium	Roella arenaria
Medium	Treichelia dodii
Medium	Pentameris bachmannii
Medium	Pentameris pholiuroides
Medium	Anthospermum ericifolium
Medium	Lobostemon capitatus
Medium	Echiostachys incanus
Medium	Echiostachys spicatus
Medium	Sensitive species 631
Medium	Sensitive species 533
Medium	Geissorhiza monanthos
Medium	Geissorhiza purpurascens
Medium	Geissorhiza setacea
Medium	Geissorhiza erosa
Medium	Sensitive species 560
Medium	Sensitive species 1253
Medium	Sensitive species 1
Medium	Sensitive species 830
Medium	Sensitive species 1140
Medium	Sensitive species 807
Medium	Sensitive species 1266
Medium	Pauridia alba
Medium	Pauridia canaliculata
Medium	Pauridia pygmaea
Medium	Oxalis natans
Medium	Hermannia rugosa
Medium	Sensitive species 222
Medium	Sensitive species 444
Medium	Sensitive species 478
Medium	Sensitive species 756
Medium	Adenogramma rigida
Medium	Wachendorfia brachyandra
Medium	Sensitive species 133
Medium	Trianoptiles solitaria
Medium	Hypodiscus rugosus
Medium	Restio duthieae
Medium	Restio papillosus
Medium	Anisodontea biflora
Medium	Sensitive species 985
Medium	Sensitive species 120
Medium	Sensitive species 266

Figure 22 continued…

Medium	Pterygodium cruciferum
Medium	Gnidia spicata
Medium	Metalasia capitata
Medium	Senecio cadiscus
Medium	Athanasia capitata
Medium	Sensitive species 1042
Medium	Adenandra villosa subsp. biseriata
Medium	Macrostylis villosa subsp. villosa
Medium	Cliffortia marginata
Medium	Muraltia decipiens
Medium	Muraltia macropetala
Medium	Sensitive species 262
Medium	Sensitive species 616
Medium	Wurmbea inusta
Medium	Phylica strigulosa
Medium	Phylica thunbergiana
Medium	Codonorhiza azurea
Medium	Lampranthus debilis
Medium	Lampranthus glaucus
Medium	Drosanthemum striatum
Medium	Xiphotheca reflexa
Medium	Psoralea alata
Medium	Aponogeton fugax
Medium	Sensitive species 593
Medium	Sensitive species 335
Medium	Sensitive species 599
Medium	Elegia squamosa
Medium	Restio paludosus
Medium	Restio rigoratus
Medium	Cotula pusilla
Medium	Sensitive species 1225

Figure 22 continued.

The result of the screening tool analysis is that the site has **MEDIUM** sensitivity, with respect to the relative plant species theme sensitivity (Figure 22). The field observations do not support this classification. The entire site has **LOW** sensitivity. None of the plant species listed in the table in Figure 22 were found, and it is **highly unlikely** that these species would occur, given the historical disturbance.

8.2.2 Relative Terrestrial Biodiversity Theme Sensitivity

The classification of sensitivity of the terrestrial biodiversity at the site (Figure 23) is incorrect and misleading. The indicators upon which the classification is based are applicable to undisturbed Swartland Granite Renosterveld. None of the sensitivity features on which the analysis in Figure 23 is based are valid. The ground-truthing exercise of this study determined that the habitat has **LOW** biodiversity sensitivity. It does not have any characteristics that qualify it for CBA1 status and conservation of the site (i.e. no development) would not add to the achievement of regional or national conservation targets for endangered Swartland Granite Renosterveld.

The only mammals that appear to have benefited from the disturbance are mole-rats and it is probable that the Cape Mole-rat (*Georychus capensis*) as well as Cape Dune Mole-rats (*Bathyergus suillus*) in some places, are the species present. Small antelope (steenbok and duiker) occur on the site, but it is doubtful that any other mammal species are found. The habitat is suitable for reptiles with a mole-snake (*Pseudaspis cana*) having been observed. No tortoises were observed.

The avifauna on the site is not diverse. The bird species recorded include, Bokmakierie, Cape Spurfowl, Common Quail, Helmeted Guineafowl and Karoo Prinia.

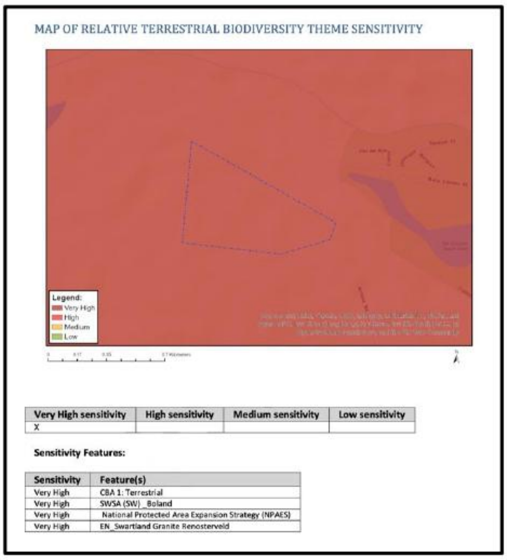


Figure 23. The output of the National Web-based Environmental Screening Tool for terrestrial biodiversity, indicating Very High Sensitivity which is disputed.

8.3 Red List Species or Species of Conservation Concern (SCC)

No Red List species or Species of Conservation Concern (SCC) were encountered in the study area.

8.4 Site Ecological Importance

The Site Ecological Importance is a metric to provide a consistent evaluation of one site relative to others. **Site Ecological Importance** (SEI) is calculated using the formula:

SEI = BI + RR (Table 2)

…where BI is the **Biodiversity Importance** (Table 1), calculated using the formula**:**

BI = CI + FI where CI is the **Conservation importance** and FI is the **Functional Integrity** (Table 1).

Table 1. Determination of Biodiversity Importance.

Biodiversity Importance		**Conservation Importance**				
		Very high	High	Medium	Low	Very low
Functional Integrity	Very high	Very high	Very high	High	Medium	Low
	High	Very high	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very low
	Low	Medium	Medium	Low	Low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

Table 2. Determination of Site Ecological Importance.

Site Ecological Importance		**Biodiversity Importance**				
		Very high	High	Medium	Low	Very low
Receptor resilience	Very high	Very high	Very high	High	Medium	Low
	High	Very high	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very low
	Low	Medium	Medium	Low	Low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

Therefore, in the case of the Spier Solar Energy site, the **Site Ecological Importance** is:

SEI = BI [Low] + RR [Low] = **LOW**

For **LOW** Site Ecological Importance, the interpretation guideline is:

Minimization and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.

8.5 Western Cape Biodiversity Spatial Plan

An overlay on Google Earth ™ imagery of the map from the Western Cape Biodiversity Spatial Plan (WCBSP) 2017 (Pence, 2014; 2017; Pool-Stanvliet *et al.*, 2017) for the Stellenbosch Municipality is presented in Figure 24. Only Critical Biodiversity Area 1 (CBA1) would be affected by the proposed solar energy development. There is no Protected Area in terms of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA) in the near vicinity of the site.

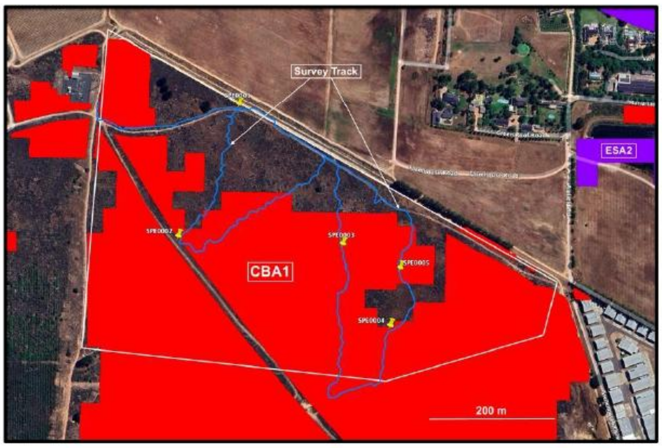


Figure 24. Aerial photo (Google Earth ™) with superimposed Critical Biodiversity Areas Map (Pence, 2017; Pool-Stanvliet *et al.* 2007). The scarlet red areas are Critical Biodiversity Areas 1 (CBA1). No other CBA categories were mapped for this area.

The assessment summary for Swartland Granite Renosterveld (Government Gazette, 2022) is as follows:

Observed rates of habitat loss between 1990 and 2018 indicate that by 2040 the geographic distribution of Swartland Granite Renosterveld will have declined by approximately 55%. National land cover and supplementary provincial and metropolitan land cover data show that Swartland Granite Renosterveld has experienced extensive spatial declines of approximately 83% since 1750. In addition, this ecosystem is narrowly distributed with high rates of habitat loss in the past 28 years (1990-2018) and evidence of ongoing biotic disruption from invasive species and overgrazing.

Table 3. Definitions of biodiversity spatial plan units and management objectives.

Unit		Definition	Management Objective
CBA1		Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.
CBA2		Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.
ESA1		Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs and are often vital for delivering ecosystem services.	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.
ESA2		Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs and are often vital for delivering ecosystem services.	Restore and/or manage to minimize impact on ecological processes and ecological infrastructure functioning, especially soil and water-related services, and to allow for faunal movement.

Although most of the area proposed for solar energy infrastructure development is within a CBA1 area, based on my field survey I have concluded that (a) this is old but secondary vegetation and is **not undisturbed Swartland Granite Renosterveld**; (b) **NO** threatened species occur; (c) the vegetation consists mainly of common species that are ruderals or common weedy species of very low importance; the species-richness of the site is low to very low and (d) there is an insignificant presence of geophytes (virtually none) even though the survey was done at an optimal time in spring. There is also **very low probability** that the habitat would restore to renosterveld representative of the original type.

My view is that the CBA classification is exaggerated and at best this area should be mapped as an Ecological Support Area 1 (ESA1) (see Table 3) since it has some ecological functionality but there is little justification for the CBA1 classification based on the plant communities now present on the site.

8.6 Red Listed Ecosystems

In 2021 the National Biodiversity Assessment was updated and emanating from that was the mapping of threatened ecosystems, for practical purposes called the Red List of Ecosystems (RLE) for the terrestrial realm of South Africa (SANBI, 2022; Skowno & Monyeki, 2021). This database reflects the current remaining natural extent (remnants) of 458 ecosystems and is mapped for the environs of the road investigated here, in Figure 25. Examination of the map (green shading) shows that very little of the study area is recognized as endangered habitat. This accords strongly with the observations recorded in this study. It is also notable that the Western Cape Biodiversity Spatial Plan classification of the site has CBA1 units that are almost completely opposite to the RLE units, as shown in Figure 25.

The proposed project would have negligible negative effects on any of the RLEs illustrated in Figure 26.

Figure 25. Map of the RLE units (mapped in green) at the Study Area (white boundary) showing that only very small areas are designated as **Endangered** (EN) habitat.

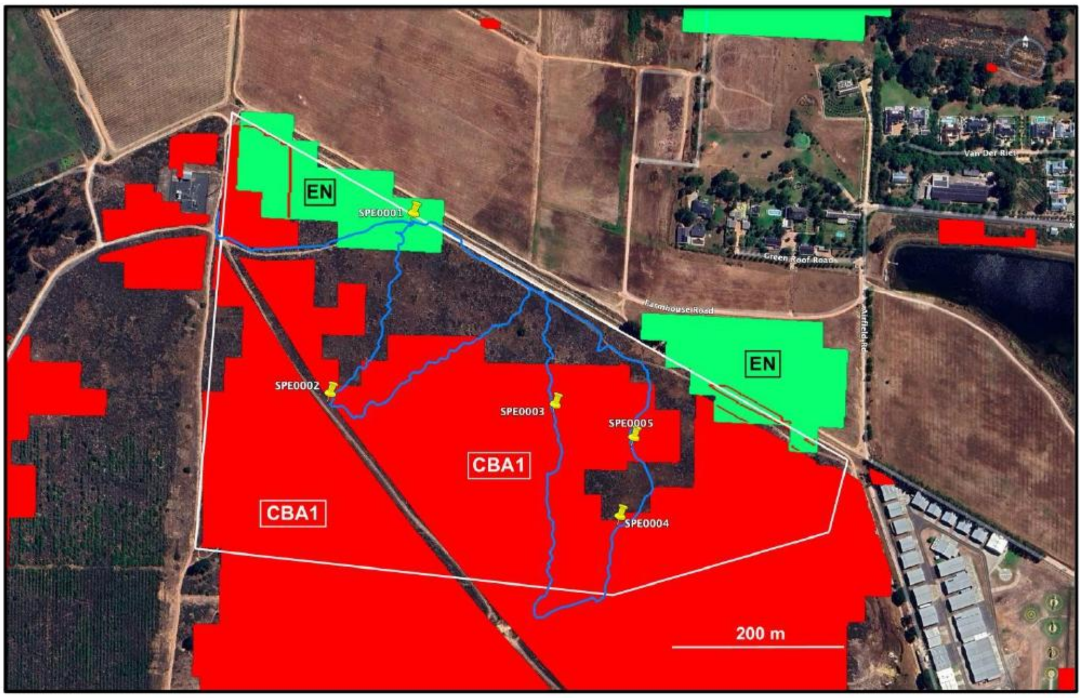


Figure 26. Juxtaposition of the WCBSP Map showing **CBA1** and the RLE map showing **EN**. The two overlap only marginally, indicating low congruence of the sensitivity of the site between these two analyses.

9. Impact Assessment

Impacts on the vegetation in the study area are assessed for the clearing of vegetation and subsequent development of a solar energy system. The 'No Go' alternative is also assessed.

9.1 'No Go' Alternative

In the case of the **"No Go" alternative** where there would be very little change to the *status quo*. The land would remain undeveloped, and the semi-natural vegetation would persist. From what has been observed, the vegetation <u>would not revert</u> to typical Swartland Granite Renosterveld. The historical land-use has compromised the seedbank so heavily and only a relatively uniform and <u>species-poor</u> secondary vegetation community, not representative at all of Swartland Granite Renosterveld, would continue to persist on the site. The 'no development' alternative or 'No Go' alternative would thus have a **Negligible** impact on the vegetation (as it currently stands) with no significant further loss or meaningful gain in condition or species-richness in the short- to long-term.

The 'No Go' alternative is included in Table 4.

9.2 Direct Impacts

Direct impacts are those that would occur directly on the existing secondary vegetation in the study area. The rating system used is given in Appendix 1. In addition to determining the individual impacts using various criteria, mitigation is also brought into the assessment.

The impacts of the proposed solar energy development are considered with respect to loss of vegetation type (originally Swartland Granite Renosterveld) and its habitat including plant species due to clearing and the construction phase of the solar energy infrastructure, and operational activities. Ecological processes are intrinsic to the habitat and are not separated here for assessment but rather the assessment incorporates the effect on ecological processes as part of the affected habitat.

9.2.1 Loss of vegetation type (Swartland Granite Renosterveld) and habitat including plant species due to development of a solar energy system (constructions and operation) in the designated area on farm Re Portion 10 of Farm 502, Stellenbosch.

The clearing of the secondary vegetation (not pristine Swartland Granite Renosterveld) for solar energy development would result in the following impacts:

Table 1. Impact and Significance – Loss of secondary vegetation and habitat as a result of solar energy infrastructure development and operation over a 24.6 ha area.

CRITERIA	'NO GO' ALTERNATIVE		PREFERRED ALTERNATIVE (construction and operation of solar energy system)	
Nature of direct impact (local scale)	**Loss of secondary vegetation**			
Construction and operation	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local	Local	Local
Duration	Long-term	Long-term	Long-term	Long-term
Intensity	Low	Low	Low	Low
Probability of occurrence	Probable	Probable	Probable	Probable
Confidence	High	High	High	High
Significance	Negligible	Negligible	Low negative	Very low negative
Nature of Cumulative impact	**Loss of secondary vegetation**			
Cumulative impact prior to mitigation	Negligible			
Degree to which impact can be reversed	Not reversible in the short- to medium-term			
Degree to which impact may cause irreplaceable loss of resources	Very Low			
Degree to which impact can be mitigated	Low			
Proposed mitigation	None proposed since the habitat has very low plant species and biodiversity sensitivity.			
Cumulative impact post mitigation	Very low negative			
Significance of cumulative impact (broad scale) after mitigation	Very low negative			

9.2.2 Mitigation

The clearing of vegetation over an area of 24.6 ha for the proposed solar energy infrastructure as described, would result in no cumulative loss of Swartland Granite Renosterveld because it has already been historically ploughed, its integrity compromised, and it has been replaced by a secondary, species-poor renosterveld-type community. Therefore, no mitigation measures are advised or recommended.

9.3 Indirect impacts

By definition, indirect impacts occur away from the 'action source' i.e. away from the development site. The impact assessed here is specifically how the proposed solar energy development would have an indirect impact on vegetation and flora away from the development site. No indirect impacts were determined and, if present, would probably be insignificant.

9.4 Cumulative impacts

The receiving environment in which the proposed solar energy development would be placed has been disturbed in the past, but from evidence and observations, this was a long time ago. Nevertheless, typical Swartland Granite Renosterveld has not returned and there would thus be no cumulative loss of this vegetation type due to the proposed development. The negative cumulative impacts are anticipated to be negligible and therefore **Very Low Negative**.

10. General Assessment and Recommendations

- What is a vegetation type? Vegetation is composed of populations of plant species (representative taxa). Each taxon shows an individual response to ecological factors and hence serves as an important ecological indicator. The differences between the vegetation patches in terms of structure, texture (floristic composition) as well as in terms of environmental composition of the habitats supporting the vegetation, make the classification of vegetation (or conceptualization of theoretical constructs called 'vegetation types') possible (paraphrased from Mucina, Rutherford and Powrie, 2006: Chapter 2).

- Only one vegetation type was originally found in the study area namely Swartland Granite Renosterveld. This vegetation no longer exists in its typical state in the study area, which is ascribed to historical agriculture. The entire site was cleared and ploughed resulting in the loss of many of the constituent plant species, never to return. The vegetation is now a uniform, secondary, species poor, plant community dominated by ruderal (weedy) species in the family Asteraceae that, apart from the shrubland physiognomy, lacks the characteristics of true renosterveld.

-

- **Swartland Granite Renosterveld** is classified as **Endangered** A2b, A3, A3alt, B1(i), B1(iii) in the *Revised National List of Ecosystems Threatened and in need of Protection* (Government Gazette, 2022). Development of the area earmarked for the solar energy facility would not result in any further loss of Swartland Granite Renosterveld. The vegetation that would be lost due to the proposed solar PV facility, is secondary, semi-natural vegetation in moderate to poor condition. It cannot be said to represent typical Swartland Granite Renosterveld and even if left fallow for a long time it would not spontaneously return to the typical condition. Even if there were other interventions, it is highly doubtful that it would successfully return to the original type and therefore in the medium to long term it would not contribute to the overall conservation of the type.

- When scrutinizing the WCBSP 2017 map as shown in Figure 24, it is seen that the study area falls largely within a CBA1. Based on my observations in the field, it is my view that this classification is exaggerated and at best should be mapped as ESA1.

- The anticipated direct impacts would be **Low Negative** prior to mitigation. However, no mitigation on the site itself is recommended. In the broader context, apart from the agricultural development, there is active conservation of other parts of Re Portion 10 of Farm Louw's Bos 502, Stellenbosch, in some areas actively encouraging the return of near-natural Swartland Granite Renosterveld as opposed to simply leaving the land to lie fallow and permitting the dominance of such species as *Eriocephalus africanus* (kapokbos), *Stoebe plumosa* (slangbos) and *Passerina corymbosa*. The conservation farming approach is articulated on the Spier website.

- No rare or threatened plant species (species of conservation concern – SCC) were found during the survey despite it being conducted in spring. This is ascribed to the loss of these species from the seedbank because of historical cultivation of the land.

11. Conclusions

The vegetation in the proposed solar energy development area at Re Portion 10 of Farm Louw's Bos 502, Stellenbosch, would originally have been Swartland Granite Renosterveld. No typical Swartland Granite Renosterveld remains and instead a uniform, secondary, species-poor, plant community is now present. No plant species of conservation concern were recorded, and the vegetation is not deemed to be sensitive. It is my strong view that the classification of the area as a CBA1 in the Western Cape Biodiversity Plan is highly exaggerated and it should, at the most, be classified as an Ecological Support Area. This view is supported by field observations as well as the Red Listed Ecosystems classification that hardly includes the study area within endangered habitat. The proposed solar energy facility development is thus supported from both botanical and biodiversity perspectives.

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Report submitted: 10 October 2024; revised 23 October 2024

Appendix 1: Impact Assessment Methodology

The assessment of impacts needs to include the determination of the following:

- The nature of the impact – see Table 1.1
- The magnitude (or severity) of the impact – see Table 1.2
- The likelihood of the impact occurring - see Table 1.2

The degree of confidence in the assessment must also be reflected.

Table 1.1 Impact assessment terminology

Term	Definition
Impact nature	
Positive	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Negative	An impact that is considered to represent an adverse change from the baseline, or introduces a new undesirable factor.
Direct impact	Impacts that result from a direct interaction between a planned project activity and the receiving environment/receptors (e.g. between occupation of a site and the pre-existing habitats or between an effluent discharge and receiving water quality).
Indirect impact	Impacts that result from other activities that are encouraged to happen as a consequence of the Project (e.g. in-migration for employment placing a demand on resources).
Cumulative impact	Impacts that act together with other impacts (including those from concurrent or planned future third party activities) to affect the same resources and/or receptors as the Project.

Assessing significance

There is no statutory definition of '*significance*' and its determination is, therefore, somewhat subjective. However, it is generally accepted that significance is a function of the magnitude of the impact and the likelihood of the impact occurring. The criteria used to determine significance are summarized in *Table 1.2*

Table 1.2 Significance criteria

Impact magnitude	
Extent	*On-site* – impacts that are limited to the boundaries of the rail reserve, yard or substation site. *Local* – impacts that affect an area in a radius of 20km around the development site. *Regional* – impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries, habitat type/ecosystem. *National* – impacts that affect nationally important environmental resources or affect an area that is nationally important/ or have macro-economic consequences.
Duration	*Temporary* – impacts are predicted to be of short duration and intermittent/occasional. *Short-term* – impacts that are predicted to last only for the duration of the construction period. *Long-term* – impacts that will continue for the life of the Project, but ceases when the Project stops operating. *Permanent* – impacts that cause a permanent change in the affected receptor or resource (e.g. removal or destruction of ecological habitat) that endures substantially beyond the Project lifetime.

Intensity	BIOPHYSICAL ENVIRONMENT: *Intensity can be considered in terms of the sensitivity of the biodiversity receptor (ie. habitats, species or communities).* **Negligible** – the impact on the environment is not detectable. **Low** – the impact affects the environment in such a way that natural functions and processes are not affected. **Medium** – where the affected environment is altered but natural functions and processes continue, albeit in a modified way. **High** – where natural functions or processes are altered to the extent that it will temporarily or permanently cease. ***Where appropriate, national and/or international standards are to be used as a measure of the impact.*** *Specialist studies should attempt to quantify the magnitude of impacts and outline the rationale used.* SOCIO-ECONOMIC ENVIRONMENT: *Intensity can be considered in terms of the ability of project affected people/communities to adapt to changes brought about by the Project.* **Negligible** – there is no perceptible change to people's livelihood **Low** - People/communities are able to adapt with relative ease and maintain pre-impact livelihoods. **Medium** - Able to adapt with some difficulty and maintain pre-impact livelihoods but only with a degree of support. **High** - Those affected will not be able to adapt to changes and continue to maintain-pre impact livelihoods.
Impact likelihood (Probability)	
Negligible	The impact does not occur.
Low	The impact may possibly occur.
Medium	Impact is likely to occur under most conditions.
High	Impact will definitely occur.

Once a rating is determined for magnitude and likelihood, the following matrix can be used to determine the impact significance.

Table 7.5 Example of significance rating matrix

SIGNIFICANCE RATING					
	LIKELIHOOD	**Negligible**	**Low**	**Medium**	**High**
MAGNITUDE	**Negligible**	**Negligible**	**Negligible**	**Low**	**Low**
	Low	**Negligible**	**Negligible**	**Low**	**Low**
	Medium	**Negligible**	**Low**	**Medium**	**Medium**
	High	**Low**	**Medium**	**High**	**High**

In *Table 7.6*, the various definitions for significance of an impact is given.

Table7.6 Significance definitions

Significance definitions	
Negligible significance	An impact of negligible significance (or an insignificant impact) is where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.

Minor significance	An impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate significance	An impact of moderate significance is one within accepted limits and standards. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that 'moderate' impacts have to be reduced to 'minor' impacts, but that moderate impacts are being managed effectively and efficiently.
Major significance	An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. A goal of the EIA process is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a development. It is then the function of regulators and stakeholders to weigh such negative factors against the positive factors such as employment, in coming to a decision on the Project.

Once the significance of the impact has been determined, it is important to qualify the **degree of confidence** in the assessment. Confidence in the prediction is associated with any uncertainties, for example, where information is insufficient to assess the impact. Degree of confidence can be expressed as low, medium or high.

Appendix 2: Curriculum Vitae

Dr David Jury McDonald Pr. Sci. Nat.

Name of Company: Bergwind Botanical Surveys & Tours CC. (Independent consultant)

Work and Home Address: 14 A Thomson Road, Claremont, 7708

Tel: (021) 671-4056 **Mobile:** 082-876-4051 **Fax:** 086-517-3806

E-mail: dave@bergwind.co.za

Website: www.bergwind.co.za

Profession: Botanist / Vegetation Ecologist / Consultant / Tour Guide

Date of Birth: 7 August 1956

Employment history:

- 19 years with National Botanical Institute (now SA National Biodiversity Institute) as researcher in vegetation ecology.
- Five years as Deputy Director / Director Botanical & Communication Programmes of the Botanical Society of South Africa
- Nineteen years as private independent Botanical Specialist consultant (Bergwind Botanical Surveys & Tours CC)

Nationality: South African (ID No. 560807 5018 080)
Languages: English (home language) – speak, read and write
Afrikaans – speak, read and write

Membership in Professional Societies:

- South Africa Association of Botanists
- International Association for Impact Assessment (SA)
- South African Council for Natural Scientific Professions (**Ecological Science, Registration No. 400094/06**)
- Field Guides Association of Southern Africa

Key Qualifications:

- Qualified with a M. Sc. (1983) in Botany and a PhD in Botany (Vegetation Ecology) (1995) at the University of Cape Town.
- Research in Cape fynbos ecosystems and more specifically mountain ecosystems.
- From 1995 to 2000 managed the Vegetation Map of South Africa Project (National Botanical Institute).
- Conducted botanical survey work for AfriDev Consultants for the Mohale and Katse Dam projects in Lesotho from 1995 to 2002. A large component of this work was the analysis of data collected by teams of botanists.
- **Director: Botanical & Communication Programmes** of the Botanical Society of South Africa (2000—2005), responsible for communications and publications; involved with conservation advocacy particularly with respect to impacts of development on centres of plant endemism.

- Further tasks involved the day-to-day management of a large non-profit environmental organisation.
- **Independent botanical consultant** (2005 – to present) over 800 projects have been completed related to environmental impact assessments in the Western, Southern and Northern Cape, Karoo and Lesotho. A list of reports (or selected reports for scrutiny) is available on request.

Higher Education

Degrees obtained
and major subjects passed:

B.Sc. (1977), University of Natal, Pietermaritzburg
Botany III
Entomology II (Third year course)

B.Sc. Hons. (1978) University of Natal, Pietermaritzburg
Botany (Ecology /Physiology)

M.Sc. - (Botany), University of Cape Town, 1983.
Thesis title: 'The vegetation of Swartboschkloof, Jonkershoek, Cape Province'.

PhD (Botany), University of Cape Town, 1995.
Thesis title: 'Phytogeography endemism and diversity of the fynbos of the southern Langeberg'.

Certificate of Tourism: Guiding (Culture: Local)
Level: 4 Code: TGC7 (Registered Tour Guide: WC 2969).

Employment Record:

January 2006 – present: Independent specialist botanical consultant and tour guide in own company: **Bergwind Botanical Surveys & Tours CC**
August 2000 - 2005 : Deputy Director, later Director Botanical & Communication Programmes, Botanical Society of South Africa
January 1981 – July 2000 : Research Scientist (Vegetation Ecology) at National Botanical Institute
January 1979—Dec 1980 : National Military Service

Further information is available on my company website: www.bergwind.co.za