Plants, Animals & Terrestrial Biodiversity Assessment

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

Portion 91 of Farm 304 Matjes Fontein, Keurboomsstrand, Plettenberg Bay in the Western Cape Province

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Plant Species, Animal Species and Terrestrial Biodiversity Assessment Report for Portion 91 of Farm 304 Matjes Fontein, Keurboomsstrand, Plettenberg Bay in the Western Cape Province

16 March 2023

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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 –

Table 1: Details of Specialist

Specialist	Qualification and accreditation
Dr David Hoare (Pr.Sci.Nat.)	• PhD Botany • SACNASP Reg. no. 400221/05 (Ecology, Botany)
Dr Wynand Vlok	PhD Zoology Pr. Sci. Nat. 400109/95 (Zoological Science, Botanical Science)

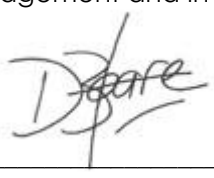
Declaration of independence:

David Hoare Consulting (Pty) Ltd in an independent consultant and hereby declare 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 David Hoare Consulting (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:

David Hoare Consulting (Pty) Ltd undertake 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 David Hoare Consulting (Pty) Ltd by the client and in addition to information obtained during the course of this study, David Hoare Consulting (Pty) Ltd present the results and conclusion within the associated document to the best of the author's professional judgement and in accordance with best practise.



_____ 16 March 2023

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, TERRESTRIAL PLANT SPECIES AND TERRESTRIAL ANIMAL SPECIES

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, and in GN. No. 1150 dated 30 October 2020 for Terrestrial Plant Species and Terrestrial Animal Species. As per these Regulations, the approach for assessing sensitivity with respect to Terrestrial Plant Species and Terrestrial Animal Species is in accordance with guidelines described in the latest version of the "*Species Environmental Assessment Guideline*", available at https://bgis.sanbi.org/.

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 Portion 91 of Farm 304 Matjes Fontein, Keurboomsstrand, Plettenberg Bay in the Western Cape Province. The site is adjacent to the main access road to Keurboomstrand and spans the area from that road to the DR1888, which does a loop from the N2 back to the N2. Refer to Figure 1 below for the general location.

The site is accessed from the Keurboomstrand access road (the P0394 road). There is an existing development on the southern side of the road (between the site and the sea (Figure 2). The eastern and the western boundaries of the site are cadastral boundaries. The entire wooded area shown in Figure 2 (the northern half of the site) is a steep south-facing ridge that stretches away in both directions from the site. The southern part of the site is a flat area with lawns in previously cultivated areas that is currently used for equestrian activities.

The scope of this report is the southern part of the property, which is the only part is planned to be developed. The entire site is 14.72 ha.

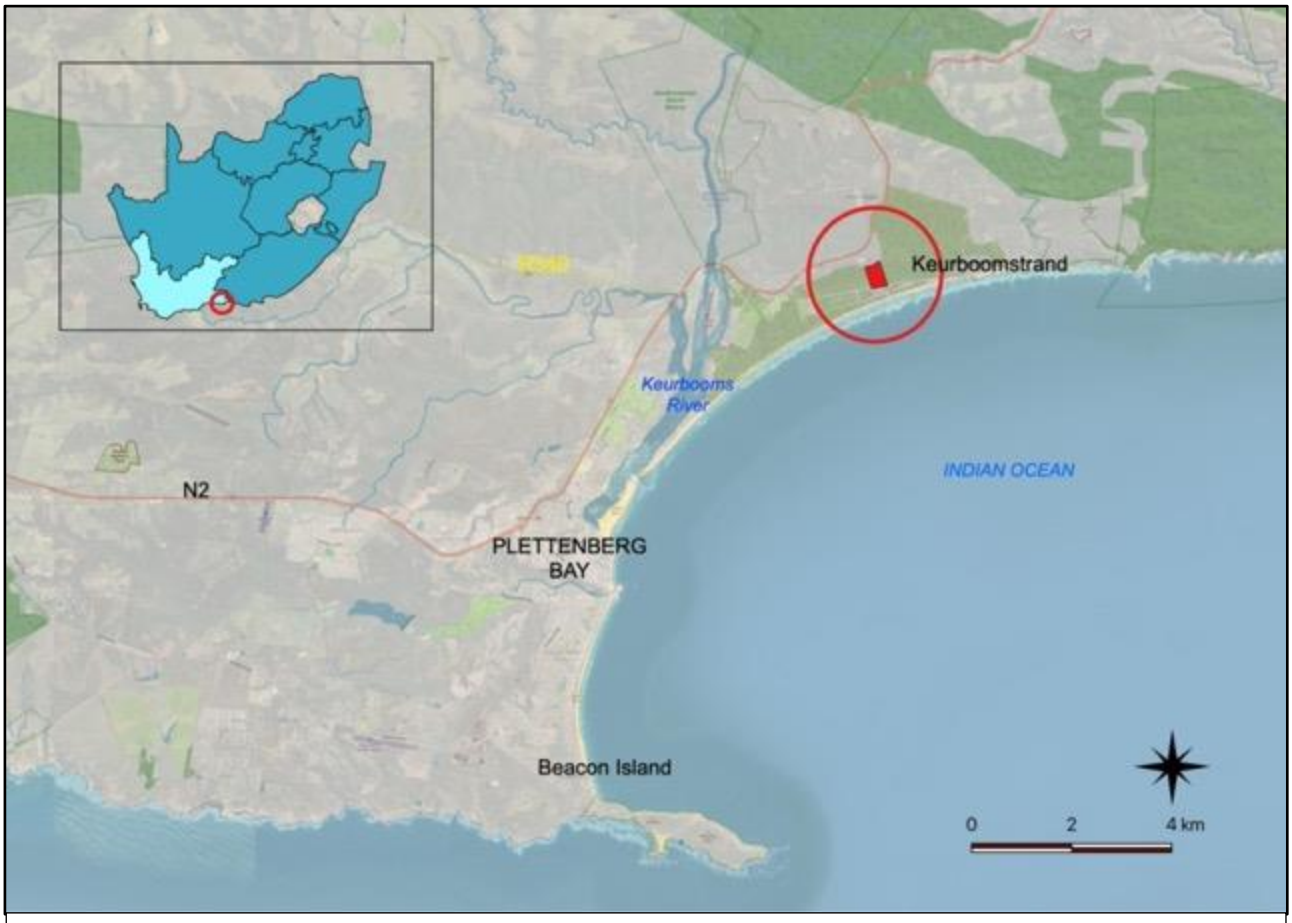


Figure 1: Location of the site (within red circle).

Figure 2: Aerial image of the site and surrounding areas.

Identified 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, dated 15/09/2022, indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Animal Species Theme		X		
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

Animal Species theme

Sensitivity features are indicates as follows:

Sensitivity	**Feature(s)**
High	Aves-Circus ranivorus
Medium	Amphibia-Afrixalus knysnae
Medium	Aves-Circus maurus
Medium	Aves-Stephanoaetus coronatus
Medium	Aves-Neotis denhami
Medium	Aves-Bradypterus sylvaticus

Medium	Mammalia-Chlorotalpa duthieae
Medium	Sensitive species 8
Medium	Invertebrate-Sarophorus punctatus
Medium	Invertebrate-Aneuryphymus montanus

Plant Species theme

Sensitivity features are indicates as follows:

Sensitivity	Feature(s)
Medium	Faurea macnaughtonii
Medium	Ocotea bullata
Medium	Lampranthus pauciflorus
Medium	Ruschia duthiae
Medium	Lebeckia gracilis
Medium	Amauropelta knysnaensis
Medium	Leucospermum glabrum
Medium	Selago burchellii
Medium	Selago rotundifolia
Medium	Sensitive species 419
Medium	Erica chloroloma
Medium	Erica glandulosa subsp. fourcadei
Medium	Hermannia lavandulifolia
Medium	Sensitive species 657
Medium	Sensitive species 1038
Medium	Sensitive species 1032
Medium	Acmadenia alternifolia
Medium	Muraltia knysnaensis
Medium	Erica glumiflora
Medium	Sensitive species 500
Medium	Sensitive species 763

Terrestrial Biodiversity theme

Sensitivity features are indicates as follows:

Sensitivity	Feature(s)
Very High	Critical biodiveristy area 1
Very High	Critical biodiveristy area 2
Very High	FEPA Subcatchments
Very High	National Forestry Inventory
Very High	Protected Areas Expansion Strategy: Sanparks
Very High	Strategic Water Source Areas
Very High	Vulnerable ecosystem

PROPOSED DEVELOPMENT

The proposed development is described below, including layout options.

Development alternatives

The proposal is the development of ±73 group housing stands with average erf sizes of ±375m². Open space and landscaped streets are incorporated into the design to enhance the quality of the neighbourhood. The property is 14.7ha in size and the gross density will calculate at 5 units per ha. The nett density is calculated excluding the undevelopable steep slopes to the north of the site. The identified development area measures approximately 6ha and 73 units will calculate to a net density of 12 units per ha.

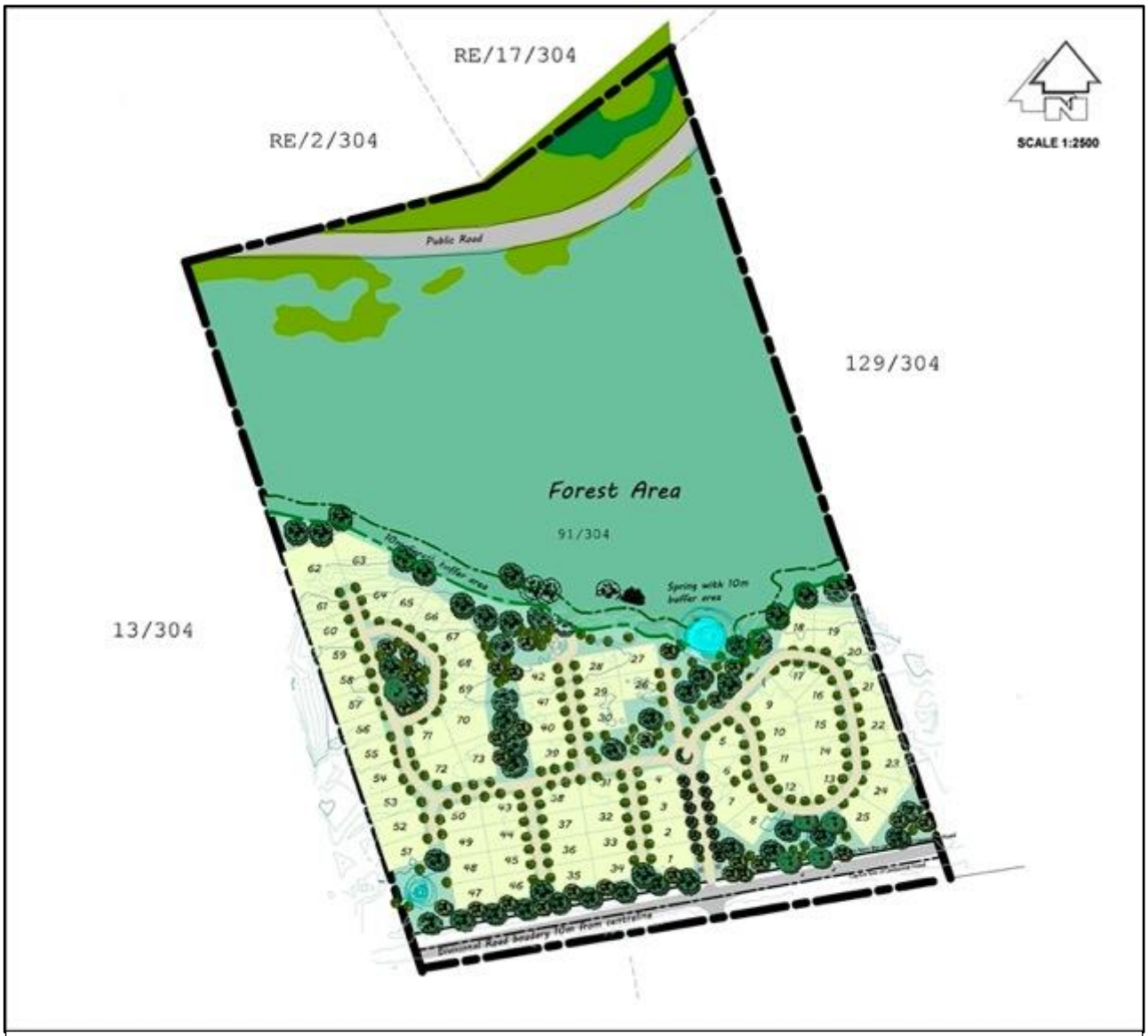


Figure 3: Proposed development.

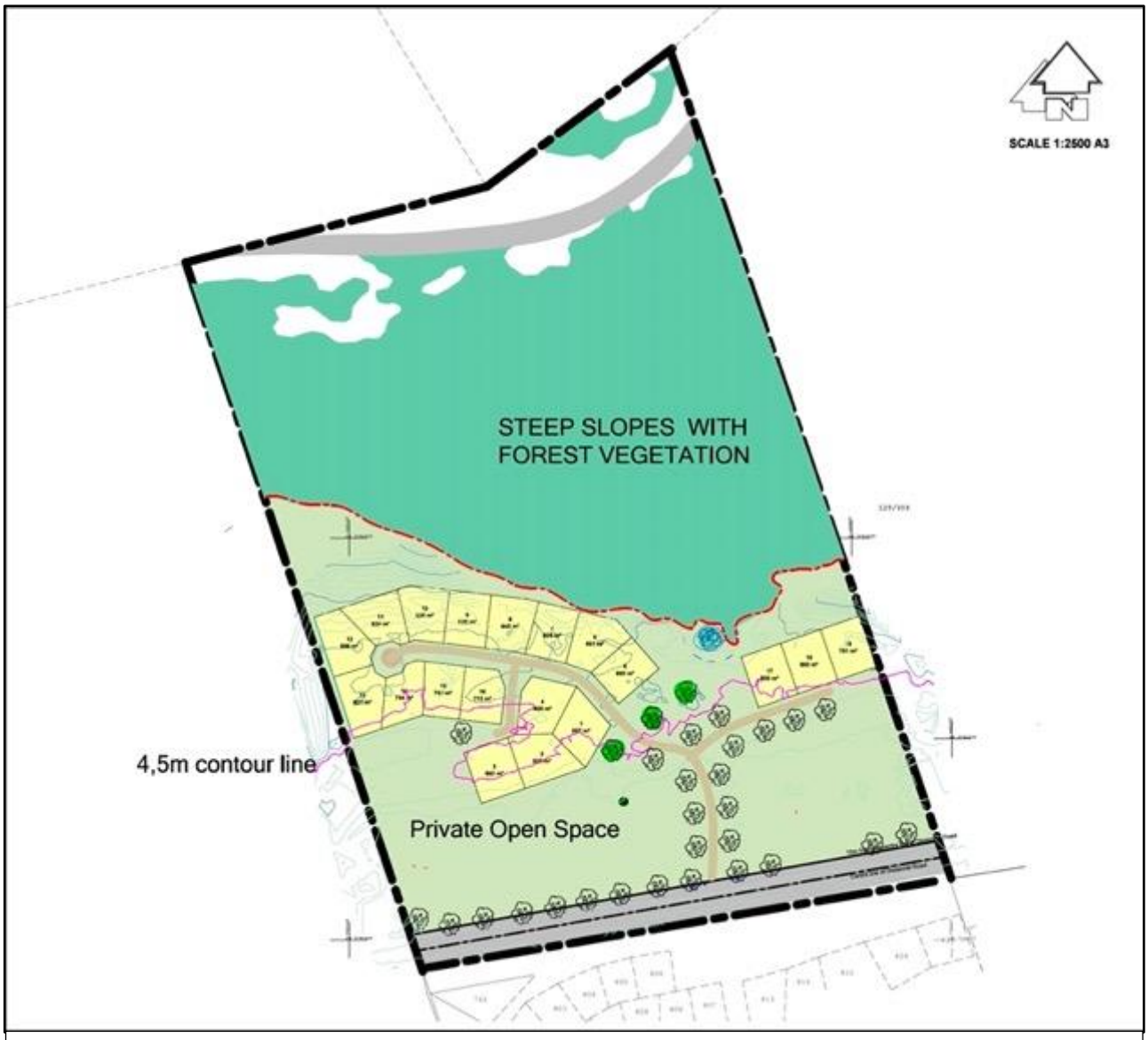


Figure 4: Proposed Alternative 1.

Two alternative layouts are assessed here, the proposed development (Figure 3) and Alternative 1 (Figure 4). For the proposed development concept, a total of 73 group housing erven are proposed with an average erf size of 375m^2 occupying a total area of 3.1 ha, approximately 1.2 ha of public roads, approximately 1.2 ha of private roads and services, and existing and rehabilitated forest area of approximately 8.6 ha.

For the Alternative 1 layout, a total of 19 single residential erven are proposed with an average erf size of 800m2 occupying a total area of 1.9 ha, approximately 1.2 ha of public roads, approximately 2.4 ha of private open space, and existing and rehabilitated forest area of approximately 8.6 ha

Project Area of Influence (PAOI)

Anticipated impacts will mostly occur during the construction phase. These impacts are not expected to extend beyond the boundaries of the development area. The PAOI is therefore treated here as the development footprint within which direct impacts will occur (Figure 3 and 4).

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 study on 9 September 2022. The site is within the Fynbos Biome with an all-year rainfall season with a slight dip in early winter (Figure 4). A more accurate indication of rainfall seasonality, which drives most ecological processes, is shown in Figure 5, which shows that Plettenberg Bay has peak rainfall from August to November, with another smaller peak in March to April. The timing of the survey in September is therefore optimal in terms of assessing the flora and vegetation of the site. The overall condition of the vegetation was possible to be determined with a high degree of confidence.

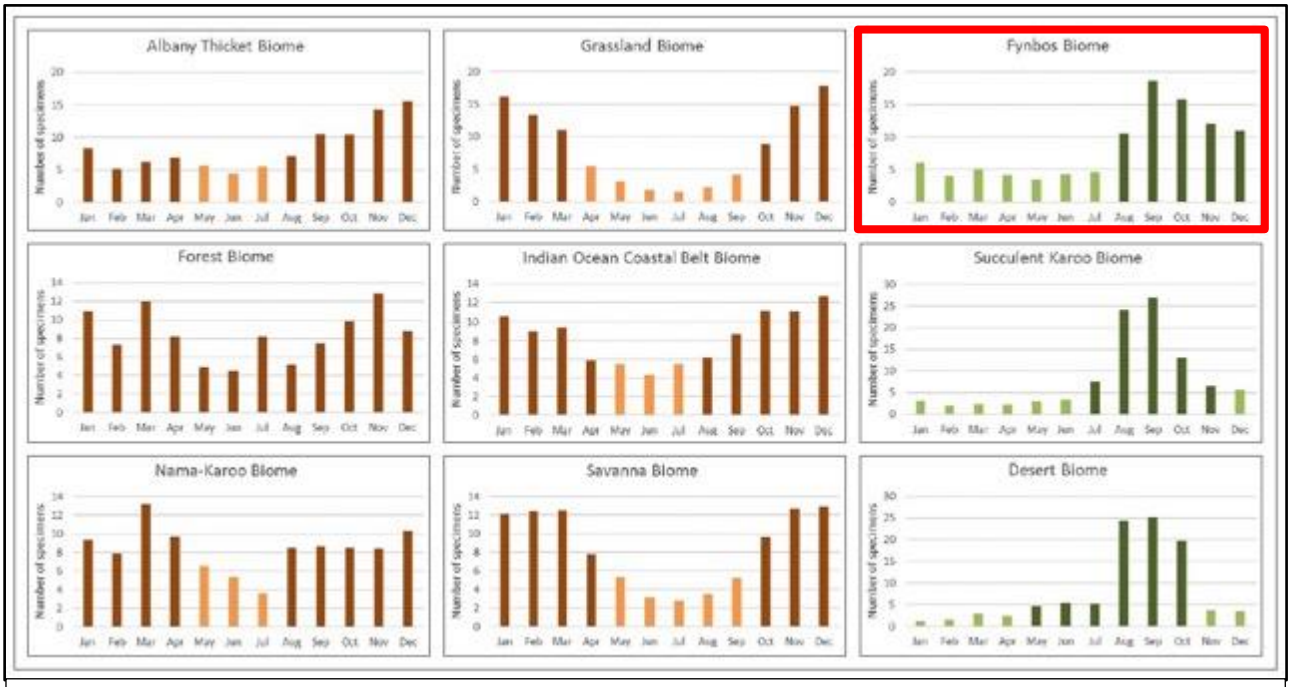


Figure 5: Recommended survey periods for different biomes (Species Environmental Assessment Guidelines). The site is within the Fynbos Biome.

Figure 6: Climate diagrams showing monthly rainfall for Mossel Bay (left), Knysna (centre) and Plettenberg Bay (right).

Field survey approach

During the field survey of habitats on site, the entire southern section of the site was assessed on foot. Field surveys included both meander searches of general areas, and active searching in habitats that were considered to be suitable for specific groups or species. Meander surveys were undertaken with no time restrictions - 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.

Figure 7: Airborne view of the site looking from east to west.

Sources of information

Regional Vegetation

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the 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, although these have not yet been gazetted.
- The plant species checklist of species that could potentially occur on site was compiled from a plant species checklist extracted from the NewPosa database of the South African National biodiversity Institute (SANBI) for the quarter degree grid in which the site is located.
- The IUCN Red List Category for plant species, as well as supplementary information on habitats and distribution, was obtained from the SANBI Threatened Species Programme (Red List of South African Plants, http://redlist.sanbi.org).

Regional plans

- Information from the National Protected Areas Expansion Strategy (NPAES) was consulted for possible inclusion of the site into a protected area in future (available on http://bgis.sanbi.org).).
- 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 Bitou [Vector] 2017. Available from the Biodiversity GIS website (biodiversityadvisor.sanbi.org)).

Vegetation and plant species

- Plant species that could potentially occur on in the general area was extracted from the NewPosa database of the South African National biodiversity Institute (SANBI) for the quarter degree grid/s in which the site is located.
- The IUCN Red List Category for plant species, as well as supplementary information on habitats and distribution, was obtained from the SANBI Threatened Species Programme (Red List of South African Plants, http://redlist.sanbi.org).
- Lists were compiled specifically for any species at risk of extinction (Red List species) previously recorded in the area. Historical occurrences of threatened plant species were obtained from the South African National Biodiversity Institute (http://posa.sanbi.org) for the quarter degree square/s within which the study area is situated. Habitat information for each species was obtained from various published sources. The probability of finding any of these species was then assessed by comparing the habitat requirements with those habitats that were found, during the field survey of the site, to occur there.
- Regulations published for the National Forests Act (Act 84 of 1998) (NFA) as amended, provide a list of protected tree species for South Africa. The species on this list were assessed in order to determine which protected tree species have a geographical distribution that coincides with the study area and habitat requirements that may be met by available

habitat in the study area. The distribution of species on this list were obtained from published sources (e.g. van Wyk & van Wyk 1997) and from the SANBI Biodiversity Information System website (http://sibis.sanbi.org/) for quarter degree grids in which species have been previously recorded. Species that have been recorded anywhere in proximity to the site (within 100 km), or where it is considered possible that they could occur there, were listed and were considered as being at risk of occurring there.

Fauna

- Lists of animal species that have a geographical range that includes the study area were obtained from literature sources (Bates et al., 2014 for reptiles, du Preez & Carruthers 2009 for frogs, Mills & Hes 1997 and Friedmann and Daly, 2004 for mammals). This was supplemented with information from the Animal Demography Unit website (adu.uct.ac.za) and literature searches for specific animals, where necessary.
- Appendix 1 is a summary of the expected animals (mammals, reptiles and amphibians) for the site.

Limitations

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

- The assessment is based on a single site visit. The current study is based on an extensive site visit as well as a desktop study of the available information. The time spent on site was adequate for understanding general patterns across affected areas.
- Compiling the list of species that could potentially occur on site is limited by the paucity of collection records for the area. The list of plant species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site. In order to compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling. Due to legislated time constraints for environmental authorisation processes, this is not possible.
- Rare and threatened plant and animal species are, by their nature, usually very difficult to locate and can be easily missed.

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					

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
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
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

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
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	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	**1**	**2**	**3**	**4**	**5**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

REGIONAL CONTEXT

Broad vegetation patterns

The entire site is within one regional vegetation type, namely Garden Route Shale Fynbos (Figure 7). There is another vegetation type nearby, Garden Route Granite Fynbos. In the event that natural habitat remains on site, there are likely to be floristic and vegetation structural influences from either of these vegetation types within the site, depending on local ecological conditions. The national vegetation map is, however, not mapped at a fine scale and it is probable that local topography could support other habitat types, such as thicket or low forest. The vegetation type that occurs on site and nearby areas, according to the national map, is briefly described below.

Garden Route Shale Fynbos

Distribution

This vegetation type is found in the Western and Eastern Cape Provinces: Patches along the coastal foothills of the Langeberg at Grootberg (northeast of Heidelberg), the Outeniqua Mountains from Cloete's Pass via the Groot Brak River Valley, Hoekwil, Karatara, Barrington and Knysna to Plettenberg Bay. Patches from the Bloukrans Pass along coastal platform shale bands south of the Tsitsikamma Mountains via Kleinbos and Fynboshoek to south of both Clarkson and the Kareedouw Mountains. Altitude 0–500 m.

Figure 8: Regional vegetation types of the site and surrounding areas.

Vegetation & Landscape Features
Undulating hills and moderately undulating plains on the coastal forelands. Structurally this is tall, dense proteoid and ericaceous fynbos in wetter areas, and graminoid fynbos (or shrubby grassland) in drier areas. Fynbos appears confined to flatter more extensive landscapes that are exposed to frequent fires—most of the shales are covered with afrotemperate forest. Fairly wide belts of Virgilia oroboides occur on the interface between fynbos and forest. Fire-safe habitats nearer the coast have small clumps of thicket, and valley floors have scrub forest (Vlok & Euston-Brown 2002).

Geology & Soils
Acidic, moist clay-loam, prismacutanic and pedocutanic soils derived from Caimans Group and Ecca (in the east) shales. Land types mainly Db and Fa.

Climate
Non-seasonal rainfall dominates the region, with MAP 310–1 120 mm (mean: 700 mm), relatively even throughout the year, but with a slight low in winter. Mean daily maximum and minimum temperatures 27.6°C and 6.5°C for January and July, respectively. Frost incidence 2 or 3 days per year.

Important Taxa

Growth form	Species
Tall shrubs	*Leucadendron eucalyptifolium* (d), *Protea aurea* subsp. *aurea* (d), *P. coronata* (d), *Leucospermum formosum*, *Metalasia densa*, *Passerina corymbosa*, *Protea neriifolia*, *Rhus lucida*[T]
Low shrubs	*Acmadenia alternifolia*, *A. tetragona*, *Anthospermum aethiopicum*, *Cliffortia ruscifolia*, *Elytropappus rhinocerotis*, *Erica hispidula*, *Helichrysum cymosum*, *Leucadendron salignum*, *Pelargonium cordifolium*, *Phylica axillaris*, *P. pinea*, *Psoralea monophylla*, *Selago corymbosa*.
Herbs	*Helichrysum felinum*
Geophytic herb	*Pteridium aquilinum* (d), *Eriospermum vermiforme*
Succulent herb	*Crassula orbicularis*
Herbaceous succulent climber	*Crassula roggeveldii*
Graminoid	*Ischyrolepis sieberi* (d), *Aristida junciformis* subsp. *galpinii*, *Brachiaria serrata*, *Cymbopogon marginatus*, *Elegia juncea*, *Eragrostis capensis*, *Ischyrolepis gaudichaudiana*, *Restio triticeus*, *Themeda triandra*, *Tristachya leucothrix*.

Note that this is a desktop description of what could possibly occur on site, based on mapped vegetation types. The on-site habitat assessment, described in a section below, determines whether any such vegettion occurs on site or not: although mapped as occurring within Garden Route Shale Fynbos, such vegetation does not necessarily occur on site.

Conservation status of broad vegetation types

The conservation status in according to scientific literature (Driver et al., 2005; Mucina et al., 2006) is shown in the table below.

The table also shows the threat status 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), which lists national vegetation types that are afforded protection on the basis of rates of transformation.

Table 2: Conservation status of different vegetation types occurring in the study area.

Vegetation Type	**Conservation status**		
	Driver *et al*. 2005 ; Mucina *et al*., 2006	**2018 NBA (Skowno et al. 2019)**	**Government Notice No 2747 of 18 November 2022**
Garden Route Shale Fynbos	Endangered	Vulnerable	Endangered

Note that this is a desktop description of what could possibly occur on site, based on mapped ecosystems. The on-site habitat assessment, described in a section below, determines whether any such vegettion occurs on site or not.

It is therefore <u>verified</u> that the site occurs within a mapped Listed Ecosystem, as listed in The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011). However, the characteristics of the on-site vegetation, as described in the on-site habitat assessment below, determine whether vegetation of a listed ecosystem occurs on site or not – if there is no natural habitat remaining on site then the sensitivity is <u>LOW</u> with respect to this attribute, or, if natural habitat occurs on site then those areas would have <u>VERY HIGH</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 Bitou shows that the entire northern 60% of the site (except the road) is within a CBA1 area (Figure 8). This CBA1 area continues beyond the boundaries of the site. This indicates that the woodland vegetation on site is considered to be highly important for the conservation of biodiversity in the Province as well as for maintaining ecological patterns in the landscape.

Note that the purpose of the specialist study, as undertaken here, is to verify whether the vegetation on site meets the standards for inclusion in a conservation zone or not. Provincial-level conservation assessments make use of remote methods for mapping and do not ground-truth all locations. It is therefore necessary to verify on the ground whether natural habitat occurs on site or not in order to determine whether the inclusion in a conservation zone is supported by patterns on the ground.

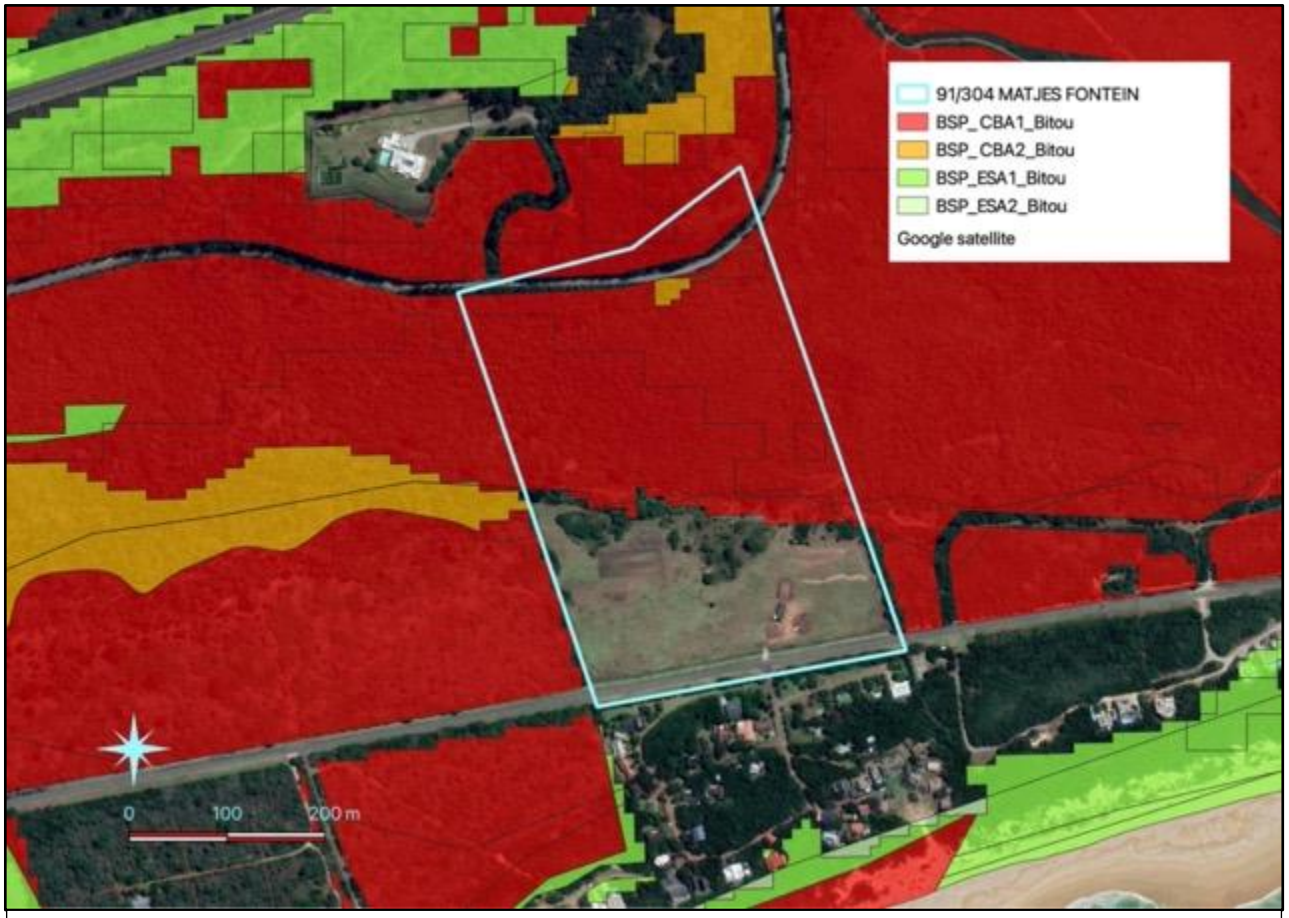


Figure 9: Western Cape Biodiversity Spatial Plan of the site and surrounding areas.

This desktop description verifies that significant parts of the site are included in conservation zones and that an on-site assessment is required to verify the sensitivity of the site with respect to this attribute.

Keurbooms and Environs Local Area Spatial Plan

The Keurbooms and Environs Local Area Spatial Plan (KELASP) is a Local Area Spatial Plan (LASP) for Keurbooms and its surrounding Environment, which will aid the Municipality in ensuring that the area is protected / conserved and managed / developed in a coherent and sustainable manner. It has been compiled in terms of Municipal Systems Act (Act 32 of 2000) which will afford it formal legal status as a Policy Guideline document to be implemented in conjunction with the broader Bitou Spatial Development Framework (SDF) as well as Integrated Development Plan (IDP).

The KELASP provides land development objectives that take into account existing development and biophysical constraints. Spatial development categories have been provided with general conditions to guide activities that may occur within each category, as set out and summarised in the table below (Table 3):

Table 3: KELASP Spatial Planning Categories.

KEY SPC DESCRIPTION	POLICIES
CORE1 Formally Protected Conservation Areas	• No conventional urban development • Formally protected areas, including those under SANParks and CapeNature control, should continue to enjoy the highest levels of protection. • Further continuous corridors between the mountains and the sea, such as that between Nature's Valley on the coast and Garden Route National Park in the Tsitsikamma Mountains, should be promoted. • The municipality should engage with the conservation authorities to ensure that economic growth and employment opportunities from these areas are maximised.
CORE 2 River Corridors and Wetlands	• River corridors and wetlands, including ephemeral pans, must be protected from urban, agricultural, and mining activities to a distance of at least 30 m from their banks unless closer setbacks have been determined by a geohydrologist and freshwater ecologist.
BUFFER 1 Endangered vegetation	• Conservation of endangered vegetation areas shall be encouraged through the promotion of conservancies and stewardship projects with limited eco-tourism development rights and/or donations to formal conservation agencies.
BUFFER 2 Extensive Agriculture / Livestock Grazing	• No development beyond 1 unit per 3 hectares. • Development should be clustered. • No further subdivisions below minimum farm size - Dept of Agriculture. • Rotational grazing nd other veld management best practices shall be promoted so as to improve biodiversity and stocking rates.
INTENSIVE AGRICULTURE Irrigation and Dry Land Crop and Pasture Farming	• No development beyond 1 unit per 3 hectares. • Development should be clustered (no further subdivisions below minimum farm size - Dept of Agriculture). • All existing and potential land suitable for intensive agriculture shall be protected from conversion to other uses including conservation. • Agriculture water demand management must be practices and intensive agriculture water supplies shall be protected and not diverted to other uses. • Investigate methods to bring the agricultural land currently lying fallow back into production if possible.
URBAN SETTLEMENT All land used for Urban purposes in Towns, Villages and Hamlets	• Increase gross average densities to 25du/ha in settlements requiring public transport. • Increase gross average densities to 15du/ha in small rural settlements that do not require public transport.

	• Urban development shall be promoted within urban settlements according to the settlement planning principles provided for in the broader Bitou SDF.
URBAN EDGE	• Outer boundary of urban settlement aligned to protect natural and agricultural resources and to promote more compact settlements. • Urban settlement should primarily be located and encouraged within the Urban Edge. • No urban development shall be permitted outside of the urban edge or identified Development Nodes. • The Urban Edge / Development Nodes should enclose sufficient land to accommodate the settlemen't growth for the next 10-20 years.

The "no-go" development areas in KELASP are determined based on various bio-physical constraints, including the following:

- below the 1:50 and 1:100 year floodlines;
- on any slope with gradient steeper than 1:4;
- below the 4,5 m coastal setback line;
- within the 100m high water mark setback; and
- within the Tshokwane Wetland system.

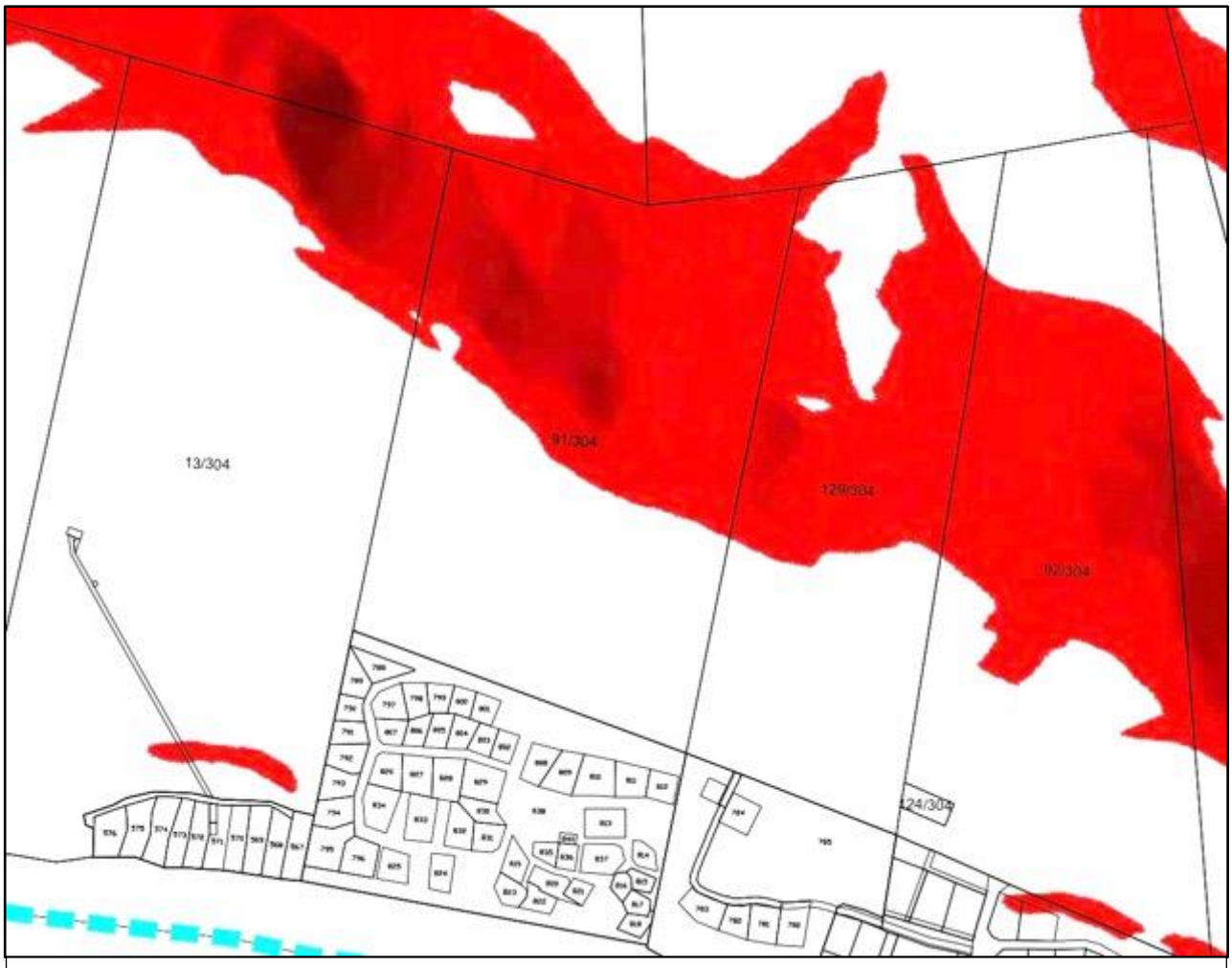


Figure 10: Slope Analysis from KELASP - slopes steeper than 1:4.

"No-go" areas also include any of the following Habitat Mapping and Sensitivity Analysis units:

Map Unit 3: Fynbos
Map Unit 4: Forest
Map Unit 5: Dune Thicket/Dune Fynbos Mosaic
Map Unit 6: Coastal fore dune and seashore
Map Unit 7: Wetlands (in general in addition to specific delineation of Tshokwane Wetland)
Map Unit 8: Fynbos invaded with aliens

The site includes significant areas that are steeper than a gradient of 1:4 indicated in KELASP (Figure 10). A comparison with the proposed development shows that these are excluded from the development footprint.

The site is outside the 1:50 and 1:100 year floodlines indicated in KELASP, and is also outside of the Tshokwane Wetland system, as well as outside the 100 m high water mark setback (Figure 11).

No-go maaping units from KELASP that occur on site are ***Map Unit 4: Forest*** and ***Map Unit 8: Fynbos invaded with aliens*** (Figure 12. A comparison with the proposed development shows that ***Map Unit 4: Forest*** is excluded from the development footprint, but that ***Map Unit 8: Fynbos invaded with aliens*** is partly included within the proposed development footprint, but not within the Alternative 1 footprint.

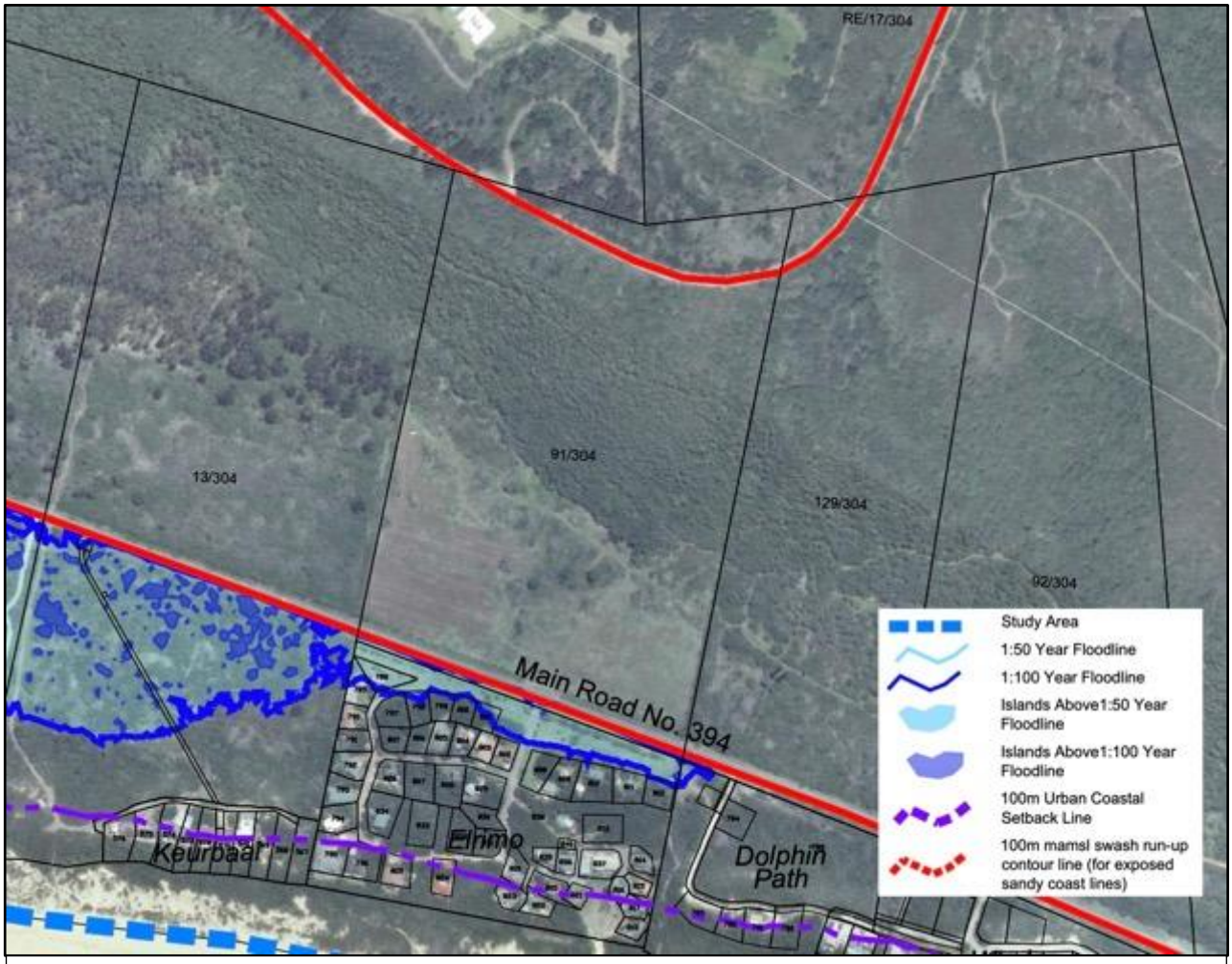


Figure 11: Floodlines and wetlands from KELASP.

Figure 12: Habitat Units from KELASP.

Historical disturbance

An aerial photograph from 1962 shows that the entire valley between the coastal dunes and the inland steep slope was cultivated at that time. This cultivation is visible on 1936 and 1942 aerial photographs.

In 1962, the road running across the north of the site was in existence and constituted the main road linking Plettenberg Bay towards the east,

An interesting feature on the 1962 aerial photograph is a road running through the site at the base of the slope (just south of halfway through the site), which was the only access road into Keurboomstrand. An aerial photograph from 1974 shows that this road was still present, but the current road running along the southern boundary of the site had been built by then. By 1989, the road through the middle of the site was overgrown, and by 2006 it is no longer visible. The only remaining evidence of this original road is the gate on the eastern boundary to the neighbouring property and remnants of the road between there and Keurboomstrand (visible in Figure 13).
The importance of the historical aerial photographs is that they show that the area on the flats on site was cleared of natural vegetation in the early 1900s (possibly earlier), and that it has never grown back, unlike on neighbouring properties, where secondary vegetation has developed.

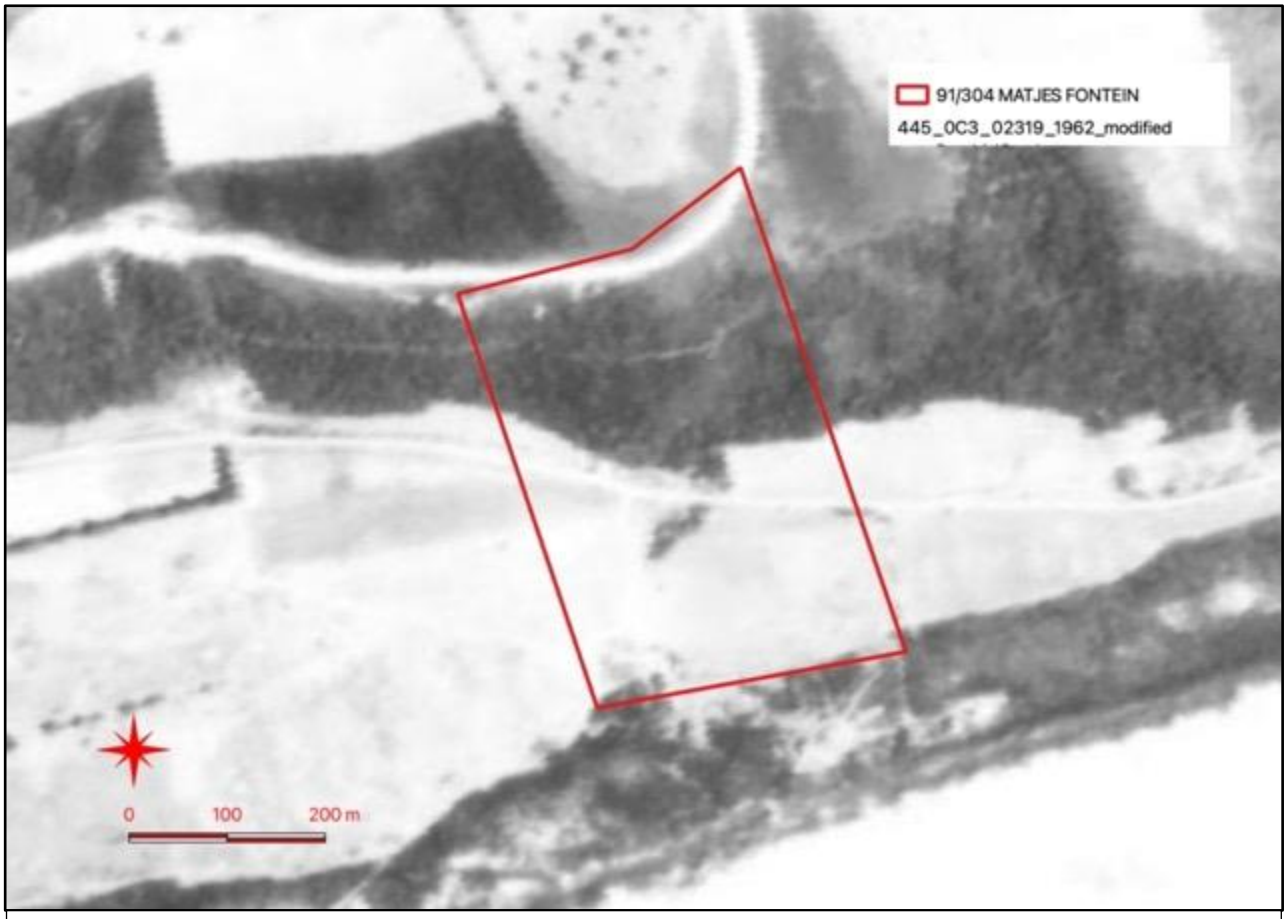


Figure 13: Aerial photograph from 1962.

OUTCOME OF THE ASSESSMENT

Habitats on site

Based on a detailed field survey to verify conditions on site, a detailed landcover and habitat mapping exercise was undertaken for the site. This identified three main habitats occurring on site, shown in Figure 14. These are mapped as **Forest, Secondary vegetation** and **Pastures**. There are also **transformed areas** associated with roads, localised patches of **alien trees**, and residual individual **milkwood trees** (Sideroxylon inerme). The habitat assessment is important for understanding the suitability of habitat on site for various plant and animal species of concern, which usually have very specific habitat requirements.

Forest

The steep-sided slopes in the northern half of the site contain indigenous forest that should probably be classified and mapped as Southern Afrotemperate Forest. It has a closed canopy, open understorey and relatively tall structure, therefore does not qualify to be mapped as thicket. No detailed vegetation survey was undertaken within this area because it had already been decided that these forested areas would be excluded from any development. Based on observations of peripheral species, it resembles mesic forest in other coastal parts of the Garden Route.

Figure 14: Map of habitats on site.

Secondary vegetation

Between the forest and the pastures is an irregularly-shaped band of vegetation that contains a mixture of shrubs and weeds that indicates that it is various stages of post-disturbance development. Historical aerial photographs show that this entire area was once cultivated, but has gone through various iterations of being cleared and then recovering somewhat.

Tall woody shrubs and small trees found here include the following: *Buddleja saligna*, *Capparis sepiaria*, *Clausena anisata*, *Dovyalis rhamnoides*, *Grewia occidentalis*, *Gymnosporia buxifolia*, *Pterocelastrus tricuspidatus*, *Putterlickia pyracantha*, *Scutia myrtina*, *Searsia crenata*, *Searsia lucida*, *Rhoicissus digitata*, and *Mystroxylon aethiopicum*, as well as *Lauridia tetragona* and *Trimeria grandifolia*, but these last two are probably forest margin species detected along the forest margin. Lower shrubs included *Acalypha* sp, *Euryops virgineus, Nidorella ivifolia, Helichrysum cymosum, Helichrysum petiolare, Helichrysum teretifolium, Osteospermum moniliferum, Otholobium stachyerum*, *Passerina corymbosa, Podalyria myrtillifolia*, and *Polygala myrtifolia*, many of which are typical colonisers of cleared plantation areas. Herbaceous species included a mixture of understorey species, such as *Anemia caffrorum, Asparagus asparagoides, Dietes cf bicolor, Isoglossa sp, Rubia petiolaris*, and *Stachys aethiopica*, and weedy species, such as *Cerastium glomeratum, Felicia amoena, Pelargonium elongatum, Rubus pinnatus* and *Vicia sativa*.

Alien invasive and exotic species detected in this area included *Acacia cyclops, Paraserianthes lophantha, Pinus* sp., and *Yucca aloifolia*.

Pastures

The pastures occur in the entire southern part of the site in areas that were historically cultivated. The landscape here is flat. They are currently being used as pasture for horses and are therefore grazed relatively short.

The pasture areas were dominated largely by the grasses, *Stenotaphrum secundatum* and *Cenchrus clandestinus*, along with a large number of weeds and species that are tolerant of disturbance, including *Abutilon sonneratianum, Arctotheca prostrata, Carpobrotus deliciosus, Cerastium glomeratum, Chenopodium sp., Euphorbia helioscopia, Felicia amoena, Medicago sp., Moraea sp Hebenstretia integrifolia, Lepidium africanum, Lycium ferocissimum, Lysimachia arvensis, Massonia depressa, Mesembryanthemum aitonis, Rumex hypogaeus, Salvia aurea, Senecio inaequidens, Solanum linnaeanum*, and *Brunsvigia orientalis*.

Milkwood trees

There are a small number of scattered milkwood trees (*Sideroxylon inerme*) that, based on their size, are possibly remnants of the original vegetation that occurred there. It was common practice to leave large trees as shade within agricultural areas. Alternatively, they became established after the cessation of active cultivation, but this would not have given them time to grow to their current stature. Three large and one small tree were counted on site, in the area between the secondary vegetation and the pastures. The milkwoods are protected trees and removal would require a permit.

Figure 16: View from south to north across the site, with pastures in the foreground, forest on the slopes and exotic trees on the skyline.

Figure 15: Equestrian infrastructure within pasture area.

Figure 18: Secondary vegetation with mixture of shrubs and herbaceous species.

Figure 17: Pasture area grazed short.

Figure 20: Large remnant milkwood tree.

Figure 19: Areas near forest margin.

Plant species recorded on site

A total of 69 plant species were recorded on site within the proposed development footprint and along the margins of the forest (see Appendix 1), of which three are declared weeds and/or alien invader plants, three are naturalized exotic species, and the remainder are indigenous species, some of which are weedy species commonly found in disturbed places or are species that commonly colonise areas of disturbance.

The alien invasive species are as follows:

- *Acacia cyclops** (NEMBA Category 1b)
- *Pinus* sp* (NEMBA Category 2)
- *Paraserianthes lophantha** (Invader category 1b)

Plant species flagged for the study area

According to the National Web-Based Environmental Screening Tool, a number of plant species of concern are flagged as of concern for the site (see previous section of this report). These are mostly fynbos species, or forest species. There are two species that could occur within forest habitats on site. These are *Ocotea bullata* (Endangered) that has a high probability of occurring on site, and *Faurea macnaughtonii* (Rare) that has a moderate possibility of occurring there. A full list of the flagged species is provided below in Table 3.

There are therefore two threatened, near threatened or rare species that could occur in the study area. It is therefore verified that the Plant Species Theme has <u>MEDIUM</u> sensitivity for this site (*suspected habitat for SCC based either on historical records prior to 2002 or being a natural area included in a habitat suitability model for this species*). Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Plant Species Specialist Assessment must be submitted in accordance with the requirements specified for "very high" and "high" sensitivity (GN 1150: PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL PLANT SPECIES).

Table 4: Plant species of concern flagged for the site.

Family	Taxon	Common name	IUCN status*	Distribution	Habitat	Probability of occurrence
RUTACEAE	Acmadenia alternifolia	None	VU	Plettenberg Bay to Knysna, possibly extending as far as Nature's Valley. A number of observations from inland areas, including the mountain foothills north of Keurbooms, and north of the N2 at Harkerville	Coastal headlands and steep slopes, exposed positions on dry cliffs near the coast from Knysna to Plettenberg Bay.	**LOW** Distribution records suggest it could occur in the area, but no siuitable habitat on site.
THELYPTERIDACEAE	Amauropelta knysnaensis	Knysna wood fern	VU	George District	Southern Afrotemperate Forest, damp places in coastal forest. Near streams and in seepage zones, sometimes away from streams.	**LOW** No streams on site.
ERICACEAE	Erica chloroloma	None	VU	Wilderness to Fish River Mouth. Most observations are between Cape St Francis and Gqeberha. Nearest population known from Goukamma Nature Reserve (recent) and Buffalo Bay (1921).	Coastal dune fynbos.	**LOW** No dune fynbos on site
ERICACEAE	Erica glandulosa subsp. fourcadei	None	VU	Mossel Bay to Cape St. Francis.	Coastal fynbos. Common in Goukamma Nature Reserve and on coastal	**LOW** No coastal fynbos on site

Family	Taxon	Common name	IUCN status*	Distribution	Habitat	Probability of occurrence
					cliffs SW of Plettenberg Bay	
ERICACEAE	Erica glumiflora	None	VU	Wilderness to East London, extending inland to Grahamstown. Recorded from Robberg peninsula near end.	Sandy coastal flats and dunes in low coastal hills. All observations are in sandy substrates.	**LOW** No suitable habitat on site.
PROTEACEAE	Faurea macnaughtonii		Rare	This species is widespread across eastern South Africa, from the Wolkberg in Limpopo Province southwards to the Amathole Mountains in the Eastern Cape. An isolated subpopulation occurs in the southern Cape forests around Knysna. It also occurs in eSwatini (Swaziland).	This species occurs deep inside mature forest, from near sea level up to 2000 m. Dispersal is limited, with seeds typically falling from the canopy to the forest floor, and therefore this species is prone to fragmentation.	**MEDIUM** Possibly suitable habitat on site. **NOT FOUND**
MALVACEAE	Hermannia lavandulifolia	None	VU	Western Cape, from Worcester to the Overberg, and extending along the southern Cape coastal lowlands to Plettenberg Bay. All observations on iNaturalist are west of Knysna. Only single observation near Plett is on coast near Robberg.	Clay slopes in renosterveld and valley thicket. Collected on western part of Robberg Peninsula in 1960 (Acocks Coll. No. 21141).	**LOW** Known locations are west of the site.
AIZOACEAE	Lampranthus pauciflorus	None	EN	Found in the Western Cape from Cape Infanta to Plettenberg Bay. Four known locations remain	On rocky coastal slopes and clay hills. Major habitats are Groot Brak	**LOW** Known locations are along the coastline. No

Family	Taxon	Common name	IUCN status*	Distribution	Habitat	Probability of occurrence
				after most of this species' habitat has been transformed for coastal development. Habitat loss continues, especially around Plettenberg Bay, Mossel Bay and Knysna.	Dune Strandveld, Blombos Strandveld, Overberg Dune Strandveld, Potberg Sandstone Fynbos, Garden Route Granite Fynbos, Albertinia Sand Fynbos, Knysna Sand Fynbos, Hartenbos Strandveld, Goukamma Dune Thicket.	suitable habitat on site.
FABACEAE	Lebeckia gracilis	None	EN	Port Elizabeth to Bredasdorp. Two main areas of occurrence are in the Lakes District between Knysna and George, and in the Albertinia area.	Coastal fynbos in deep sandy soils below 300 m.	**LOW** Most recent observations are west of Plett. Habitat on site is NOT deep sandy soils.
PROTEACEAE	Leucospermum glabrum	Outeniqua Pincushion	EN	Outeniqua and Tsitsikamma mountains. Observed multiple times around George in the mountains, as well as north of Plett. and around Keurbooms.	Wet south slopes in Sandstone Fynbos.	**LOW** The key habitat appears to be mesic mountain fynbos on the southern flanks of mountains. No remaining natural habitat on site. It is therefore considered unlikely that this species

Family	Taxon	Common name	IUCN status*	Distribution	Habitat	Probability of occurrence
						would occur on the lower part of the site.
POLYGALACEAE	Muraltia knysnaensis	Knysna butterflybush	EN	Coastal lowlands between Mossel Bay and Keeurbooms River.	Coastal fynbos on dry flats and hills.	**LOW** No suitable habitat on site.
LAURACEAE	Ocotea bullata	Stinkwood	EN	Widespread in South Africa from the Cape Peninsula to the Limpopo Province.	Grows in most high, cool, evergreen Afromontane forests.	**HIGH** Suitable habitat on site. Recorded numerous times in general area of Plettenberg Bay. **NOT FOUND ON SITE BUT PROBABLY OCCURS IN FOREST**
AIZOACEAE	Ruschia duthiae	None	VU	A highly range-restricted but locally common species, known from 10 locations from Sedgefield to Nature's Valley. Quite common in the sandy soils of the Lakes District between Wilderness and Knysna.	Gentle north-facing sandstone or shale slopes with grassy fynbos.	**LOW** Habitat on site does not match common habitat found in Lakes area.
SCROPHULARIACEAE	Selago burchellii	None	VU	George to Plettenberg Bay, including Robberg coastal corridor, Knysna western heads, Goukamma, inland parts of the lakes area, and in the Outeniqua Mountains.	Coastal slopes and flats. Unverified observation from Robberg. Distribution data shows that it also occurs in the Outeniqua Mountains, which would be mountain fynbos.	**LOW** No suitable habitat on site.

Family	Taxon	Common name	IUCN status*	Distribution	Habitat	Probability of occurrence
SCROPHULARIACEAE	*Selago rotundifolia*	None	VU	Knysna to Port Elizabeth.	Forest margins or grassy flats near the coast, 90-210 m.	**LOW,** no suitable habitat on site
	Sensitive species 419		VU	George to Humansdorp. Recorded numerous times in Plett area.	Damp sandstone slopes in coastal fynbos. Numerous observations in mountains.	**LOW** Distribution records suggest it could occur in the area, but no siuitable habitat on site.
	Sensitive species 500		EN	Cape Flats to Gqeberha. Previously recorded from near Robberg.	Lowland sandy flats, stabilised dunes and coastal rock promontories. Observations include coastal and mountain habitats.	**LOW** Distribution records suggest it could occur in the area, but no siuitable habitat on site.
	Sensitive species 763		VU	Riversdale to Port St Johns. Recorded previously from near Keurbooms, as well as Diepwalle.	Dry coastal renosterveld and grassy places in coastal forest.	**LOW** Distribution records suggest it could occur in the area, but no siuitable habitat on site.
	Sensitive species 657		EN	Great Brak River to Port Elizabeth.	Coastline. Coastal habitats.	**LOW**, confined to coastal littoral habitat
	Sensitive species 1038					**LOW** Distribution records suggest it could occur in the area, but no suitable habitat on site.
	Sensitive species 1032		VU	George to Port Alfred.	On stabilised (fixed) dunes close	**LOW**, confined to coastal habitat

Family	Taxon	Common name	IUCN status*	Distribution	Habitat	Probability of occurrence
					to the shoreline. 0-150 m.	

Animal species flagged for the study area

According to the National Web-Based Environmental Screening Tool, a small number of animal species have been flagged as of concern for the current project (see previous section of this report). These are all species that require specific habitat conditions to inhabit the site.

Circus ranivorus (African marsh harrier)

Endangered

This site was flagged as having **High sensitivity** potential for this species. Widespread but sparsely distributed throughout central, eastern and southern Africa, only absent from areas of lower rainfall (<300 mm p.a.). It is dependent on permanent wetlands for breeding, feeding and roosting. The main threat to this species is loss and degradation of wetlands.

There are no (suitable) wetlands on site although there are nearby in the Keurbooms River. The proposed development is located well away from these habitats. The species is unlikely to occur on site and the proposed project will have no effect on it.

Afrixalus knysnae (Knysna Leaf-folding Frog / Spiny Reed Frog)

Endangered

This site was flagged as having **Medium sensitivity** potential for this species. Endemic to the Western Cape Province, occurring from Groenvlei (3422BB) in the west to Covie (3323DC) in the east, and is confined to the coastal region by the Outeniqua and Tsitsikamma mountains (Pickersgill 1996, 2000). Found in the coastal mosaic of Mountain Fynbos and Afromontane Forest. As examples of habitats in which the species is found, FitzSimons (1946) recorded specimens in glades, clearings and roadside pools at Diepwalle (3323CA), while Pickersgill (2000) collected juveniles from "arum blooms on boggy ground near an irrigation dam at Barrington" (3322DD). The species has previously been recorded at Saasveld close to the Garden Route Dam (De Lange 2019, page 26 for locality information). The frogs breed in small dams and shallow semi-permanent water with much emergent vegetation and even in well vegetated ornamental garden ponds; it is suspected that this species requires high water quality for breeding. The species is threatened by habitat loss and degradation as a result of coastal development, forestry and agriculture, often due to draining, impoundment and eutrophication of wetlands near residential areas and agricultural lands, and encroachment of invasive alien vegetation.

There is a small pond on site, but it is exposed with no emergent vegetation and, due to being used as a waterhole by horses, the water quality is sub-standard for the frog. Therefore, there is no suitable habitat on site for breeding, although the species could occur there within the forested areas. Good management of this small possible habitat could lead to the site eventually becoming suitable for breeding for the species.

Circus maurus (Black harrier)

Endangered

This site was flagged as having **Medium sensitivity** potential for this species. This is a rare endemic raptor with its main distribution centred on the fynbos and karoo inland of that. Black Harriers breed in the montane fynbos, renosterveld and strandveld habitats of the Western Cape and many individuals disperse into the karoo and grassland habitats during the autumn and winter months. This species prefers coastal and mountain fynbos, highland grasslands, Karoo sub-desert scrub and open plains with low shrubs and croplands. Harriers breed close to coastal and upland marshes, damp sites, near vleis or streams with tall shrubs or reeds. South-facing slopes are preferred in mountain areas where temperatures are cooler and vegetation is taller.

There are estuarine wetlands nearby that could potentially be suitable, but it is unknown if they occur there or not - there are no recent observations in the Plettenberg Bay area. In the event that they did occur in the area, the proposed project would have little effect on them.

Stephanoaetus coronatus (Crowned Eagle)

Near Threatened

This site was flagged as having **Medium sensitivity** potential for this species. Occurs from Guinea to South Africa, with an isolated population in Ethiopia. It is found at low densities in eastern and southern South Africa. It generally prefers forest habitats, such as gallery forest, dense woodland, forest gorges in savanna or grassland and alien tree plantations (such as *Eucalyptus* and pine). Not threatened internationally but Near-threatened in South Africa, largely due to persecution by small stock farmers and destruction of forest habitats, although it has adapted to living in alien tree plantations.

There are forest habitats on site and extensive forests nearby, including suitable gorges and nesting sites. It has been recorded in the Plettenberg Bay area, as well as further west, therefore must be assumed to be present in the general area. The forests on site may not be of tall enough stature for nesting, but could possibly form part of foraging habitat. On condition forest areas are protected, there will be negligible impact on this species.

Neotis denhami (Denham's Bustard)

Vulnerable

This site was flagged as having **Medium sensitivity** potential for this species. Has a wide but fragmented Afrotropical range. It occurs widely but sparsely over much of the mesic eastern half of South Africa. In the Western Cape, it can be locally numerous in mosaics of cultivated pastures, agricultural croplands and natural vegetation with seasonal differences in the use of each habitat (Taylor et al. 2015).

It has been recorded several times in the general Garden Route area, including inland of Plettenberg Bay, but mostly in open landscapes with agricultural fields, not in urban areas or wooded areas. It is unlikely that it occurs on site.

Bradypterus sylvaticus (Knysna warbler)

Vulnerable

This site was flagged as having **Medium sensitivity** potential for this species. Has a restricted and fragmented distribution in four areas of Eastern and Western Cape. One sub-population occurs in the Garden Route between Tsitsikamma and Stilbaai. It occurs along the edges of Afrotemperate forests and in thick, tangled vegetation along the banks of watercourses or drainage lines in forest patches in the Fynbos Biome (Taylor et al. 2015). Population decline is attributed to clearance of habitat for developments, agriculture and silviculture, leading to a decrease in the amount of available habitat, as well as the quality (Taylor et al. 2015).

Potentially suitable habitat occurs on site within the forested areas. It has been previously recorded in coastal thicket in Plettenberg Bay within the urban fringe. The species could occur on site within forest margin areas. These areas may possibly be impacted by the proposed project. However, the presence of houses does not seem to limit the species. On condition the habitat is preserved, the proposed project would have little effect on them.

Chlorotalpa duthieae (Duthie's Golden Mole)

Vulnerable

This site was flagged as having **Medium sensitivity** potential for this species. Found in a narrow coastal band from Wilderness to Storms River mouth, as well as near Port Elizabeth. There is a disjunction in the distribution of this species showing that it does not occur in the Plettenberg Bay area, probably due to the absence of proper forests in this area. Locally common in coastal and scarp southern Cape Afrotemperate forest habitats, and adjacent pasturelands, cultivated lands and gardens. Restricted to alluvial sands and sandy loams in deeper forest habitats. They construct shallow subsurface foraging tunnels that radiate outwards from under the roots of trees.

There is forest habitat on site, but there is a lack of sandy or loamy soils in which the species is likely to occur. Most of the soils on site within the forest area is relatively stony. There are also no records of this species in the Plettenberg Bay area. It is therefore unlikely that this species occurs on site. Nevertheless, if it did occur there, it would be within the forest, which is outside the proposed development and will not be affected.

Sensitive species 8 (small antelope)

Vulnerable

This site was flagged as having **Medium sensitivity** potential for this species. Found in a variety of forested and wooded habitats, including primary and secondary forests, gallery forests, dry forest patches, coastal scrub farmland and regenerating forest (Venter et al. 2016). Within South Africa, they occur mainly within scarp and coastal forests, thickets or dense coastal bush (Skinner & Chimimba 2005), although they can occupy modified habitats. They frequent forest glades and open areas but need dense underbrush to rest or take cover. They are selective foragers which mainly feed on fruit, dicots and a small percentage of monocots (Venter et al. 2016).

There are several records of the species in areas around Plettenberg Bay, all within thicket or forest areas. Forest occurs on site and the species could occur there. In the event that the species occurs on site, the proposed project would probably have no effect on them, in terms of habitat loss, loss of forage, and loss of migration corridors.

Sarophorus punctatus (Tunnelling dung beetle)

Endangered

This site was flagged as having **Medium sensitivity** potential for this species. This is a dung beetle that is one of five species in the Genus Sarophorus. There is little known about its biology, but available information indicates a feeding preference for old dung and carrion remains which imply detritus as preferred food rather than dung (Frolov & Scholtz 2003). The type for the species was collected in Keeurboomstrand in 1976 in natural thicket vegetation (Frolov & Scholtz 2003). More recent observations have been made in Wilderness Heights near George in June 2021 (Mish 2021), inland of Mossel Bay (Koen 2022) and near Herbetsdale (Koen 2022). It is not shown to occur anywhere else in the country (Frolov & Scholtz 2003).

The site has forested areas that are the type locality for the species. All woodland on site is therefore suitable habitat for this species and, based on known information, there is a high probability of this species occurring there. However, the proposed development does not affect this habitat. In the event that the species occurs on site, the proposed project would be unlikely to have an effect on them.

Aneuryphymus montanus (Yellow-winged Agile Grasshopper)

Vulnerable B2ab(iii,v)

This site was flagged as having **Medium sensitivity** potential for this species. Only known from six localities in the Cape region (Brown 1960). The species is associated almost strictly with fynbos vegetation, although extending geographically towards East London, where it has been collected "amongst partly burnt stands of evergreen Sclerophyll in rocky foothills" (Brown 1960). It prefers south-facing cool slopes (Kinvig 2005). It is a medium-sized, robust, active geophilous insect which readily flies off when disturbed and is easily distinguished in flight by the pale lemon base of the hind wing (Brown 1960).

Published descriptions suggest that it is not often seen but, when observed, occurs in obvious numbers. No grasshoppers were seen on site that matched the description of this species. If it occurred in the area it would be found within fynbos, which does not occur on site. It is therefore unlikely that it would occur on site.

Summary

On the basis that it has been recorded from Plettenberg Bay and the site has suitable habitat, the Knysna Warbler (Vulnerable) has a moderate to high probability of occurring in forest margin areas

on site. The forests on site may constitute part of the general foraging range of Crowned Eagle (Near Threatened), but it is unlikely that they occur on site, or are dependent on it. The type locality of the Tunnelling Dung Beetle (Endangered) is forest habitats in the Keurboomstrand area. It therefore has to be assumed that there is a high probability of it occurring there. There is a moderate to high probability of the small antelope (Vulnerable) occurring in the forests on site.

It is therefore verified that the Animal Species Theme has <u>MEDIUM</u> sensitivity for the site (*suspected habitat for SCC based either on historical records (prior to 2002) or being a natural area included in a habitat suitability model for this species*). Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Animal Species Specialist Assessment must be submitted in accordance with the requirements specified for "very high" and "high" sensitivity (GN 1150: PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL ANIMAL SPECIES).

SITE ECOLOGICAL IMPORTANCE

The Species Environmental Assessment Guidelines require that a Site Ecological Importance is calculated for each habitat on site, and provides methodology for making this calculation.

As per the Species Environmental Assessment Guidelines, Site Ecological Importance (SEI) is calculated as a function of the Biodiversity Importance (BI) of the receptor and its resilience to impacts (SEI = BI + RR). The Biodiversity Importance (BI) in turn is a function of Conservation Importance (CI) and Functional Integrity (FI), i.e. BI = CI + FI.

Sensitivity scores provided in the Species Environmental Assessment Guidelines allow evaluation relative to ecosystem status and/or presence of sensitive species.

Table 5: Site ecological importance for habitats found on site.

Habitat	Conservation importance	Functional integrity	Receptor resilience	Site Ecological Importance (BI)
Forest	High ECOSYSTEM CRITERION: 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. The forest on site is part of a larger contiguous area of approximately 71 ha that falls within a listed VU ecosystem. SPECIES CRITERION: 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. Forest is suitable habitat of EN species listed under	High Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types - forest on site is evaluated in terms of entire connected extent, both on-site and in surrounding areas, because it acts as a continuous unit = 71 ha.	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. Based on the fact that the habitat is structurally dominated by long-lived tree species.	Very High (BI = High)

	criterion A (*Ocotea bullata*).			
Invaded secondary vegetation	High Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type - site is within listed Endangered ecosystem type.	Medium Several minor and major current negative ecological impacts but moderate rehabilitation potential.	Medium Will recover slowly (more than 10 years) to restore >75% to restore the original species composition and functionality	Medium (BI = Medium)
Pastures / lawns	Very low No natural habitat remaining.	Very low Several major current negative ecological impacts.	Very High Habitat that can recover rapidly	Very low (BI = Very low)
Transformed (roads)	Very low No natural habitat remaining.	Very low Several major current negative ecological impacts.	Very High Habitat that can recover rapidly	Very low (BI = Very low)

The calculation of Site Ecological Importance includes an explicit recognition of the ability of each ecosystem to tolerate and recover from disturbance. Guidelines for development activities within different importance levels are given in the Table below. This shows that impacts within Forests should be avoided, and impacts within Secondary vegetation should be minimized, followed by restoration activities.

Table 6: Guidelines for interpreting SEI in the context of the proposed development activities.

Site ecological importance	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.

Habitat sensitivity

According to the "PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL BIODIVERSITY", there are only two sensitivity classes for the Terrestrial Biodiversity Theme, namely VERY HIGH or LOW. The VERY HIGH category includes any area of natural vegetation that falls within one of the following categories:

1. terrestrial critical biodiversity areas (CBAs).
2. terrestrial ecological support areas (ESAs).
3. protected areas as defined by the National Environmental Management: Protected Areas Act, 2004.
4. priority areas for protected area expansion.
5. strategic water source areas (SWSAs).
6. freshwater ecosystem priority areas (FEPA) subcatchments.
7. indigenous forests.

Any area that is in a natural state and that falls within one of these categoriers is therefore automatically assigned a sensitivity class of VERY HIGH and requires a Terrestrial Biodiversity Specialist Assessment.

It is important to note that the definition of natural vegetation, according to the National Environmental Management Act, 1998 (Act No. 107 of 1998) is "*vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years*." According to this description, the vegetation on site (including secondary vegetation) is legally in a natural state.

The current site includes areas within CBA1 that are also indigenous forest. It is confirmed from the site visit that these areas are in a natural state. They therefore have VERY HIGH sensitivity according to the Terrestrial Biodiversity Theme.

There is habitat on site that is suspected habitat for threatened plant and animal species. This is the forest habitat, which is outside the proposed development footprint and will not be affected by the proposed development. The species that could potentially occur within this habitat are as follows:

- Knysna Warbler (Vulnerable) has a moderate probability of occurring in forest margin areas.
- Crowned Eagle (Near Threatened) - the forests on site may constitute part of the general foraging range but it is unlikely that they are resident on site, or are dependent on it.
- Tunnelling Dung Beetle (Endangered). The type locality of the species is forest habitats in the Keurboomstrand area.
- Small antelope (Vulnerable). There is a moderate to high probability of it occurring in the forests on site.
- *Ocotea bullata* (Stinkwood, Endangered) probably occurs in the forests on site.

None of these species are expected to be negatively affected by the proposed development (both options).

A map of combined habitat sensitivity on site for the Plant Species Theme and Animal Species Theme is provided in Figure 17, mapped according to the calculations provided through the process of calculating Site Ecological Importance.

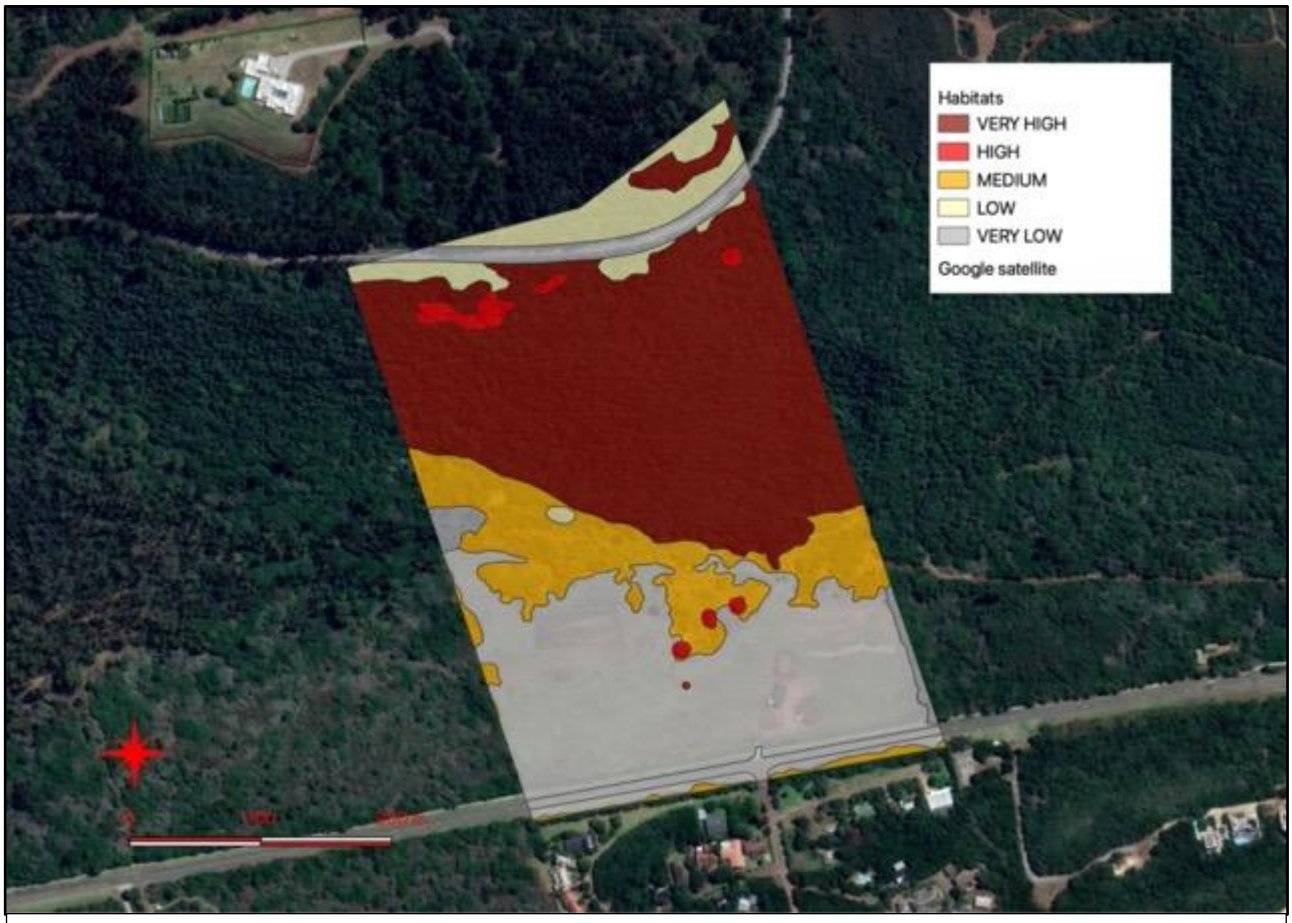


Figure 21: Habitat sensitivity on site.

IMPACT ASSESSMENT

The proposal is to develop housing on site. The footprint of the proposed development is within areas mapped as "lawns/pasture" (Very Low sensitivity), "Secondary Vegetation" (Medium sensitivity) and "Alien Trees" (Very Low or Low sensitivity).

No plant species of concern were found on site, but a small number of free-standing, relatively large milkwood trees (*Sideroxylon inerme*) were found on site that are protected under the National Forests Act. These are shown as being retained within the proposed development (both options).

There are two sensitive animal species that are likely to use that particular habitat / part of the site. They can use it for foraging on rare occasion (e.g. the Bustard and raptor species). The other listed (e.g. the insects) have a low probability of presence while the small antelope may use the transition zones near dense trees and shrubs on rare occasions.

The impacts assessed here are therefore as follows:

1. LOSS OF SECONDARY VEGETATION WITHIN AN ENDANGERED ECOSYSTEM.
2. LOSS OF INDIVIDUALS OF A PROTECTED TREE SPECIES
3. LOSS OF HABITAT FOR LISTED THREATENED ANIMAL SPECIES

Loss of natural vegetation

Resource irreplaceability

The vegetation type (Garden Route Shale Fynbos) is listed as Endangered. All upland areas of the site on the steep slopes are covered with forest that matches the description for Southern Afrotemperate Forest, which is not threatened, but is separately listed as protected under the National Forests Act. The forest areas on site fall within a CBA1. These forested areas are completely excluded from the proposed development (both options) and are not directly affected.

The only remaining non-forest vegetation on site is considered to be secondary. However, on the basis that no legal soil disturbance has occurred during the preceding 10 years, it is legally considered to be natural vegetation that is within an Endangered ecosystem. It is, however, not representative of this vegetation unit and, being secondary, is not considered to be irreplaceable. Score = 1.

Threshold

The potential impact affects a negligible proportion of the vegetation type (Garden Route Shale Fynbos) and no part of the CBA1. Score = 1.

Resource condition

The vegetation on site (within the proposed development footprint) is in relatively poor condition, and consists either of lawns or secondary vegetation with a species composition that is not representative of the natural habitat. Score = 2.

Reversibility of impact

Loss of habitat on site (within the proposed development footprint) is probably fully REVERSIBLE - secondary vegetation can easily be restored to its current state through active rehabilitation in combination with natural succession. Score = 2.

Extent of impact
The impact will occur within the site boundary. It is possible that there may be spillover effects into surrounding areas, due mostly to secondary impacts, such as boundary disturbance, alien invasive species spread, etc. Score = 1.

Duration of impact
Loss of the habitat on site is assessed as being permanent. Score = 5

Intensity of impact
At a local scale, the impact is of MEDIUM intensity, since it would result in ecological processes on site continuing but in a modified way. Score = 3.

Probability of occurrence
Based on the proposed development plan and the known location of the habitats found on site, the impact will be DEFINITE. Score = 5.

Confidence
There is a high understanding in the identity and on-site value of the vegetation, as well as the nature and extent of the proposed activity. No measures are therefore required to improve the confidence in the assessed impact.

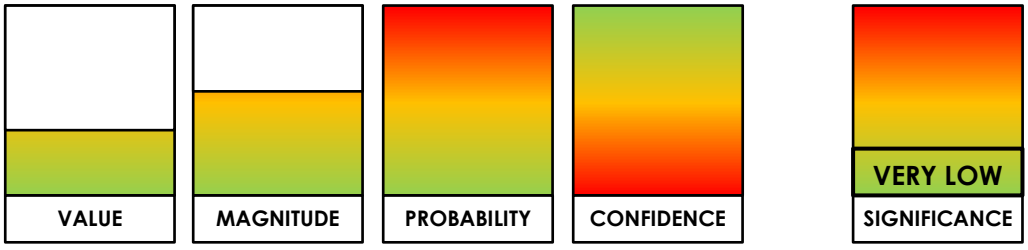
Significance of impact
The significance is a combination of the value of the biodiversity resource, the magnitude of the expected impact and the probability of the impact occurring.

Biodiversity value score: (1 + 1 + 2 + 2)/4 = 1.50
Impact magnitude: (1 + 5 + 3)/3 = 3.00
Impact probability: 5.00

The calculation of the significance of an impact uses the following formula:

Significance = (Biodiversity value) x (Magnitude) x (Probability).

On this basis, the impact is calculated as (1.50 x 3.00 x 5.00 = 22.5)/25 = 0.9 = **VERY LOW** significance



Possible mitigation measures
Possible mitigation measures that can be applied are as follows:

1. Access to forested areas during construction must not be permitted by any construction personnel. These areas must be fenced off and no access allowed.
2. Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control.
3. Undertake regular monitoring to detect alien invasions early so that they can be controlled, as per the Alien Management Plan.

Loss of individuals of protected tree species

Resource irreplaceability
The tree species affected is *Sideroxylon inerme*, protected under the National Forests Act. A total of 4 individuals were seen on site, all of them relatively large individuals. The species is widespread but is a key and dominant component of coastal forests in the Garden Route. Score = 2.

Threshold
The potential impact affects a very small proportion of the overall known population the species. Score = 1.

Resource condition
The trees on site are large and in good condition but probable remnants of original coastal forest. Score = 4.

Reversibility of impact
Loss of individuals on site is possibly PARTLY REVERSIBLE in terms of replacement of individuals due to natural population processes or deliberate planting (milkwoods plant easily and grow well in this type of environment). Score = 2.

Extent of impact
The impact will occur within the site boundary (within the development footprint). Score = 1.

Duration of impact
Loss of the habitat on site is assessed as being long-term on the basis that trees removed can be replaced through planting - the timeframe is to allow planted individuals to achieve a reasonable size, which could take 10 years or more. Score = 5

Intensity of impact
At a local scale, the impact is of VERY HIGH intensity, since it would result in the permanent loss of the populations on site. Score = 4.

Probability of occurrence
Based on the proposed development plan and the known location of the individuals found on site (intention is to retain trees within the proposed development), the impact has LOW PROBABILITY. Score = 2.

Confidence
There is a high understanding in the identity and distribution of the species on site, as well as the nature and extent of the proposed activity. A high proportion of suitable habitats were checked on site and it is not expected that the on-site population varies much from what was observed. Additional searches will improve the overall count but not the on-site distribution. However, it is unknown whether any individuals of *Erica platycalyx* or *Euchaetis albertiniana* occur in surrounding areas or not. Additional measures are therefore required to improve the confidence in the assessed impact.

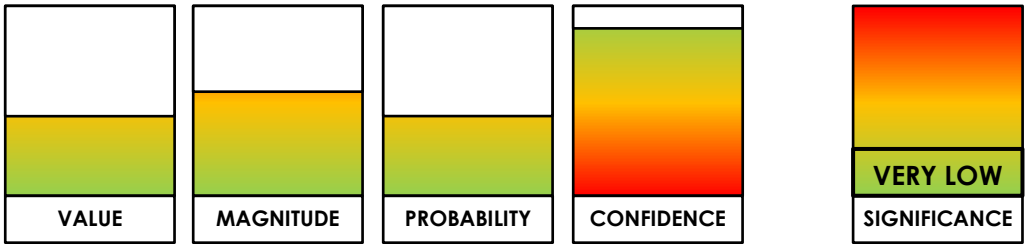
Significance of impact
The significance is a combination of the value of the biodiversity resource, the magnitude of the expected impact and the probability of the impact occurring.

Biodiversity value score: (2 + 1 + 4 + 2)/4 = 2.25
Impact magnitude: (1 + 5 + 4)/3 = 3.33
Impact probability: 2.00

The calculation of the significance of an impact uses the following formula:

Significance = (Biodiversity value) x (Magnitude) x (Probability).

On this basis, the impact is calculated as (2.25 x 3.33 x 2.00 = 15)/25 = 0.60 = **VERY LOW** significance



Possible mitigation measures
Possible mitigation measures that can be applied are as follows:

1. Retain existing large trees within proposed development.
2. If any trees need to be removed or pruned then a permit is required, according to the National Forests Act.
3. Plant additional milkwoods in the development as part of the final landscaping. These can be planted along with other appropriate coastal forest species, but the proportions and composition should reflect habitat that would have occurred naturally at this site.

Loss of habitat for listed threatened animal species

Resource irreplaceability
There is habitat on site that is suspected habitat for threatened plant and animal species. This is the forest habitat, which is outside the proposed development footprint and will not be affected by the proposed development. The species that could potentially occur within this habitat are as follows:

- Knysna Warbler (Vulnerable) has a moderate probability of occurring in forest margin areas.
- Crowned Eagle (Near Threatened) - the forests on site may constitute part of the general foraging range but it is unlikely that they are resident on site, or are dependent on it.
- Tunnelling Dung Beetle (Endangered). The type locality of the species is forest habitats in the Keurboomstrand area.
- Small antelope (Vulnerable). There is a moderate to high probability of it occurring in the forests on site.

Score = 4.

Threshold
The potential impact affects a negligible proportion of the overall habitat available for these species and will not directly affect any individuals. Score = 1.

Resource condition
The vegetation on site is in relatively good condition. Score = 4.

Reversibility of impact
Loss of forest habitat on site (not planned or expected) is IRREVERSIBLE. Score = 5.

Extent of impact
The impact will occur within the site boundary. It is possible that there may be spillover effects into surrounding areas, due mostly to secondary impacts, such as dust deposition, alien invasive species spread, etc. Score = 2.

Duration of impact
Loss of the habitat on site is assessed as being permanent. Score = 5

Intensity of impact
At a local scale, the impact is of VERY LOW magnitude, since it is not expected to affect any of the sensitive habitat resource for potentially affected species. Score = 1.

Probability of occurrence
Based on the proposed development plan and the known location of the habitats found on site, the impact will be IMPROBABLE, although any actual impacts on animal species of concern is LOW PROBABILITY. Score = 2.

Confidence
There is a high understanding in the identity and on-site value of the vegetation, as well as the nature and extent of the proposed activity. No measures are therefore required to improve the confidence in the assessed impact.

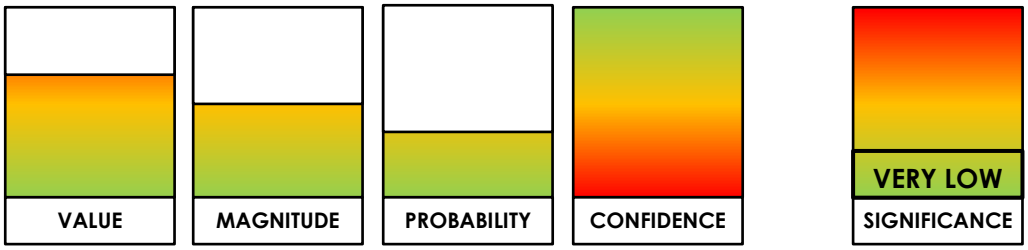
Significance of impact
The significance is a combination of the value of the biodiversity resource, the magnitude of the expected impact and the probability of the impact occurring.

Biodiversity value score: (4 + 1 + 4 + 5)/4 = 3.50
Impact magnitude: (2 + 5 + 1)/3 = 2.67
Impact probability: 2.00

The calculation of the significance of an impact uses the following formula:

Significance = (Biodiversity value) x (Magnitude) x (Probability).

On this basis, the impact is calculated as (3.50 x 2.67 x 2.00 = 18.7)/25 = 0.7 = **VERY LOW** significance



Possible mitigation measures
Possible mitigation measures that can be applied are as follows:

1. Protect natural forest vegetation adjacent to the proposed development site.
2. Rehabilitate and improve the small dam on site, including introducing pond margin vegetation typical of mountain ponds in forested areas. This will provide good habitat for various frogs, including potentially *Afrixalus knysnae*.

CONCLUSION

Desktop information, field data collection and mapping from aerial imagery provides the following verifications of patterns for various themes:

1. The site consists of a combination of pasture / lawns (on the flat lowlands), secondary scrub vegetation, forest woodland (on the steep south-facing slopes), patches of alien trees, and some scattered milkwood trees within the pasture area. The forests are in a natural state whereas other habitats are secondary.

2. The proposed development will be restricted to the lowland areas that were previously cultivated. The forest areas are therefore outside the proposed development footprint.

3. The forest exists in the areas designated as Critical Biodiversity Area 1. The site occurs within Garden Route Shale Fynbos, which is listed as Endangered. The forest habitat on site is not typical of the listed ecosystem within which it occurs but it is nevertheless a listed ecosystem.

4. Following the procedures within the Species Environmental Assessment Guidelines, the forests on site have been assessed as having Very High sensitivity / Ecological Importance, secondary vegetation as having Medium sensitivity / Ecological Importance, and remaining areas Low or Very Low sensitivity.

5. On the basis of the presence of natural habitat within a CBA1 area and within a listed ecosystem, it is verified that the site occurs partially within an area of VERY HIGH sensitivity with respect to the Terrestrial Biodivesity Theme. These areas are not affected by the proposed development.

6. No plant species of concern were found on the lowland part of the site and, based on the available habitat (except for the forest, which will not be affected by the proposed development), it is considered unlikely that any of those plant species flagged for the site would occur there. However, it is likely that an Endangered tree species occurs within the forest, and possible that a Rare tree occurs within the forest. It is therefore verified that the site has MEDIUM sensitivity with respect to the Plant Species Theme, but only within areas not affected by the proposed development.

7. The lowland part of the site is not considered to be good habitat for any of the animal species flagged for the site. However, the forest is likely habitat for three animal species, the Knysna Warbler (Vulnerable), a small antelope (Vulnerable), and the Tunnelling Dung Beetle (Endangered). It is therefore verified that the Animal Species Theme has MEDIUM sensitivity for the site, but only within areas not affected by the proposed development.

8. An impact assessment determined that the impact of the proposed development (both options) has Very Low significance on vegetation, protected trees, and animal species of concern. However, Alternative 1 is preferred on the basis that it incorporates more open space, which is better for ecosystem processes and connectivity, although not significantly so.

9. The proposed development project (73 units) affects a small area mapped in the Keurbooms and Environs Local Area Spatial Plan (KELASP) as "***Map Unit 8: Fynbos invaded with aliens***", which is a restricted zone according to this LASP. The on-site vegetation was found to be secondary with alien plants, but this is legally natural vegetation within an Endangered

ecosystem (according to the legal definition of natural vegetation in NEMA). This small patch of habitat is not considered to have biodeiversity significance, but constitutes the only restriction, according to the information considered here. On this basis, the Alternative 1 proposal is preferred.

10. The proposed development is entirely within areas mapped as secondary or pasture that has low biodiversity value and sensitivity. The development is therefore supported on condition that forest habitats on the property are fully protected. Either option is acceptable, although Alternative 1 is marginally preferred.

RECOMMENDATIONS

- Forest habitats on the upland, steeply-sloping part of the site, have high biodiversity and conservation value, and are designated as sensitive. These areas must not be affected by the proposed development. A buffer zone should be retained along the base of the slope to protect the forest margin. For example, steps should be taken to rehabilitate these areas and encourage growth of species, such as *Pterocelastrus tricuspidatus* and *Sideroxylon inerme*, that are mesic and fire-resistant. An open space management system should be developed to formalize such steps for forest protection.

- Rehabilitation of disturbed areas, as well as previously invaded areas, should promote establishment of site-appropriate indigenous species.

- An ongoing alien invasive management programme should take place on site. This will protect riparian habitats downslope from degradation and could potentially be the biggest contribution to maintaining and protecting biodiversity on site and in surrounding areas.

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APPENDICES:

Appendix 1: Plant species recorded on site.

Abutilon sonneratianum
Acacia cyclops* (Invader category 1b)
Anemia caffrorum
Arctotheca prostrata
Asparagus asparagoides
Brunsvigia orientalis
Buddleja saligna
Capparis sepiaria
Carex uhligii
Carpobrotus deliciosus
Cenchrus clandestinus*
Cerastium glomeratum
Clausena anisata
Crassula multicava
Cynanchum obtusifolium
Dovyalis rhamnoides
Euphorbia helioscopia
Euryops virgineus
Felicia amoena
Acalypha
Chenopodium
Cotula
Dietes bicolor
Isoglossa
Medicago
Melolobium
Moraea
Pinus sp. (Invader category 2)
Grewia occidentalis
Gymnosporia buxifolia
Hebenstretia integrifolia
Helichrysum cymosum
Helichrysum petiolare
Helichrysum teretifolium
Lauridia tetragona
Lepidium africanum
Lycium ferocissimum
Lysimachia arvensis
Massonia depressa
Mesembryanthemum aitonis
Mystroxylon aethiopicum
Nidorella ivifolia
Osteospermum moniliferum
Otholobium stachyerum
Paraserianthes lophantha* (Invader category 1b)
Passerina corymbosa
Pelargonium elongatum
Podalyria myrtillifolia
Polygala myrtifolia
Pterocelastrus tricuspidatus

Putterlickia pyracantha
Rhoicissus digitata
Rubia petiolaris
Rubus pinnatus
Rumex hypogaeus
Salvia aurea
Scutia myrtina
Searsia crenata
Searsia lucida
Senecio inaequidens
Sideroxylon inerme (PROTECTED TREE)
Solanum linnaeanum*
Stachys aethiopica
Stenotaphrum secundatum
Trimeria grandifolia
Vicia sativa*
Yucca aloifolia*