TERRESTRIAL BIODIVERSITY ASSESSMENT

PROPOSED AGRICULTURAL EXPANSION ON ERF 385, HOEKWIL, GEORGE MUNICIPALITY, WESTERN CAPE PROVINCE

CAPENSIS

GREG NICOLSON

MAY 2024

REPORT PREPARED FOR
ECO ROUTE ENVIRONMENTAL CONSULTANTS

NATIONAL LEGISLATION AND REGULATIONS GOVERNING THIS REPORT

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

APPOINTMENT OF SPECIALIST

Capensis Ecological Consulting (Pty) Ltd was appointed by Eco Route Environmental Consultants to provide specialist botanical and terrestrial biodiversity consulting services for a proposed development at Erf 385, Hoekwil, Western Cape.

CONDITIONS RELATING TO THIS REPORT

The content of this report is based on the authors' best scientific and professional knowledge as well as available information. Capensis Ecological Consulting (Pty) Ltd reserves the right to modify the report in any way deemed fit should new, relevant or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation.

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DETAILS OF THE SPECIALISTS

Gregory Nicolson MSc (Botany) Pr. Sci. Nat.
Capensis Ecological Consulting
156 Main Road
Muizenberg
7945
Mobile: 072 211 9843
e-mail: greg@capenis.co.za

Expertise

- Qualifications: BSc. Hons. (Environmental Science), MSc (Botany)
- Botanist with 10 years' experience in the field of Botanical Surveys
- Has experience in Botanical exploration in South Africa and Namibia
- Has conducted over 250 botanical assessments for the EIA process.

THE SPECIALIST

I, Gregory Alexander Nicolson, as the appointed specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
- other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
- in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the applicant all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation by interested and affected parties was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application;
- have ensured/will ensure the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;
- have kept/will keep a register of all interested and affected parties that participate/d in the public participation process; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.

Signature of the specialist:

Name of company: Capensis Ecological Consulting (Pty) Ltd
Date: 08 May 2024

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1. INTRODUCTION

Capensis Ecological Consulting has been appointed by Eco Route Environmental Consultants to provide specialist botanical and terrestrial biodiversity consulting services for proposed agricultural development on ERF 385 near Hoekwil. The developments, if approved, would result in the loss of indigenous vegetation and therefore requires a Terrestrial Biodiversity and Plant Species Assessment. A separate Animal Species Assessment and Freshwater Ecological Assessment are also being submitted for the proposed development. This report focuses on the Terrestrial Biodiversity features such as habitat, vegetation and ecological processes and excludes the faunal and freshwater features.

2. TERMS OF REFERENCE

2.1. GENERAL

Terrestrial Biodiversity assessments must follow guidelines set out in the following documents:

- Department of Environmental Affairs and Development Planning (DEA&DP) Guidelines for Involving Biodiversity Specialists in the EIA Process (Brownlie, 2005);
- Ecosystem Guidelines for Environmental Assessment in the Western Cape (Cadman et al., 2016);
- The requirements of CapeNature for providing comments on agricultural, environmental, mine planning and water-use related applications (Turner, 2013); and
- Protocol for the assessment and reporting of environmental impacts on terrestrial biodiversity (Government Gazette 2020).

2.2. SPECIFIC

- Identify and describe biodiversity patterns at community and ecosystem level (main vegetation type, plant communities in the vicinity and threatened/vulnerable ecosystems), at species level (threatened Red List species, presence of alien species) and in terms of significant landscape features;
- Identify ecological drivers and ecological processes, including any likely presence of important faunal species;
- Assess the local and regional importance of the vegetation communities and plant species within the affected areas based on the relevant biodiversity plans, bioregional planning documents and Environmental Management Frameworks.
- Determine the implications that the proposed project has for the relevant fine-scale biodiversity plan (in this case the, 2017 Western Cape Biodiversity Spatial Plan).

- Describe the sensitivity of the site and its environs and map these resources.
- Identify any areas not suitable for construction activities (No-Go Areas) and related buffers that should be observed.
- Describe the direct, indirect and cumulative impacts (both before and after mitigation) and provide an assessment of the significance of the impacts.
- Describe the measures to mitigate any impacts, and an indication of whether or not the measures (if implemented) would change the significance of the impact.
- On the basis of the impact assessment findings provide an authorisation opinion regarding whether or not the proposed activity should proceed.

3. PROTOCOL FOR DETERMINING LEVEL OF REPORTING

The terrestrial biodiversity sensitivity theme was predetermined using the Department of Forestry, Fisheries and the Environment's (DFFE) National Web Based Screening Tool (https://screening.environment.gov.za/screeningtool/). The Screening Tool assigns a Very High terrestrial biodiversity sensitivity rating to the site (Figure 1). The Very High sensitivity rating, if verified, requires a **Terrestrial Biodiversity Impact Assessment** to be submitted as part of the application for Environmental Authorization (EA). High, Medium and Medium-Low sensitivity areas have been confirmed and identified at the site and an impact assessment is thus provided. This Terrestrial Biodiversity Impact Assessment meets the requirements set out in the Protocol for the assessment and reporting of environmental impacts on terrestrial biodiversity (GN 320 of 20 March 2020).

The relative plant species theme sensitivity for the site is rated as 'Medium' by the Screening Tool Report. "An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "medium sensitivity" for terrestrial plant species, must submit either a **Plant Species Specialist Assessment Report** or a **Plant Species Compliance Statement**, depending on the outcome of a site inspection undertaken in accordance with paragraph 4" (GN 1150 of 30 October 2020, as amended). Plants listed as Species of Conservation Concern (SCC) have been identified within the study area and therefore a Plant Species Specialist Assessment Report is included in Appendix 3 of this report.

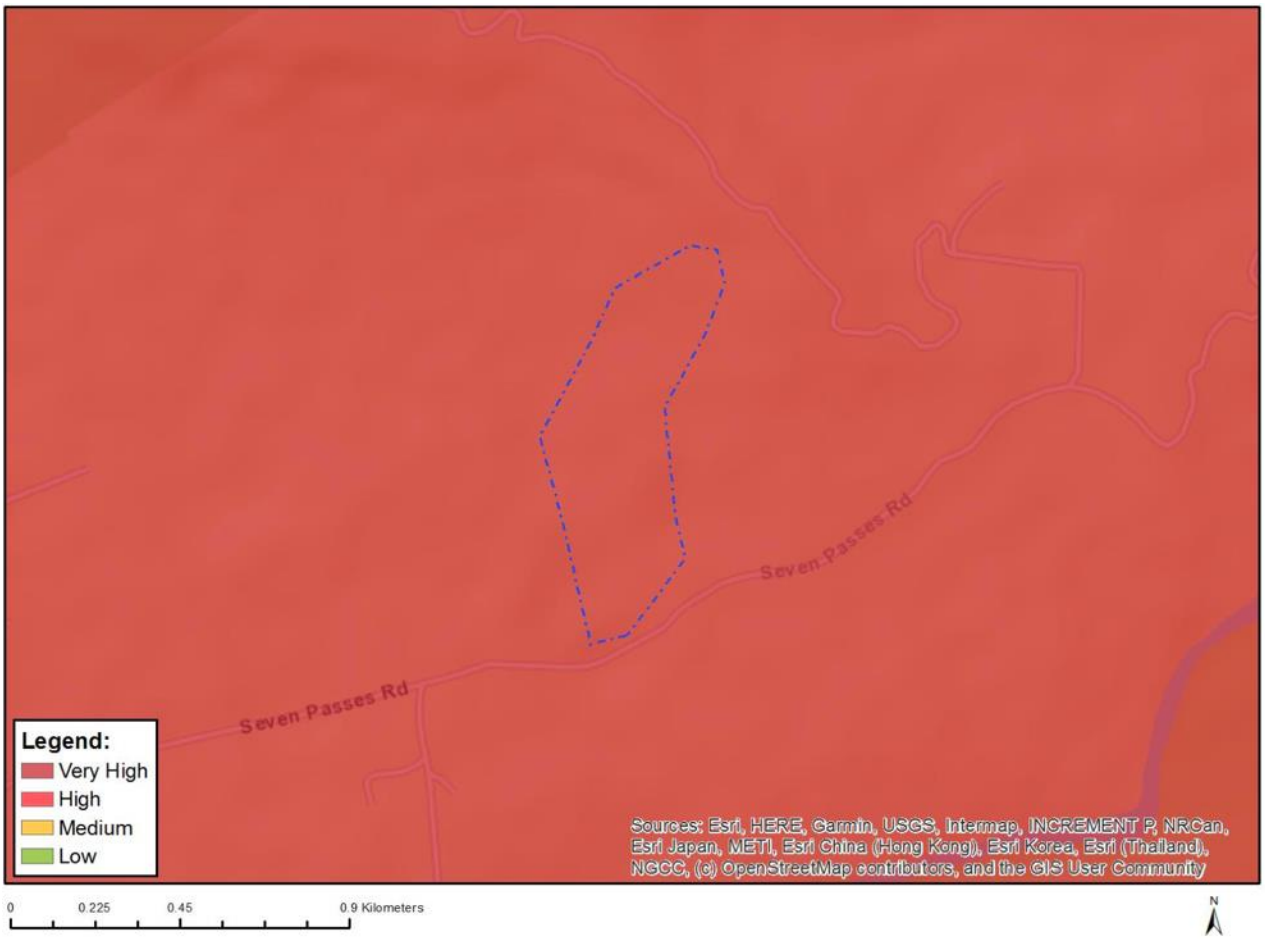

Figure 1. Map of relative terrestrial biodiversity theme sensitivity generated from the DFFE Screening Tool (https://screening.environment.gov.za). The study area is marked by the blue dashed line.

4. METHODOLOGY, LIMITATIONS AND ASSUMPTIONS

The study area was visited on the 11th of April 2024 and surveyed on foot. Sample waypoint positions were obtained using a Garmin GPS map 62. Photographs were taken and georeferenced using an Olympus TG-5 Camera with built-in GPS.

The following sources have been used to inform this study:

- *Site boundaries:* The property boundaries have been downloaded from the Cape Farm Mapper Website (https://gis.elsenburg.com/apps/cfm/).
- *Vegetation Types*: Based on *The Vegetation of South Africa, Lesotho and Swaziland* (VEGMAP)(Mucina & Rutherford, 2006). The South African National Biodiversity Institute (SANBI) has updated the mapping for the VEGMAP (2018) and these latest shapefiles have been used. The Fine Scale Vegetation Map for the Garden Route (Vlok, Euston-Brown, & Wolf, 2008) has also been referenced.

- *Ecosystem threat status:* Informed by (1) The Revised National List of Ecosystems that are Threatened and in Need of Protection (Government Gazette, 2022)
- *Biodiversity planning*: The Western Cape Biodiversity Spatial Plan (WCBSP) for the George Municipality (CapeNature, 2017) is essential to determine the conservation importance of the affected habitats. Ground-truthing is an essential component in terms of determining the habitat condition.
- *Important Plant species*: The presence or absence of threatened (i.e. species of conservation concern) and ecologically important species informs the ecological condition and sensitivity of the site. The latest conservation status of species is checked on the Red List of South African Plants (Raimondo *et al.* 2009) via the website (www.redlist.sanbi.org). A list of sensitive species generated by the National Web-based Screening Tool (screening.enviornment.gov.za) was used. Certain species cannot be disclosed to the public as per the requirements of the screening tool. Observations from iNaturalist (inaturalist.org) at and in the vicinity of the study area were also noted.

The site visit was carried out during autumn. The timing of the survey is sub-optimal as many geophytic and annual plant species flower during spring. Some bulbs species were visible, either as their leaves were present or their old flowering parts were still visible. It should be noted however that due to the year-round precipitation experienced in the Garden Route region this limitation is not considered to have had a highly significant effect on sampling efforts.

5. STUDY AREA

5.1. LOCALITY

The study area is located near Wilderness Heights and Hoekwil within the George Municipality. (Figure 2). The Seven Passes Road runs along the southern edge of the subject property and study area, with the N2 National Highway further to the south. A perennial river occurs on the west side of the site whereas a non-perennial river occurs on the east side of the site (Figure 3). The area is characterized a mix of agricultural developments, indigenous vegetation and undeveloped areas invaded by exotic tree species (Figure 4).

Figure 2. The location of the study area within the context of the George Municipality and closest towns, overlaid on an Google Maps ™ Map.

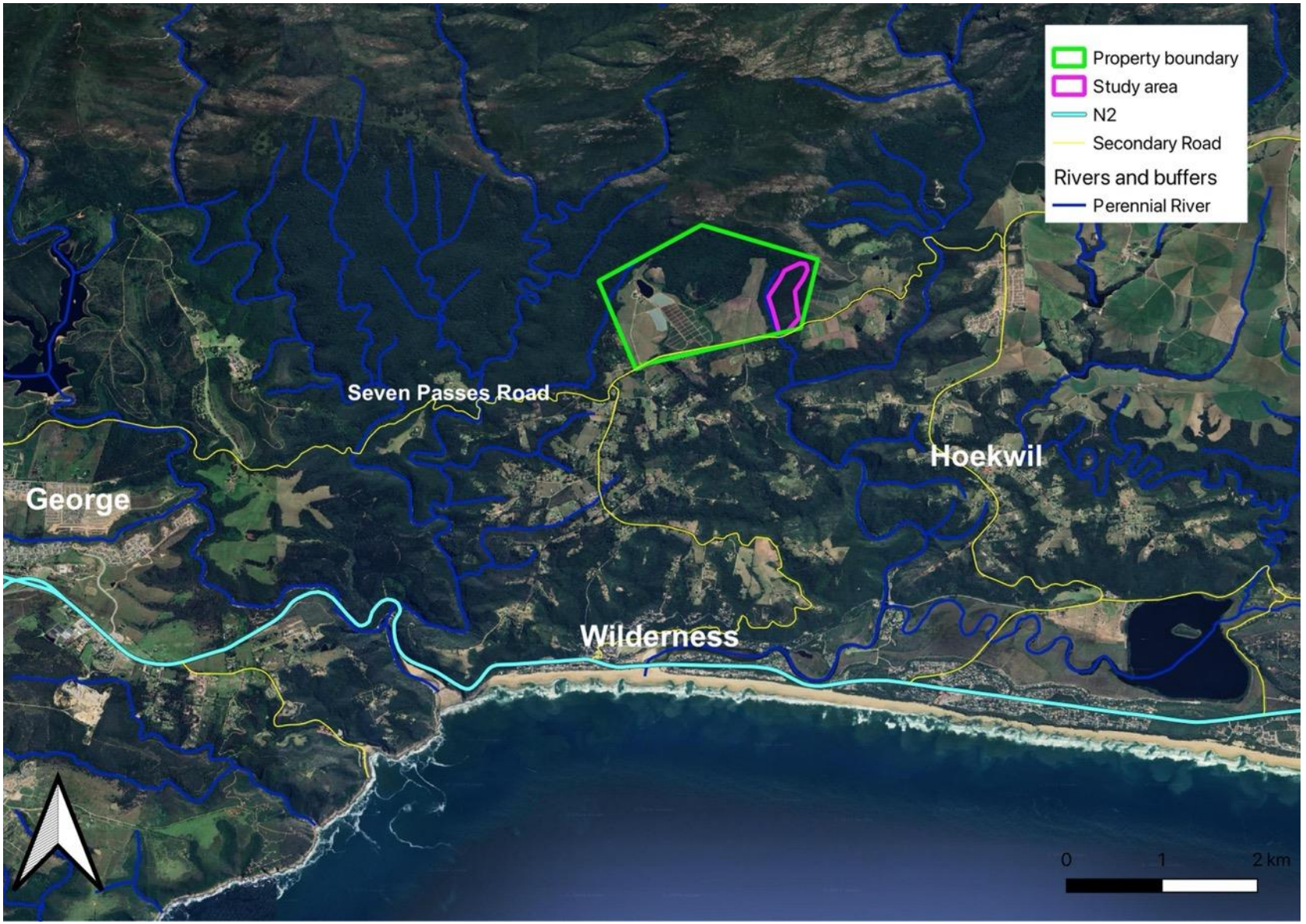

Figure 3. The location of the subject property and study area in relation to the closest roads, perennial rivers and towns, overlaid on a Google Maps™ aerial image.

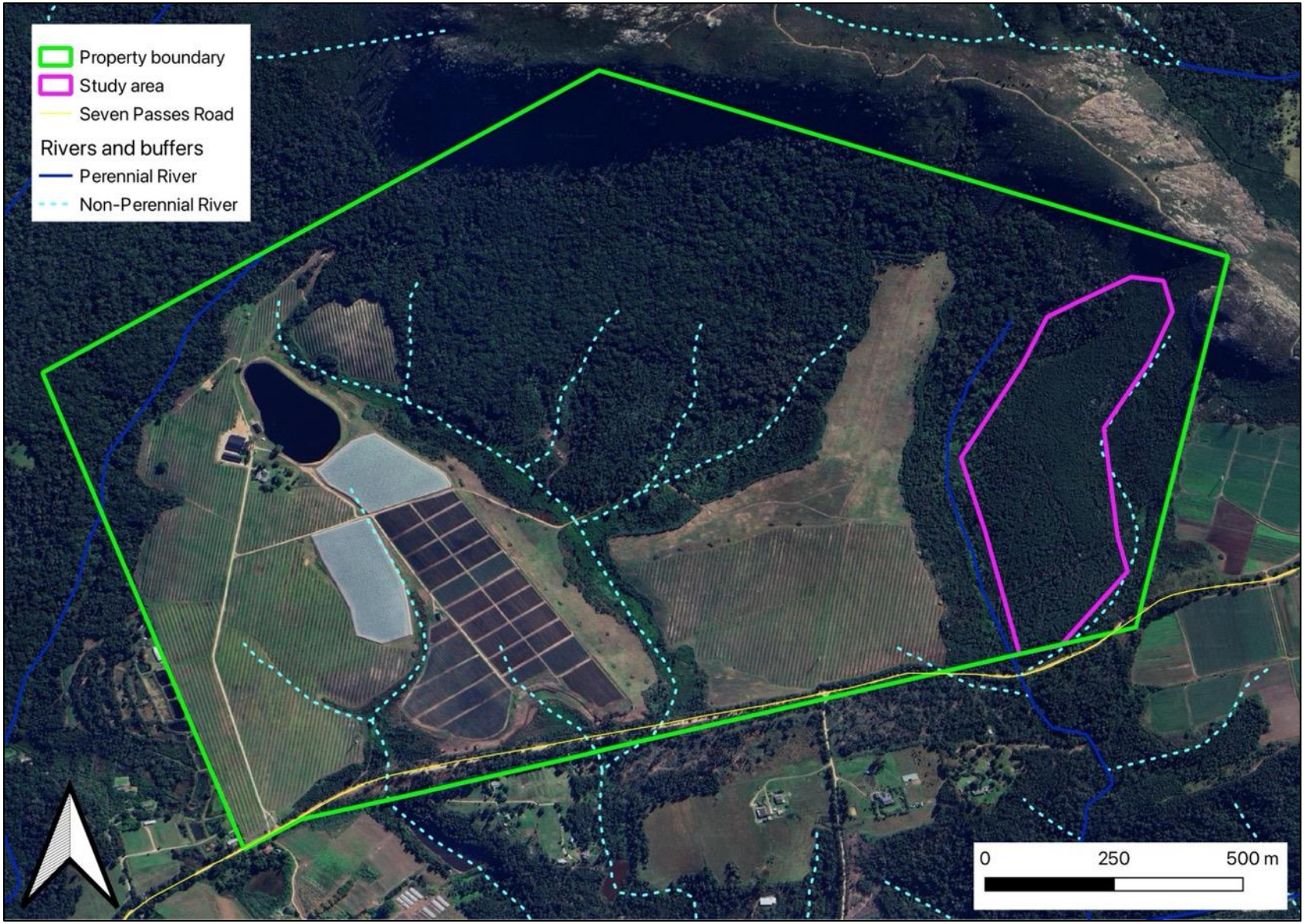

Figure 4. A Google Maps ™ satellite image of the subject property, study area, Seven Passes Road, perennial and non-perennial rivers.

5.2. LANDSCAPE AND GEOLOGY

The topography of the study area is dominated by a ridge running in a north-south direction, with the higher elevation on the north side of the site (elevation 315 MASL) becoming fairly steep. There is a perennial river on the west side of the ridge and a non-perennial drainage line on the east side. The lowest elevation in the south is 210 MASL (Figure 5).

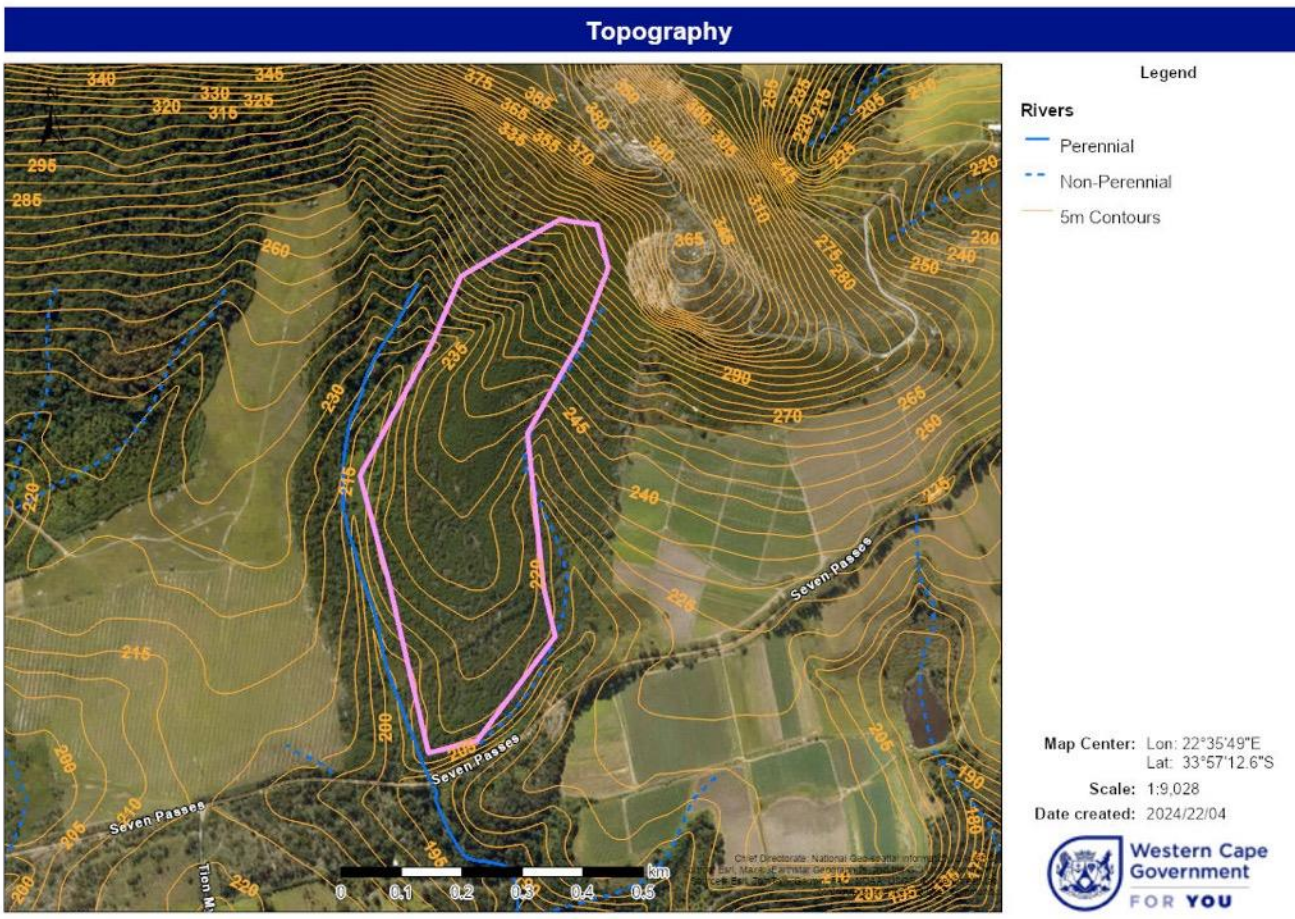

Figure 5. A contour map showing the topography on the site overlaid on a ESRI ™aerial image (CapeFarm Mapper: Western Cape Department of Agriculture, gis.elsenberg.com).

According to the Soils and Geology (ENPAT) layer on CapeFarmMapper (gis.elsenburg.com) the site contains two types of soils, Gb2 and Db33. The soils and geology of these types are described below:

Land Type: Gb2	
Soil:	Soils with a diagnostic ferrihumic horizon, predominantly shallow (Houwhoek form)
Geology:	Mainly quartzitic sandstone and subordinate shale of the Table Mountain Group; locally also feldspathic quartzite, schist and hornfels of the Kaaimans Group, as well as gneissic granite and granodiorite.
Land type: Db33	
Soil:	Prismacutanic and/or pedocutanic diagnostic horizons dominant, B horizons mainly not red

Geology:	Mainly gneissic granite and granodiorite, as well as phyllite, schist, grit, hornfels and quartzite of the Kaaimans Group, and quartzitic sandstone of the Table Mountain Group, Cape Supergroup.

The soils observed on the site are dark brown fine-grained loams derived from shale with some sandstone washed off the hill. This is fairly consistent with the soils associated with the dominant vegetation type found on the site, namely Garden Route Shale Fynbos, are described by Rebelo et al. (2006) as: ***"****Acidic, moist clay-loam, prismacutanic and pedocutanic soils derived from Caimans Group and Ecca (in the east) shales. Land types mainly Db and Fa".*

6. OVERVIEW OF VEGETATION AND CONSERVATION PLANS

6.1. NATIONAL VEGETATION TYPE

The National Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018) (VEGMAP) classifies the expected vegetation types in the study area as Southern Afrotemperate Forest, Garden Route Shale Fynbos and South Outeniqua Sandstone Fynbos (Figure 6). The vegetation and landscape features of the assigned vegetation types are described as follows:

Southern Afrotemperate Forest

> *"Tall, multilayered afrotemperate forests dominated by yellowwoods (Afrocarpus falcatus and Podocarpus latifolius), Ocotea bullata, Olea capensis subsp. macrocarpa, Pterocelastrus tricuspidatus, Platylophus trifoliatus etc. In scree and deep-gorge habitats Cunonia capensis, Heeria argentea, Metrosideros angustifolia, Podocarpus elongatus and Rapanea melanophloeos predominate. The shrub understorey and herb layers are well developed, especially in mesic and wet habitats".*

Garden Route Shale Fynbos

> "*Undulating hills and moderately undulating plains on the coastal forelands. Structurally this is a 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 fires – most of the shales are covered in 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)"*

South Outeniqua Sandstone Fynbos

> *"Gentle to steep south-facing slopes, over a 160 km long area, relatively broad with some moderately sloping intramontane valleys in the west where it is over 10 km wide. The dominant vegetation is a tall, open to medium dense shrubland with medium dense, medium tall shrub understorey—mainly proteoid and restioid fynbos, with extensive ericaceous fynbos on the upper slopes. Some grassy fynbos at lower altitudes, and scrub fynbos in riverine areas. Patches of this unit are not confined to south-facing slopes, but are found on all slopes south of the highest peaks in the range. Thus there are extensive northern slopes in some intramontane valley systems, the most significant of those found in the Doring River Wilderness Area".*

Figure 6. VEGMAP: The study area in relation to the VEGMAP (SANBI, 2018) overlaid on a Google Maps ™ aerial image.

6.2 NATIONAL ECOSYSTEM THREAT STATUS

Ecosystem threat status is informed by *The Revised National List of Ecosystems that are Threatened and Need of Protection* (RNLETNP)(Government Gazette, 2022). Species information is not provided in the RNLETNP and is thus taken from The National List of Ecosystems that are Threatened and in Need of Protection (Government Gazette, 2011). Table 1 provides a summary of (a) the ecosystem status and reasons, (b) the remaining percentage of the ecosystem and the original (national) extent, (c) the proportion of ecosystem target protected, and (d) the national conservation target from the two most relevant information sources.

Table 1. Ecosystem threat status derived from available information sources

	The Revised National List of Ecosystems that are Threatened and in Need of Protection
Garden Route Shale Fynbos	
Ecosystem threat status	ENDANGERED
Reason	B (Rate of loss of natural habitat)
Remaining % of ecosystem	44% of 56474 (ha)
Conservation target	23%
Protected area	5.7 %
Species of Concern	Data deficient
Pressures & threats	Agriculture has been a pressure to this ecosystem, in particular cultivation of pastures, with 131.24 km^2 of the ecosystem consisting of croplands and a further 62.49 km^2 of old fields. Plantations cover 79.19 km^2. This ecosystem is further degraded by erosion, overgrazing and invasions by Hakea sericea and various species of Acacia (Rebelo et al. 2006).
NOTES	Trigger Sub-Criteria: B1(i) - Garden Route Shale Fynbos is narrowly distributed with high rates of habitat loss in the past 28 years (1990-2018), placing the ecosystem type at risk of collapse. Scope: Global & national status (global extent assessed)
South Outeniqua Sandstone Fynbos	
Ecosystem threat status	LEAST CONCERN
Reason	(No Criteria for LC)
Remaining % of ecosystem	67% of 157123 (ha)
Conservation target	23%
Protected area	32.2%
Species of Concern	Data deficient
Pressures & threats	Plantations are a key pressure to this ecosystem, covering 290.32 km^2. Agriculture is another pressure to the ecosystem with 74.12 km^2 covered by croplands, and a further 133.57 km^2 covered by old fields. Threatened plant species data indicate that alien invasive species, overgrazing and altered fire regimes are important pressures (Red list of Species 2018). Specifically, invasions Pinus pinaster and Hakea sericea (Rebelo et al. 2006).
NOTES	South Outeniqua Sandstone Fynbos has experienced low rates of natural habitat loss and biotic disruptions, placing this ecosystem at low risk of collapse. Scope: Global & national status (global extent assessed)
Southern Afrotemperate Forest	
Ecosystem threat status	LEAST CONCERN
Reason	(No Criteria for LC)
Remaining % of ecosystem	80% of 77532 (ha)
Conservation target	22%
Protected area	54.3%
Species of Concern	Data deficient
Pressures & threats	Data deficient
NOTES	Southern Afrotemperate Forest has experienced low rates of natural habitat loss and biotic disruptions, placing this ecosystem at low risk of collapse. Scope: Global & national status (global extent assessed)

Ecological drivers

The key ecological drivers for the relevant ecosystems (Cadman et al., 2016) are listed below:

Lowland fynbos: (1) the natural fire frequency, (2) diversity of habitat and environmental gradients, (3) regional and local natural water drainage patterns and (4) natural grazing and physical soil disturbance. **Midland and mountain fynbos**: (1) the natural re regime and the interplay of re and grazing, (2) edaphic conditions and underlying lithology, and (3) drainage patterns and soil moisture gradients.

Forest: (1) the succession pathway of forest regeneration including seed dispersal and regeneration opportunities, (2) fire, (3) canopy cover and moisture levels, and (4) exceptional invertebrate diversity.

6.3 GARDEN ROUTE INITIATIVE VEGETATION MAP (2008)

The vegetation within the study area was mapped at a fine scale by Vlok, Euston-Brown, & Wolf (2008) in the C.A.P.E. Fine-scale Mapping Project. According to this map four vegetation units are found within the study area, namely Mellville Mesic Proteoid Fynbos, Outeniqua Plateau Forest, Grootbrak River and Floodplain, and Wolwedans Grassy Fynbos (Figure 7). These units are described as follows:

> ***Mellville Mesic Proteoid Fynbos:*** *"In the Mellville Mesic Proteoid Fynbos an overstorey of proteoid shrubs such as* Leucadendron eucalyptifolium, Leucadendron uliginosum, Leucospermum cuneiforme*, and* Protea neriifolia *is usually present. In this respect it is very similar to the Ruitersbos Mesic Proteoid Fynbos unit, but here distinctive species such as* Mimetes cucullatus *and* Protea aurea *are absent. They are replaced by another distinctive local endemic,* Leucospermum glabrum. *This unit is very similar to the Tsitsikamma Mesic Proteoid Fynbos unit, but is slightly less mesic with moisture-loving species such as* Protea mundii *uncommon here.*
>
> ***Outeniqua Plateau Forest:*** *"This habitat is well know as the "Knysna-forests"…As in the case of the Mountain Forests we recognize two vegetation units. They also differ marginally from each other with the Outeniqua Plateau Forest in general having more dry forest sections present and having some uncommon tree species such as* Faurea macnaughtonii *and the epiphytic orchid* Angraecum conchiferum *present, which seems to be absent from the Tsitsikamma Plateau Forest unit. In the case of the Tsitsikamma Plateau Forest moisture loving ferns such as Cyathea capensis tend to be more abundant in the understory, but that may be an artifact of the large number of rivulets that originate and intersects the Tsitsikamma Plateau Forest unit".*
>
> ***Grootbrak River and Floodplain:*** *"We recognize two vegetation units in this habitat, despite their overall similarity in vegetation present. The more western Groot Brak River and floodplain unit seems to have a more punctuated flooding regime resulting in a wider floodplain zone, usually with fewer forest patches in the upper region. The more eastern Tsitsikamma River and floodplain unit*

occurs in a generally higher rainfall zone with high rainfall events more frequently and thus the drainage channels more clearly defined. No rare or endangered plant species are known from these units, but uncommon species such as Watsonia galpinii *occurs within the flood zone of the Tsitsikamma River and floodplain unit.*

These two units span a bridge from subtropical affiliated plants (e.g. Calodendrum capense*) in the lowlands to temperate affiliated plants (e.g.* Laurophyllus capense*) of the uplands. They intersect both fire and non-fire systems so functioned as a conduit to enable species of vastly different systems to intermingle, which confused ecologists much in the past. They are and will remain to be vital corridors to convey vastly different genetic material over the Garden Route domain. Sadly the functioning of this corridor is now impeded over most of the domain by severe invasion of especially alien Acacia tree species".*

Wolwedans Grassy Fynbos: *"The Wolwedans Grassy Fynbos extends westwards, beyond the boundaries of the Garden Route domain. Here the grass component is usually well developed on north- facing slopes with few* Cyperaceae *and* Restionaceae *are present. Ericoid shrubs are usually abundant in the matrix Fynbos, especially* Erica sparsa *and* Phylica axillaris *on southern slopes and* Metalasia acuta *and* Passerina falcifolia *on north-facing slopes. Proteoid shrubs such as* Leucadendron eucalyptifolium *and* Protea neriifolia *were probably present on south facing slopes, but most of this unit has been transformed to pastures. It is thus very difficult to reconstruct the vegetation of this unit. The remnants of this unit is not very rich in species, but some uncommon geophytes such* as Brunsvigia josephinae *and* Gladiolus emiliae *are still present".*

Table 2 provides the ecosystem threat status of the vegetation units mapped in the Garden Route Initiative Map derived from the Critical Biodiversity Areas of the Garden Route Conservation Planning Technical Report (Holness et al, A. 2010)

Table 2. Ecosystem threat status for the FSP vegetation units derived from available information sources.

Vegetation type	**National Equivalent Ecosystem Status**
Mellville Mesic Proteoid Fynbos	VULNERABLE
Outeniqua Plateau Forest	LEAST THREATENED
Grootbrak River and Floodplain	VULNERABLE
Wolwedans Grassy Fynbos	CRITICALLY ENDANGERED

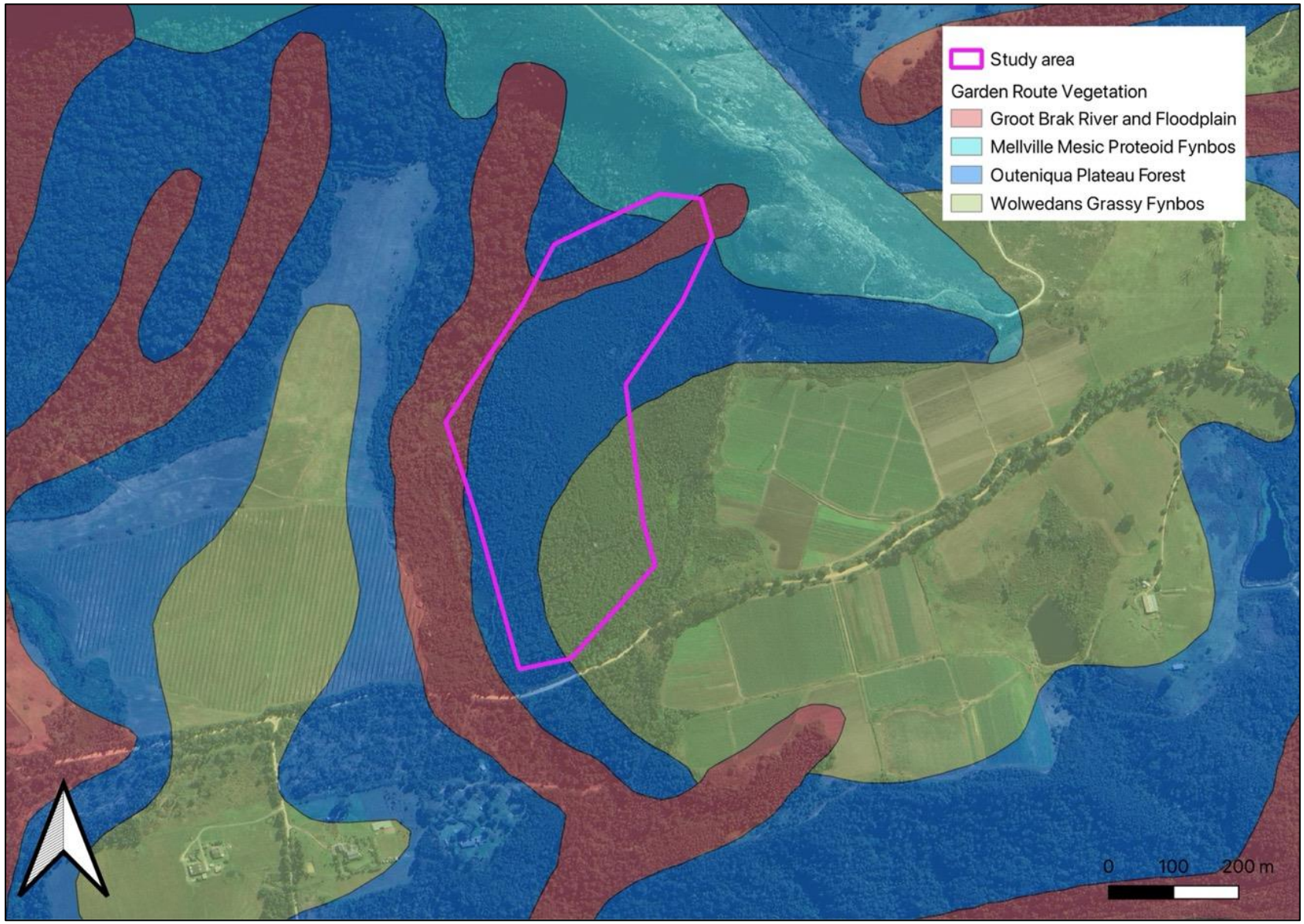

Figure 7. FSP VEGMAP: The study area in relation to the C.A.P.E FSP Vegetation Map for the Garden Route (Vlok, Euston-Brown, & Wolf 2008) overlaid on a Google Maps™ aerial image

6.4 BIODIVERSITY PLANS

The 2017 WCBSP Handbook (Pool-Stanvliet *et al*., 2017) distinguishes between the various conservation planning categories. Critical Biodiversity Areas are habitats with high biodiversity and ecological value. Such areas include those that are likely to be in a natural condition (CBA 1) and those that are potentially degraded or represent secondary vegetation (CBA 2). Ecological Support Areas are not essential for meeting biodiversity targets. However, they play an important role in supporting the functioning of Protected Areas (PA) or CBAs and are often vital for delivering ecosystem services. A distinction is made between ESAs that are still likely to be functional (i.e. in a natural, near-natural or moderately degraded condition; (ESA 1) and Ecological Support Areas that are severely degraded, or have no natural cover remaining, and therefore require restoration (ESA 2). Other Natural Area (ONA) sites are not currently identified as a priority, but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although not prioritised, they are still an important part of the natural ecosystem. Ground-truthing of the assigned CBA and ESA sites are described in the vegetation and discussion section below.

The majority of the study area is classified as ESA 1, with smaller areas mapped as CBA 1 (terrestrial) , CBA 2 and ESA 2 (Figure 8 and Table 3)

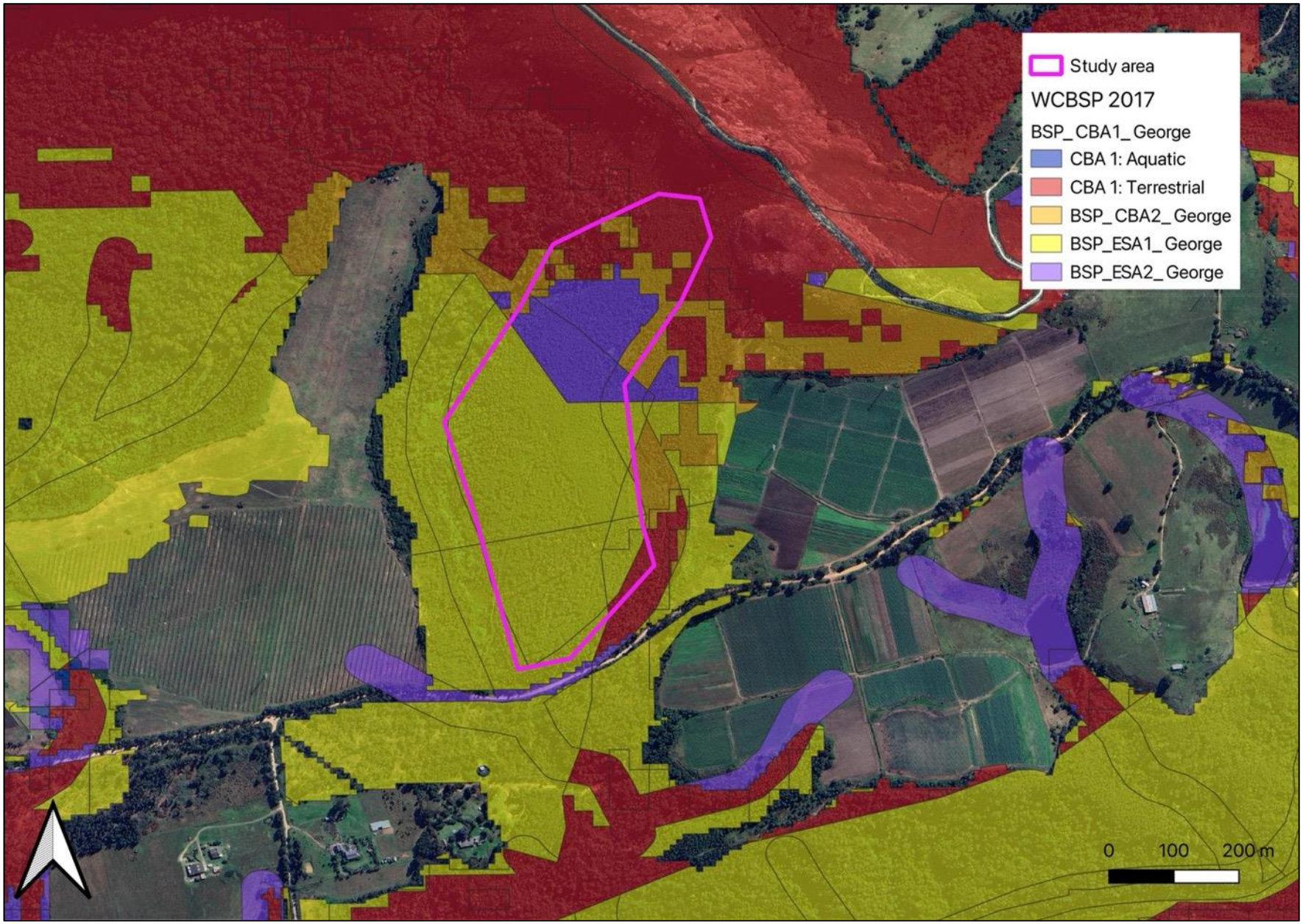

Figure 8. CONSERVATION PLANNING MAP: The study area in relation to the Western Cape Biodiversity Spatial Plan (CapeNature 2017) overlaid on a ESRI ™ aerial image.

Table 3. The CBA categories from the WCBSP (CapeNature 2017) with the associated subcategory, definition and management objectives that are found on the site

Map category	Subcategory & Features	Definition	Management objective	Reasons
CBA 1	CBA: Terrestrial & Forest	Areas that are required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure. These include: • All areas required to meet biodiversity pattern (e.g. species, ecosystems) targets; • Critically Endangered (CR) ecosystems (terrestrial, wetland and river types); • All areas required to meet ecological infrastructure targets, which are aimed at ensuring the continued existence and functioning of ecosystems and delivery of essential ecosystem services; and • Critical corridors to maintain landscape connectivity.	Maintain in a natural or near natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.	Bontebok Extended Distribution Range Cape Mountain Zebra Garden Route Shale Fynbos (EN) Indigenous Forest Type South Outeniqua Sandstone Fynbos (VU) Threatened Plant Upland-lowland interface Water source protection- Touws Watercourse protection- South Eastern Coastal Belt
CBA 2	Terrestrial	Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.	
ESA 1	Climate Corridor, Critically Endangered or Endangered veg, Water Source, Forest	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.	
ESA 2	River, Watercourse, Wetland	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.	Restore and/or manage to minimize impact on ecological processes and ecological infrastructure functioning, especially soil and water-related services, and to allow for faunal movement.	

6.5. PROTECTED AREA EXPANSION

The National Protected Area Expansion Strategy for South Africa 2018 (DEA, 2018) is a detailed document that outlines the need for protected area expansion in South Africa, the priority areas and the mechanisms through which it can be achieved. The main motivation for protected area expansion according to the NPAES is that "South Africa's protected area network currently falls far short of representing all ecosystems and maintaining ecological processes". The site has been excluded from the NPAES mapping, the far western part of the subject property falls within a NPAES Priority Focus area (Figure 9).

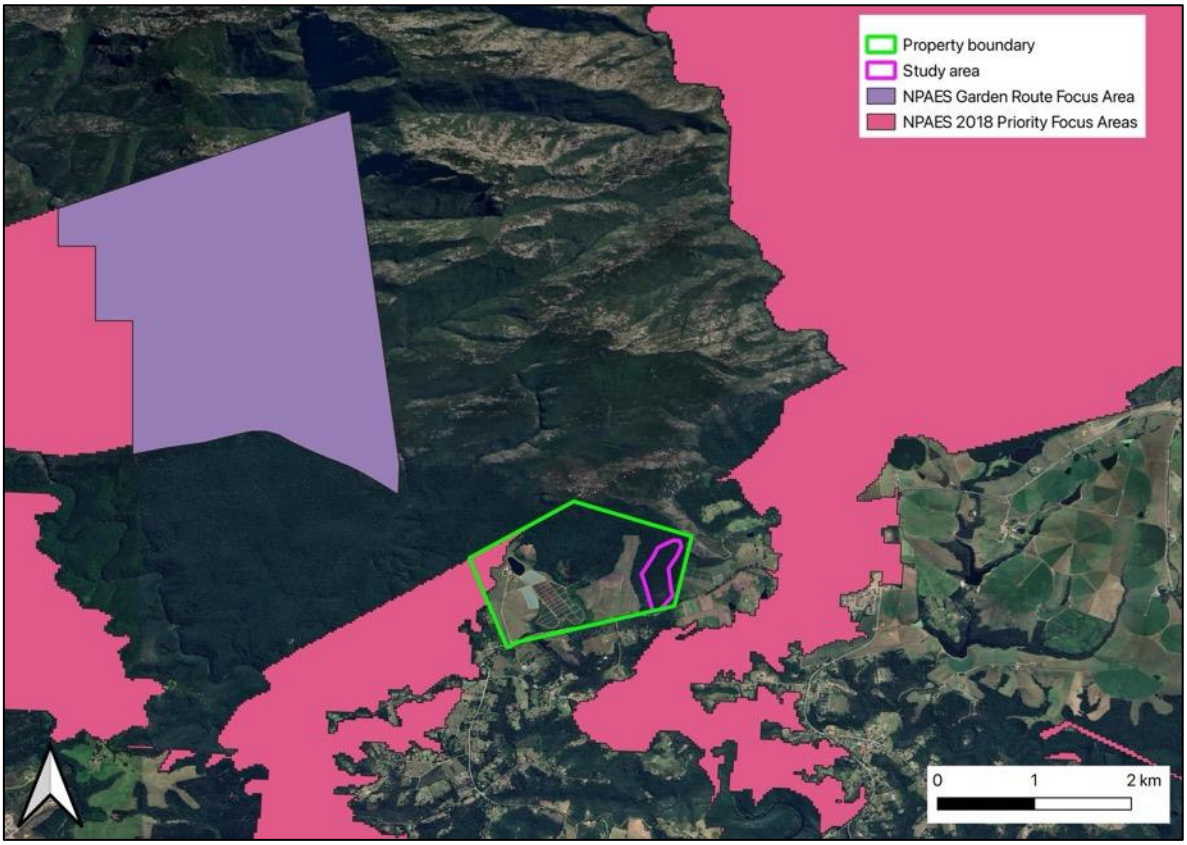

Figure 9. The NPAES map for the region showing the already protected areas as well as the priority focus areas for expansion. Note that the already Protected Areas shown in this image include lower-level protected areas that may not be as well conserved as a National Park.

7. VEGETATION AND TERRESTRIAL BIODIVERSITY OF THE STUDY AREA

The study area is mapped to contain a number of vegetation types in both the national vegetation map VEGMAP (SANBI, 2018) and the FSP (Vlok et al., 2007). Both sources map both fynbos and forest ecosystems on the site. The original extent and distribution of these ecosystems is hard to determine due the long history and current dominance of Invasive

alien plants (IAPs) within the study area and surroundings. Based on the remnant vegetation in the site and surroundings, it seems likely that the greater part of the study area was originally dominated by fynbos and fynbos-forest margin. Intact forest still occurs adjacent to the site on the north-west, with the fynbos forest margin, dominated by keurboom *Virgillia oroboides*, occurring within the study area. The steeper north parts of the site support the remnant fynbos, which is a fairly good match for Garden Route Shale Fynbos, or potentially Melville Mesic Proteoid Fynbos, and/orWolwedans Grassy Fynbos. However, due to the dominance of IAPs, the few indigenous fynbos species occurring on the site do not allow for a very clear idea of the original ecosystem. However, all the fynbos units purported to occur on the site are threatened, and therefore important from a conservation perspective. Forest ecosystems are also protected, so the entire site is potentially sensitive. This is discussed in more detail in the Sensitivity section.

The habitat map provided in Figure 10 distinguishes between Forest and Fynbos and their condition. The habitats include (1) Intact Forest, (2) Degraded Forest, (3) Semi-intact Fynbos, (4) Degraded Fynbos, (5) Degraded to Highly degraded Fynbos, (6) Highly degraded Fynbos, (7) Drainage line margin and (8) Powerline servitude. The description of habitat condition classes appears in Table 4.

Table 4. The habitat condition descriptions used for the vegetation on the site.

Habitat category	Description	Indigenous vegetation
Intact vegetation	A true representation of the original vegetation type in terms of structure and species makeup. Minimal soil disturbance. Unlikely to have ever been ploughed. Disturbance may be evident.	Yes
Semi-intact	Resembles the original vegetation type in terms of structure and species makeup but has lower species diversity than intact vegetation. Dominated by disturbance-resilient species. Soils may have been heavily disturbed in the past. Restoration potential is high.	Yes
Degraded	Only a few species representative of the original vegetation type are present. The vegetation has undergone heavy disturbance. Restoration potential is either low or moderate.	Yes
Highly degraded	The original vegetation is usually absent and has been removed in the past. Only a few remnant or pioneer species are present. Soils usually ploughed in the past. Restoration potential is very low.	*No (not naturally occurring as per the NEMA definition)
Transformed	No remnant species exist anymore. The landscape is altered irreversibly with no restoration potential. Examples include cultivated farmland and the built environment.	*No (not naturally occurring as per the NEMA definition)

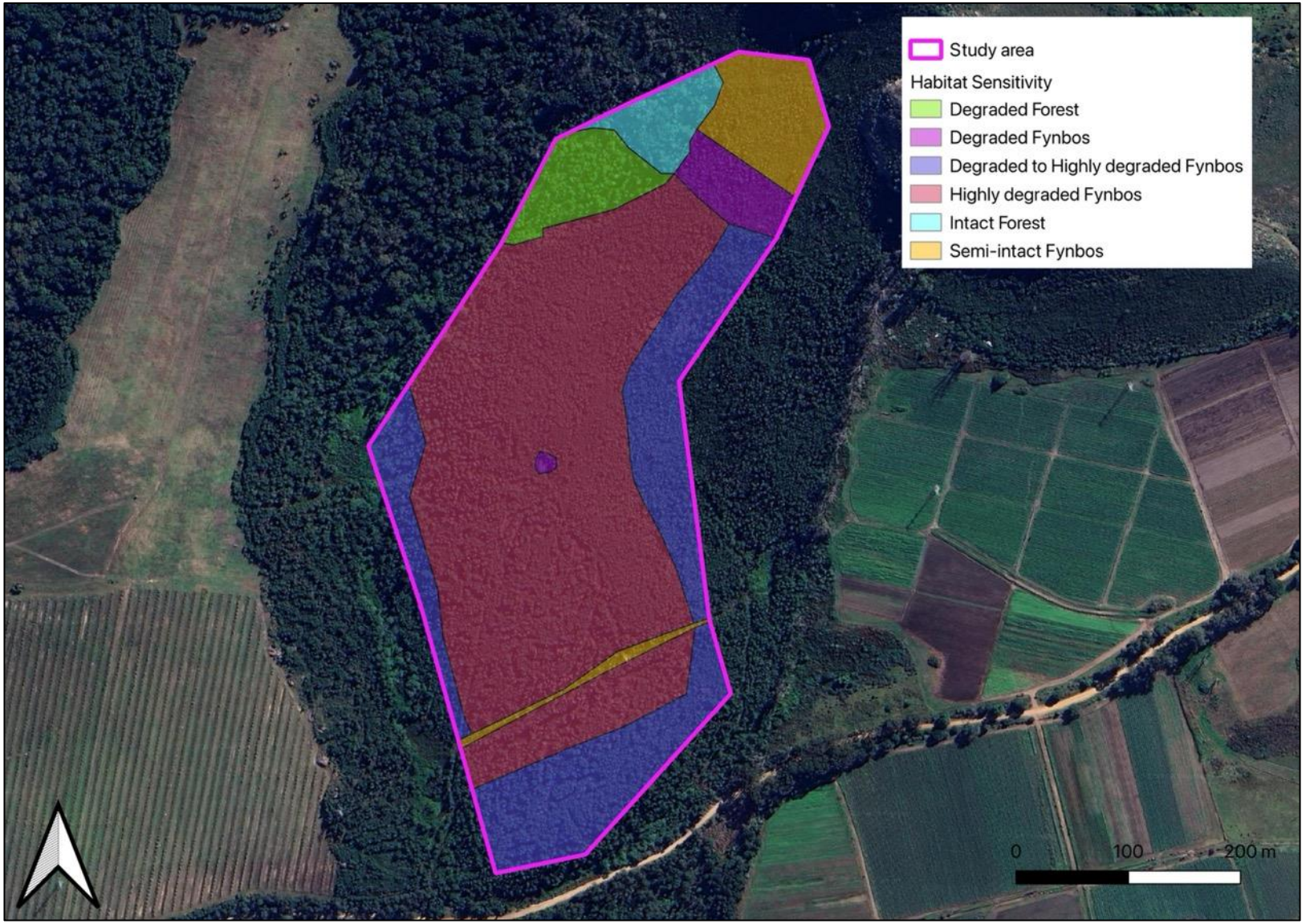

Figure 10. HABITAT MAP: The habitats identified in the screened areas, overlaid on a Google™ aerial image.

7.1 INTACT FOREST

This habitat occurs in the north-west corner of the study area and the area adjacent to the site on the north-west boundary. Outside of the site it forms a large patch of good condition forest that occurs on the south slopes of the mountain to the north. A number of smaller drainage lines occur outside of the site, joining a perennial river that flows along the western boundary of the site. The forest supports tall evergreen trees and a dense understory of herbaceous plants and ferns.

One species of conservation concern (SCC) was identified in this habitat the Endangered black stinkwood *Ocotea bullata*. In addition, a number of protected trees were also recorded here, including the assegai *Curtisia dentata*, real yellowwood *Podocarpus latifolius* and Outeniqua yellowwood *Afrocarpus falcatus*. Species identified in this habitat are listed below in Table 5. Note that not all of these species occur within the site, they were found in this habitat adjacent to the site.

Table 5. Plant Species List for the Intact Forest Habitat (species marked with * are protected)

Scientific name	Common name	Scientific name	Common name
*Afrocarpus falcatus**	Outeniqua yellowwood	*Ocotea bullata** (EN)	black stinkwood
Asparagus scandens	climbing asparagus	*Olea capensis*	Black Ironwood
Buddleja salviifolia	sagewood	*Olinia ventosa*	hard pear
Burchellia bubalina	wild pomegranate	*Physalis peruviana*	cape gooseberry
Canthium inerma	turkey berry	*Plectranthus sp.*	
Cassinopsis ilicifolia	lemonthorn cassinopsis	*Podocarpus latifolius**	real yellowwood
Cissampelos torulosa		*Polystichum sp.*	shield fern
Clausena anisata	samandua	*Pteridium aquilinum*	bracken fern
Clutia pulchella	warty clut	*Pterocelastrus tricuspidatus*	candlewood
*Curtisia dentata**	assegai	*Pyrenacantha scandens*	
Cussonia thyrsiflora	Cape Coast Cabbagetree	*Rapanea melanophloeos*	Cape beech
Diospyros dichrophylla		*Rothmannia capensis*	wild gardenia
Elaeodendron croceum	Forest saffron	*Scutia myrtina*	cat-thorn
Gonioma kamassi	Knysna boxwood	*Searsia chirindensis*	Forest currant
Gymnosporia nemerosa	white forest spikethorn	*Searsia tomentosa*	bicolour currantrhus
Halleria lucida	tree fuschia	*Senecio macroglossum*	ivy ragwort
Kiggeleria africana	wild peach	*Solanum giganteum*	giant bitter apple
Lauridia tetragona	Climbing Saffron	*Trichocladus citrinus*	onderbos
Nuxia floribunda	forest elder	*Vepris lanceolata*	white ironwood

The ecological functioning of the forest habitat is likely to be slightlyaltered in its current state, mainly due to the marginal presence on the site and the close proximity of high density IAPs. The ecological functioning in the adjacent area is very high, with high plant species diversity and freshwater habitat, and therefore optimal habitat for all forms of animal life. At least one animal Species of Conservation Concern Duthie's golden mole (*Chlorotalpa duthieae*) was found in the forest habitat outside of the proposed development area.

Figure 11. The Intact Forest habitat adjacent to the site along the north-west boundary. This is a healthy forest ecosystem with climax trees and a diverse understory where light penetrates.

Figure 12. The intact forest adjacent to the site showing the slope heading down to the perennial stream on the west of the site.

7.2 DEGRADED FOREST

This habitat occurs to the south of the intact forest habitat, but also in the northern part of the study area. It is partly degraded and has lower species diversity than the intact forest habitat, however, this is partly due to the proximity to the fynbos habitat, and the dynamic nature of this ecotone. Fires would affect this forest boundary, and therefore the long lived forest species are absent from this habitat. It is dominated by the keurboom *Virgilia oroboides* and has a moderate level of the invasive black wattle *Acacia mearnsii* present, with a low level of the also invasive black wood *Acacia melanoxylon* present. These species would result in hotter than normal fires in this area and therefore a reduction in diversity of indigenous species. Other indigenous species found in this habitat include Cape sweatpea *Dipogon lignosus*, bracken fern *Pteridium aquilinum*, warty clut *Clutia pulchella* and Cape starapple *Diospyros glabra*. No species of conservation concern (SCC) were identified in this habitat. The ecological functioning of this habitat is likely to be moderately altered. The plant species diversity is affected by the presence of IAPs and this impacts available habitat for other biota.

Figure 13. The Degraded forest, is also the ecotone with the fynbos habitat. The keurboom is the dominant tree and bracken fern dominates the understorey.

7.3 SEMI-INTACT FYNBOS AND DEGRADED FYNBOS

These two habitats grade into one another with the better condition Semi-intact fynbos at the highest elevations on the northernmost part of the site with the Degraded fynbos slightly lower down slope. An isolated patch of Degraded fynbos occurs in the central part of the site, and the powerline servitude near the southern part of the site still contains Semi-intact fynbos. There is still a low to medium density of IAPs in these habitats, dominated by black wattle, except for the powerline servitude which is kept mostly free of IAPs though scheduled maintenance. The invasive sugar gum *Eucalyptus* cf. *cladocalyx* is also found within these habitats in low densities. Fynbos elements are dominant and indicate that this was certainly the original ecosystem on the main part of the ridge (i.e. within the fire path). A list of species found in these habitats appears below in Table 6.

Table 6. Plant Species Semi-intact fynbos and Degraded fynbos habitats

Scientific name	**Common name**	***Scientific name***	**Common name**
Agathosma ovata	False Buchu	*Lobelia tomentosa*	Woolly Lobelia
Aristea ensifolia	forest Capeblue	*Lomariocycas tabularis*	Leathery Hard Fern
Berzelia intermedia	Common Coppice Kolkol	*Metalasia trivialis*	Eastern Blombush
Centella eriantha	Woolflower Capepurse	*Nuxia floribunda*	Forest Elder
Centella virgata	Branching Capepurse	*Ocotea bullata*	Stinkwood
Cliffortia sp.	Caperoses	*Osteospermum moniliferum*	bitou
Cliffortia burchellii	Garden Route Caperose	*Passerina corymbosa*	Common Gonna
Cyathea capensis	Forest Tree Fern	*Pelargonium cordifolium*	heartleaf storksbill
Dioscorea burchellii		*Phylica sp.*	Hardleaves
Ehrhata ramosa	pohl veldt grass	*Phylica purpurea*	Purple Hardleaf
Erica canaliculata	Hairy Grey Heather	*Podalyria buxifolia*	Box Capesweetpea
Erica curviflora	water heath	*Polygala fruticosa*	heartleaf falsepea
Erica discolor	Discolorous Heath	*Protea mundii*	Forest Sugarbush
Erica sp.	Heaths	*Psoralea sp.*	
Erica sparsa	Spartan Heath	*Pteridium aquilinum*	Bracken fern
Gleichenia polypodioides	Coral Fern	*Restio scaberulus*	
Gnidia denuata		*Restio sp.*	
Indigofera flabellata	Flabby Indigo	*Restio triticeus*	Wheat Capereed
Leucadendron eucalyptifolium	Gumleaf Conebush	*Rhodocoma gigantea*	Tall Elephantreed
Leucospermum glabrum	Outeniqua Pincushion	*Stoebe alopecuroides*	Foxy Snakebush
Lobelia neglecta	Rough Lobelia	*Tetraria involucrata*	Honey Tetrar
		Ursinia scariosa	Paper Paraseed

The ecological functioning of these habitats is moderate, and most ecological processes will still persist under the current disturbance regime. However, the isolated patch of Degraded fynbos will likely have less faunal and pollinator activity due to its fragmentation from the more continuous better condition vegetation. A single SCC, *Leucospermum glabrum* (EN) was found in this isolated patch of Degraded fynbos. The pollinators will not pass through this patch as often when compared to the more extensive and open fynbos at the north of the site.

Figure 14. The Semi-intact fynbos at the far north end of the site at waypoint S33° 56.983' E22° 35.908' looking south.

Figure 15. The Semi-intact fynbos in the powerline servitude. This area has been kept clear of IAPs and gives an indication of the original ecosystem. Photo at waypoint S33° 57.331' E22° 35.793'looking east.

Figure 16. The small patch of Degraded fynbos in the central part of the site. This area contains a number of indigenous species surrounded by high density IAPs.

7.4 DEGRADED TO HIGHLY DEGRADED FYNBOS AND HIGHLY DEGRADED FYNBOS

These two habitats are similar, both being dominated by a high density invasion of black wattle. The invasive sugar gum *Eucalyptus* cf. *cladocalyx* was extensively planted within these habitats in the past and is still dominant in places. The difference is that the Degraded to Highly degraded fynbos has some indigenous species scattered in the understorey, whereas the Highly degraded habitat is almost completely devoid of indigenous species, usually under the *Eucalyptus* species. The Degraded to Highly degraded habitat occurs along the eastern and western edges of the site in close proximity to the drainage lines.

Indigenous species found in these habitats are the more common and disturbance tolerant species such as common gonna *Passerina corymbosa*, bitou *Osteospermum moniliferum*, hairy grey heather *Erica canaliculata*, *Phylica* sp., silver everlasting *Helichrysum petiolare* and a *Watsonia* sp. Some forest margin species such as tree fuschia *Halleria lucida*, boekenhout *Rapanea melanophloeos*, sagewood *Buddleja salviifolia*, num num *Carissa*

bispinosa, glossy currantrhus *Searsia lucida*, *Diospyros dichrophylla,* white forest spikethorn *Gymnosporia nemerosa* and some seedlings of forest species such as black stinkwood *Ocotea bullata* (EN) occur in the Degraded to Highly degraded habitat. Three SCC occur in these habitats, namely the Outeniqua pincushion *Leucospermum glabrum* (EN), black stinkwood *Ocotea bullata* (EN) and *Sensitive species 419* (VU). The Outeniqua pincushion occurs on the eastern side of the site, whereas *Sensitive species 419* occurs on the eastern and western sides.

Figure 17. The southern part of the site contains a mix of medium to high density IAPs with pockets of indigenous species still persisting. This is a typical view of the Degraded to Highly degraded habitat at waypoint S33° 57.338' E22° 35.862'.

The ecological integrity and functioning of these habitats has been highly modified from their original state. In the case of the Highly degraded habitat, very few indigenous species occur and this severely limits the diversity of indigenous fauna that is supported and consequently results in a low ecological functioning. However, it is noted that the faunal specialist has found a SCC within this habitat, Duthie's golden mole *Chlorotalpa duthieae* (VU). This is due to the increase in their habitat of trees, due to the IAPs present. The ecological functioning within the Degraded to Highly degraded habitat is slightly higher due to the higher number of indigenous species present, however, the processes are still limited by the

presence of IAPs. This habitat occurs along the margins of the site in close proximity to the drainage lines, and therefore plays and important ecological role in connecting lowland and upland habitats.

Figure 18. The edges of the study area typically have a slightly higher indigenous species diversity due to their proximity to the drainage lines (waypoint S33° 57.282' E22° 35.703').

Figure 19. The Highly degraded habitat contains a high density of IAPs with almost no indigenous species present (waypoint S33° 57.250' E22° 35.815').

8. SENSITIVITY AND CONSTRAINTS

8.1 SENSITIVITY

Sensitivity is defined here as the **'conservation value'** together with the **'degree of resilience to disturbance'**. The conservation value relates to the conservation status (including the ecosystem threat status) and other factors including ecological connectivity, habitat condition, persistence of ecological process and the site's role in supporting biodiversity. The degree of resilience takes into consideration factors such as sensitivity to disturbance and restoration potential.

In the case of the study area, a **High sensitivity** applies to the Intact Forest and Semi-intact fynbos habitats for the following reasons:

1. The forest habitat is in good condition and links to a large continuous section of forest (this is Least Concern ecosystem; however, forests are protected under the National Forest Act (Act 84 of 1998)).

2. At least four Protected tree species occur in this habitat, although not within the study area (assegai *Curtisia dentata*, black stinkwood *Ocotea bullata* (EN), real yellowwood *Podocarpus latifolius*, Outeniqua yellowwood *Afrocarpus falcatus*)
3. The Semi-intact fynbos is representative of the original vegetation types, all those mapped to occur on the site are threatened. For the purposes of this report, the original ecosystem is assigned as Garden Route Shale Fynbos, an Endangered Ecosystem.
4. These habitats occur in the north of the study area, on the steepest slopes and adjacent to large and intact natural areas.
5. This part of the site has been classified as CBA 1 and CBA 2 in the WCBSP 2017. These classifications are supported based on the site visit.
6. The ecological functioning of these habitats is high and an important linkage between the habitats to the east and west of the site at this altitude exists.
7. These habitats do not require any rehabilitation but would benefit from the removal of IAPs that occur in low densities within or on their margins.

A **Medium sensitivity** applies to the Degraded Fynbos, the Degraded forest and the Degraded to Highly degraded fynbos habitats for the following reasons:

1. The vegetation type present in the Degraded fynbos habitat is Endangered and the vegetation is partially representative of this ecosystem.
2. This area classified as a CBA 1, CBA 2, ESA 1 and ESA 2 in the WCBSP. These classifications are supported based on the site visit.
3. Two SCC were found in the Degraded to Highly degraded fynbos habitat, namely the Outeniqua pincushion *Leucospermum glabrum* (Endangered) and *Sensitive species 419* (Vulnerable).
4. The ecological functioning of these habitats is moderately modified (Degraded habitats) or Highly modified (Degraded to Highly degraded habitat) and impacted by a medium to high density of IAP.
5. These habitats occur adjacent to the Intact Forest, Semi-intact fynbos and drainage lines, and the habitats are an important buffer if the development is authorized.
6. The Degraded to Highly degraded habitat occurs on the eastern and western edges of the study area, partially within the buffers associated with the drainage lines and wetlands (as mapped by the freshwater ecologist). These areas are important for north-south, upland-lowland connectivity and are thus mapped as No-Go areas.
7. The restoration potential of these area is moderate to high if the IAP are removed.

A **Low sensitivity** applies to the Highly degraded habitat for the following reasons:

1. The indigenous vegetation has been impacted by a long history of plantations and IAP presence. Currently there is no indigenous vegetation present, only a few scattered indigenous species occur.
2. The site classified as ESA 1 in the WCBSP. Based on the current condition, ESA 2 would be a more appropriate classification.
3. One SCC was found in this habitat, one seedling of the EN Ocotea bullata. This species is unlikely to persist in this area and the isolated individual found outside of the forest habitat does not suggest a higher sensitivity for this habitat.
4. The rehabilitation potential is low for this habitat.
5. The habitat occurs outside of the buffers associated with the drainage lines on the site.

The sensitivity map is provided below in Figure 20.

8.2 DEVELOPMENT CONSTRAINTS

The identification of potentially developable and No-Go areas is largely dependent on the habitat sensitivity. However, if it is reasonable to either include or exclude certain areas based on an evaluation of the best interests of the affected environment versus the proposed development activity, then this should be motivated accordingly.

The following development constraints apply from a Terrestrial Biodiversity perspective:

1. The High sensitivity habitats are not suitable for development from an ecological perspective.
2. A 50m buffer has been placed around the Intact forest habitat to ensure that the proposed development does not impact this habitat if it were to be authorized.
3. The Degraded fynbos habitat at the northern end of the site should not be developed as it occurs on fairly steep slopes and is needed as a buffer between the potential development and the Semi-intact fynbos habitat.
4. The Endangered Outeniqua pincushion *Leucospermum glabrum* individuals should not be lost. The subpopulations on the east side of the site have been buffered by 100m to ensure that they can persist if the development is authorized. This buffer extends to the individual of this species found in the central part of the site, and this species should persist, however, it has not been buffered.

5. The Vulnerable *Sensitive species 419* on the eastern side of the site falls within the abovementioned buffers and will persist. The *Sensitive species 419* found on the western side of the site can be marked for search and rescue.
6. The areas buffered from the drainage lines and wetlands by the freshwater ecologist are important linkages in the landscape from an ecological perspective and these areas are excluded from the developable footprint.

The potentially developable and No-go areas are shown in the Constraints map in Figure 21.

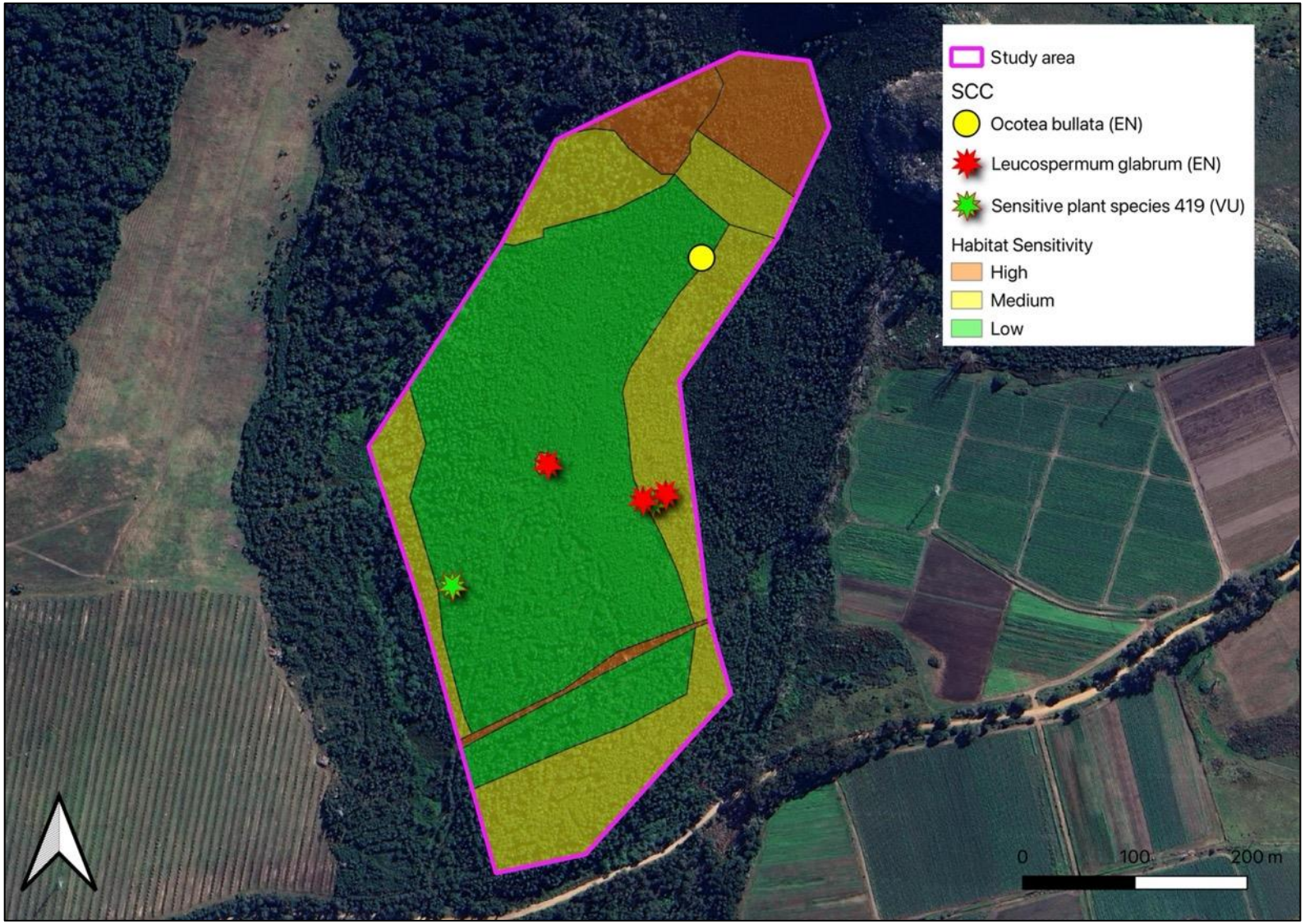

Figure 20. SENSITIVITY MAP: The sensitivities for the study area overlaid on an Google Maps ™ image.

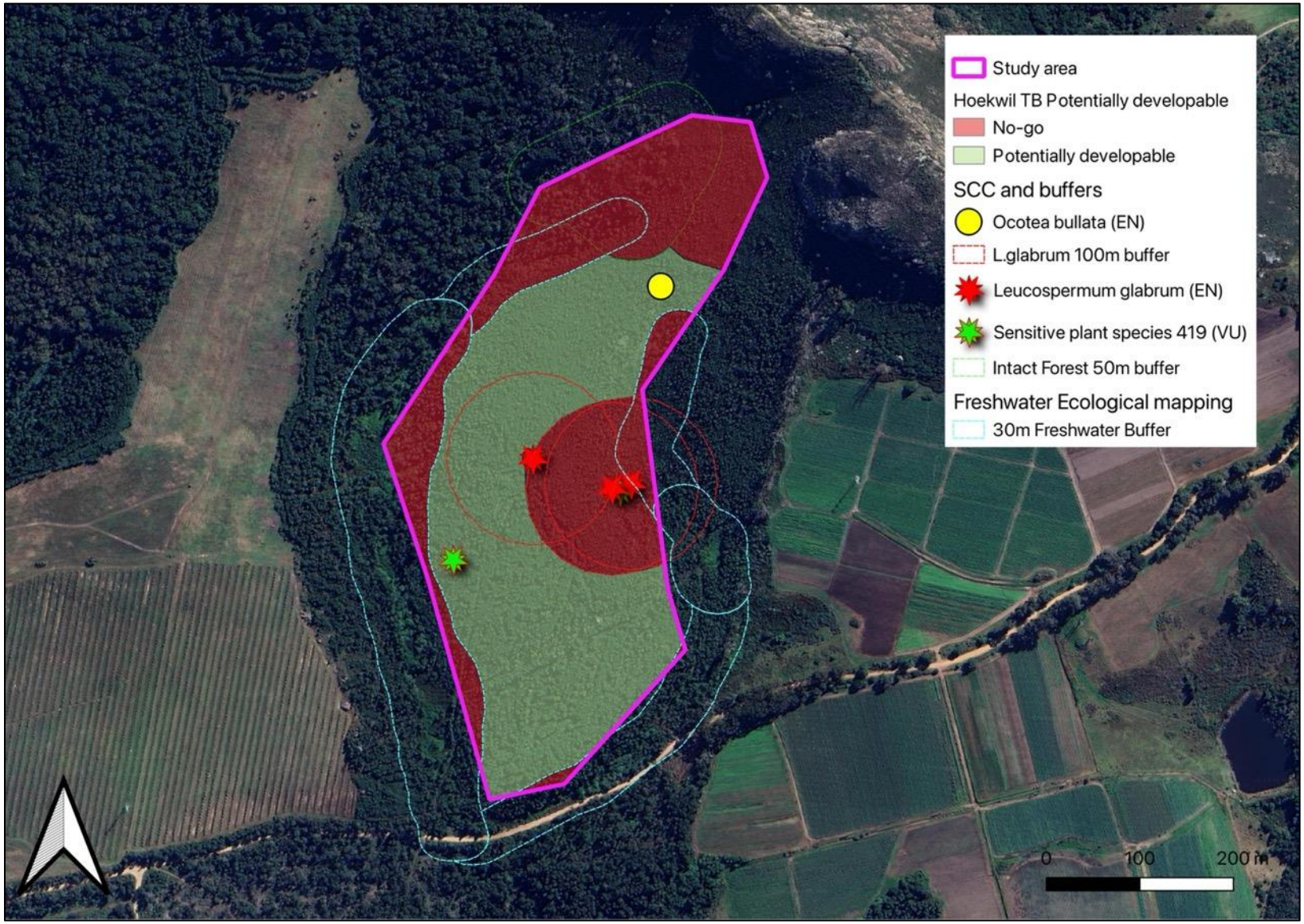

Figure 21. CONSTRAINTS MAP: The Terrestrial Biodiversity and Plant theme constraints for the study area overlaid on an ESRI ™ image. Note that the buffers around the freshwater features were provided by the freshwater ecologist James Dabrowski.

9. IMPACT ASSESSMENT

The impact assessment is a measure of the impacts likely to occur on the affected environment, specifically the vegetation, ecological processes, important species and habitats. They are considered for (a) the 'No Go' scenario and (b) the direct, indirect and cumulative impacts of the proposed project. Impacts are assessed for the construction and operational phases.

The impact assessment methodology is explained in detail in Appendix 1.

9.1. 'NO GO' OR NO DEVELOPMENT SCENARIO

The 'No Go' or no development scenario takes into consideration the impacts associated with the no construction option. It is a prediction of the future state of the affected area in the event of no construction activities taking place and is based on the current and/or anticipated future land use. If no construction were to take place and the *status quo* would remain the same, the site would continue to be invaded by IAP into the parts of the site with some representative indigenous vegetation. The indigenous seed bank would be further reduced in the next fire event reducing the chance of positive restoration of the site. In the medium term, the impact of the No-Go scenario is **Low to Medium Negative** as it would likely result in the complete loss of fynbos on the site. However, it is the legal responsibility of the landowner to remove and control these species so this should not be considered as a reason to allow development on the site.

9.2. DIRECT IMPACTS

Direct impacts are those that would occur as a direct result of the agricultural activities proposed. The vegetation that occurs in the areas proposed for expansion would be removed and permanently lost.

The direct impacts are considered separately for the two following components:

1. Loss of terrestrial ecology including: vegetation type, ecological processes, indigenous vegetation, ecologically important species, terrestrial habitat and ecological connectivity.
2. Loss of species of conservation concern (SCC).

The study area was 19 ha in extent, and the applicant has indicated the desire to cultivate approximately 15 ha. The loss of 15 ha on this site would result in the loss of Medium and

High sensitivity areas and species of conservation concern, and would result in a Medium to High negative residual impact which would require a biodiversity offset. The calculated potentially developable area (Figure 21) is 11 ha. If this area were to be developed it would result in a Low negative impact if mitigation is applied (Table 7). Mitigation includes the search and rescue of one SCC the Vulnerable *Sensitive species 419* and the rehabilitation of the areas excluded from the development footprint. Mitigation is further detailed in section 9.5

Table 7. Impact table for the construction phase of the proposed development.

	Loss of SCC	**Loss of Terrestrial Biodiversity**	**No-Go Alternative**
Potential impact and risk:	Loss of at least one Ocotea bullata seedling. Potential loss of two other SCC from site	Cultivation of up to 15 ha including Intact and Semi-intact habitat	Status quo remains
Nature of impact:	Negative	Negative	Negative
Extent and duration of impact:	Site (1) and Long-term (3)	Site (1) and Long-term (3)	Site (1) and Long term (3)
Magnitude	High (3)	High (3)	Medium (2)
Consequence of impact or risk:	Moderately detrimental (7)	Moderately detrimental (7)	Slightly detrimental (6)
Probability of occurrence:	Definite (4)	Definite (4)	Definite (4)
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Medium	Low
Degree to which the impact can be reversed:	Low	Low	Low
Cumulative impact prior to mitigation:	Low	Low	Low
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (28)	Medium (28)	Low (24)
Degree to which the impact can be avoided:	Medium	Medium	Low
Degree to which the impact can be managed:	Low	Low	Low
Degree to which the impact can be mitigated:	Low	Low	Low
Proposed mitigation:	Search and rescue of *Dioscorea burchellii* from west side of the site. Apply 100m buffer around *Leucospermum glabrum* on the eastern side of the site.	Avoidance of Medium and High sensitivity areas. Rehabilitation of fynbos habitat not developed.	N/A
Residual impacts:	Low	Low	Low
Cumulative impact post mitigation:	Low	Low	Low
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (24)	Low (24)	Low (24)

Operational Phase

The operational phase impacts are related to the use of the site for agricultural production in the long-term. The impacts in the operational phase will relate to the potential edge effects of the agricultural activities spreading into the adjacent natural vegetation. Impacts are related to spray-drift, fertiliser running into the water courses, exotic and invasive species spreading into the surrounding natural vegetation. Impacts are expected to be Low negative without mitigation, but can be reduced to Very low. The impact on SCC in the operational phase is potentially Medium if care is not taken to ensure that the central subpopulation of *Leucospermum glabrum* is protected (Table 8). Fire exclusion is another possible reason that this species will not persist. Recommended mitigation is listed in section 9.5.

Table 8. Impact table for the operational phase of the proposed development.

	Loss of SCC	**Loss of Terrestrial Biodiversity**	**No-Go Alternative**
Potential impact and risk:	Potential loss of the central subpopulation of *Leucopsermum glabrum* (EN)	Edge effects of agriculture on surrounding vegetation	Status quo remains
Nature of impact:	Negative	Negative	Negative
Extent and duration of impact:	Site (1) and Long-term (3)	Site (1) and Long-term (3)	Site (1) and Long term (3)
Magnitude	High (3)	Medium (2)	Medium (2)
Consequence of impact or risk:	Moderately detrimental (7)	Moderately detrimental (6)	Slightly detrimental (6)
Probability of occurrence:	Definite (4)	Definite (4)	Definite (4)
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Medium	Low
Degree to which the impact can be reversed:	Low	Low	Low
Cumulative impact prior to mitigation:	Low	Low	Low
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (28)	Low (24)	Low (24)
Degree to which the impact can be avoided:	Medium	Medium	Low
Degree to which the impact can be managed:	Low	Low	Low
Degree to which the impact can be mitigated:	Low	Low	Low
Proposed mitigation:	Ensure that the undeveloped area is treated as a No-go for agricultural vehicles and staff during the operational phase. Monitoring of the populations of SCC within the excluded areas to ensure that they persist.	Monitor adjacent vegetation for impacts related to agricultural practises. Continue removal of exotic and IAPs along with rehabilitation of adjacent areas.	N/A
Residual impacts:	Low	Low	Low
Cumulative impact post mitigation:	Low	Low	Low

Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (24)	Very Low (18)	Low (24)

9.3 INDIRECT IMPACTS

Indirect impacts occur mostly at the operational stage and are less obvious. Examples include loss of diversity due to loss of connectivity between vegetation remnants and associated loss of pollination. Indirect impacts associated with the loss of connectivity between the north and south of the study area will be mitigated by the exclusion of the freshwater features and their associated buffers. Indirect impacts are expected to be Low to very low if the mitigation is applied successfully.

9.4 CUMULATIVE IMPACTS

Cumulative impacts are those impacts linked but not limited to (a) increased loss of vegetation type or the ecosystems listed in the Revised National List of Ecosystems that are threatened and in need of protection (Government Gazette, 2022) and (b) other local developments taking place in the region. The area that would be lost within the Garden Route Shale Fynbos ecosystem (Degraded to Highly degraded habitat only and the Degraded and Semi-intact habitats are not recommended for development) is 2.5 ha. This represents 0.01% of the remaining natural area of the ecosystem (24848 ha) (Government Gazette, 2022). Considering the Low percentage lost, the impact rated as **Low negative**.

9.5 MITIGATION

Mitigation options are generally considered in terms of the following mitigation hierarchy: (1) avoidance, (2) minimization, (3) restoration and (4) offsets. A distinction is also made between essential mitigation (non-negotiable mitigation measures that lower the impact significance) and non-essential mitigation (best practise measures that do not lower the impact significance).

In this instance, a number of essential mitigation measures are necessary to reduce the impact of the development.

1. Avoidance of the Intact forest (including a 50m buffer), Semi-intact fynbos and Degraded fynbos habitats which are of High and Medium sensitivity.

2. Avoidance of the subpopulation of *Leucospermum glabrum* (including a 100m buffer) and *Sensitive species 419* on the eastern side of the site.
3. Ensure that natural fire cycles can occur within this area.
4. Avoidance of the freshwater features (including a 30m buffer) to ensure connectivity of lowland and upland habitat.
5. The 'search and rescue' of the *Sensitive species 419* from the western side of the site.
6. The vegetation from the fynbos habitat that is not developed must be rehabilitated to a state where it is representative of the original fynbos ecosystem and supports ecological functioning to a moderate or high level.
7. The rehabilitation must be undertaken in a phased approach, according to a rehabilitation plan and undertaken by a qualified botanist or restoration ecologist.
8. The initial step will require the removal and control of all IAPs on the property and erosion control if necessary. Passive rehabilitation on the parts of the site where no earthworks have taken place can be allowed for one winter season following the removal of IAPs. Thereafter the site must be assessed by the restoration contractor to determine the level of active rehabilitation input. Active rehabilitation will be required for areas where topsoil has been disturbed, and areas that do not naturally recover from stored soil seedbank.
9. The restoration contractor should monitor the populations of SCC to ensure that they persist on the site, and additional propagation of these species may be required.
10. Follow-up clearing of all exotic and listed IAPs is required every 6 months for the first three years, and annually thereafter to ensure that the IAPs do not dominate the fynbos.

Best practise mitigation

1. Mark off the areas that are not going to be developed prior to undertaking any works, and ensure that no unnecessary loss of adjacent vegetation occurs.
2. Mark off all SCC, especially the central subpopulation of *Leucospermum glabrum*, to ensure that it is not disturbed during construction.
3. Sites for building material stocks, vehicles, toilets etc must be clearly marked and restricted to the building footprint, exiting roads or existing disturbed areas.

10. CONCLUSIONS AND RECOMMENDATIONS

According to the VEGMAP, the study area contains the Endangered Garden Route Shale Fynbos, Southern Afrotemperate Forest (Least Concern) and Outeniqua Sandstone Fynbos (Least Concern). According to the Vegetation Map for the Garden Route the site supports

Melville Mesic Proteoid Fynbos (Vulnerable), Outeniqua Plateau Forest (Least Threatened), Grootbrak River and Floodplain (Vulnerable) and Wolwedans Grassy Fynbos (Critically Endangered). The mapping of both resources is not completely accurate for the site, however, the threat status of both resources suggest that any remaining natural fynbos habitat is threatened and sensitive. Based on the site visit, the fynbos habitat that remains is considered to be representative of Garden Route Shale Fynbos and the forest is representative of Southern Afrotemperate Forest.

The WCBSP 2017 assigns the northern parts of the site as CBA 1 and CBA 2. ESA 2 is assigned to the area just to the south of this, and ESA 1 is assigned to the greater part of the central and southern parts of the site. In general the classifications are supported based on the site visit, however, the CBA 1 site in the south-eastern corner of the site is erroneously classified as a forest patch, however, the dense vegetation in this area is invasive species.

The Terrestrial Biodiversity sensitives assigned to the site are High, Medium and Low. Based on this the most sensitive areas are considered as No-go areas and excluded from the development footprint. An area of 11 ha is regarded as acceptable for cultivation and this will exclude (1) the High sensitivity areas, (2) most of the Medium sensitivity areas, (3) both SCC on the eastern side of the site, and (4) the important drainage line buffers on both sides of the site. This will also exclude the area classified as CBA 1 and 2 for the most part.

The areas included in the development footprint are not intact (Degraded to Highly degraded or Highly degraded) and only partially representative of the original fynbos ecosystem. The sensitivity of the Degraded to Highly degraded habitat is Medium, and the Highly degraded habitat is rated as Low sensitivity.

The proposed development will result in the permanent loss of habitat which is currently Degraded to Highly degraded or Highly degraded. The mitigation of avoidance, search and rescue and rehabilitation will result in the remaining habitat on the site improving in condition. This will improve the overall ecological functioning of the site by ensuring that the dominant vegetation is locally occurring indigenous vegetation. This will allow for better habitat for faunal species and improving plant/animal interactions such as pollination. The connectivity between the upper and lower elevations on the site will allow for better faunal movement between the site and surrounding areas. The occurrence of fires which are an important ecological driver for fynbos ecosystems may be reduced by increasing density of agricultural activities. Fire suppression will likely be practised around the cultivated areas, however, as

evident in 2017 fires may still occur. The drainage lines on either side of the site may become densely vegetated and this may exclude fire if forest species dominate.

The proposed development of 15 ha within the study area would result in the loss of Medium and High sensitivity vegetation, species of conservation concern and areas critical for ecological functioning such as river corridors. This loss is not supported from a Terrestrial Ecology perspective. An area of 11 ha has been mapped that excludes the most sensitive areas and species, and the development of this area is considered as acceptable from a Terrestrial Biodiversity perspective. However, the impacts will still need to be mitigated, and rehabilitation of the excluded areas is required. This will have a Low negative cumulative impact, and no change to the ecosystem threat status will occur as a result of the proposed development.

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APPENDIX 1: ASSESSMENT METHODOLOGY

For each impact, the **nature** (positive/negative), **extent** (spatial scale), **magnitude/intensity** (intensity scale), **duration** (time scale), **consequence** (calculated numerically) and **probability** of occurrence is ranked and described. These criteria would be used to ascertain the **significance** of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place.
The tables below show the rankings of these variables, and defines each of the rating categories.

Table 2: Assessment criteria for the evaluation of impacts

CRITERIA	RANK	DESCRIPTION
Nature	**Positive (+)**	The environment will be positively affected.
	Negative (-)	The environment will be negatively affected.
Extent or spatial influence of impact	**National (4)**	Beyond provincial boundaries, but within national boundaries.
	Regional (3)	Beyond a 10 km radius of the proposed activities, but within provincial boundaries.
	Local (2)	Within a 10 km radius of the proposed activities.
	Site specific (1)	On site or within 100 m of the proposed activities.
	Zero (0)	Zero extent.
Magnitude/ intensity of impact (at the indicated spatial scale)	**High (3)**	Natural and/ or social functions and/ or processes are *severely* altered.
	Medium (2)	Natural and/ or social functions and/ or processes are *notably* altered.
	Low (1)	Natural and/ or social functions and/ or processes are *slightly* altered.
	Zero (0)	Natural and/ or social functions and/ or processes remain *unaltered.*
Duration of impact	**Long Term (3)**	More than 10 years, but impact ceases after the operational phase.
	Medium Term (2)	Between 3 – 10 years.
	Short Term (1)	Construction period (up to 3 years).
	None (0)	Zero duration.
Consequence (Nature x (Extent + Magnitude/ Intensity + Duration))	**Extremely beneficial/ detrimental (10 – 11) (+/-)**	The impact is *extremely* beneficial/ detrimental.
	Highly beneficial/ detrimental (8 – 9) (+/-)	The impact is *highly* beneficial/ detrimental.

	Moderately beneficial/ detrimental (6 – 7) (+/-)	The impact is *moderately* beneficial/ detrimental.
	Slightly beneficial/ detrimental (4 – 5) (+/-)	The impact is *slightly* beneficial/ detrimental.
	Negligibly beneficial/ detrimental (1 – 3) (+/-)	The impact is *negligibly* beneficial/ detrimental.
	Zero consequence (0) (+/-)	The impact has zero consequence.
Probability of occurrence	**Definite (4)**	Estimated at a greater than 95% chance of the impact occurring.
	Probable (3)	Estimated 50 – 95% chance of the impact occurring.
	Possible (2)	Estimated 6 – 49% chance of the impact occurring.
	Unlikely (1)	Estimated less than 5% chance of the impact occurring.
	None (0)	Estimated no chance of impact occurring.

The **significance** of an impact is derived by taking into account the **consequence** (nature of the impact and its extent, magnitude/intensity and duration) of the impact and the **probability** of this impact occurring through the use of the following formula:

Significance Score = Consequence x Probability

The means of arriving at a significance rating is explained in Table 3.

Table 3: Definition of significance ratings

SIGNIFICANCE SCORE	SIGNIFICANCE RATINGS	
32 – 40	**High (+)**	**High (-)**
25 – 31	**Medium (+)**	**Medium (-)**
19 – 24	**Low (+)**	**Low (-)**
10 – 18	**Very-Low (+)**	**Very-Low (-)**
1 – 9	**Negligible**	

Once the significance of an impact has been determined, the **confidence** in the assessment of the impact, as well as the degree of **reversibility** of the impact and **irreplaceable loss of resources** would be determined using the rating systems outlined in Table 4, 5 and 6 respectively. Lastly, the **cumulative impact** is ranked and described as outlined in Table 7.

Table 4: Definition of confidence ratings

CONFIDENCE RATINGS	CRITERIA
High	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
Medium	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
Low	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

Table 5: Degree of reversibility

REVERSABILITY OF IMPACT	CRITERIA
High	High potential for reversibility.
Medium	Medium potential for reversibility.
Low	Low potential for reversibility.
Zero	Zero potential for reversibility.

Table 6: Degree of irreplaceability

IRREPLACEABLE LOSS OF RESOURCES	CRITERIA
High	Definite loss of irreplaceable resources.
Medium	Medium potential for loss of irreplaceable resources.
Low	Low potential for loss of irreplaceable resources.
Zero	Zero potential for loss of irreplaceable resources.

Table 7: Cumulative Impact on the environment

CUMULATIVE IMPACTS	CRITERIA
High	The activity is one of *several* similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the geographical, physical, biological, social, economic and cultural aspects of the environment.
Medium	The activity is one of a *few* similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the geographical, physical, biological, social, economic and cultural aspects of the environment.
Low	The activity is localised and might have a negligible cumulative impact.
Zero	No cumulative impact on the environment.

APPENDIX 2: ABBREVIATED CURRICULUM VITAE: GREG NICOLSON

Experience

- Expertise in field work in the CFR – vegetation surveys, plant identification, plant collection, ecological monitoring
- Data management and analysis
- Basic skills in GIS programs
- Vegetation and species mapping
- MSc thesis entitled *" Road reserves as conservation assets: exploring the species of conservation concern and the ecological condition of the N7 road reserve".* Graduation date: December 2010
- Experience leading teams of field assistants in remote mountainous areas
- Completed over 100 botanical survey/assessment reports

Career History

- 2019 – present: Co-founder and independent botanist at Capensis Ecological Surveys
- March 2013 – Dec 2018: independent botanical specialist and associate of Bergwind Botanical Surveys & Tours CC
- March 2011 – December 2012: conducted a comprehensive post fire survey of the Paardeberg (Paardeberg Sustainability Institute)

Education and qualifications

- Pr. Nat. Sci. (116488)
- MSc (Botany) – University of Cape Town (2010).
- BSc: Hons (Env. Science) – University of Cape Town (2005)
- BSc: Environmental and Geographical Science - University of Cape Town (2002 – 2004)

Personal Details

- Greg Nicolson
- 25 Dartmouth Road, Muizenberg, 7945
- Cell: 072 211 9843. Home: 021 709 0750
- greg@capensis.co.za
- Date of birth – 26/08/1981
- Marital status – Single
- Dependents – 3

APPENDIX 3: PLANT SPECIES SPECIALIST ASSESSMENT REPORT

1. Introduction

The relative plant species theme sensitivity for the site generated by the web-based Screening Tool (https://screening.environment.gov.za) is rated as "Medium" (Figure 1). "An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "medium sensitivity" for terrestrial plant species, must submit either a **Plant Species Specialist Assessment Report** or a **Plant Species Compliance Statement**, depending on the outcome of a site inspection undertaken in

accordance with paragraph 4" (Government Gazette 2020b). Plants listed as Species of Conservation Concern (SCC) have been identified at this site, and therefore a Plant Species Specialist Assessment Report is provided. This report has been compiled following the guidelines set out for the **Terrestrial Fauna and Terrestrial Flora Species Protocols for Environmental Impact Assessments in South Africa** (SANBI 2022).[1]

Figure 1. Map of relative plant species theme diversity.

2. Project Area of Influence (PAOI) and Sampling Density

In this case the PAOI is the areas surveyed during the site visit (Figure 2). No impacts are expected to occur outside of this area if the mitigation is successfully applied. 33 Waypoints were recorded in the 19 ha site making the sampling density 1.7 waypoints/hectare.

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

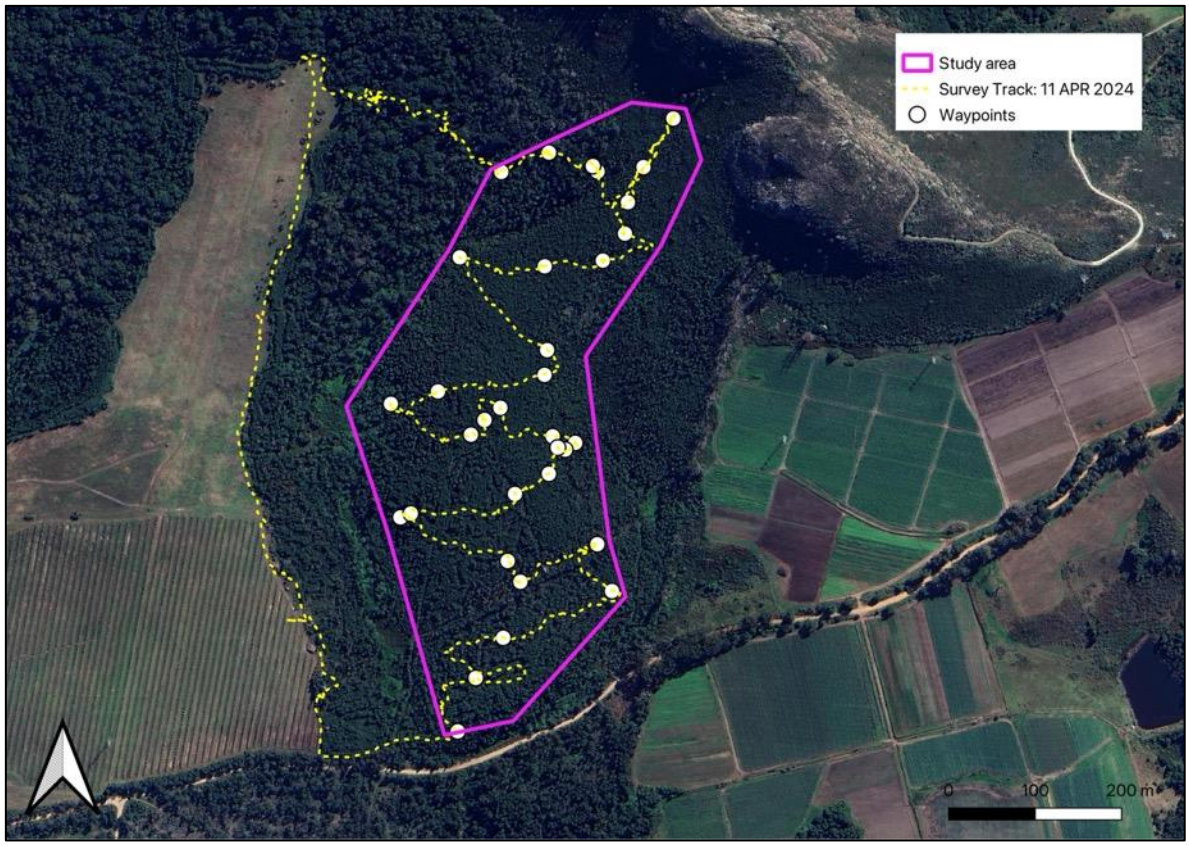

Figure 2. The map of the study area showing the survey tracks and waypoints recorded.

3. SCC within the study area

Three SCC were recorded during the site visits (See Figure 3 and Tables 1 – 4 below). The contents of tables 1 – 4 appears below:

Table 1: The SCC predicted to occur within the study area (based on the screening tool).
Table 2: The SCC confirmed within the study area.
Table 3: Additional details about the SCC confirmed or suspected to occur within the study area.
Table 4: Additional information on the SCC confirmed on the site or likely to be found on the site from The Red List of South African Plants website (www.redlist.sanbi.org)

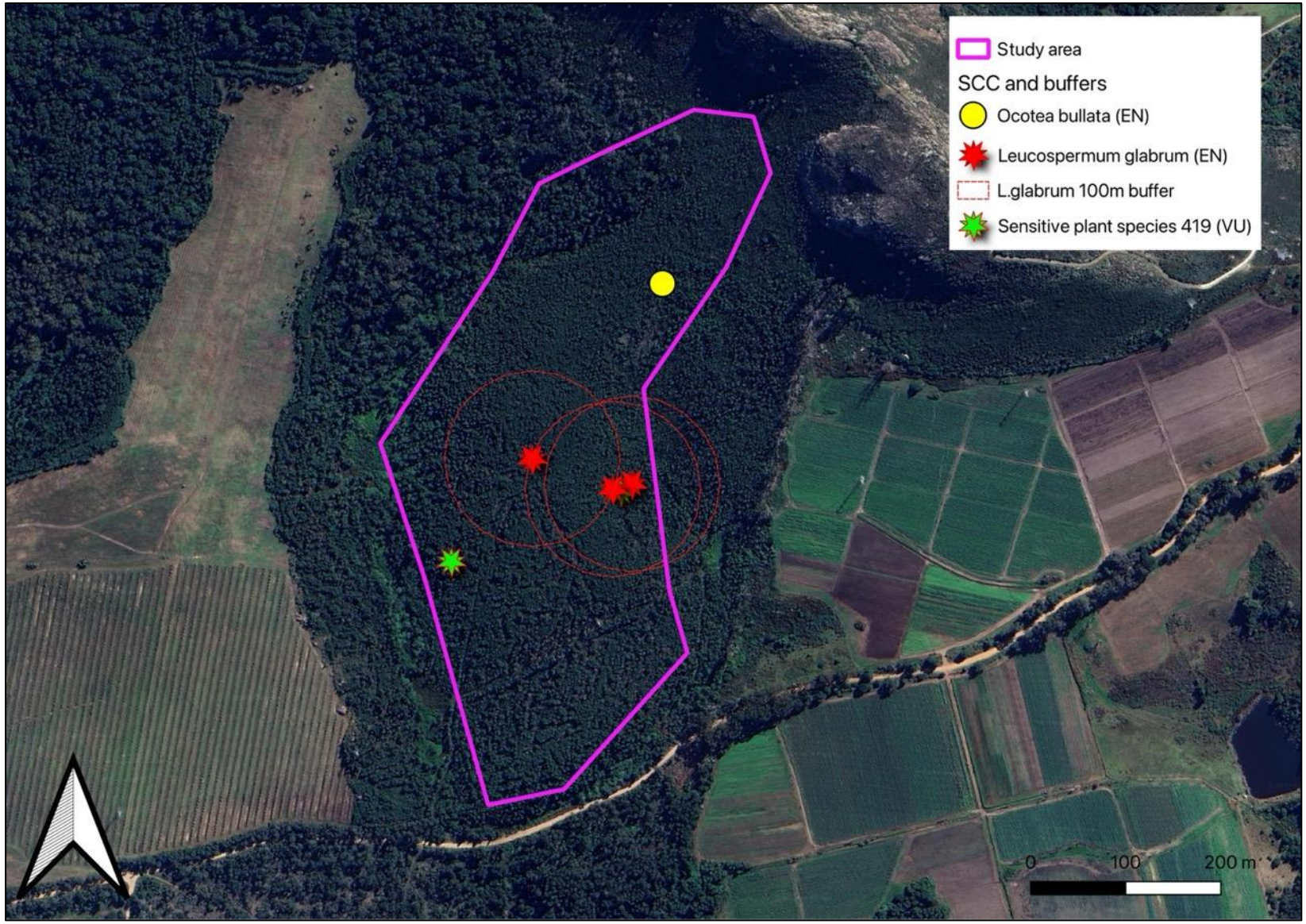

Figure 3. The map of the study area showing the SCC found in or surrounding the proposed development footprint.

Table1. Species predicted to be in the study area (by the screening tool) AND those not predicted in the screening tool that were found in the adjacent vegetation.

Species	***IUCN Status***	***Observed/Likelihood of***	***Justification for likelihood of occurrence***
Faurea macnaughtonii	*Rare*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Ocotea bullata	*EN*	*Confirmed*	
Aspalathus bowieana	*EN*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Amauropelta knysnaensis	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Leucospermum glabrum	*EN*	*Confirmed*	
Mimetes pauciflorus	*NT*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Mimetes splendidus	*EN*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Selago burchellii	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Nemesia elata	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Psydrax capensis	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Sensitive species 1081	*EN*	*No/Low*	*This species was not found on the site but was potentially missed due to seasonality of the survey and the high density of IAPs on the site. It is unlikely to have flowered under the high shading effects of the IAPs.*
Sensitive species 419	*VU*	*Confirmed*	
Erica aneimena	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Erica stylaris	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Erica glandulosa subsp. fourcadei	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Sensitive species 1024	*EN*	*No/Low*	*This species was not found on the site but was potentially missed due to seasonality of the survey and the high density of IAPs on the site. It is unlikely to have flowered under the high shading effects of the IAPs.*
Osteospermum pterigoideum	*EN*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Muraltia knysnaensis	*EN*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Sensitive species 1171	*Rare*	*No/Medium*	*This species was not found on the site but was potentially missed due to seasonality of the survey and the high density of IAPs on the site. It is unlikely to have flowered under the high shading effects of the IAPs.*

Erica glumiflora	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Acrolophia lunata	*EN*	*No/Medium*	*This species was not found on the site but was potentially missed due to seasonality of the survey and the high density of IAPs on the site. It is unlikely to have flowered under the high shading effects of the IAPs.*
Sensitive species 763	*VU*	*No/Medium*	*This species was not found on the site but was potentially missed due to seasonality of the survey and the high density of IAPs on the site. It is unlikely to have flowered under the high shading effects of the IAPs.*
Pterygodium cleistogamum	*VU*	*No/Medium*	*This species was not found on the site but was potentially missed due to seasonality of the survey and the high density of IAPs on the site. It is unlikely to have flowered under the high shading effects of the IAPs.*

Table 2. Plant Species of Conservation Concern found within the study area.

FAMILY	*Species*	*Status*	*Url link to observation(s)*
LAURACEAE	*Ocotea bullata*	**Endangered A2bd**	
PROTEACEAE	*Leucospermum glabrum*	**Endangered C2a(ii)**	
	Sensitive species 419	**Vulnerable B1ab(iii,v)+2ab(iii,v)**	*Not included*

Table 3. SCC confirmed on the site or likely to be found on the site

Species	**Distribution (Figure 3)**	**Viability**	**Population Size**	**Nature and extent of impact on SCC**	**Known population size* and AOO (Appendix 8 of Guidelines) and loss**	**Conservation importance of SCC**

Ocotea bullata	Occurs within the Intact forest habitat adjacent to the site. One seedling was found within the site in an area dominated by IAPs	Unlikely to persist in the long term.	Only one plant seen but more seedlings likely to occur under the IAPs	Loss of these individuals	AOO 34.47 km² AOO lost is 0.001/34.47x100 = 0.003%.	This species still persists in the proper forest habitat adjacent to the study area. The seedling that has come up in the site is likely to occur in a n area previously fynbos before it was invaded by IAPs and therefore not the proper habitat. Seeds are likely spread by birds perching in the IAPs. If this individual (and potentially some others) are lost, no change in conservation status will occur.
Leucospermum glabrum	Three sub-populations were found in the study area, one is central and the other two occur on the eastern side of the site.	Viable in the medium term, but may be lost in the long term if no control of IAPs occurs.	Estimated as 15 plants in all three subpopulations.	With the avoidance mitigation applied, these sub-populations should persist.	If they were to be lost: AOO 77.93 km² AOO lost is 0.01/77.93x100 = 0.01%.	With the avoidance mitigation applied, these sub-populations should persist. No change in conservation status will occur.
Sensitive species 419	Two sub-populations were found in the study area, one on the west side and one on the east side.	Viable in the medium term, but may be lost in the long term if no control of IAPs occurs.	Estimated as 5 plants that were observed but likely to be more common in the right habitat	With the avoidance mitigation applied, one sub-populations should persist. The other will be marked for 'search and rescue'.	AOO 1.16 km² AOO lost is 0.001/1.16x100 = 0.08%.	With the avoidance mitigation applied, one sub-populations should persist and the other should re-establish with search and rescue. No change in conservation status will occur.

* Derived from the Red List of South African Plants (www.redlist.org.za)

Table 4. Additional information on the SCC confirmed on the site or likely to be found on the site from The Red List of South African Plants website (www.redlist.sanbi.org)

Name	Justification	Range	Habitat Description	Threats	Population
Ocotea bullata	The species was heavily exploited for the timber industry in the past, and more recently for bark for the traditional medicine trade. Despite its wide, but disjunct, distribution, subpopulations in at least 53% of its range have been heavily exploited, rendering them extinct, near-extinct, rare, scarce or fragmented. We estimate a minimum of 50% population reduction in the last 240 years (generation length 80 years).	It is widespread in South Africa from the Cape Peninsula to the Wolkberg Mountains in Limpopo.	Plants grow in high, cool, evergreen Afromontane forests.	The main threats to Ocotea bullata are timber logging in the past, and bark harvesting in the recent past, present and future.	Decreasing
Leucospermum glabrum	Leucospermum glabrum is a restricted endemic with an extent of occurrence (EOO) ranging between 1620 and 1642 km², and an area of occupancy (AOO) of between 152 and 156 km². This species occurs as scattered small subpopulations with the total population not exceeding 2500 mature individuals, and each subpopulation having fewer than 250 plants. The mountains where this species occurs have been extensively surveyed during the 1990s as part of the Protea Atlas Project and again between 2005 and 2018 by citizen scientists working as part of the Custodians of Rare and Endangered Wildflowers programme. It is highly unlikely that there are large unrecorded subpopulations. Invasive alien plants and incorrect fire return intervals and burn season is resulting in an ongoing decline in the number of mature individuals. This species therefore qualifies as Endangered under criterion C.	This species is endemic to the Outeniqua and Tsitsikamma Mountains in the southern Cape, South Africa.	It occurs on wet south slopes in sandstone fynbos. Mature individuals are killed by fires, and only seeds survive. Seeds are released after ripening, and dispersed by ants to their underground nests, where they are protected from predation and fire. This species is pollinated by birds.	There has been a loss of 36% of this species habitat in the past mainly to afforestation, this threat is no longer ongoing, but remaining subpopulations are small and isolated and are impacted by fires in the incorrect season as well as too frequent fire return intervals. Invasive alien plants are also causing ongoing degradation of habitat and loss of mature individuals.	This species is known from scattered isolated subpopulations over a 110 km stretch of mountains. Between 15 and 18 subpopulations are known today, it is possible that three have been lost since they were recorded in the late 1990s but resurveying of these sites has not taken place. This species is still extant at 15 subpopulations all are smaller than 250 individuals and 9 have fewer than 10 plants. Decline in the number of mature individuals is ongoing in response to inappropriate fire management and loss to invasive alien plant species.
Sensitive species 419	A rare, range-restricted species (EOO 1310 km²), known from fewer than 10 locations and declining due to ongoing	George to Humansdorp.	Damp sandstone slopes in coastal fynbos.	Historically, a large proportion of this species' habitat has been	This species is extremely rarely recorded, and most records are old. During recent field

	habitat loss and degradation, as well as competition from alien invasive plants.			converted to timber plantations, especially around George and Knysna. Plantations are no longer expanding, but are associated with severe ongoing degradation, particularly the spread of escaped seedlings, which have become invasive in many areas and are outcompeting native species. Around George it is also threatened by ongoing habitat loss to urban expansion.	surveys, it was found to be extremely rare in the field, and most of its habitat is severely degraded (P. Wilkin pers. obs.). There are very few known existing locations, but it may be easily overlooked in dense fynbos. It is declining due to ongoing habitat loss and degradation.

3. Site Ecological Importance (SEI)(Derived from SANBI 2022 Guidelines)

SEI is considered to be a function of the biodiversity importance (BI) of the receptor (e.g. species of conservation concern, the vegetation/fauna community or habitat type present on the site) and its resilience to impacts (receptor resilience [RR]) as follows:

EI = BI + RR

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

BI = CI + FI

SEI Calculation for Development Footprint

The SEI for each habitat has been calculated according to the Species Guidelines (SANBI, 2022)(Table 5) and the appropriate mitigation suggested for each SEI category is provided in Table 6.

Table 5. Calculation of SEI ratings for each habitat and the relevant fulfilling criteria for the proposed development.

Habitat	Conservation Integrity	Functional Integrity	Receptor Resilience	Site Ecological Importance
Intact Forest	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining	**Very High** No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing).	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Very High**
Semi-intact Fynbos	**High** Small area (> 0.01% but < 0.1% of the total ecosystem type	**Very High** No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing).	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have	**Very High**

	extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type.		a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	
Degraded fynbos and Degraded forest	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining.	**Medium** Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium**
Degraded to Highly degraded fynbos	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining.	**Medium** Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium**
Highly degraded	**Low** < 50% of receptor contains natural habitat with limited potential to support SCC.	**Low** Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Low**

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.

The habitats within the study area with a Very High SEI have been avoided by the proposed layout. The some of the Medium SEI habitat will also be avoided, however some Medium SEI habitat will be lost. The remainder will be restored. The Low SEI habitat has been targeted for development.

4. Impacts and Mitigation

The loss of species of conservation concern from within the proposed development footprint would be Medium negative and can be mitigated to Low if the SCC proposed mitigation measures are implemented (refer to section 9 of the Terrestrial Biodiversity Report).

5. Buffers

The SCC buffers appear in Figure 3. The 200m buffer around the Endangered and Vulnerable cannot be applied and allow any potential of development. A 100m buffer has been placed around the Endangered *Leucospermum glabrum* subpopulation on the eastern side of the site. This has been slightly modified to include the central subpopulation of *L. glabrum*. This buffer also incorporates the eastern subpopulation of Sensitive species 419. These buffers are deemed as appropriate to sufficiently protect the SCC on the site, and in conjunction with the other mitigation measures will ensure their persistence on the site.

6. Conclusion

This plant species specialist assessment report has been compiled according to the relevant legislation using the guidelines provided. The impact on SCC of the proposed development is Low negative if mitigation is carried out. The Site Ecological Importance is Very High, Medium or Low. The appropriate mitigation of Avoidance and restoration has been recommended for the site, and the proposed development of 11h is supported.

7. Content of report requirement and relevant sections

		Section or page of report
2.1	The assessment must be undertaken by a specialist registered with the South African Council for Natural Scientific Professions (SACNASP), within a field of practice relevant to the taxonomic groups ("taxa") for which the assessment is being undertaken.	Page ii and Appendix 3
2.2	The assessment must be undertaken within the study area.	It was
2.3	The assessment must be undertaken in accordance with the *Species Environmental Assessment Guideline*[23] and must:	
2.3.1	Identify the SCC which were found, observed or are likely to occur within the study area;	Tables 1 and 2 in Appendix 4
2.3.2	provide evidence (photographs) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility[24] immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3).	Tables 1 and 2 in Appendix 4
2.3.3	identify the distribution, location, viability[25] and detailed description of population size of the SCC identified within the study area.	Table 2 and 3 in Appendix 4
2.3.4	identify the nature and the extent of the potential impact of the proposed development to the population of the SCC located within the study area.	Section 9
2.3.5	determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases.	Table 3 in Appendix 4
2.3.6	determine the potential impact of the proposed development on the habitat of the SCC located within the study area.	Table 3 in Appendix 4
2.3.7	include a review of relevant literature on the population size of the SCC, the conservation interventions as well as any national or provincial species management plans for the SCC. This review must provide information on the need to conserve the SCC and indicate whether the development is compliant with the applicable species management plans and if not, a motivation for the deviation;	Table 3 in Appendix 4
2.3.8	identify any dynamic ecological processes occurring within the broader landscape, that might be disrupted by the development and result in negative impact on the identified SCC, for example, fires in fire-prone systems.	N/A
2.3.9	identify any potential impact on ecological connectivity within the broader landscape and resulting impacts on the identified SCC and its long term viability.	N/A
2.3.10	determine buffer distances as per the *Species Environmental Assessment Guidelines* used for the population of each SCC; and	Section 4 of Appendix 4
2.3.11	discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, *Data Deficient or Near Threatened Species, as well as any undescribed species26; and*	Table 1 of Appendix 4.
2.3.12	identify any alternative development footprints within the preferred development site which would be of "low" sensitivity" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification.	N/A

APPENDIX 4: MINIMUM CONTENT REQUIREMENTS FOR TERRESTRIAL BIODIVERSITY SPECIALIST REPORTS AS PER PROTOCOL FOR THE SPECIALIST ASSESSMENT OF ENVIRONMENTAL IMPACTS ON TERRESTRIAL BIODIVERSITY (GN 320 OF 20 MARCH 2020)

Protocol ref	**Terrestrial Biodiversity Specialist Assessment Report Content**	**Section / Page**
3.1.1.	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page ii and Appendix 3
3.1.2.	a signed statement of independence by the specialist;	Page iii
3.1.3.	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 5
3.1.4.	a description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Section 5
3.1.5.	a description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 5
3.1.6.	a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 8
3.1.7.	additional environmental impacts expected from the proposed development;	Section 9
3.1.8.	any direct, indirect and cumulative impacts of the proposed development;	Section 9
3.1.9.	the degree to which impacts and risks can be mitigated;	Section 9
3.1.10.	the degree to which the impacts and risks can be reversed;	Section 9
3.1.11.	the degree to which the impacts and risks can cause loss of irreplaceable resources;	Section 9
3.1.12.	proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 9
3.1.13.	a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	N/A
3.1.14.	a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Section 10
3.1.15.	any conditions to which this statement is subjected.	Section 10

DECLARATION OF THE SPECIALIST

Note: Duplicate this section where there is more than one specialist.

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

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

23 May 2024

Signature of the Specialist: Date:

Capensis Ecological Consulting

Name of company (if applicable):