Botanical Impact Statement

Proposed Grootbrak WWTW PV solar plant, Mossel Bay

14 March 2024

Author details

Specialist Details | Mark Berry	
Company Name	Mark Berry Environmental Consultants cc – T/A MB Botanical Surveys
Physical address	14 Alvin Crescent, Somerset West, 7140
Email Address	markberry@webafrica.org.za
Telephone	083 286-9470
Fax	086 759-1908
Highest Qualification	PhD in Botany
SACNASP Reg. No.	400073/98 (Ecological Science)
Area of Specialisation	Botanical surveys

Mark Berry is an independent botanical specialist with over 25 years of experience mainly in the Western Cape, but also in the adjacent provinces, Free State and KwaZulu-Natal. Mark is also experienced in undertaking/compiling Environmental Impact Assessments (EIA's), Environmental Management Programmes, environmental audits, land use surveys, etc. CV is available upon request.

Citation of report

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Declaration of Independence

I Mark Gerald Berry, 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:	
Name of Company:	MB Botanical Surveys
Date:	14 March 2024

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1. Introduction

Proposed development and area assessed

The applicant (Mossel Bay Municipality) wishes to establish a PV solar plant next to the Grootbrak wastewater treatment works (WWTW) on Portion 23 of Farm Wolvedans 129, Groot Brak River, near Mossel Bay. The site is located on a gentle south-facing slope, about 0.8 km north of Tergniet (**Figure 1-1**). One layout option is currently proposed for the solar plant (**Figure 1-2**). Apart from the PV solar arrays, there will also be a paved access road, a gravel perimeter road and solar MV stations on site. The rest of the infrastructure will be accommodated inside the existing WWTW area. The development footprint is estimated at 4.7 ha according to the terms of reference supplied by the environmental assessment practitioner (EAP).

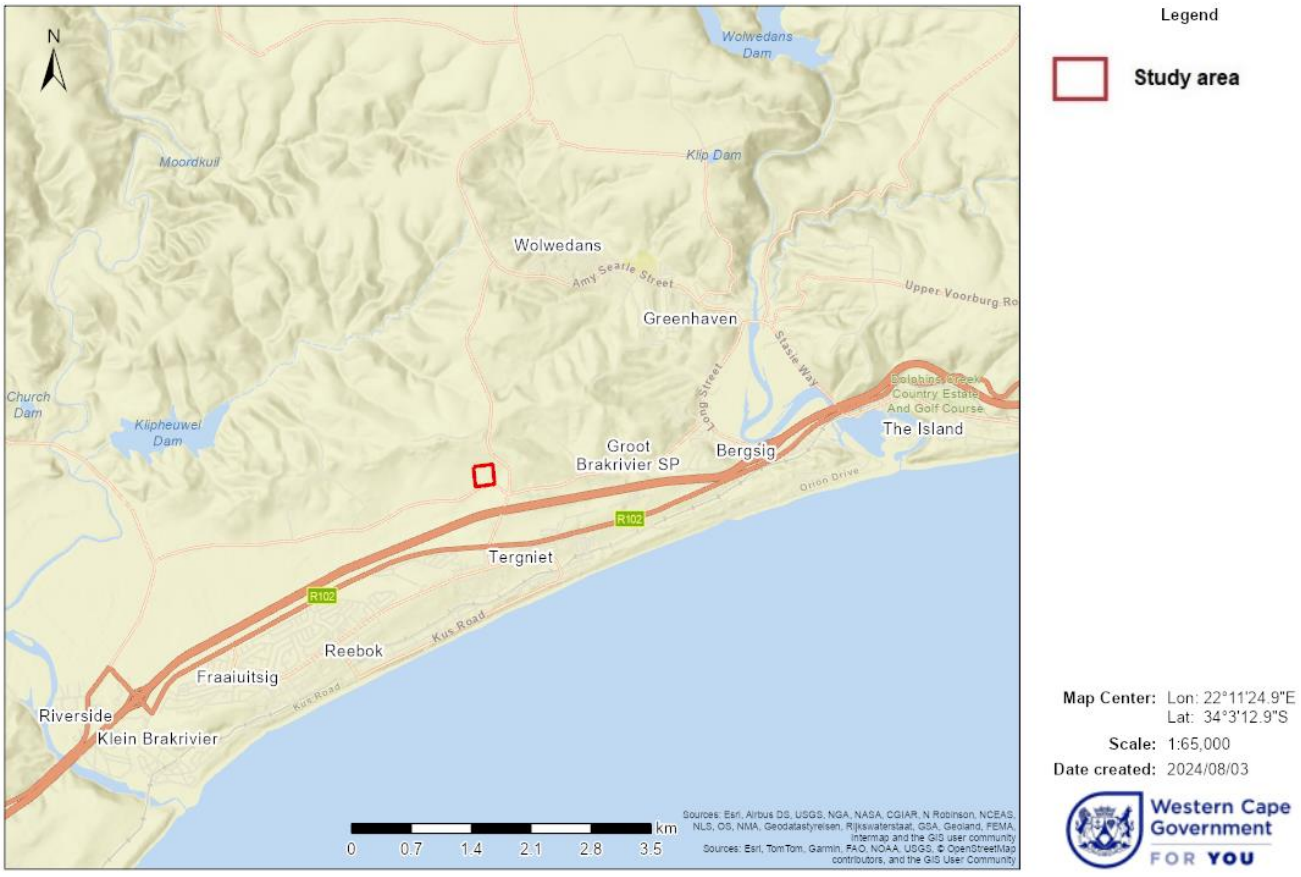

Figure 1-1: Location of the site north of Hartenbos, Mossel Bay area.

According to the Screening Report, generated by the EAP (Sharples Environmental Services) on 31 January 2024, the site has been mapped as Low sensitive in the plant species theme. With regards to the terrestrial biodiversity theme, it has been mapped as Very High sensitive. The Very High sensitivity is ascribed to the possible presence of threatened ecosystems, a critical biodiversity area (CBA) and an ecological support area

(ESA). As a result, MB Botanical Surveys was contracted as an independent specialist to undertake a botanical survey of the site.

Figure 1-2: Proposed layout.

Terms of Reference

The terms of reference agreed upon for this botanical study include:

- Adhere to the EAP's terms of reference for the study;
- Identify and describe biodiversity patterns at a community and ecosystem level (main vegetation type, plant communities and threatened ecosystems), at species level (Species of Conservation Concern and protected species) and in terms of significant landscape features;
- Describe the sensitivity of the site and its immediate surroundings;
- Map or describe the presence of invasive alien plants;
- Review the relevant biodiversity plans compiled in terms of the National Environmental Management Biodiversity Act (Act 10 of 2004);
- Make recommendations with regards to the protection/management of biodiversity; and
- Adhere to the NEMA and CapeNature protocols for biodiversity assessments.

Limitations and Assumptions

The following limitations and assumptions apply to the study:

- Fieldwork was carried out at the end of the summer season, considered to be an unsuitable time for many flowering species in the Southern Cape. Plants that only flower at other times of the year (e.g. winter to spring), such as certain bulbs (Iridaceae and Orchidaceae), may have been missed. The overall confidence in the completeness and accuracy of the botanical findings is however considered to be good. Given the transformed state of the site, no further surveys are deemed necessary.

Use of this report

This report reflects the professional judgment of its author(s). The information and recommendations presented in this report are specific to the project and site at hand and do not extend to future developments or neighbouring sites. Use of this report is therefore restricted.

2. Site Sensitivity Verification

The Department of Environmental Affairs online Environmental Screening Tool indicates that the plant species theme is of Low sensitivity for the site. The Screening Report further indicates that the terrestrial biodiversity theme is of Very High sensitivity for the site. This rating is ascribed to the possible presence of threatened ecosystems (i.e. Hartenbos Dune Thicket and Garden Route Granite Fynbos), a terrestrial critical biodiversity area (CBA) and an ecological support area (ESA). In circumstances where the *status quo* assessment proves the contrary to the above (i.e. where the site is deemed to be of Low sensitivity in respect of both themes, the GN320 of 2020 requires that a Terrestrial Biodiversity Compliance Statement is submitted as set out by the National Environmental Management Act (NEMA) (Act No. 107 of 1998) Regulations of 2020 (as amended). If the above is confirmed, then a biodiversity assessment will be required.

3. Methodology

The methodology used in this terrestrial biodiversity assessment, including a desktop background assessment and one site visit, is outlined in the subsections below.

Desktop assessment

A brief review of online (e.g. Google Earth, iNaturalist.org, posa.sanbi.org and CapeFarmMapper) and desktop resources (available literature and reports) was undertaken to determine the nature of the site, the expected vegetation type(s), the

presence of natural vegetation remnants and species of conservation concern (SCC), hydrological features, and the significance of the site in terms of biodiversity planning.

Site survey

A botanical survey of the site was undertaken on 22 February 2024 by the author. A qualitative assessment of the type and condition of affected vegetation on site, disturbances and presence of alien species, SCC and protected tree species was carried out. The path walked during the survey is shown on **Figure 3-1**. Plant species not identified in the field, were collected and/or photographed and identified at the office and Compton (Kirstenbosch) Herbarium. A few of the identifications were confirmed on iNaturalist. The 2018 South African Vegetation Map and the latest floristic taxonomic literature and reference books were used for the purpose of this specialist study. Any plants classified as rare or threatened in the Red List of South African Plants online database[1] are highlighted. The assessment follows the relevant national guidelines/protocols for biodiversity assessments as listed in the Government Gazette No. 43110 on 20 March 2020.

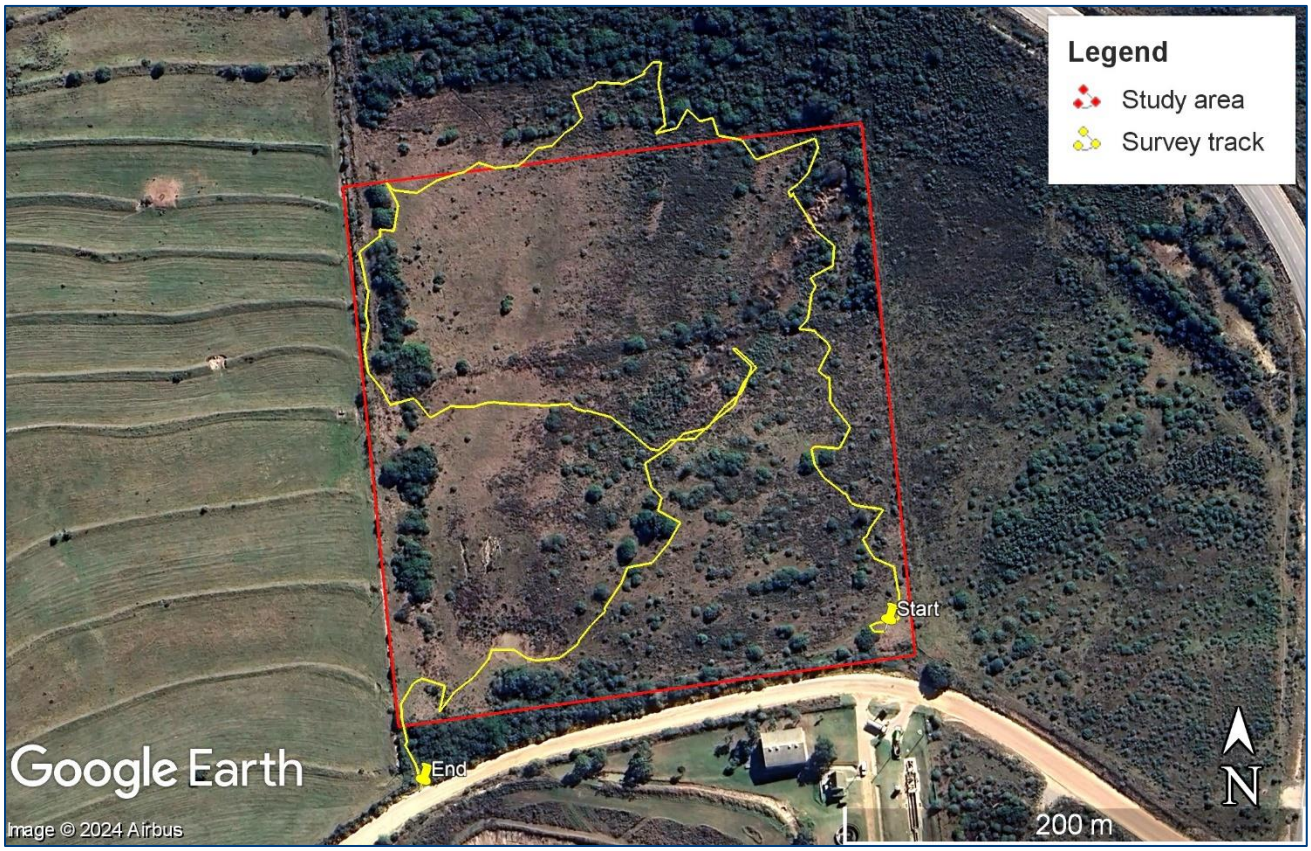

Figure 3-1: Satellite photo showing the survey track on the site.

[1] Threatened Species Programme | SANBI Red List of South African Plants

The following information was recorded during the site visit:

1. The condition of the vegetation. Is the vegetation either disturbed or degraded? A disturbed or degraded area could range from agricultural fields (fallow land), or areas previously disturbed by mining activities, to an area that has been severely eroded or degraded as a result of bad land management or alien infestation.
2. Species diversity (alpha diversity). This refers to the numbers of different indigenous plant species occurring on site.
3. Species of Conservation Concern (SCC), endemics, as well as protected tree species occurring on site. This would include near threatened, rare, vulnerable, endangered or critically endangered species. SCC and protected tree species were mapped using Easy GPS v2.5 software on an iPhone. Accuracy is given as ±4 m.
4. Identification of the vegetation type(s) and communities (if discernible) on the site. This would include trying to establish the distribution of a vegetation type and whether or not it is vulnerable, endangered or critically endangered.
5. Connectivity with (or isolation from) nearby natural vegetation.

Data analysis

Site ecological importance (SEI) of the affected (receptor) area has been determined by applying the criteria described in the Species Environmental Assessment Guideline (SANBI, 2020). See **Annexure 1** for a description of the SEI methodology.

4. Literature Study

A desktop literature review was undertaken during the biodiversity assessment using both online resources and existing maps and reports. A summary of the most relevant information to this assessment is presented below. Some of the information was ground truthed during the site surveys.

Location, topography & land use

The site is located on a gentle south-facing hill slope (65-105 masl) above the Sandhoogte Road and Grootbrak WWTW, 0.8 km north of Tergniet (**Figure 4-1**). Apart from the hills behind the site that extend northwards, there are no notable topographical features in the area. The site itself comprises an old (fallow) land, covered mainly by grasses and pioneer shrubs. The surrounding area comprises a pasture (to the west), dense (impenetrable) shrubland (to the north), fallow land (to the east) and the Grootbrak WWTW (to the south) (**Figure 4-2**).

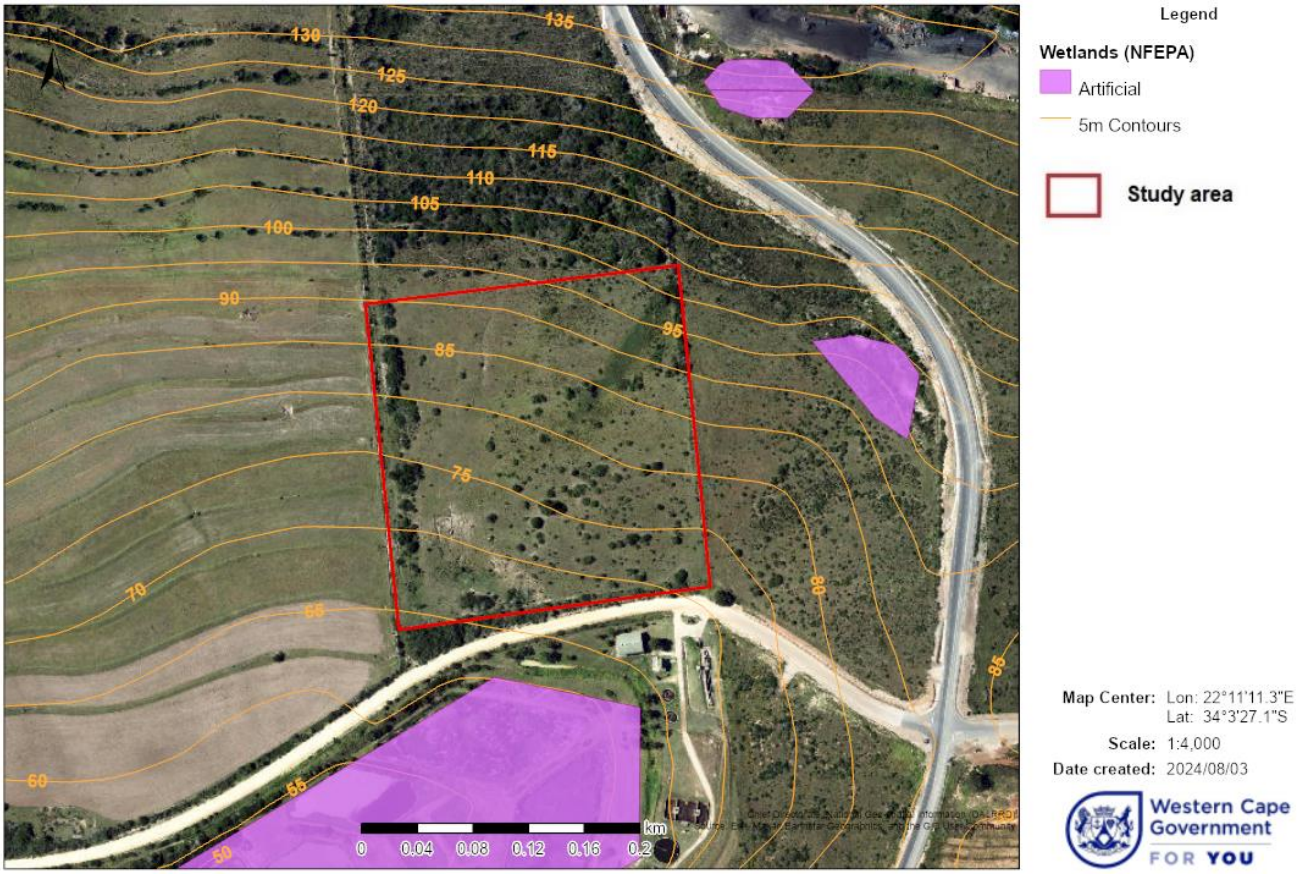

Figure 4-1: Combined topography and hydrology map.

Figure 4-2: View across the site towards the Grootbrak WWTW.

Hydrology

According to Cape Farm Mapper, there are no watercourses present on the site (**Figure 4-1**). There are a few artificial NFEPA (National Freshwater Ecosystem Priority Area) water bodies (two impoundments and the WWTW itself) located ±100 m away. However, a watercourse was noted running down from the north-eastern corner of the site. It appears to be artificial. There is also a small impoundment or depression located in the south-western corner of the site (**Figure 4-3**).

Figure 4-3: Small depression (impoundment) in the south-western corner of site.

Climate

The mean annual rainfall for the site is 512 mm (as per Cape Farm Mapper climatic data for 1950 to 2000). The peak rainfall periods are the months of March (autumn) and October (spring), while the driest periods are the winter and summer months, i.e. bimodal rainfall regime. The study area lies in the transition zone between the winter and summer rainfall regions. Mean monthly maximum and minimum temperatures are 23.8°C and 9.4°C for February and July, respectively (as per Cape Farm Mapper data). The Köppen-Geiger climate classification for the Groot Brak River area is BSk (arid, steppe, cold).

Geology

According to the 3422AA Mossel Bay 1:50 000 geological map, the site is underlain by Uitenhage Group sediments (Kirkwood Formation) of Cretaceous age. The Kirkwood Formation comprises mudstone, siltstone, sandstone and subordinate conglomerate, and typically supports thicket vegetation in the area. This unit is usually exposed in road and river cuttings, as well as in quarries (Viljoen, 1993).

Biodiversity Planning Context

According to the 2018 Vegetation Map of South Africa, the site lies at an interface between Hartenbos Dune Thicket and Garden Route Granite Fynbos (**Figure 4-4**). Hartenbos Dune Thicket stretches from the Duiwenhoks River mouth in the west to Glentana in the east. It is described as "a mosaic of low (1-3 m) thicket, occurring in small bush clumps dominated by small trees and woody shrubs, in a mosaic of low (1-2 m) asteraceous fynbos. Thicket clumps are best developed in fire-protected dune slacks, and the fynbos shrubland occurs on upper dune slopes and crests" (Mucina, 2006). Hartenbos Dune Thicket is well represented on the fixed dunes between Hartenbos and Glentana.

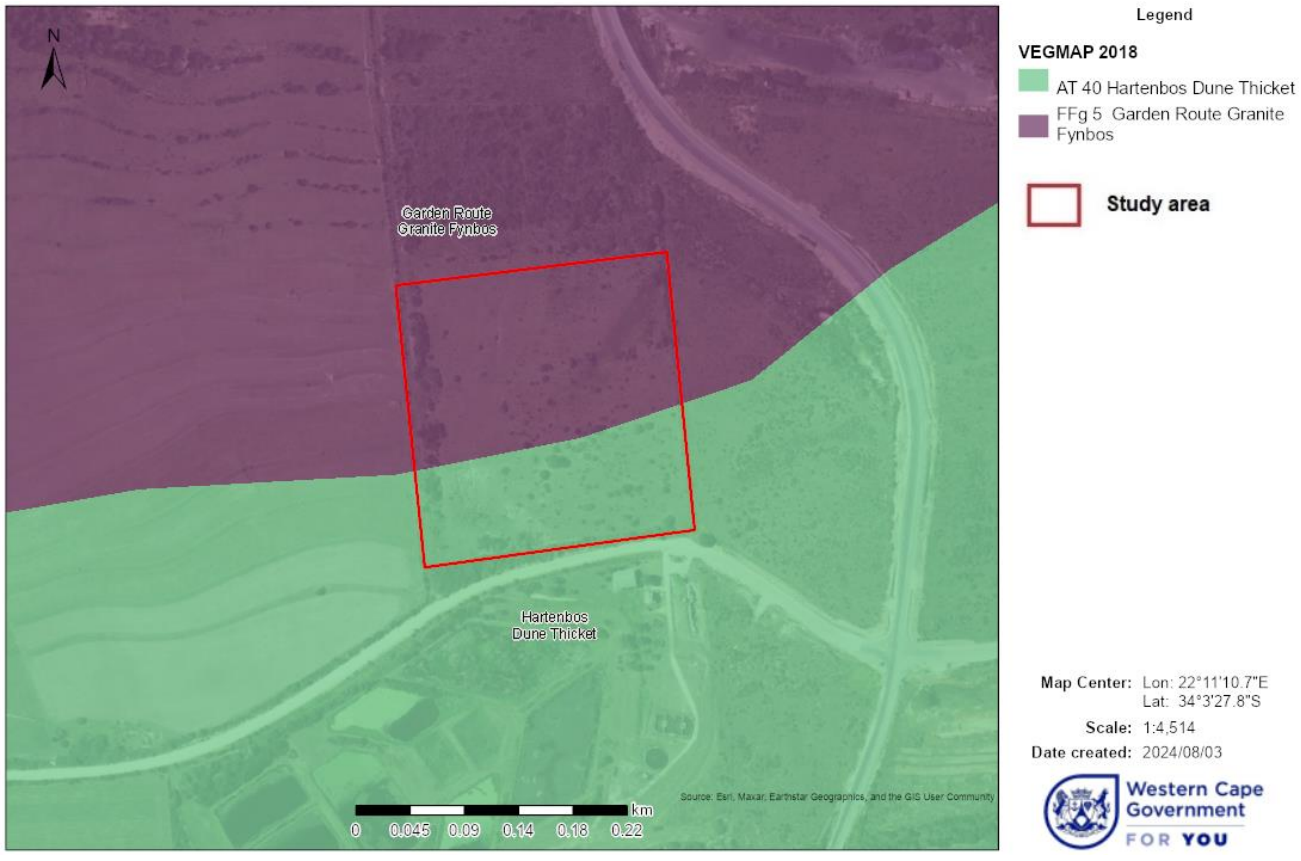

Figure 4-4: Extract of the 2018 SA Vegetation map.

Garden Route Granite Fynbos occurs as three units from Botterberg (south of Robinson Pass) in the west to Hoogekraal Pass (west of Karatara) in the east. The site is situated on

the southern side of the western block between Botterberg and Groot Brak River. It is described as a dense proteoid and ericoid shrubby grassland (Mucina, 2006). In the west, most of the remnants are dominated by proteas (Mucina, 2006). Eastwards, graminoid and ericaceous fynbos are dominant on the flatter areas (Mucina, 2006).

Although well represented in the larger area (79% still left), Hartenbos Dune Thicket is currently listed as Endangered[2]. It is being threatened by invasive aliens and habitat loss due to cultivation, road building and coastal developments. Almost 6% is formally protected in the Geelkrans Nature Reserve complex and several contract nature reserves, such as Pauline Bohnen and Gourikwa. Due to its transformed state, Garden Route Granite Fynbos is currently listed as Critically Endangered in the Revised National List of Threatened Ecosystems (DEA, 2022), with only 37% left[3]. It has been transformed mainly for cultivation, pine plantations and urban development (Mucina, 2006). Remnants of Garden Route Granite Fynbos largely remain in isolated pockets on steeper slopes (Mucina, 2006). About 1% of it is conserved in the Garden Route National Park and few private nature reserves (Mucina, 2006). Its protection should therefore remain a priority in the coastal areas. Like all fynbos types, Garden Route Granite Fynbos is maintained by a regular fire regime. Unfortunately, landscape fragmentation is disrupting this 'maintenance' requirement, often leading to localised species loss and bush encroachment or alien infestation (pers. obs.). Fire is an important ecological driver in the Fynbos Biome and regular fires are needed for biodiversity maintenance and recruitment purposes.

The site falls inside the Mossel Bay biodiversity network (**Figure 4-5**). Nearly the entire site has been mapped as a terrestrial ecological support area (ESA), while the northernmost part falls inside a terrestrial critical biodiversity area (CBA). The site forms part of a minor corridor that connects the CBA network on the hills behind the site with the east-west ESA corridor that runs along the N2 to the south. Reasons for the importance of the mapped ESA and CBA units include the presence of a threatened vegetation type albeit the wrong one (Groot Brak Dune Strandveld), threatened vertebrate habitat (bontebok) and water resource protection (Southern Coastal Belt). The closest protected area appears to be the Diosma Reserve, a contract nature reserve located 16.5 km away in Mossel Bay (Heiderand) to the southwest of the site.

CBA's are defined as areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure (Pool-Stanvliet, 2017). These sites are selected for meeting national targets for species, habitats and ecological processes (Pool-Stanvliet, 2017). Many of these areas support known occurrences of threatened plant species, and/or may be essential elements of designated ecological corridors. Loss of designated CBA's is therefore not recommended.

[2] Ecosystem Detail - Biodiversity BGIS (sanbi.org)
[3] Ecosystem Detail - Biodiversity BGIS (sanbi.org)

ESA's, on the other hand, are supporting zones required to prevent the degradation of CBA's and Protected Areas.

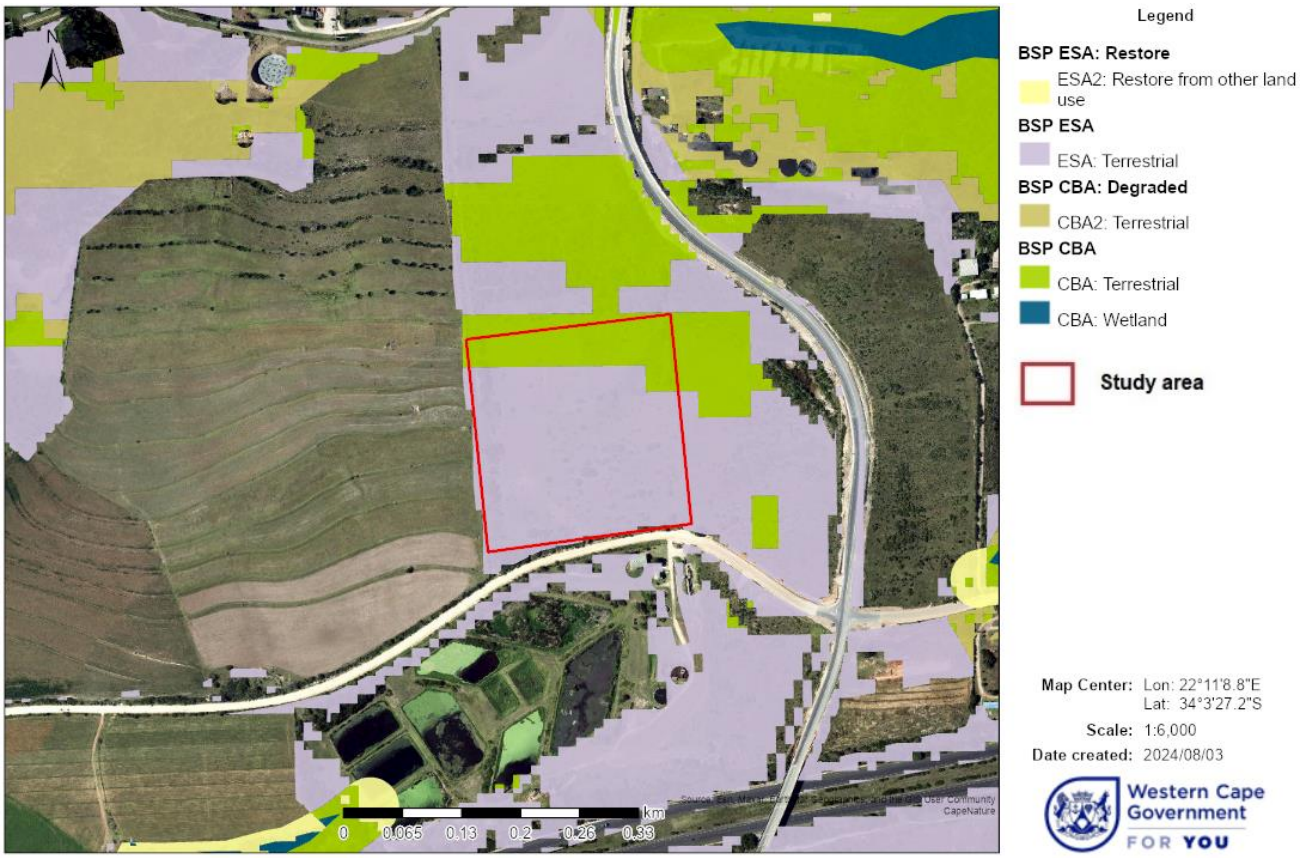

Figure 4-5: Extract of the Western Cape biodiversity network map.

5. Results

In order to fulfil in the requirements of the terrestrial biodiversity and plant species protocols, this section describes the vegetation (terrestrial biodiversity) and plant species encountered in two subsections. In the plant species subsection specific reference is made, among other, to species of conservation concern (SCC) and protected tree species.

Terrestrial biodiversity (vegetation)

The vegetation covering the site can be described as a shrubby grassland, with a few emergent shrub and tree species scattered around (**Figures 5-1** to **5-3**). Some parts are shrubbier than others. Denser strips of tall shrubs and trees were encountered along the western and southern boundaries of the site, as well as on the slope above the site on northern side. The relatively low number of indigenous species recorded shows that the site was subject to a long period of cultivation. Historical Google Earth photographs indicate that it has been lying fallow for at least 20 years. Its chances of reverting back to

the original vegetation is therefore slim. The dominant species are grasses (e.g. *Cynodon dactylon*) and a few pioneer shrubs, such as *Helichrysum rutilans*, *Senecio rosmarinifolius* and *Nidorella ivifolia*. The denser scrub/thicket patches are populated by *Acacia cyclops* (rooikrans), *Gymnosporia buxifolia, Grewia occidentalis* and *Searsia lucida*. *Cynodon dactylon* is considered a troublesome weed.

A slightly higher species diversity was encountered in the scrub outside the site on northern side, including *Olea europaea* ssp. *cuspidata, Searsia lucida, S. pallens, Diospyros dichrophylla, Erica peltata, Seriphium plumosum* and *Dicerothamnus rhinocerotis.* A watercourse runs down the site from the north-eastern corner. It appears to be artificial and is populated by *Typha capensis* and *Nidorella ivifolia* (**Figure 5-4**). There is also a small impoundment in the south-western corner of the site populated by grasses, *Schoenoplectus cf paludicola* and the weed *Persicaria lapathifolia*. Apart from evidence of past farming activities and invasive aliens, no other disturbances were noted on site. The botanical attributes of the site are presented in **Figure 5-5**.

Figure 5-1: Grassy western part of the site.

Figure 5-2: Shrubby south-eastern corner of site, dominated by *Helichrysum rutilans*.

Figure 5-3: Patch of scrub in the centre of site, with a *Pinus pinaster*.

Figure 5-4: Damp area next to watercourse populated by *Typha capensis* and *Nidorella ivifolia*.

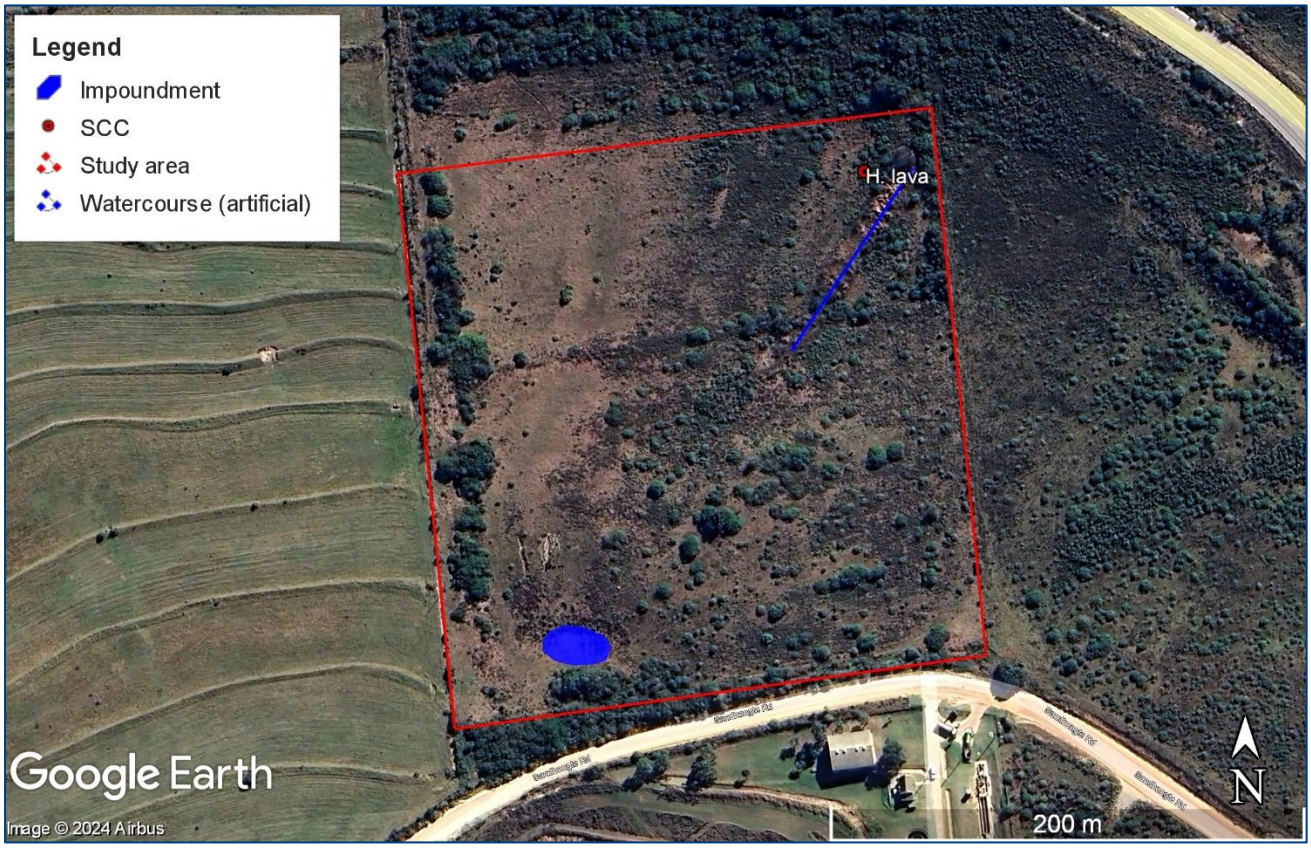

Figure 5-5: Botanical attributes of the site. The untoned area comprises fallow land.

Plant species

The following indigenous shrub and tree species were recorded on site, namely *Helichrysum rutilans* (dominant), *Senecio rosmarinifolius* (dominant), *Pseudognaphalium undulatum, Nidorella ivifolia* (dominant in damp spots), *Athanasia trifurcata, Metalasia acuta, Osteospermum moniliferum, Searsia lucida, S. pallens, S. glauca, S. crenata, Gymnosporia buxifolia, Grewia occidentalis, Gnidia nodiflora, Passerina* sp, *Cliffortia linearifolia, Anthospermum aethiopicum, Buddleja saligna, Ruschia tenella, Carpobrotus edulis, Hermannia lavandulifolia, Pelargonium capitatum, Rubus rigidus, Chironia baccifera* and *Selago* sp. Most of these species are pioneers that thrive in disturbed areas. Hemicryptophytes recorded include *Pteridium aquilinum* (dominant in damp spots), *Cheilanthes viridis, Typha capensis, Schoenoplectus cf paludicola* and the weedy grass *Cynodon dactylon*. **Figure 5-6** shows a few of the indigenous species.

Figure 5-6: A few indigenous species recorded on site, with *Senecio rosmarinifolius* (top left), *Rubus rigidus* (top right), *Hermannia lavandulifolia* (bottom left) and *Metalasia acuta* (bottom right).

Alien species are abundant on site, including *Acacia cyclops* (rooikrans, category 1b), *A. mearnsii* (black wattle, 2), *Pinus pinaster* (cluster pine, 1b), *Lantana camara* (lantana, 1b), *Psidium guajava* (guava), *Schinus terebinthifolia* (Brazilian pepper tree, 3), *Agave*

americana (garingboom, 3) and *Persicaria lapathifolia* (spotted knotweed) (**Figure 5-7**). *Acacia cyclops* appears to be the most problematic. As indicated above, most of these species are Categories 1b, 2 and 3 invaders in the Western Cape. In terms of the National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) Alien and Invasive Species List (2016), Category 1b invasive species require compulsory control as part of an invasive species control programme. Further in terms of the above Act, the harbouring of black wattle (Category 2 invader) on a property is prohibited without a permit.

Figure 5-7: A few alien species recorded on site, with *Acacia mearnsii* (top left), *Lantana camara* (top right), *Schinus terebinthifolia* (bottom left) and *Agave americana* (bottom right).

Only one Species of Conservation Concern (SCC) was recorded on site, namely *Hermannia lavandulifolia* (VU). The latter is very common in the Mossel Bay area. All the other recorded species are widespread and common in the region.

Site Ecological Importance

In order to demonstrate the biodiversity sensitivity of the site, a site ecological importance (SEI) map was prepared (**Figure 5-8**). This map considers the biodiversity importance of the receptor area and its resilience to impacts. The receptor area is described as the affected habitat (fallow land with relatively few indigenous species), which may

accommodate certain SCC. A Low SEI value was allocated to the site due to its degraded (transformed) state, low species diversity and relatively small footprint (<5 ha).

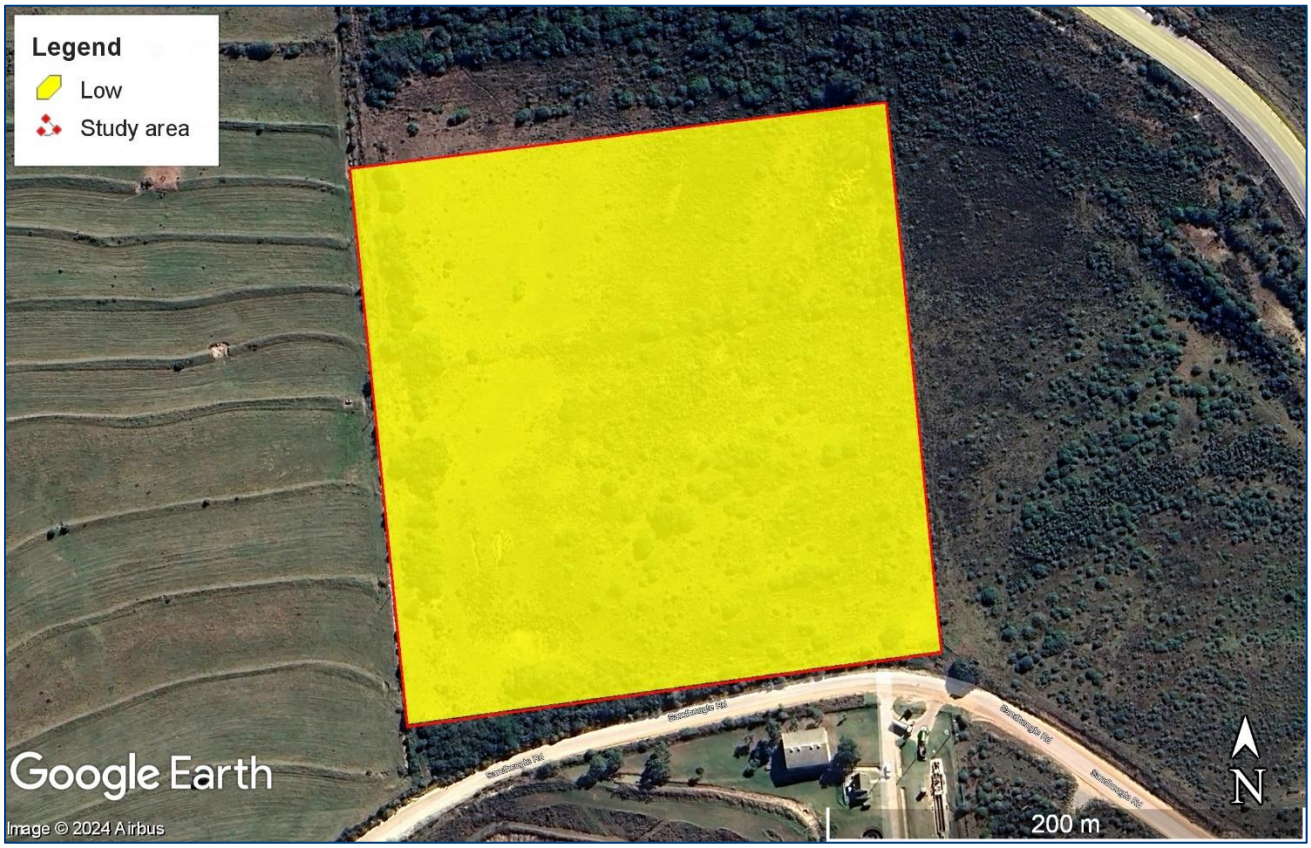

Figure 5-8: Site ecological importance (SEI) map.

6. Potential Impacts

Terrestrial biodiversity (vegetation)

It is the author's opinion that the site is significantly degraded. After 20 years or more of lying fallow, species diversity is still relatively low, with regrowth not bearing any resemblance to fynbos or dune thicket. The impact posed by the development on terrestrial biodiversity is therefore expected to be of low significance. Although the proposed development encroaches onto a mapped ESA and CBA, it is not expected to impact on the functionality of the greater biodiversity network for the reason(s) mentioned above. Connectivity will remain around the eastern side of the site, albeit on an adjacent property.

For the reasons mentioned above it is debateable whether Activity 12 of Listing Notice 3 of the NEMA EIA regulations (as amended on 7 April 2017) will be triggered. In terms of the above regulations, the "clearance of an area of 300 m^2 or more of indigenous vegetation within any critically endangered or endangered ecosystem listed in terms of Section 52 of the NEMBA" is a listed activity. The affected vegetation (regrowth) in this instance does

not resemble (structurally or floristically) any of the mapped vegetation types for the site. It can thus be argued that the activity does not apply.

In the case of the site not being developed (no-go alternative), it will remain in a degraded state with little potential for reverting to the original vegetation in the long term.

Plant species

The impact on plant species, including potential SCC, is also expected to be of little significance or concern. All the recorded species are common and widespread in the region. Only one SCC was recorded in the north-eastern corner of the site, namely *Hermannia lavandulifolia* (VU). It is fortunately still very common in the Mossel Bay area. The probability of other SCC to occur on the site also seems low. No protected tree species were recorded.

The identified construction and operational phase impacts are as follows:

Construction Phase

- No significant impact identified.

Operational phase

- Increased alien infestation.

The **cumulative botanical impact** of the project is expected to be equivalent to the impact on terrestrial biodiversity described above. In this instance, the loss of biodiversity and resultant cumulative impact is considered small (acceptable) due to the degraded (transformed) state of the site.

7. Recommended Mitigation Measures

As a long-term management requirement for the remainder of the property, invasive plant species, such as *Acacia cyclops* (rooikrans), *A. mearnsii* (black wattle) and *Lantana camara* (lantana), must be controlled. In terms of the National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) Alien and Invasive Species List (2016), Category 1b invasive species, such as rooikrans and lantana, require compulsory control as part of an invasive species control programme. Furthermore, the harbouring of black wattle (Category 2 invader) on a property is prohibited without a permit.

8. Summary & Conclusion

This report sets out the results from a desktop study, as well as a field survey conducted on 22 February 2024, to ascertain terrestrial biodiversity and plant species constraints and possible impacts associated with the development of a PV solar plant next to the

Grootbrak wastewater treatment works (WWTW) on Portion 23 of Farm Wolvedans 129, Groot Brak River.

The vegetation covering the site comprises fallow land and do not resemble any specific vegetation type, such as Hartenbos Dune Thicket or Garden Route Granite Fynbos. It can be described as a shrubby grassland. The dominant species are grasses (e.g. *Cynodon dactylon*) and a few pioneer shrubs, such as *Helichrysum rutilans*, *Senecio rosmarinifolius* and *Nidorella ivifolia*. Due to the severity of past agricultural activities (cultivation), it is unlikely that it will revert to fynbos or thicket in the long term. Only one SCC was recorded on site, namely *Hermannia lavandulifolia* (VU). It is fortunately still very common in the Mossel Bay area. The probability of other SCC to occur on the site also seems low. The site therefore does not present any notable botanical constraints.

Due to the degraded (transformed) state of the site, the impact on both terrestrial biodiversity and plant species is expected to be of low significance. Despite the site's position inside the biodiversity network, it is highly compromised by past agricultural activities and invasive aliens. It is therefore recommended that the proposed development be considered for approval.

References

Bromilow, C. 2010. Problem Plants and Alien Weeds of South Africa. Briza Publications, Pretoria.

DEA 2022. Revised National List of Ecosystems that are threatened and in need of protection. Government Gazette No. 47526. Government Printer, Pretoria.

Manning, J. & Goldblatt, P. 2012. Plants of the Greater Cape Floristic Region 1: the Core Cape flora, Strelitzia 29. SANBI, Pretoria.

Mucina, L. & Rutherford, M.C. 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

Pool-Stanvliet, R., Duffell-Canham, A., Pence, G. & Smart, R. 2017. The Western Cape Biodiversity Spatial Plan Handbook. CapeNature, Stellenbosch.

SANBI 2020. Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 3.1. 2022.

Viljoen, J.H.A. & Malan, J.A. 1993. Die geologie van die gebiede 3421 BB Mosselbaai en 3422 AA Herbertsdale. Geologiese Opname, Departement van Mineraal- en Energiesake, Pretoria.

Annexure 1: Site Ecological Importance

Site Ecological Importance (SEI) is considered to be a function of the biodiversity importance (BI) of the receptor (e.g. SCC, the vegetation community or habitat type present on site) and its resilience to impacts (receptor resilience or RR) as follows:

SEI = BI + RR

BI in turn is a function of conservation importance (CI) and the functional integrity (FI) of the receptor as follows:

BI = CI + FI

Conservation importance (CI) is evaluated in accordance with recognised established internationally principles and criteria for the determination of biodiversity-related value, including the IUCN Red List of Species, Red List of Ecosystems and key biodiversity areas. CI is defined here as: "The importance of a site for supporting biodiversity features of conservation concern present, e.g. populations of SCC (CR, EN, VU & NT), Rare species, range-restricted species, and areas of threatened ecosystem types, through mainly natural processes". Fulfilling criteria to evaluate CI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation, providing a more robust evaluation of CI (Table 1).

Table 1: Conservation importance (CI) criteria.

CI	Criteria
Very high	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that have a global EOO of <10 km^2. Any area of natural habitat of a CR ecosystem type or large area (>0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type.
High	Confirmed or highly likely occurrence of CR, EN and VU species that have a global EOO of >10 km^2. IUCN threatened species (CR, EN & VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or <10 000 mature individuals remaining. Small area (>0.01% but <0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (>0.1%) of natural habitat of VU ecosystem type. Presence of Rare species.
Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN & VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species.
Low	>50% of receptor contains natural habitat with potential to support SCC. No confirmed or highly likely populations of SCC.

CI	Criteria
	No confirmed or highly likely populations of range-restricted species. <50% of receptor contains natural habitat with limited potential to support SCC.
Very low	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

Functional integrity (FI) of the receptor (e.g. the vegetation community or habitat type) is defined here as the receptors' current ability to maintain the structure and functions that define it, compared to its known or predicted state under ideal conditions. Ecological processes can be considered to be mostly intact and functional if the receptor area has low levels of current ecological disruptors, has good connectivity to other areas and is a relatively large area. As for CI, the fulfilling criteria to evaluate FI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation (Table 2).

Table 2: Functional integrity (FI) criteria.

FI	Criteria
Very high	Very large (>100 ha) intact area for any conservation status of ecosystem type or >5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing).
High	Large (>20 ha but <100 ha) intact area for any conservation status of ecosystem type or >10 ha for EN ecosystem types. Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.
Medium	Medium (>5 ha but <20 ha) semi-intact area for any conservation status of ecosystem type or >20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.
Low	Small (>1 ha but <5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
Very low	Very small (<1 ha) area.

FI	Criteria
	No habitat connectivity except for flora with wind-dispersed seeds. Several major current negative ecological impacts

Recalling that biodiversity importance (BI) is a function of conservation importance (CI) and the functional integrity (FI) of a receptor, BI can be derived from a simple matrix of CI and FI as follows:

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

Receptor resilience (RR) is defined here as: "The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention." The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor (Table 3) and will require justification by the specialist.

Table 3: Receptor resilience (RR) criteria.

RR	Criteria
Very high	Habitat that can recover rapidly (<5 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (5-10 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (>10 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: >15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of

RR	Criteria
	remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
Very low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

Finally, after the successful evaluation of both BI and RR as described above, it is possible to evaluate the **site ecological importance (SEI)** from the final matrix as follows:

Site ecological importance		Biodiversity importance				
		Very high	High	Medium	Low	Very low
Receptor resilience	Very low	Very high	Very high	High	Medium	Low
	Low	Very high	Very high	High	Medium	Very low
	Medium	Very high	High	Medium	Low	Very low
	High	High	Medium	Low	Very low	Very low
	Very high	Medium	Low	Very low	Very low	Very low

Table 4: Guidelines for interpreting SEI in the context of the proposed development activities.

SEI	Interpretation in relation to proposed development activities
Very high	Avoidance mitigation - no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation - changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation - development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation - development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very low	Minimisation mitigation - development activities of medium to high impact acceptable and restoration activities may not be required.