Terrestrial Biodiversity Specialist Assessment

prepared in accordance with the
"Protocol for the Specialist Assessment and minimum report content requirements for environmental impacts on Terrestrial Biodiversity"

Proposed development on Portion 79 of the Farm 205 Ruygte Vally, Sedgefield, Knysna District, in the Western Cape Province

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29 April 2025

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SPECIALIST DETAILS & DECLARATION

This report has been prepared in accordance with the "Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity", as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020. It has been prepared independently of influence or prejudice by any parties.

The details of Specialists are as follows:

Specialist	Qualification and accreditation
Dr David Hoare (Pr.Sci.Nat.)	• PhD Botany • SACNASP Reg. no. 400221/05 (Ecology, Botany)

Declaration of independence:

BioCensus (Pty) Ltd is in an independent consultant and hereby declares that it does not have any financial or other vested interest in the undertaking of the proposed activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998). In addition, remuneration for services provided by BioCensus (Pty) Ltd is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.

Disclosure:

BioCensus (Pty) Ltd undertakes to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and will provide the competent authority with access to all information at its disposal regarding the application, whether such information is favourable to the applicant or not.

Based on information provided to BioCensus (Pty) Ltd by the client and in addition to information obtained during the course of this study, BioCensus (Pty) Ltd presents the results and conclusion within the associated document to the best of the author's professional judgement and in accordance with best practise.

_____ 29 April 2025

Dr David Hoare Date

TERMS OF REFERENCE

This report is prepared in compliance with the PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL BIODIVERSITY

This assessment follows the requirements of The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020 for Terrestrial Biodiversity.

The assessment and minimum reporting requirements of these protocols are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool). The screening tool can be accessed at:

https://screening.environment.gov.za/screeningtool.

INTRODUCTION

Site location

The site is located above the coastal cliffs to the east of Cola Beach, Sedgefield in the Garden Route (Figure 1). It is accessed from the Groenvlei Beach road, which is a gravel road that runs past the western side of Groenvlei to the beach on the western edge of Goukamma Nature Reserve.

The site is in an area of untransformed coastal thicket between Goukamma Nature Reserve and Cola Beach in Sedgefield (Figure 2). The strip of land is privately owned and has been divided into several small holdings, some that overlook the sea (Figure 3). One of these sea-facing sites has already been partially developed, and there is strong pressure to develop the area.

Most of the areas to the north and north-east of the site are in a natural state. This natural area between Sedgefield and Goukamma Nature Reserve provides an important natural buffer to the vegetation in Goukamma Nature Reserve.

The scope of this report is the entire property, part of which is being considered for development, which is 5.21 ha.

Figure 1: Location of the site near Sedgefield.

Figure 3: Aerial image of the property.

Figure 2: Distribution of small holdings between Sedgefield and Goukamma Nature Reserve.

Terrestrial Biodiversity Theme Sensitivities

A sensitivity screening report from the DEA Online Screening Tool was requested in the application category: Transformation of land | Indigenous vegetation. The DEA Screening Tool report for the area indicates the following sensitivities:

Sensitivity	Feature(s)
Very High	Lake Pleasant Private Nature Reserve Section No.5
Very High	Wilderness National Lake Area
Very High	CBA 2: Forest
Very High	CBA 2: Terrestrial
Very High	CBA 1: Forest
Very High	CBA 1: Terrestrial
Very High	FEPA Subcatchment
Very High	National Protected Area Expansion Strategy (NPAES)

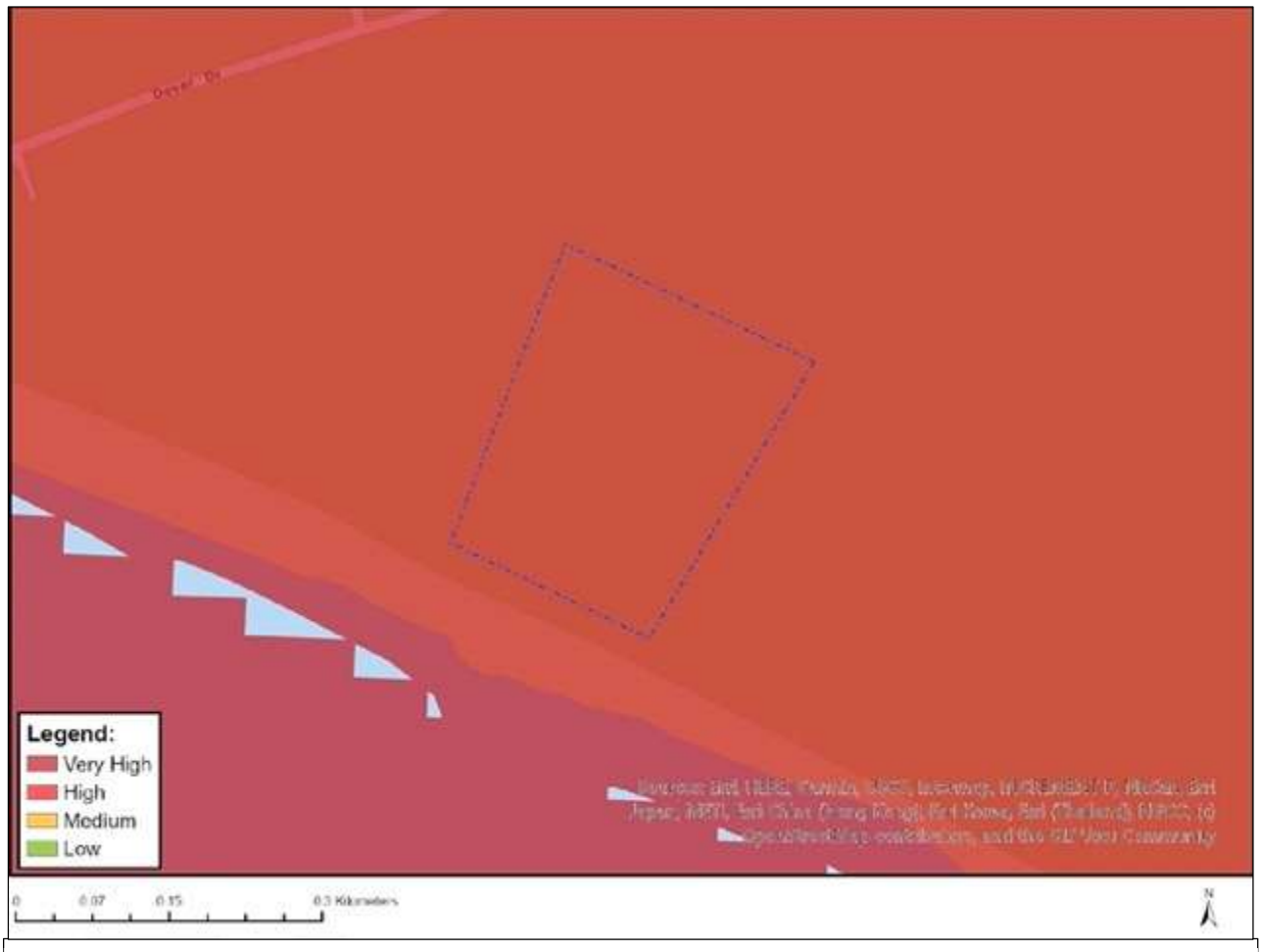


Figure 4: Terrestrial Biodiversity theme sensitivity for the site and surrounding areas.

ASSESSMENT METHODOLOGY

The detailed methodology followed as well as the sources of data and information used as part of this assessment is described below.

Survey timing

The study commenced as a desktop-study followed by site-specific field studies on 4 October 2024. The site is within the Fynbos Biome with an all-year rainfall season with a slight dip in early winter. Figure 5 shows that Knysna has peak rainfall from March to April, with another peak in October to November. The timing of the survey in October is therefore optimal in terms of assessing the flora and vegetation of the site. It was possible to determine the overall condition of the vegetation with a high degree of confidence.

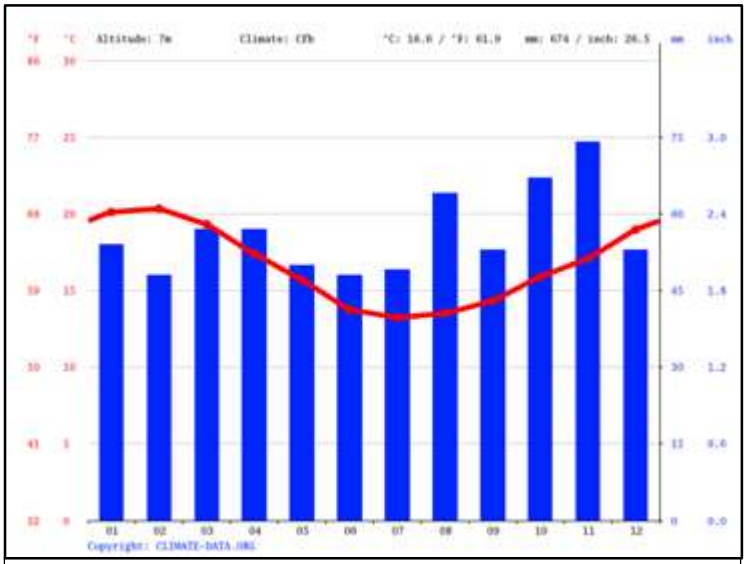


Figure 5: Monthly rainfall for Knysna.

Field survey approach

The entire site was assessed by surveying the terrestrial biodiversity on foot. The objective was to comprehensively examine all natural areas. A hand-held Garmin GPSMap 64s was used to record a track within which observations were made. Digital photographs were taken of features and habitats on site, as well as of all plant and animal species that were seen. All plant and animal species recorded were uploaded to the iNaturalist website (https://www.inaturalist.org) and are accessible by viewing the observations for the site (use the Explore menu, zoom and pan until the desired study area is within the browser window, click the button "Redo search in map", and all observations for that area will be shown and listed).

Aerial imagery from Google Earth was used to identify and assess habitats on site. This included historical imagery that may show information not visible in any single dated image. Patterns identified from satellite imagery were verified on the ground. Digital photographs were taken at locations where features of interest were observed. During the field survey, particular attention was paid to ensuring that all habitat variability was covered physically on the ground.

Impact assessment methodology

The Impact Assessment Methodology assists in evaluating the overall effect of a proposed activity on the environment. Impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). The rating system is applied to the potential impact on the receptor. The impact assessment methodology provided below explicitly takes into account the value and condition of the biodiversity resources affected. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
BIODIVERSITY VALUE / SENSITIVITY CRITERIA					
Irreplaceability (I) The biodiversity value of the affected resource	Resource is widespread and common and /or regenerates itself (LC)	Resource is uncommon, endemic to a restricted area, moderately rare, or is already noticeably affected but still relatively widespread (e.g., NT, ESA)	Resource is naturally rare, restricted to limited localities, ephemeral, or is approaching a threshold of persistence (VU, CBA2)	Resource is highly localised / loss has already exceeded persistence thresholds (EN, CBA1)	Resource is critically rare / loss has already well exceeded persistence thresholds (CR, Protected)
Threshold (T) The scale of the impact relative to the overall distribution of a resource, therefore the degree to which the impact contributes towards exceeding an ecological threshold	Impact affects a negligible proportion of the overall biodiversity resource	Impact affects a proportion of the biodiversity resource that is within 6 orders of magnitude of the total extent / number of the resource (0.001-0.1%)	Impact affects a proportion of the biodiversity resource that is within 4 orders of magnitude of the total extent / number of the resource (0.1-1%)	Impact affects a proportion of the biodiversity resource that is within 2 orders of magnitude of the total extent / number of the resource (1-10%)	Impact affects a proportion of the biodiversity resource that is within 1 order of magnitude or more of the total extent / number of the resource (≧10%)
Condition (C) The integrity of the resource in terms of its intactness and functionality, the coherence of its ecological structure and function	Resource in very poor condition, displaying advanced degradation		Moderately affected resource, functional but displaying obvious signs of minor degradation		Fully functional and in a state expected in a completely natural state, unaffected by human influence.
Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation	Mostly reversible: requires minor mitigation	Partly reversible: Recoverable with more intense mitigation	Barely reversible: unlikely to be reversed, even with intense mitigation	Irreversible: Not possible despite action

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
IMPACT MAGNITUDE CRITERIA					
Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Within site boundary only	Site & surroundings: Extends for a limited distance beyond site boundaries	Landscape: Outside activity area	Regional: Affects patterns at a regional or provincial scale	Global: Across borders or boundaries
Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact, 0-1 years	Short term: 1-5 years	Medium term: 5-10 years	Long term: Project life, 10-25 years	Permanent: Indefinite
Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease or continue in a highly modified way	Very High: Permanent cessation of processes
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$\boldsymbol{S = [(E + D + M)/3 \times (R + I + T + C)/4 \times P]/25}$ $\boldsymbol{Significance = (Extent + Duration + Magnitude)/3 \times (Reversibility + Irreplaceability + Threshold + Condition)/4 \times Probability}$				
IMPACT SIGNIFICANCE RATING					
Total Score	**0 - 1**	**1 - 2**	**2 - 3**	**3 - 4**	**4 - 5**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

Sources of information

Regional Vegetation

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates described in Dayaram et al., 2019 and according to the South African National Biodiversity Institute (SANBI) BGIS website (http://bgis.sanbi.org), as follows:
    - Mucina, L. and Rutherford, M.C. (editors) 2006. Vegetation map of South Africa, Lesotho and Swaziland: an illustrated guide. Strelitzia 19, South African National Biodiversity Institute, Pretoria.
    - South African National Biodiversity Institute 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland [Vector] 2018. Available from the Biodiversity GIS website, downloaded on 23 September 2021.
- The description of each vegetation type includes a list of plant species that may be expected to occur within the particular vegetation type.

Threatened Ecosystems

- The conservation status of the vegetation types were obtained from Mucina and Rutherford (2006) and the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004). Updates from the National Biodiversity Assessment 2018 were taken into consideration, and have recently been gazetted.

Regional plans

- The 2017 Western Cape Biodiversity Spatial Plan (WCBSP) Maps were consulted for inclusion of any parts of the site into any Critical Biodiversity Areas or Ecological Support Areas (CapeNature. 2017 WCBSP Knysna [Vector] 2017, available from the Biodiversity GIS website (biodiversityadvisor.sanbi.org)).
- South Africa Protected Areas Database (SAPAD_OR_2021_Q2) retrieved from the Department of Forestry, Fisheries and the Environment website (https://egis.environment.gov.za/data_egis/data_download/current).

Aerial imagery

- Recent satellite imagery (courtesy of Google Earth Pro). Google Earth Pro also provides historical imagery for a period up to 15 years ago, which aided in the determination of certain vegetation types and land use historically and currently present on site.

Assumptions, limitations and gaps in knowledge or data

The following assumptions, limitations and uncertainties are listed regarding the assessment of the site:

- The assessment is based on one site visit as well as a desktop study of the available information. The time spent on site was adequate for understanding general vegetation patterns across the study area.
- Regional vegetation maps and conservation plans are based on available information and expert knowledge that is not always able to take local variation and diversity into account. Expert local knowledge, an ecological understanding of the area, and field assessments are required to verify these maps.

DESKTOP DESCRIPTION OF SITE

Regional vegetation patterns

The property is within one mapped regional terrestrial vegetation type, namely Goukamma Strandveld (Figure 6). The vegetation map also shows Cape Seashore Vegetation, which occurs at the base of the cliffs and not above the cliffs where the proposed development is situated. Any natural vegetation on site would therefore fall within Goukamma Strandveld.

Goukamma Strandveld

Distribution

This vegetation type occurs in the Western Cape Province in Sedgefield Bay, wedged between the Knysna Heads to the east and Wilderness to the west covering 39 km^2.

Vegetation & Landscape Features

Parabolic dunes occur along the coastal margin, with inland ridges supporting Knysna Sand Fynbos. Mesic Dune Thicket patches are common in the Goukamma Strandveld, and in fire-protected and locally wet areas, they grow into forests. Altitude ranging between 1 – 196 metres (median 49 m).

Geology & Soils

Figure 6: Regional vegetation types of the site and surrounding areas.

The vegetation is overlaying the Klein Brak Formation rocks cemented beach deposits, Waenhuiskrans aeolianite sand on oxidised, neutral sands. The Klein Brak Formation rocks, which are primarily quartz-rich, shelly sandstones, border the dune cordon between Arniston and De Hoop Nature Reserve.

Climate
Like that of the St Francis Strandveld but with a lower annual rainfall 500–700 $mmyr^{-1}$. Warm temperate, subhumid to semi-arid and sub-Mediterranean. The temperature regime is equable: mean midsummer temperatures are 20–22 °C, and midwinter temperatures 16–18 °C.

Important Taxa
(d=dominant, e=South African endemic, et=possibly endemic to a vegetation type)

Growth form	Species
Tall Shrub	*Passerina corymbosa* (d), *Erica glumiflora*(d), *Metalasia muricata* (d), *Imperata cylindrica* (d), *Restio eleocharis* (d), *Struthiola argentea* (d), *Cliffortia falcata* (d), *Chironia decumbens* (d), *Erica glandulosa* ssp. *fourcadii* (d), *Disparago kraussii* (d), *Cliffortia linearifolia* (d), *Lachnaea diosmoides* (d).
Herb	*Carpobrotus edulis*

Other descriptions of vegetation patterns in the area

The vegetation of the Wilderness Lakes area has been complex to map and describe. The vegetation of the coastal dunes was initially included in the national vegetation map as being within a single broad unit called Southern Cape Dune Fynbos, which occurred from Wilderness to Oyster Bay in the Eastern Cape. The national vegetation map initially mapped this area as falling within Goukamma Dune Thicket, but this unit was recently split into Goukamma Dune Thicket and Goukamma Strandveld. There are now primarily three regional terrestrial vegetation units currently described for the Wilderness Lakes area, namely Goukamma Dune Thicket, Goukamma Strandveld and Knysna Sand Fynbos. Some valleys with Southern Afrotemperate Forest also intrude into the area from the north and there is also a small patch of vegetation near Sedgefield named Southern Cape Dune Fynbos.

Goukamma Strandveld is mapped as a unit that stretches along the coastline and slightly inland from Wilderness to Knysna. This area encompasses high variation in topography, moisture regime and substrate conditions. For example, the vegetation of this area was described in a project done for the Garden Route Initiative (Vlok et al. 2008) and, within the Wilderness Lakes area, the following habitat types are mapped (with equivalent VegMap units shown):

Habitat	**Variant**	**Equivalent VegMap vegetation type**
Dune Sandplain Fynbos	Hoogekraal Sandplain Fynbos	Knysna Sand Fynbos
Dune Sandplain Fynbos	Sedgefield Sandplain Fynbos	Goukamma Strandveld
Dune Sandplain Mosaic Thicket	Sedgefield Thicket Fynbos	Goukamma Strandveld
Dune Thicket Mosaic Forest	Sedgefield Thicket Fynbos	Goukamma Dune Thicket / Goukamma Strandveld
Dune Thicket Mosaic Forest	Wilderness Forest Thicket	Goukamma Strandveld
Dune Thicket Mosaic Littoral Vegetation	Kleinkrantz Littoral-Thicket	Goukamma Strandveld
Drift Sands	Kleinkrantz Drift Sands	Goukamma Strandveld
Coastal Dune Milkwood & Ekebergia	Groenvlei Coastal Forest	Goukamma Dune Thicket / Goukamma Strandveld
Primary Dune	Hartenbos Primary Dune	Cape Seashore Vegetation
Coastal Solid	Sedgefield Coastal Grassland	Southern Cape Dune Fynbos

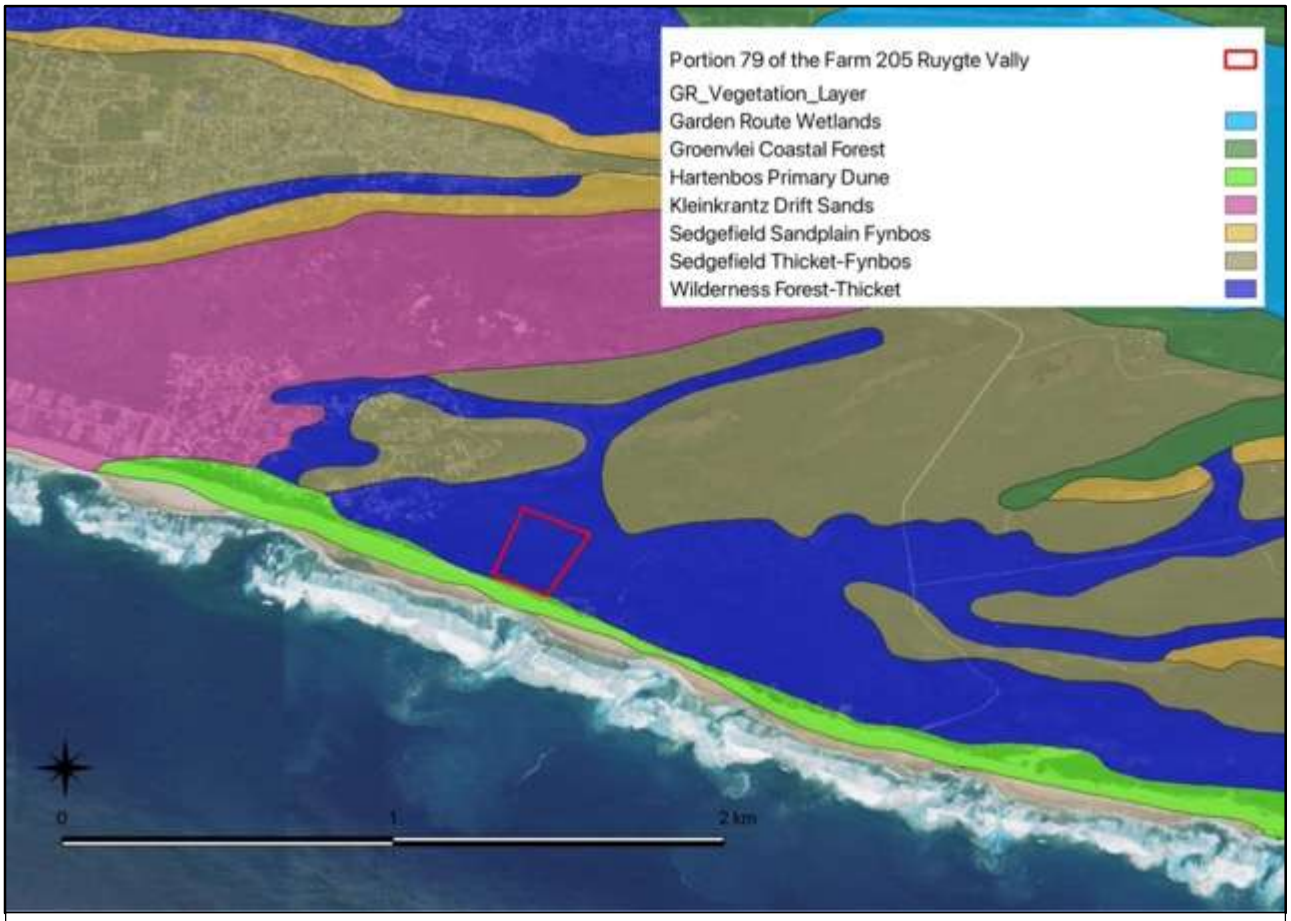


Figure 7: Vegetation types according to the Garden Route Initiative vegetation map.

It is clear from the Garden Route Initiative description that what is currently mapped as Goukamma Strandveld encompasses variation that includes fynbos, thicket, littoral vegetation, forest and grassland.

Studies at Goukamma Nature Reserve (van der Merwe 1976, Hoare 1994) identified several vegetation communities within areas mapped as Goukamma Dune Thicket. On sea-facing cliffs and headlands that are included within the mapped region called Goukamma Dune Thicket are additional communities that have been described (Hoare 1993, Hoare *et al*. 2000).

According to the vegetation map of the Garden Route Initiative (Vlok et al. 2008) the vegetation on site is mapped as Wilderness Forest Thicket and Hartenbos Primary Dune. There is also some Sedgefield Thicket-Fynbos nearby, but not on site. Vlok et al. indicate proportional areas for different units, which shows that Wilderness Forest Thicket consists of only 28.5 hectares in total.

Cowling et al. (2023) described the vegetation of the Holocene coastal dunes of the Cape south coast and distinguished the unit now called Goukamma Strandveld (Figure 8). This has been separated from Goukamma Dune Thicket in VegMap2024. Goukamma Strandveld comprises 41% of the original extent of Goukamma Dune Thicket, and excludes all areas inland that occur on older Pleistocene sediments. Cowling et al. (2023) emphasize that Holocene sands are physically and chemically different from Pleistocene sands. The vegetation of the southern Cape coast is highly responsive to these differences, with alkaline Holocene sand supporting a floristically distinct vegetation with a different structure to, and sharing few species with the Sand Fynbos of the older sediments (Cowling, 1990).

Figure 8: Goukamma Strandveld (Cowling et al. 2023).

The vegetation unit described by Cowling et al. (2023), Goukamma Strandveld, includes numerous patches of Goukamma Mesic Dune Thicket that occurs in sites with high levels of soil moisture. (Cowling et al. 2023) describe Mesic Dune Thicket vegetation as dominated by species with multi-stemmed, laterally spreading architecture (e.g., *Sideroxylon inerme* and *Pterocelastrus tricuspidatus*), but single-stemmed, vertically-growing species are indicative, for example *Zanthoxylum capense*, *Apodytes dimidiata*, *Celtis africana*, *Clausena anisata*, *Afrocanthium mundianum* and *Acokanthera oppositifolia*. Canopy height is approximately 4–6 m. Mesic Dune Thicket usually has a well-developed herbaceous understorey comprising of species such as *Brachiaria chusqueoides*, *Hypoestes aristata*, *Amaranthus thunbergii*, *Droguetia iners* and *Stipa dregeana*. The liana and vine floras are rich with the most common and widespread species being *Asparagus scandens*, *Capparis sepiaria*, *Dioscorea mundii*, *Secamone alpini*, *Behnia reticulata* and *Kedrostis nana*. This description is typical of the vegetation found on site.

Conservation status of broad vegetation types

Rouget et al. (2006) classified South African vegetation types according to their ecosystem status, a measure based on the extent of remaining untransformed area of a vegetation type in relation to its biodiversity target (% area). An updated status assessment, based on the latest classification of South Africa's vegetation (Dayaram et al., 2019) and implementing the IUCN Red List of Ecosystems V. 1.1 protocol (Keith et al., 2013), classified most Cape south coast dune vegetation as "Least Concern". However, the delimitation of vegetation units on coastal dunes of the Cape south coast is not accurate and therefore there are inherent errors in the threat status assessments

of these ecosystems. Given the continuing threat of coastal development and encroachment by invasive plants, Cowling et al. (2023) propose that all remnant South Coast Strandveld vegetation be protected.

The conservation status for Goukamma Dune Thicket in accordance with the Revised National List of Ecosystems (Government Notice No 2747 of 18 November 2022) published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), is given below. Note that there is no assessment for Goukamma Strandveld, therefore the status of the vegetation unit from which Goukamma Strandveld was eparated is provided here.

Vegetation Type	**Conservation status**
	Revised National Ecosystem List (NEM:BA) (2022)
Goukamma Dune Thicket	Not listed - Least concern

It is therefore <u>verified</u> that the site DOES NOT occur within a Listed Ecosystem, as listed in the Revised National List of Ecosystems that are Threatened and need of protection (GN2747 of 2022) and therefore has <u>LOW</u> sensitivity with respect to this attribute.

Biodiversity conservation plans

The Western Cape Biodiversity Spatial Plan (WCBSP) classifies the habitats of the province according to conservation value in decreasing value, as follows:

1. Protected Areas (PA);
2. Critical Biodiversity Areas 1 (CBA1);
3. Critical Biodiversity Areas 2 (CBA2);
4. Ecological Support Area 1 (ESA1);
5. Ecological Support Area 2 (ESA2);

The WCBSP map for Knysna (Figure 9) shows that most of the site is within a CBA1 area, with a band of CBA2 along the southern part of the site. There are also two ESA2 areas on site. There are several protected areas in nearby areas, including the neighbouring property to the east (which is already partly developed!). The more inland areas that are protected are Lake Pleasant Nature Reserve.

The WCBSP map includes a layer that provides reasons for including areas within specific conservation categories. For the area within the site, the following reasons are given:

1. Ecological processes.
2. Indigenous forest type.
3. Threatened SA Vegetation type - Southern Cape Dune Fynbos (VU) - note that the vegetation map has been updated and this unit no longer exists.
4. Water resource protection - Swartvlei.
5. Coastal resource protection.

This verifies the output from the Online Screening Tool in concept and spatial placement and confirms that the majority of the site has <u>VERY HIGH</u> sensitivity from a Terrestrial Biodiversity perspective. A specialist assessment is therefore required.

Figure 9: Western Cape Biodiversity Spatial Plan of the site and surrounding areas.

Natural Forest on site

According to the National Forests Act 84 of 1998, various natural forest types have been declared as national forests under section 7(3)(a) of the Act. A list of forest types declared as National Forest Types was published in GN 1388 dated 30 October 1998, amended in Notice 167 of 2017. Included in this list of National Forest Types is Western Cape Milkwood Forests (VEGMAP CODE FOz VI3).

The description for this forest type (Western Cape Milkwood Forest) states that it occurs in the Western Cape Province, near the coast from the Groenvlei forest (Goukamma Nature Reserve), the Standford-Hermanus area, to parts on the eastern and western side of the Cape Peninsula (von Maltitz et al. 2003). The site falls within this geographical range.

The official forest type is described as being generally a low forest with trees with large stems and widely spreading crowns. The stands are often dominated by *Sideroxylon inerme*, and/or *Celtis africana* and/or *Apodytes dimidiata*. The understorey is either open or a shrub layer with diverse species, including soft shrubs of the Acanthaceae (von Maltitz et al. 2003). It occurs mainly on aeolian sand, as well as on limestone.

At the time of publishing this description (von Maltitz et al. 2003) there was insufficient distribution data to calculate area or conservation status. However, an unpublished map from the The Garden Route Biodiversity Sector Plan for the George, Knysna and Bitou Municipalities (Vromans et al. 2010) shows that the site is within an area mapped as "Dune Thicket Mosaic Forest: Wilderness Forest-Thicket variant". The short description for this unit (Vlok et al. 2008, pp. 43) provides a species list that is typical of that found on the current site (see next section of this report). This same unpublished document also describes the thicket at Goukamma Nature Reserve (see description above for Groenvlei forest) as being Groenvlei Coastal Forest, although Wilderness Forest-Thicket also occurs at Goukamma Nature Reserve.

Although it is therefore not clear whether or not the thicket on site falls under Western Cape Milkwood Forest (protected under the National Forests Act), it is dominated by the Milkwood, *Sideroxylon inerme*, that is protected under the same Act.

Historical disturbance

Historical aerial photographs show that the site has always been in a natural state. An aerial photograph from 1958 (Figure 10) shows the entire site and surrounding areas covered by thicket vegetation, similar to the current status. A possible difference is that there appears to be some mobile dune sand on the lip of the cliffs that is currently vegetated (white patches in Figure 10).

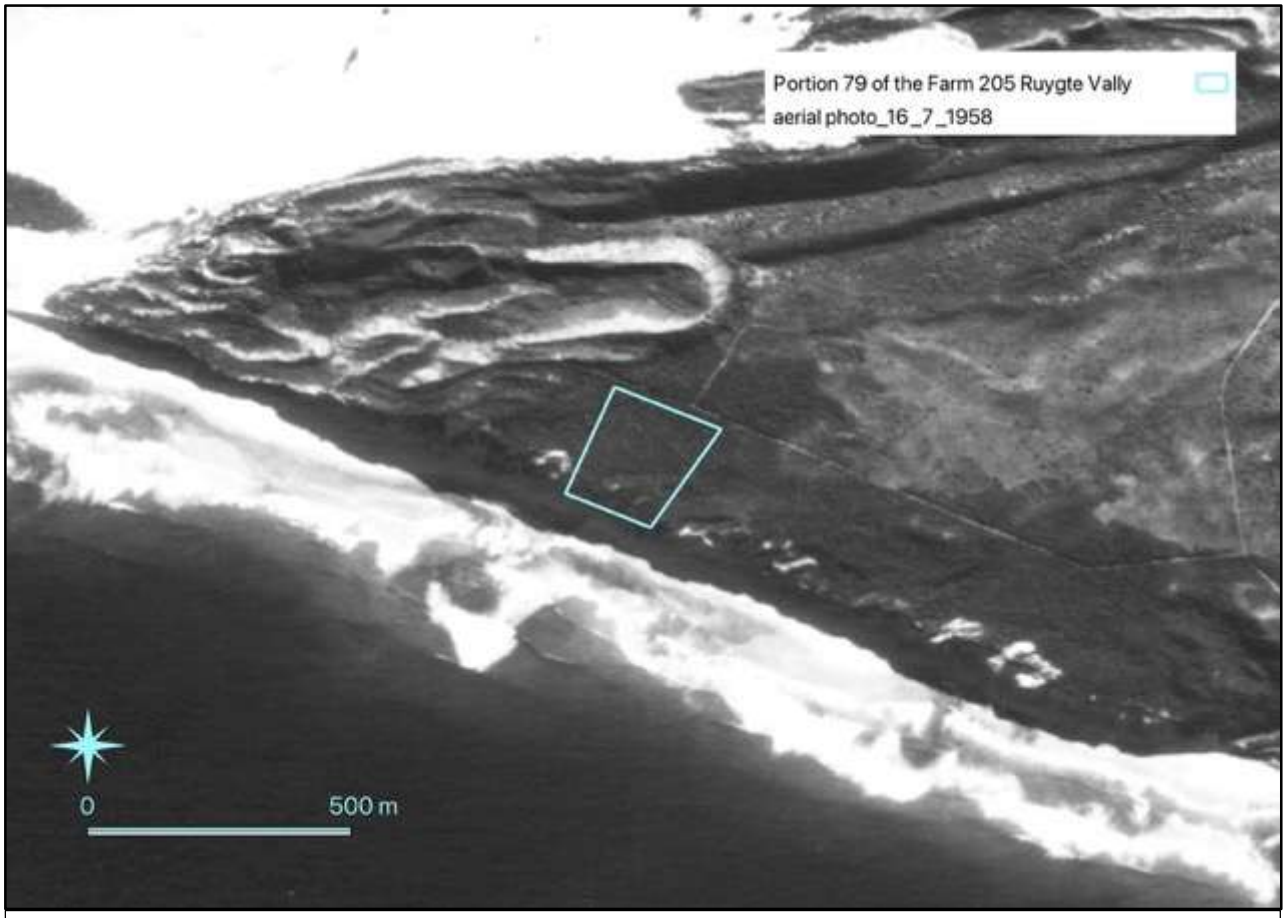


Figure 10: Aerial photograph from 1973.

OUTCOME OF THE ASSESSMENT

Verification of observations on site

According to the "AMENDMENT TO THE PROTOCOLS FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL ANIMAL AND PLANT SPECIES IN TERMS OF SECTIONS 24(5)(a) AND (h) AND 44 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998", a specialist report must include the following:

5.3.4A verifiable evidence from the specialist's site inspection, including as a minimum:

5.3.4A.1 a map showing the specialist's GPS track in relation to the study area; and

5.3.4A.2 at least 4 spatially representative sample site descriptions from across the study area that include as a minimum:

(a) precise geographical coordinates of the sample site;

(b) at least one in situ photograph (taken on site by the specialist during the site inspection) of the sample site; and

(c) a habitat description of the sample site.

To address these specific requirements, photographs of landscapes on site were taken at various localities to show conditions on site. A map showing the location of these photographs is provided in Figure 11. This also shows the GPS track log of areas walked while undertaking this assessment.

Figure 11: Location of photographs taken on site during the site inspection, as well as the GPS track log of areas traversed during the field assessment of the site.

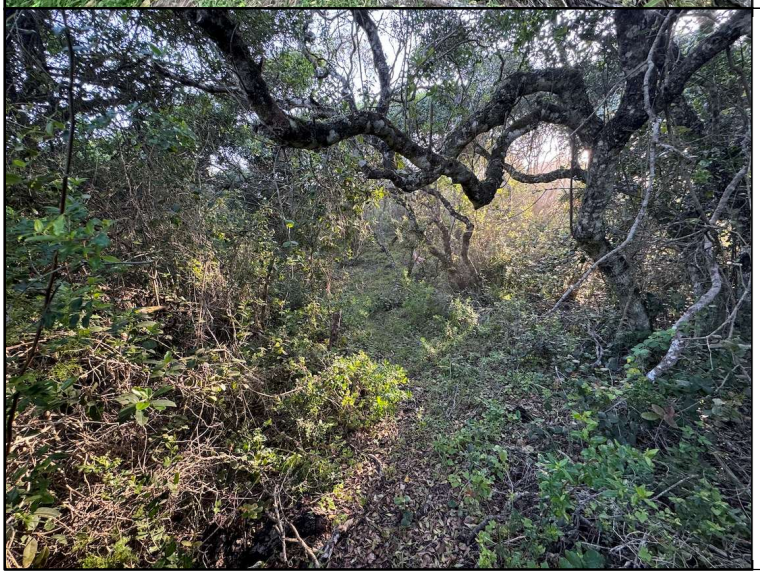
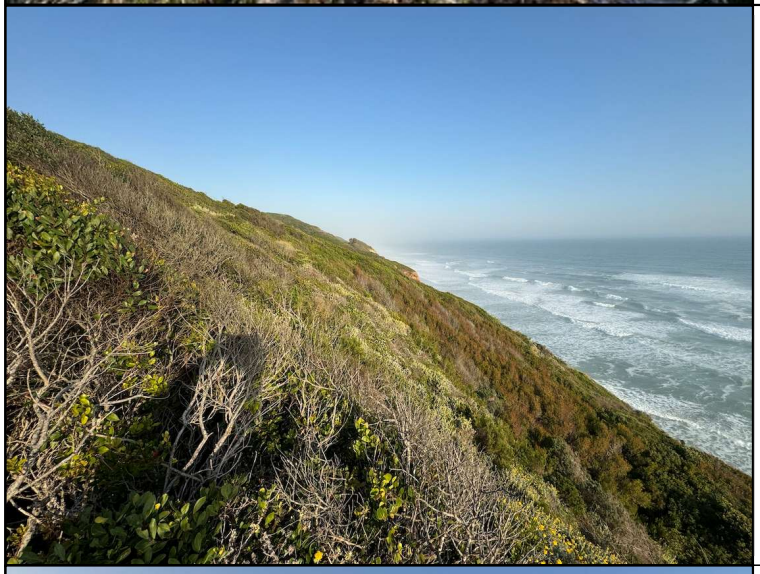
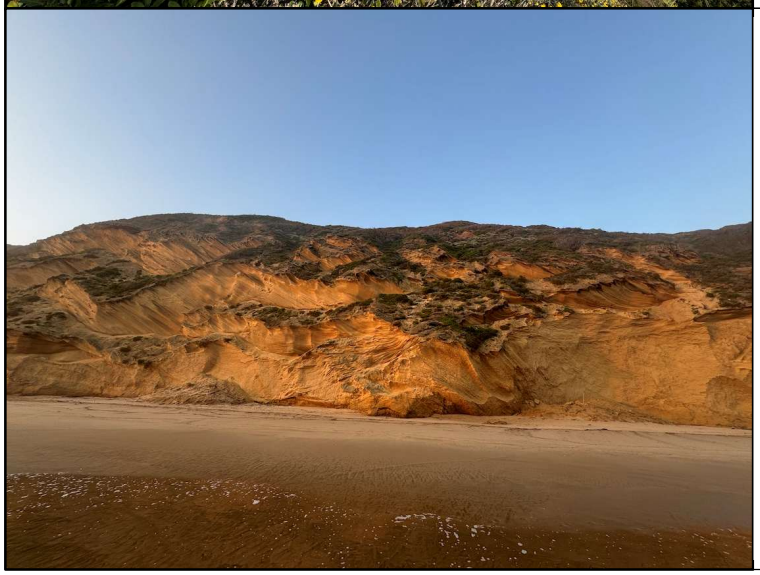
	**Photo 7185** **34° 2' 25.12" S, 22° 49' 35.238" E** **Typical thicket structure in the general area.**
	**Photo 7191** **34° 2' 26.69" S, 22° 49' 32.808" E** **Clearing in the thicket.**
	**Photo 7193** **34° 2' 26.61" S, 22° 49' 30.738" E** **Pathway through the thicket.**

	**Photo 7204** **34° 2' 26.26" S, 22° 49' 26.838" E** **Pathway through wind-pruned thicket at entrance to eastern-most proposed dwelling.**
	**Photo 7194** **34° 2' 27.34" S, 22° 49' 28.212" E** **Wind-pruned thicket on the sea-facing slopes. The most common indigenous species is *Sideroxylon inerme*, but heavily invaded by *Acacia cyclops*.**
	**Photo 7230** **34° 2' 29.13" S, 22° 49' 24.612" E** **View of the coastal cliffs at the site from the high-tide mark.**

Results of field surveys

The vegetation on site is an almost closed canopy of milkwood-dominated mesic thicket or low forest. It matches the description by Cowling et al. (2023) for Goukamma Mesic Dune Thicket. Closer to the edge of the sea-facing cliff, this changes to a low, wind-cropped vegetation, dominated by the alien,, *Acacia cyclops*, along with milkwoods (*Sideroxylon inerme*). This wind-cropped thicket has been found all along the coastal cliffs to Glentana (Hoare et al. 2000) and is characteristically short (less than 1 m tall, but dominated by typical thicket species.

A list of plant species found on site is provided in Appendix 1.

There are existing pathways through the forest / thicket. The original pathway / roadway is visible on the 1973 aerial photograph, but the footpaths onto the site may be more recent.

The entire site is in a natural state. Due to the fact that it occurs within either CBA1 or CBA2 areas, this means that the entire site has Very High sensitivity with respect to the Terrestrial Biodiversity Theme. According PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL BIODIVERSITY, the following is stated:

"1.5. If any part of the proposed development footprint falls within an area of "very high" sensitivity, the assessment and reporting requirements prescribed for the "very high" sensitivity apply to the entire footprint, excluding linear activities for which impacts on terrestrial biodiversity are temporary and the land in the opinion of the terrestrial biodiversity specialist, based on the mitigation and remedial measures, can be returned to the current state within two years of the completion of the construction phase, in which case a compliance statement applies.

IMPACT ASSESSMENT

Proposed development

The proposal is to build a series of units along the top of the cliff, with an access road running back towards the existing access road. The proposed layout is shown in Figure 12, which also shows the existing development on the neighbouring property. This is useful because it gives an indication of the likely level of impact.

The units are mostly within the steeper slope area overlooking the coast. This is preferable in the sense that it is heavily invaded by rooikrans (*Acacia cyclops*) and is therefore somewhat degraded from a biodiversity perspective, but it introduces a strong erosion and general pollution risk to downslope areas from the proposed development. It is also preferable in the sense that it has a smaller footprint area within the forest, which is the most sensitive vegetation on site. Finally, it is preferable because it is mostly within CBA2 areas, which is better than being within CBA1 areas.

Forest is vulnerable to development because the vegetation health is dependent on the integrity of the canopy - any break in the canopy introduces edge effects, including modification of micro-environmental conditions and an environment suitable for invasive species.

Figure 12: Proposed layout superimposed on braod habitat map.

Potential impacts

In terms of the Terrestrial Biodiversity Theme, any sensitivities (from a terrestrial perspective) would be linked primarily to the existence of indigenous forest, and CBA1 and CBA2 areas on site. The site is also within the buffer of the Wilderness National Lake Area and the Lake Pleasant Private Nature Reserve, and also includes areas highlighted for future protection in the National Protected Area Expansion Strategy (NPAES). The habitat on site is supportive of all of these sensitivities and is in an ecologically functional state. The site therefore has VERY HIGH sensitivity with respect to the Terrestrial Biodiversity Theme.

Impacts assessed here are as follows:

1. IMPACTS ON FOREST.
2. IMPACTS ON PROTECTED TREES.
3. IMPACTS ON EXISTING AND FUTURE CONSERVATION PLANNING OPTIONS.
4. IMPACTS ON DOWNSLOPE CLIFF THICKET.

Impacts on forests

The forest on site is part of relatively narrow bands of coastal forest that match the description of Western Cape Milkwood Forest, protected under the National Forests Act 84 of 1998. The forests are part of a natural vegetated area to the east of Cola Beach that is currently almost fully intact, with strong linkages to forests within Goukamma Nature Reserve. Development on site will have localised impacts that will introduce edge effects in a line from the coast inland, as well as along the top of the coastal cliff. It would be the beginning of what is likely to be a series of small developments that will extend Coal Beach eastwards. Each development on its own has relatively minor impacts, but the cumulative effect will be fragmentation of the forest in this row of properties. Although protected in Goukamma Nature Reserve, the affected area of forest here is the largest intact patch of coastal forest within the Holocene Dune system of the Wilderness Lakes area.

BIODIVERSITY VALUE / SENSITIVITY CRITERIA	DESCRIPTION	SCORE
Irreplaceability (I)	The affected areas are within an CBA1 & 2.	4
Threshold (T)	Potential impacts would be related to construction damage on vegetation, as well as edge effects (trampling, erosion, runoff, pollution, spread of alien invasive species). The impact affects a small proportion of the overall biodiversity resource - the proposed footprint is relatively small relative to the overall remaining area of the vegetation.	3
Condition (C)	The potentially affected vegetation the site is in good condition.	4
Reversibility (R)	Impacts are IRREVERSIBLE..	5
IMPACT MAGNITUDE CRITERIA		
Extent (E)	The impact will occur in within the site boundary (CBA).	1
Duration (D)	Loss of vegetation on site, if it occurs, is assessed as being permanent (for the structures proposed), although localised.	5

Magnitude (M)	Although localised, impacts on vegetation will result in processes continuing but in a modified way. The potential impact is therefore scored as being of MEDIUM intensity.	3
Probability of Occurrence (P)	PROBABLE	5
Significance (S) $S = [(R + I + T + C)/4 \times (E + D + M)/3\ ]/5$	**[(4+3+4+5)/4 x (1+5+3)/3]/5 = [4.00 x 3.00]/5 = 12.00/5 = 2.40** **MODERATE negative significance**	

Possible mitigation measures

Possible mitigation measures that can be applied are as follows:

1. Obtain a permit from the relevant Department for impacts on a protected forest area.
2. Areas outside of the development footprint must be protected under some form of formal conservation agreement. It has been proposed that the entire property be rezoned "Open Space III" (Nature conservation area). This proposal is supported and will mitigate against future vegetation loss.
3. Strictly adhere to footprint areas.
4. No entry beyond construction footprint by construction personnel.
5. No pathways to the beach to be constructed - only public access routes to be used.
6. An approved Alien Invasive Management Plan must be implemented.
7. Use existing access roads for construction and operation.

It is noted that the current footprint area has undergone several iterations and is currently as small as possible and located in the most appropriate position to minimise loss of habitat. These measures are commended and assist in reducing the potential significance of impacts. It is also noted that there is an existing right to construct a primary dwelling on site and that there are also concession rights that may apply to the site. In this regard, the efforts to minimise the proposed footprint are commended and supported.

Impacts on protected trees

The forest on site is dominated by milkwoods, *Sideroxylon inerme*, which are protected under the National Forests Act 84 of 1998. Any impacts on protected trees will require a permit from the relevant Department.

BIODIVERSITY VALUE / SENSITIVITY CRITERIA	**DESCRIPTION**	**SCORE**
Irreplaceability (I)	The milkwoods on site are protected under the National Forests Act, but are relativbely common and widespread.	1
Threshold (T)	The milkwoods on site are relativbely common and widespread	1
Condition (C)	The trees on site are in good condition.	5
Reversibility (R)	Impacts are BARELYREVERSIBLE..	4
IMPACT MAGNITUDE CRITERIA		
Extent (E)	The impact will occur in within the site boundary	1

Duration (D)	Loss of trees on site, if it occurs, is assessed as being permanent (for the structures proposed), although localised.	5
Magnitude (M)	Although localised, impacts on trees will result in processes continuing but in a modified way. The potential impact is therefore scored as being of MEDIUM intensity.	3
Probability of Occurrence (P)	PROBABLE	5
Significance (S) $S = [(R + I + T + C)/4 \times (E + D + M)/3\ ]/5$	**[(1+1+5+4)/4 x (1+5+3)/3]/5 = [2.75 x 3.00]/5 = 8.25/5 = 1.65** **LOW negative significance**	

Possible mitigation measures

Possible mitigation measures that can be applied are as follows:

1. Shift access roads to avoid as many trees as possible. This may require curving the road instead of having it straight, as is currently indicated.
2. Obtain permits for any protected trees that will be affected.

Impacts on existing & future conservation planning

The site is within CBA1 and CBA2 areas, which are ideal areas to include in future conservation areas due to already being identified as being high value biodiversity areas. The site is also within the buffer of the Wilderness National Lake Area and the Lake Pleasant Private Nature Reserve, and also includes areas highlighted for future protection in the National Protected Area Expansion Strategy (NPAES).

BIODIVERSITY VALUE / SENSITIVITY CRITERIA	**DESCRIPTION**	**SCORE**
Irreplaceability (I)	The affected areas are within an CBA1 & 2..	4
Threshold (T)	Loss of habitat within identified high-value biodiversity areas means that alternative sites are required to meet biodiversity targets and to protect ecosystem processes within protected area buffer zones.	3
Condition (C)	The vegetation on site is in good condition.	4
Reversibility (R)	Impacts are IRREVERSIBLE..	5
IMPACT MAGNITUDE CRITERIA		
Extent (E)	The impact will occur in within the site boundary but affects regional level conservation planning	4
Duration (D)	Loss of vegetation on site, if it occurs, is assessed as being permanent (for the structures proposed), although localised.	5
Magnitude (M)	Although localised, impacts on vegetation will result in processes continuing but in a modified way. The potential impact is scored as being of LOW intensity.	2

Probability of Occurrence (P)	PROBABLE	5
Significance (S) $S = [(R + I + T + C)/4 \times (E + D + M)/3\ ]/5$	**[(4+3+4+5)/4 x (4+5+2)/3]/5 = [4.00 x 3.67]/5 = 14.67/5 = 2.93** **MEDIUM negative significance**	

Possible mitigation measures

Possible mitigation measures that can be applied are as follows:

1. Areas outside of the development footprint must be protected under some form of formal conservation agreement. It has been proposed that the entire property be rezoned "Open Space III" (Nature conservation area). This proposal is supported and will mitigate against future vegetation loss.

It is noted that the current footprint area has undergone several iterations and is currently as small as possible and located in the most appropriate position to minimise loss of habitat. These measures are commended and assist in reducing the potential significance of impacts. It is also noted that there is an existing right to construct a primary dwelling on site and that there are also concession rights that may apply to the site. In this regard, the efforts to minimise the proposed footprint are commended and supported.

Impacts on downslope cliff areas

The site is on the summit of the coastal cliffs. High-tide often reaches the foot of the cliffs. The scree slopes below the development area are covered in wind-cropped dwarf thicket. Although heavily invaded, this vegetation is sensitive and has a relatively narrow distribution between Glentana and Knysna. The coastal cliffs are mostly Pleistocene age consolidated beach sand and are easily erodable once the vegetation cover has been lost (as can be seen near Gericke Point).

BIODIVERSITY VALUE / SENSITIVITY CRITERIA	DESCRIPTION	SCORE
Irreplaceability (I)	The wind-cropped thicket with the specific composition and structure as found on site is limited to the area between Glentana and Knysna.	2
Threshold (T)	It is estimated that about 10-20% of this ecosystem on this coastline has been degraded.	4
Condition (C)	The potentially affected vegetation the site is in poor condition (heavily invaded).	2
Reversibility (R)	Impacts are probably IRREVERSIBLE - once this vegetation is lost it is unlikely to re-establish.	5
IMPACT MAGNITUDE CRITERIA		
Extent (E)	The impact will occur in within the site boundary but will affect downslope and adjacent areas.	2
Duration (D)	Loss of vegetation on site, if it occurs, is assessed as being permanent (for the structures proposed), although localised.	5
Magnitude (M)	Although localised, impacts on vegetation will result in processes continuing but in a modified way. The potential impact is therefore scored as being of MEDIUM intensity.	3

Probability of Occurrence (P)	PROBABLE	5
Significance (S) $S = [(R + I + T + C)/4 \times (E + D + M)/3\ ]/5$	**[(2+4+2+5)/4 x (2+5+3)/3]/5 = [3.25 x 3.33]/5 = 10.83/5 = 2.17** **MODERATE negative significance**	

Possible mitigation measures

Possible mitigation measures that can be applied are as follows:

1. Strictly adhere to footprint areas.
2. Management of all activities that could result in downslope effects must be strictly managed, both during construction and operation. This includes water-flow, diffuse pollutants, material slip, etc.
3. No entry beyond construction footprint by construction personnel, especially in downslope areas.
4. No pathways to the beach to be constructed - only public access routes to be used, such as at Groenvlei Beach.
5. An approved Alien Invasive Management Plan must be implemented. Note that removal of aliens without simultaneous rehabilitation will result in slope failure and permanent loss of vegetation characteristic of this ecosystem.

Summary of potential impacts

The assessment here considered several possible impacts associated with the proposed development. These are as follows:

1. There are low coastal forests on site that are part of a connected area of forests linked to Goukamma Nature Reserve. Even small impacts on these forests can cause local ecosystem damage, as well as wider fragmentation effects. Due to the relatively long life-span of the trees, impacts may only become evident decades into the future. The footprint area of the proposed project is relatively small, but the significance has been assessed here as being **MODERATE. negative** These forests fit the description of Western Cape Milkwood Forest, protected under the National Forests Act 84 of 1998.
2. The dominant tree species on site is the milkwood (*Sideroxylon inerme*). This tree species is protected under the National Forests Act 84 of 1998. Any trees to be damaged by the proposed project will require a permit. As an impact, loss of these trees was assessed as having **LOW negative** significance.
3. The site is close to Goukamma Nature Reserve and the Lake Pleasant Private Nature Reserve. It is also within CBA1 and CBA2 areas, which are defined on the value of the biodiversity, therefore they are seen as being important areas for the conservation of biodiversity. Unsurprisingly, the area has been earmarked for future conservation. Development of the site therefore compromises these conservation objectives, an impact which was assessed as having **MODERATE negative** significance.
4. The proposed development is at the summit of the coastal cliffs. There is therefore a strong risk from the project towards any ecosystems directly below the proposed buildings. The vegetation on these slopes is in poor condition due to alien invasion, but it is currently stable. Destabilisation of the slope due to loss of vegetation will lead to collapsing, as can currently be seen close to Gericke Point. Possible impacts related to this from the proposed development were assessed as having **MODERATE negative** significance.

These impacts will be permanent, are difficult to mitigate, and are probably irreversible.

CONCLUSION

Desktop information, field data collection and analysis of aerial imagery provides the following verifications of patterns for the Terrestrial Biodiversity Theme:

1. The site is within one regional vegetation type, Goukamma Strandveld, which is not listed. in any threat category. However, the mapping and description of this vegetation unit has been criticised for not reflecting the high diversity of vegetation, habitats and species that it contains. A recent assessment of coastal dune ecosystems (Cowling et al. 2023) suggests that this vegetation type needs re-assessment and that the coastal components should be a high priority for protection.
2. The proposed development is almost entirely within areas of natural habitat that have high biodiversity value. The site is within CBA1 and CBA2 areas, is an indigenous forest protected under the National Forests Act 84 of 1998, is adjacent to protected areas and therefore falls within the buffer zones of these, and has been earmarked as being desirable for future conservation.
3. The vegetation on site is dominated by the protected tree species, *Sideroxylon inerme*.
4. The proposed development is on the lip of the coastal cliffs that run along this coast. These cliffs are comprised of recent (Holocene era) sand deposits and are therefore unstable without established vegetation.
5. An impact assessment considered four impacts of which three were assessed as being of concern, namely:
    a. Impacts on forests: MODERATE negative significance.
    b. Impacts on protected trees: LOW negative significance.
    c. Impacts on existing and future conservation planning: MODERATE negative significance.
    d. Impacts on downslope cliff areas: MODERATE negative significance.
6. It is noted that the current footprint area has undergone several iterations and is currently as small as possible and located in the most appropriate position to minimise loss of habitat. These measures are commended and assist in reducing the potential significance of impacts. It is also noted that there is an existing right to construct a primary dwelling on site and that there are also concession rights that may apply to the site. In this regard, the efforts to minimise the proposed footprint are commended and supported.

TERRESTRIAL BIODIVERSITY STATEMENT:

1. The entire site is in a natural state and also falls within CBA1 and CBA2 areas, as well as being an indigenous natural forest. All parts of the site therefore have VERY HIGH sensitivity with respect to the Terrestrial Biodiversity Theme. According to the "Protocols", a Specialist Assessment is therefore required.
2. An impact assessment assessed that potential impacts associated with the proposed development could have MODERATE and LOW negative significance, primarily because of the high conservation value of the forest habitats on site and the value that this areas has for current and future conservation. Although relatively small in extent, the proposed development will form part of a cumulative trend that will lead to posible disruption of ecological processes.
3. The property is zoned for Agriculture, which carries rights with respect to dwellings that can be constructed. Given the existing rights, the small proposed footprint and intent to protect remaining undeveloped parts of the site from any other loss of vegetation, the proposal provides a compromise that is supportive of conservation. This makes the proposed development as compatible as possible with conservation planning and biodiversity protection while exercising existing rights. On condition the risks to coastal forest ecosystems are well managed, the proposed project can be approved.

4. This statement is subject to any conditions contained in the final approved EMPr, including the requirement for permits under the National Forests Act.

RECOMMENDATIONS

The following measures are recommended:

1. An Alien Invasive Management Plan must be compiled for the project, as well as an Ecological Management Plan.
2. Any clearance must be only for the direct footprint of proposed structure and other required infrastructure or space, including any fire-management requirements. Remaining areas must be kept in a natural state - no gardens are to be created.
3. Any construction disturbances not required for infrastructure must be allowed to convert back to thicket. If this requires active intervention then it must be formalised in a management plan.
4. Obtain required permit from Department of Forestry for loss of forest vegetation on site that constitutes a National Forest, under section 7(3)(a) of the National Forests Act, Act 84 of 1998.
5. Commit remaining undeveloped areas to formal conservation. It has been proposed that the entire property be rezoned "*Open Space III*" (Nature conservation area). This proposal is supported and will mitigate against future vegetation loss.

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APPENDIX

Appendix 1: Plant species recorded on site.

Acokanthera oppositifolia
Agathosma apiculata
Asparagus aethiopicus
Capparis sepiaria
Carissa bispinosa
Cassine peragua
Cussonia thyrsiflora
Cynanchum sp
Diospyros simii
Diospyros whyteana
Dovyalis rhamnoides
Elaeodendron croceum
Euclea racemosa
Felicia echinata
Helichrysum dasyanthum
Hellmuthia membranacea
Lauridia tetragona
Maytenus procumbens
Megathyrsus maximus
Mystroxylon aethiopicum
Noronhia foveolata
Phylica axillaris
Polygala ericifolia
Pterocelastrus tricuspidatus
Roepera morgsana
Scutia myrtina
Searsia crenata
Searsia glauca
Sideroxylon inerme (Protected tree - NFA)