VEGETATION ASSESSMENT:

Erf 2003, Wilderness, George District, Western Cape Province

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Declaration of Independence & Summary of Expertise

Appointment of specialist

David Hoare of David Hoare Consulting (Pty) Ltd was commissioned by Eco-Route Environmental Consultants to provide specialist consulting services for the amendment to the environmental authorisation of Erf 2003 in Wilderness in the George District, Western Cape Province. The consulting services comprise an assessment of potential impacts on the flora and vegetation in the study area due to proposed amendment.

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Summary of expertise

Dr David Hoare:

- Dr Hoare has majors in Botany and Zoology with distinction from Rhodes University, Grahamstown, an Honours Degree (with distinction) in Botany from Rhodes University, an MSc (cum laude) from the Department of Plant Science, University of Pretoria, and a PhD in Botany from the Nelson Mandela Metropolitan University, Port Elizabeth with a focus on grassland diversity.
- Registered professional member of The South African Council for Natural Scientific Professions (Ecological Science, Botanical Science), registration number 400221/05.
- Founded David Hoare Consulting (Pty) Ltd, an independent consultancy, in 2001.
- Ecological consultant since 1995, with working experience in Gauteng, Mpumalanga, Limpopo, North West, Eastern Cape, Western Cape, Northern Cape and Free State Provinces, Tanzania, Kenya, Mozambique, Zimbabwe, Botswana and Swaziland.
- Conducted, or co-conducted, over 500 specialist ecological surveys as an ecological consultant. Areas of specialization include general ecology, biodiversity assessments,

vegetation description and mapping, plant species surveys and remote sensing of vegetation. Has undertaken work in grassland, thicket, forest, savannah, fynbos, coastal vegetation, wetlands and Nama-Karoo vegetation.
- Published six technical scientific reports, 15 scientific conference presentations, seven book chapters and eight refereed scientific papers.
- Attended 15 national and international congresses & 5 expert workshops, lectured vegetation science / ecology at 2 universities and referee for 2 international journals.

Independence

David Hoare Consulting (Pty) Ltd and its Directors have no connection with the proponent. David Hoare Consulting (Pty) Ltd is not a subsidiary, legally or financially, of the proponent. Remuneration for services by the proponent in relation to this project is not linked to approval by decision-making authorities responsible for authorising this proposed project and the consultancy has no interest in secondary or downstream developments as a result of the authorisation of this project. David Hoare Consulting (Pty) Ltd is an independent consultant to the Environmental Assessment Practitioner and has no business, financial, personal or other interest in the activity, application or appeal in respect of which he was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of this specialist performing such work.

Indemnity and conditions relating to this report

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. David Hoare Consulting cc and its staff reserve the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

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Contents

Introduction

This document presents the results of the flora and vegetation assessment of the study site, based on a desktop and field assessment, as well as mapping from aerial imagery.

On 3 March 2021 David Hoare Consulting (Pty) Ltd was appointed by Eco-Route Environmental Consultants to undertake an assessment of the flora and vegetation of the site.

The requirement of the study was to assess the sensitivity of the vegetation of the site and to assess the possibility of any threatened plant species occurring there.

Terms of reference and approach

The fundamental requirement for this study is the compilation of a site screening / sensitivity report which adheres to the following:

- The Initial Site Sensitivity Verification reporting requirements for environmental themes in terms of section 24(5)(a) and (h) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).
- Identification of any discrepancies with the environmental sensitivity as identified on the national web based environmental screening tool.
- Identification of the sensitive areas to be avoided (including corresponding spatial data) for each site.

The intention of the study was to provide an assessment of potentially sensitive vegetation or plant species features on site that may be negatively impacted by development of the site. The study was to include a site visit to assess the habitat on site with the view of making judgements on:

1. the condition of the vegetation on site;
2. the sensitivity and conservation value of vegetation on site;
3. the suitability of habitat for threatened plant species.

The study was to cover the remaining areas of natural vegetation on the site. The following information was to be provided in the report:

- To provide a description of the broad vegetation types and/or habitats for the area, including any areas of potential conservation value. This will be based on published sources, including the vegetation map of South Africa (Mucina et al. 2006), the National

Spatial Biodiversity Assessment and any Biodiversity Conservation Plans that exist for Western Cape Province.

- To provide the national conservation status of major vegetation types in which the study sites are located, as listed in The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004).
- To provide an assessment of the Red and Orange List (threatened, near threatened and declining) flora species that could occur in the project study area, including information on habitats in which they are most likely to be encountered.
- To investigate the potential presence of trees protected according to the National Forests Act and flora protected under the National Environmental Management: Biodiversity Act.
- To provide a list of the declared weeds or alien invader species on site, according to the Alien and Invasive Species (AIS) Regulations, in terms of Section 97(1) of NEM:BA, published in Government Notice R598 in Government Gazette 37885 in 2014 (NEM:BA, 2014). The Alien and Invasive Species (AIS) lists, published in Government Notice R 864 of 29 July 2016 (NEM:BA, 2016), lists declared weeds and invaders in one of the following categories:
    - Category 1a: Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
    - Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
    - Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Cat 2 plants to exist in riparian zones.
    - Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Cat 3 plants to exist in riparian zones.
- To compile an assessment and map of the general status of vegetation on site in order to provide a description of which areas contain natural habitat versus those that are transformed and/or degraded.

Desktop description of study area

This section provides a description of the location of the study area as well as an outline of the background biodiversity information known for the study area.

Study area

Location

The site is located on the slopes overlooking the sea just to the west of Wilderness. This is just inland of the N2 National Road between Wilderness and George (Figure 1). The Kaaiman's River mouth is a short distance south-west of the site, and Map of Africa is just to the north. It is accessed from Remskoen road, which branches off of Heights road, which is the road between Wilderness and the Seven Passes Road. The site is within the quarter degree grid 3322DC Wilderness.

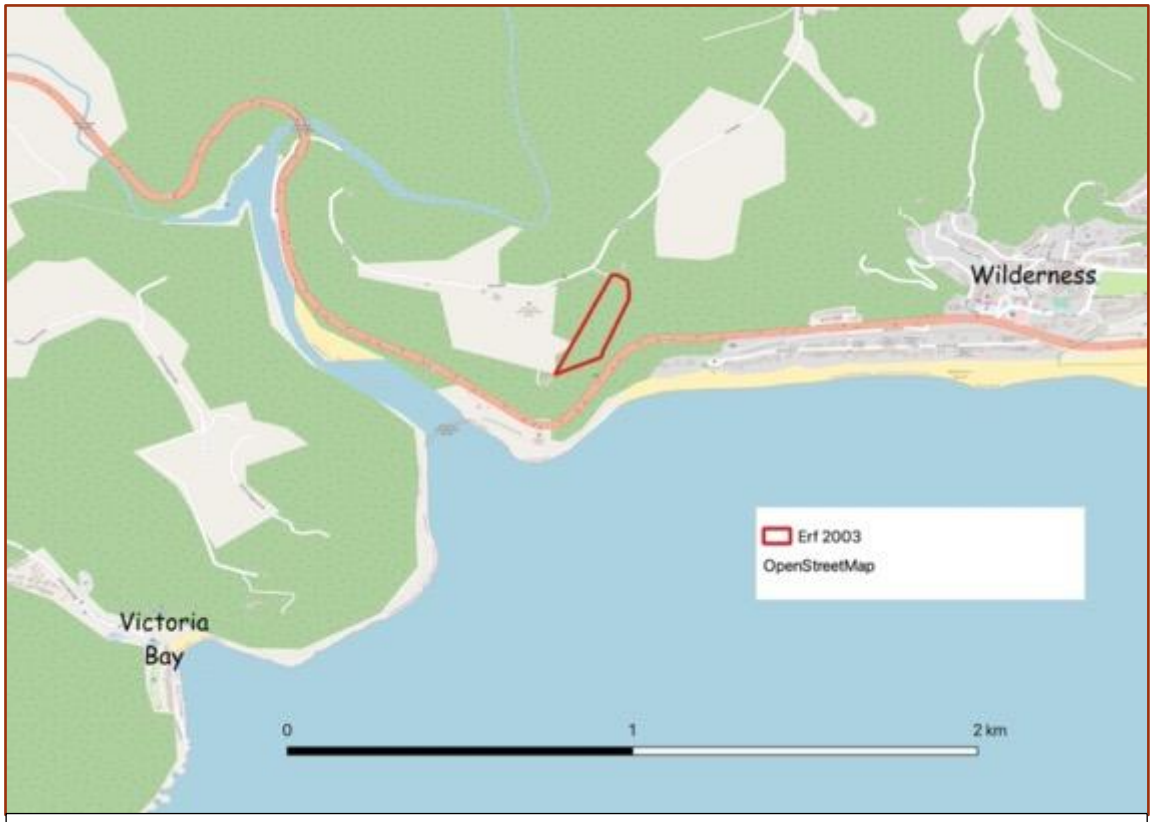

Figure 1: Location of the site.

The site is in a property that is within an area of coastal thicket / forest (Figure 2). It is on a relatively steep sea-facing slope with a drainage valley passing through the centre of it in a south-easterly direction. The slope summits on Remskoen Road just to the north of the site.

The entire site is currently in a natural state, althgough there are localised distrubances on site (under the vegetation canopy) that are not visible from aerial imagery. Surrounding areas consist mostly of the same type of vegetation, except for the grassy old lands to the west (see Figure 2). The access road to the site is off of Remskoen Road, and it curls around the northern boundary of the site (only the first part is visible in Figure 2).

Figure 2: Aerial image of the site and surrounding areas dated 23 April 2021.

An older aerial image (dated April 2011) (Figure 3) shows the access road more clearly. It also shows that the forested areas between the site and Remskoen Road are moderately disturbed and were partly lost at that date.

The proposal is to construct a small number of units within the forest camopy in such a way as to disturb the minimum amount of existing habitat. The proposal is to put the units onto stilts so

that the forest floor is also left mostly intact. The units are proposed to be located as close as possible to the access road coming into the site along the northern boundary.

Figure 3: Aerial image of the site dated 15 October 2020.

Regional vegetation patterns in relation to the site

A description of the regional vegetation type is provided here, because it provides an expectation of the vegetation composition in the event that remaining patches of indigenous vegetation occur on site.

According to the most recent vegetation map of the country (SANBI, 2018) the entire site falls within one regional vegetation type, namely Garden Route Shale Fynbos (FFh9) (Figure 4). It is very clear from aerial imagery, as well as from observations on the ground that the site is NOT fynbos vegetation but some form of woodland or forest. The two nearest vegetation types, other than Garden Route Shale Fynbos, are Goukamma Dune Thicket (At36) and Southern Afrotemperate Forest (FOz1). The vegetation structure suggests that it falls within one of these two vegetation types. Goukamma Dune Thicket is a coastal vegetation type, usually located on

consolidated dune sand and in typically coastal habitats, which is not the case for this site, although the site is directly sea-facing. All of the inland river valleys associated with the Kaaimans River and Swart River systems and tributary valleys are all mapped as being Southern Afrotemperate Forest. The vegetation on site is therefore expected to most resemble Southern Afrotemperate Forest, but with some coastal elements from Goukamma Dune Thicket.

Southern Afrotemperate Forest

Distribution: The vegetation type is found in the Western Cape, the Eastern Cape and also (only a few patches) in the Northern Cape Provinces: The largest complex is found in the southern Cape along the narrow coastal strip (250 km long) between Humansdorp in the east and Mossel Bay in the west (Knysna-Tsitsikamma forest region)—here occurring on sheltered seaward slopes, plateaux and coastal scarps. The easternmost outlier forest patches occur near Port Elizabeth, while westwards floristically impoverished forms of these forests occur along the feet of south- and east-facing slopes and in deep kloofs and ravines of the Cape Fold Belt mountains as far as the Cape Peninsula in the west. The northernmost localities are near Vanrhynsdorp Pass and in

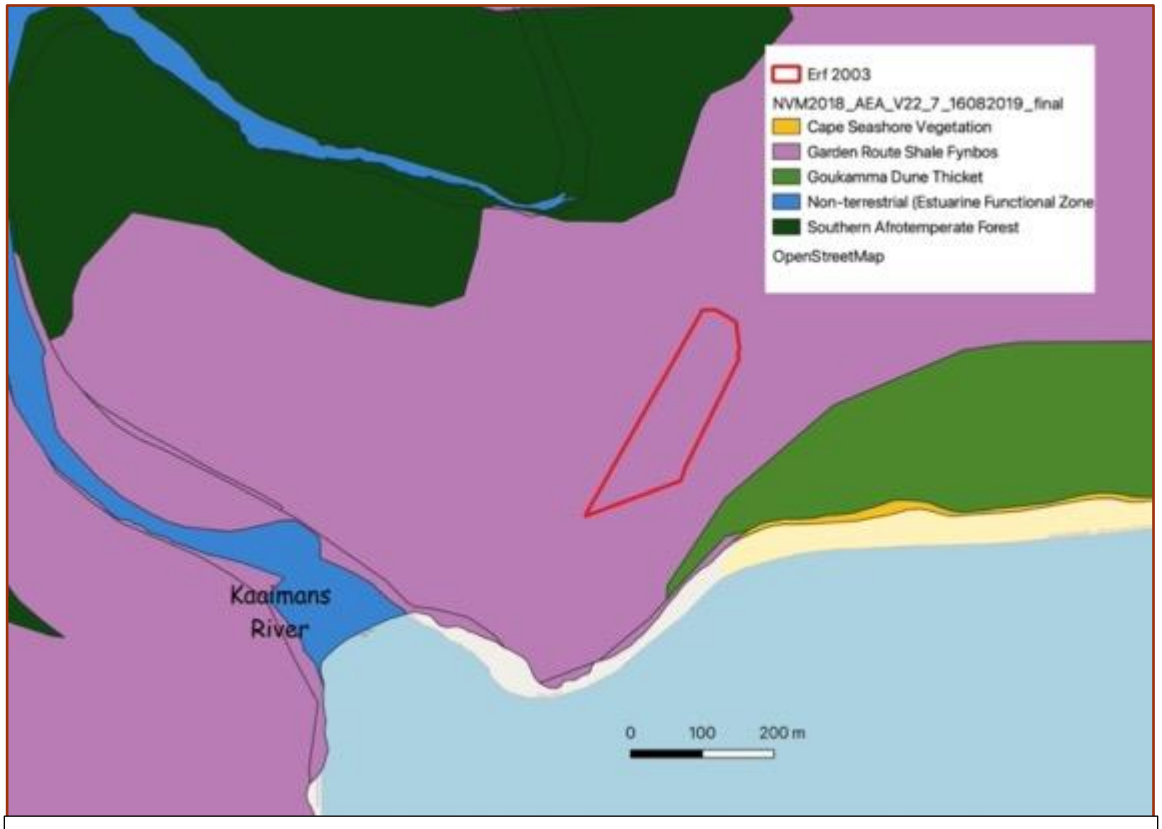

Figure 4: Regional vegetation types of the site and surrounding areas.

the Matsikamma Mountains. It occurs at altitudes ranging from about 10 m (Tsitsikamma region) to 600 m (most of patches), with notable outliers occurring as high as 1 060 m.

Vegetation & Landscape Features: This is a 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.

Geology & Soils: Soils varying from shallow (and skeletal) Mispah, Glenrosa and Houwhoek forms to sandy humic Fernwood form, derived from Table Mountain Group sandstones and shales of the Cape Supergroup and partly also from Cape Granite.

Important Taxa:

Tall Trees: *Afrocarpus falcatus* (d), *Cunonia capensis* (d), *Curtisia dentata* (d), *Nuxia floribunda* (d), *Ocotea bullata* (d), *Olinia ventosa* (d), *Podocarpus elongatus* (d), *P. latifolius* (d), *Pterocelastrus tricuspidatus* (d), *Rapanea melanophloeos* (d), *Ilex mitis*, *Olea capensis* subsp. *macrocarpa*.

Small Trees. *Canthium inerme* (d), *Cassine peragua* (d), *Diospyros whyteana*.

Tree Fern: *Cyathea capensis* (d).

Herbaceous Climber: *Cissampelos torulosa*.

Epithytic Herb: *Angraecum pusillum*.

Tall Shrubs: *Burchellia bubalina* (d), *Trichocladus crinitus* (d), *Sparrmannia africana*.

Geophytic Herbs: *Blechnum capense* (d), *B. tabulare* (d), *Dietes iridioides* (d), *Rumohra adiantiformis* (d), *Todea barbara* (d), *Oxalis incarnata*.

Graminoid: *Oplismenus hirtellus* (d).

Biogeographically Important Taxa ([CE]ndemic of Capensis, [W]Western distribution limit) Tall Trees: *Brabejum stellatifolium*[C], *Ochna arborea* var. *arborea*[W]. Small Trees: *Gonioma kamassi*[W] (d), *Heeria argentea*[C] (d), *Metrosideros angustifolia*[C] (d), *Allophylus decipiens*[W], *Brachylaena neriifolia*[C], *Cassine schinoides*[C], *Lachnostylis hirta*[C], *Virgilia divaricata*[C]. Woody Climber: *Asparagus scandens*[C]. Epiphytic Herb: *Mystacidium capense*[W]. Tall Shrub: *Laurophyllus capensis*[C]. Herb: *Gerbera cordata*[W], *Streptocarpus rexii*[W]. Geophytic Herbs: *Liparis capensis*[C]. Graminoids: *Ischyrolepis subverticillata*[C], *Schoenoxiphium lanceum*[C].

Endemic Taxa Tall Tree: *Platylophus trifoliatus* (d). Small Trees: *Apodytes geldenhuysii*, *Cryptocarya angustifolia*, *Virgilia oroboides* subsp. *ferruginea*, *V. oroboides* subsp. *oroboides*. Megaherb: *Strelitzia alba* (d). Geophytic Herbs: *Amauropelta knysnaensis*, *Clivia mirabilis*, *Freesia sparrmannii*, *Polystichum incongruum*.Graminoid: *Schoenoxiphium altum*.

Remarks Southern Afrotemperate Forests are species-poorer than those of the mistbelt, but they still support some woody (palaeo)endemic elements such as *Cunonia capensis*, *Cryptocarya angustifolia*, *Heeria argentea*, *Metrosideros angustifolia*, *Platylophus trifoliatus*, *Podocarpus latifolius* and *Afrocarpus falcatus*.

Goukamma Dune Thicket

Distribution: The vegetation type is found in the Western Cape Provinces in coastal stretches from Victoria Bay near Wilderness to the Knysna Heads, with smaller areas along the coast from Robberg Peninsula near Plettenberg Bay eastward to Keurboom strand. The altitude range is 1 – 203 m.

Vegetation & Landscape Features: On flat to moderately undulating coastal dunes. A mosaic of low to tall (1 - 5 m), dense thicket, dominated by small trees and woody shrubs with lianas abundant, in a mosaic of low (1 - 2 m) asteraceous fynbos. Thicket clumps are best developed in fire-protected dune slacks, which occasionally also support pockets of coastal forest (*Celtis africana, Ekebergia capensis, Searsia chirindensis*). The fynbos shrubland occurs on upper dune slopes and crests where succulents may be common in more open areas.

Geology & Soils: The area is dominated by Strandveld and Wankoe Formations. The dominant land types in the areas where the vegetation type occurs are the Hb land type.

Climate: Non-seasonal rainfall dominates the region with MAP between 588 and 859 mm. Frost is present for approximately 3 days per year. The mean monthly maximum and minimum temperatures are 26.7°C and 7.9°C for February and July, respectively.

Important Taxa

Small tree: *Pterocelastrus tricuspidatus* (d), *Schotia afra*, *Sideroxylon inerme* (d), *Tarchonanthus littoralis* (d).

Tall tree: *Afrocarpus falcatus, Calodendrum capense, Celtis africana, Ekebergia capensis, Olea capensis, Searsia chirindensis*.

Succulent shrub: *Carpobrotus acinaciformis* (d), *Cotyledon orbiculata, Crassula nudicaulis, Euphorbia muirii, Gasteria acinacifolia, Zygophyllum morgsana.*

Low shrub: *Eriocephalus paniculatus* (d), *Felicia echinata* (d), *Helichrysum patulum* (d), *Indigofera erecta* (e), *Muraltia spinosa* (d), *Salvia africana-lutea* (d), *Muraltia knysnaensis* (e), *Selago burchellii (e).*

Graminoid: *Restio eleocharis* (d), *Stenotaphrum secundatum* (d), *Thamnochortus insignis* (e).

Tall shrub: *Azima tetracantha, Carissa bispinosa, Mystroxylon aethiopicum, Cassine peragua (d), Cussonia thyrsiflora (e), Erica glandulosa subsp. fourcadei (e), Euclea racemosa (d), Grewia*

occidentalis, Gymnosporia capitata (e), Lauridia tetragona (d), Maytenus procumbens (d), Metalasia muricata (d), Morella cordifolia (e), Mystroxylon aethiopicum subsp. aethiopicum (d), Olea exasperata (d), Osteospermum moniliferum, Ptaeroxylon obliquum, Passerina rigida (e), Putterlickia pyracantha (e), Robsonodendron maritimum (e), Scutia myrtina, Searsia crenata (d), Searsia glauca (d), Searsia lucida, Searsia pterota (e), Zanthoxylum capense

Herb: *Indigofera erecta* (e)

Woody succulent climber: *Cynanchum viminale*

Herbaceous climber: *Cynanchum ellipticum, Rhoicissus digitata, Solanum africanum*

Vegetation conservation status

National status

Garden Route Shale Fynbos is listed as Vulnerable in The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004). The other two vegetation types are listed as LEast Concern, but may be protected in terms of the National Forests Act.

Table 3: Conservation status of vegetation types occurring in the study area, according to Mucina et al. 2005 and the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).

Vegetation Type	Status (SANBI 2018)	Status (NEMBA)
Garden Route Shale Fynbos	Endangered	Vulnerable
Southern Afrotemperate Forest	Least Concern	Not listed
Goukamma Dune Thicket	Least Concern	Not listed

Provincial C-Plan status

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

1. Protected Areas (PA);

2. Critical Biodiversity Areas 1 (CBA1);
3. Critical Biodiversity Areas 2 (CBA2);
4. Ecological Support Area 1 (ESA1);
5. Ecological Support Area 2 (ESA2);
6. Other Natural Areas (ONA).

The WCBSP map for George shows that the entire site is within a CBA1 area (Figure 5). This CBA1 area continues beyond the boundaries of the site. This indicates that the remaining vegetation on site is considered to be highly important for the conservation of biodiversity in the Province as well as for maintaining ecological patterns in the landscape. There is also an Ecological Support Area running through the site that corresponds with the main drainage line. The reasons provided for the CBA1 categorisation are: Critically Endangered Vegetation variant, ecological processes, indigenous forest type, threatened SA vegetation type, threatened vertebrate, water resource protection.

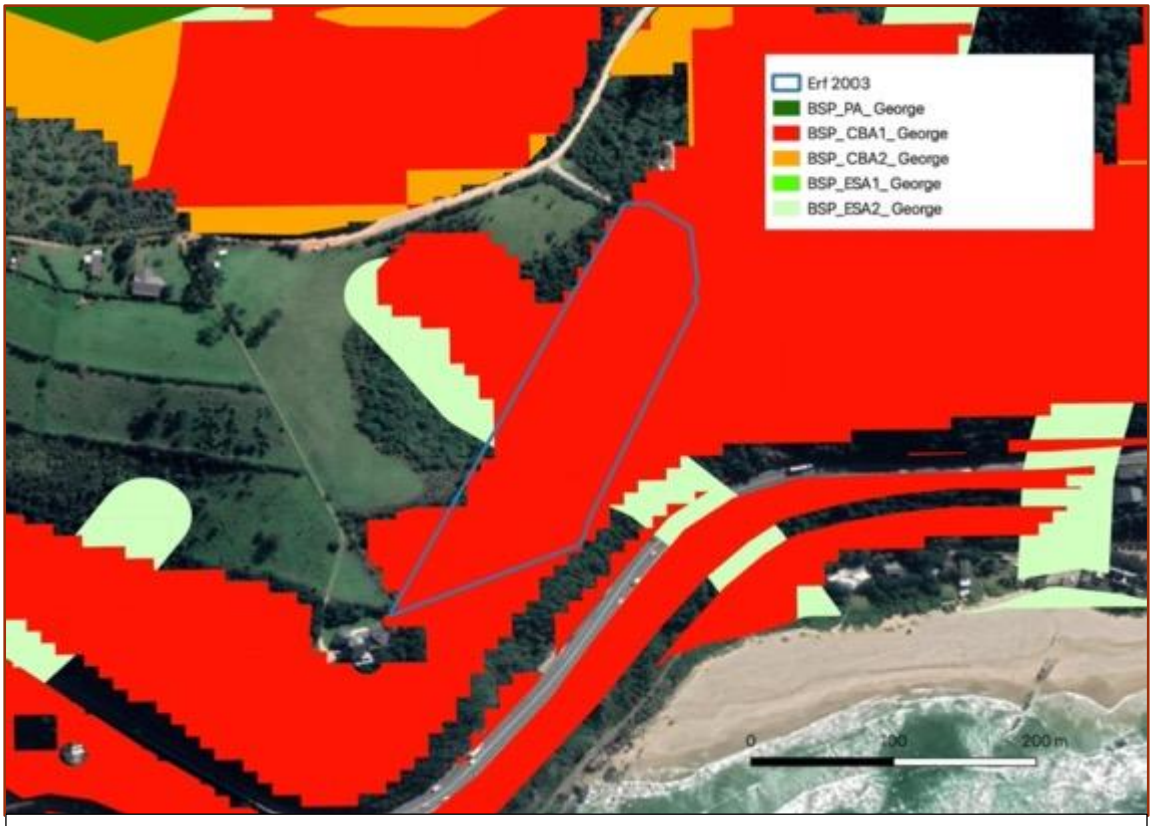

Figure 5: Western Cape Biodiversity Spatial Plan of the site and surrounding areas.

Plant species of concern

Listed threatened and near-threatened species known for the geographical area in which the site is located are listed in Appendix 1. The list contains 51 species assessed as threatened or near threatened according to IUCN Ver. 3.1 (IUCN, 2001) criteria (Appendix 1).

The probability of finding any of these species was then assessed by comparing the habitat requirements with those habitats that were found on site during the field survey of the site. On the basis of habitat preferences the species could be allocated to habitats within the study area where they are most likely to be found.

There were 51 threatened or near threatened plant species with a geographical distribution that includes the site. Habitat preferences and observation records were analysed to assess the risk of any of these species occurring on site or not (see Appendix 1).

Four of these species were assessed as having a high possibility of occurring on site, and/or have been seen in nearby areas in similar habitat (see Appendix 1 for analysis). These are all forest species and are as follows:

- *Thelypteris knysnaensis* (Knysna Wood Fern) - Vulnerable
- *Dioscorea mundii* - Near Threatened
- *Ocotea bullata* (Cape Stinkwood) - Endangered
- *Psydrax capensis* (Cape Forest Quar) - Vulnerable

The Knysna Wood Fern occurs in the George District in Southern Afrotemperate Forest, where it is found in damp places in coastal forest, in moist evergreen temperate forest, growing near streams, on seepage zones or, on the shaded forest floor away from water. It is locally frequent in the forests around George and Knysna.

Dioscorea mundii occurs from Nature's Valley to George, where it is found in coastal forest on fixed dunes and on the edges of Afromontane forest. It has been observed multiple times in the Wilderness area in similar habitat as found on site. It is a fairly cryptic small creeper that may have been overlooked during the field surveys.

The Cape Stinkwood is widespread in South Africa from the Cape Peninsula to the Wolkberg Mountains in Limpopo. It is found in high, cool, evergreen Afromontane forests. It was not seen on site but has been recorded multiple times in nearby areas.

The Cape Forest Quar is found from the Langeberg Mountains near Grootvadersbos to Knysna, where it occurs in coastal and submontane forests. It was not seen on site but is known to occur in similar habitat in nearby areas. There are no known recent records for this species but historical collection records indicate that it occurs in the area.

For the remaining species in Appendix 1, there is a small possibility that they could occur in the area that includes the site, or it is unlikely.

Animal species of concern

According to the DEA Online Screening Tool output, the following animals are flagged as being of concern for the site:

- *Bradypterus sylvaticus* (Knysna Warbler) - Vulnerable
- *Aneuryphymus montanus* (Yellow-winged Agile Grasshopper) - Vulnerable
- *Afrixalus knysnae* (Knysna Spiny Reed Frog) - Endangered
- *Chlorotalpa duthieae* (Duthie's Golden Mole) - Vulnerable
- Sensitive species 7 (small antelope) - Vulnerable

The Knysna Warbler occurs along the edges of Afrotemperate Forest and in thick, tangled vegetation along the banks of watercourses or drainage lines in forest patches in the Fynbos Biome. The area between George and Tsitsikamma contains an important sub-population of this species. Habitat loss and poor habitat management are two of the more important contributary factors in the decline of this species. It has been recently recorded close to the site in similar habitat. There is therefore a possibility that it could occur on site.

The Yellow-winged Agile Grasshopper is endemic to the Cape region. It is associated with fynbos vegetation, where it has been collected "amongst partly burnt stands of evergreen Sclerophyll in rocky foothills" (Brown 1960). It prefers south-facing cool slopes (Kinvig 2005). The main threats to this species are conversion of its habitat into farmland and invasions of non-native plant species. The type specimen is from the Langkloof valley. Based on the habitat requirements, it would probably not occur on site.

The Knysna Spiny Reed Frog is endemic to the Western Cape Province. It occurs from Groenvlei (3422BB) in the west to Covie (3323DC) in the east, and is confined to the coastal region by the Outeniqua and Tsitsikamma mountains (Minter et al. 2004). It inhabits a coastal mosaic of Mountain Fynbos and Afromontane Forest in the Outeniqua District centre of endemism. Specimens have been recorded in glades, clearings and roadside pools at Diepwalle (= Deepwalls; 3323CA), while juveniles have been collected from “arum blooms on boggy ground near an irrigation dam at Barrington”. A key habitat requirement is shallow ponds of water, which do not occur on site.

Duthie's Golden Mole is found in a narrow coastal band from Wilderness to Port Elizabeth where it is found in coastal and scarp southern Cape Afrotemperate forest habitats, and adjacent pasturelands, cultivated lands and gardens. It is restricted to alluvial sands and sandy loams and

constructs shallow subsurface foraging tunnels that radiate outwards from under the roots of trees. It could possibly occur on site.

Sensitive species 7 is a small antelope that occurs in south-eastern, central and western Africa. Within South Africa, it is found in the south-eastern coastal belt, extending inland in places into montane forest. It is territorial and confined to forest fringes. It has been recorded a number of times recently in the general area in similar habitat. The main threats to this species are human-induced habitat loss, and hunting. Based on habitat requirements, overall distribution, and known observations, it is probable that this species occurs on site or nearby.

Methodology

The study commenced as a desktop-study followed by a site-specific field study. Aerial imagery from Google Earth was used to establish an ecological history of activities on site as well as to identify ecological features of interest on site. Patterns identified from satellite imagery were verified on the ground. Sources of information were as follows:

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the SANBI BGIS website (http://bgis.sanbi.org).
- The national conservation status of the vegetation types was obtained from Mucina and Rutherford (2006) and the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004).
- The regional conservation status and Critical Biodiversity Areas were obtained from the Western Cape Biodiversity Spatial Plan (WCBSP) for the George District (Cape Nature 2017).
- There were three sources for threatened species, namely species listed according to the DEA Online Screening Tool (https://screening.environment.gov.za/screeningtool/), a species list extracted from the South African National Biodiversity Institute (http://posa.sanbi.org) for the quarter degree square/s within which the study area is situated, and from records from the iNaturalist website (https://www.inaturalist.org/) for the general area that includes the site. An updated status for all species was obtained from the SANBI website (http://redlist.sanbi.org/), as well as supplementary information on habitats and distribution.

On the basis of the information referenced above, it is considered that the current report considers national and regional conservation principles as are prescribed in the Guideline for Biodiversity Specialists (Münster, 2005).

The focus of the site visit was a reconnaissance of the site and a search for any vegetation in a natural state. A full survey of this site was conducted on 26 April 2021. A follow-up survey was conducted 5 May 2021. At that time a checklist of species occurring on site was collected and specific areas of concern on the site were investigated in detail. These parts of the site was traversed by foot and species listed as they were encountered. Plant names follow Germishuizen *et al*. (2005) and any taxonomic updates, as found on the SANBI website. Digital photographs were taken where features of interest were observed. The season of the survey was favourable and it is likely that most of the species present on site were identifiable at the time of the survey. The survey was of adequate duration and intensity to characterise the flora of the site.

Results of the field survey

This section provides a description of vegetation and flora patterns found on site, as determined from the field survey in combination with mapping from aerial imagery. Historical aerial imagery was used to attempt to understand any patterns of disturbance seen on site during the field survey.

The majority of the site is in a natural state, although there is some localized disturbance under the forest canopy in places closer to the north-western boundary of the site. The entire site consists of a forest of 8-12 m tall with a relatively open understorey (Figure 6). There is a drainage area running through the centre of the site that is defined mostly on topography, although there are clear channels in places that carry water movement (Figure 7).

The canopy layer is dominated by a variety of tree species, including *Cassine peragua*, *Elaeodendron croceum*, *Sideroxylon inerme*, *Acokanthera oppositifolia*, *Pterocelastrus tricuspidatus*, *Trichocladus crinitus*, *Scutia myrtina*, *Mystroxylon aethiopicum*, *Curtisia dentata*, *Olea capensis*, *Canthium inerme*, *Trimeria grandis*, *Dovyalis rhamnoides*, *Searsia chirindensis*, and

Figure 6: Typical view within the forest on site.

Pittosporum viridiflorum. This is accompanied by various woody shrubs and climbers, including *Carissa bispinosa*, *Cussonia thyrsiflora*, *Capparis sepiaria*, *Gymnosporia nemerosa*, *Asparagus aethiopicus*, *Rhoicissus digitata*, *Grewia occidentalis*. *Asparagus macowanii*, *Scolopia zeyheri*, *Cynanchum obtusifolium*, *Gymnosporia buxifolia*, *Searsia lucida*, and *Nidorella ivifolia*.

The herbaceous layer is relatively sparse but includes a number of species, including *Habenaria arenaria*, *Bonatea speciosa*, *Liparis remota*, *Euphorbia kraussiana*, *Gerbera cordata*, *Asparagus asparagoides*, *Ehrharta erecta*, *Rumohra adiantiformis*, *Asplenium rutifolium*, *Oxalis incarnata*, *Hypoestes forskaolii*, *Streptocarpus rexii*, and *Stachys aethiopica*.

This species composition appears to be intermediate between Goukamma Dune Thicket and Southern Afrotemperate Forest, with the obvious absence of yellowwoods being a factor suggesting it is not typical forest. However, it includes *Gerbera cordata* and *Streptocarpus rexii* that are listed as biogeographically important taxa for Southern Afrotemperate Forest. The site has many of the taller woody species typical of Goukamma Dune Thicket, but the structure and understorey of Southern Afrotemperate Forest.

No alien invasive species were recorded on site. Potentially problematic species recorded nearby include *Acacia mearnsii* and *Acacia melanoxylon*.

Figure 7: Drainage line within the forest.

Protected tree species recorded on site, according to the National Forests Act 84 of 1998 (see Appendix 4) are *Curtisia dentata*, *Pittosporum viridiflorum*, and *Sideroxylon inerme*. None of these dominate the site but there are some fairly large individuals of each, particualrly of *Sideroxylon inerme*.

Speceis found on site that are protected according to the Cape Nature and Environmental Conservation Ordinance 19 of 1974 (see Appendix 3) include *Habenaria arenaria*, and *Liparis remota* (both relatively common ground orchids on site), *Bonatea speciosa*, and *Streptocarpus rexii* (mostly within the drainage area).

No listed threatened or near threatened species were found on site, although there are four plant species and three animal species that could potentially occur there.

Figure 8: Local disturbance within a clearing on the northern boundary.

Sensitivity assessment

There are some ecological features on site that warrant consideration in assessing the biodiversity value of the site. These include the following:

1. Critical Biodiversity Areas 1: The entire site is shown as occurring within a CBA1. These areas are in a natural state on site.

2. Threatened ecosystem: The site occurs spatially within a regional vegetation type called Garden Route Shale Fynbos, which is listed as Vulnerable in The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004). The floristic analysis here indicates that the vegetation on site is floristically and structurally forest, therefore not fynbos, but the spatial location within a threatened ecosystem is legally applicable.

3. Forest habitat: The vegetation on site is forest, which is protected according to the National Forests Act.

Figure 9: Drainage areas and protected milkwood trees on site.

4. Drainage areas: The central valley on site is a drainage area, complete with central channel (see Figure 9). This area represents important hydrological functions and is protected under the National Water Act.

5. Protected tree species: There are three protected tree species (National Forests Act) occurring on site, *Curtisia dentata*, *Sideroxylon inerme* and *Pittosporum viridiflorum*. The most numerous on site is Sideroxylon inerme, with all observed trees on site shown in Figure 9.

6. Habitat for threatened animal species: There are three listed animal species that could occur on site, The Knysna Warbler, Duthie's Golden Mole, and a small antelope.

On the basis of these factors, all remaining areas of natural habitat on site is considered to have a HIGH sensitivity. Other than the entire site being a CBA1, a threatened ecosystem, a forest, and potential habitat for threatened species, specific sensitivities are shown in Figure 9.

Proposed infrastructure

The proposed development consists of a main dwelling, four cottages, parking areas, and driveways, totalling 965 m2 (Figure 10). These would be placed in such a way as to avoid any protected trees, as well as any trees of significant size, irrespective of status. In addition, it was suggested that the units would be built on stilts to minimize forest floor impacts.

There would be some localised loss of habitat during construction bu this would recover to some degree with time, especially if no significant trees are disturbed. The impacts would be within proximity to the access road along the north-eastern boundary of the property, which would minimise fragmentation and would keep any construction together with existing nodes of development on neighbouring properties. The cottages would be spaced across the western boundary, which is where the highest level of disturbance is in neighbouring properties. The remaining parts of the site would be untouched, which would ensure minimum loss of forest, CBA1, and listed ecosystem, as well as no loss of protected trees and temporary disturbance of any fauna that may occur on site.

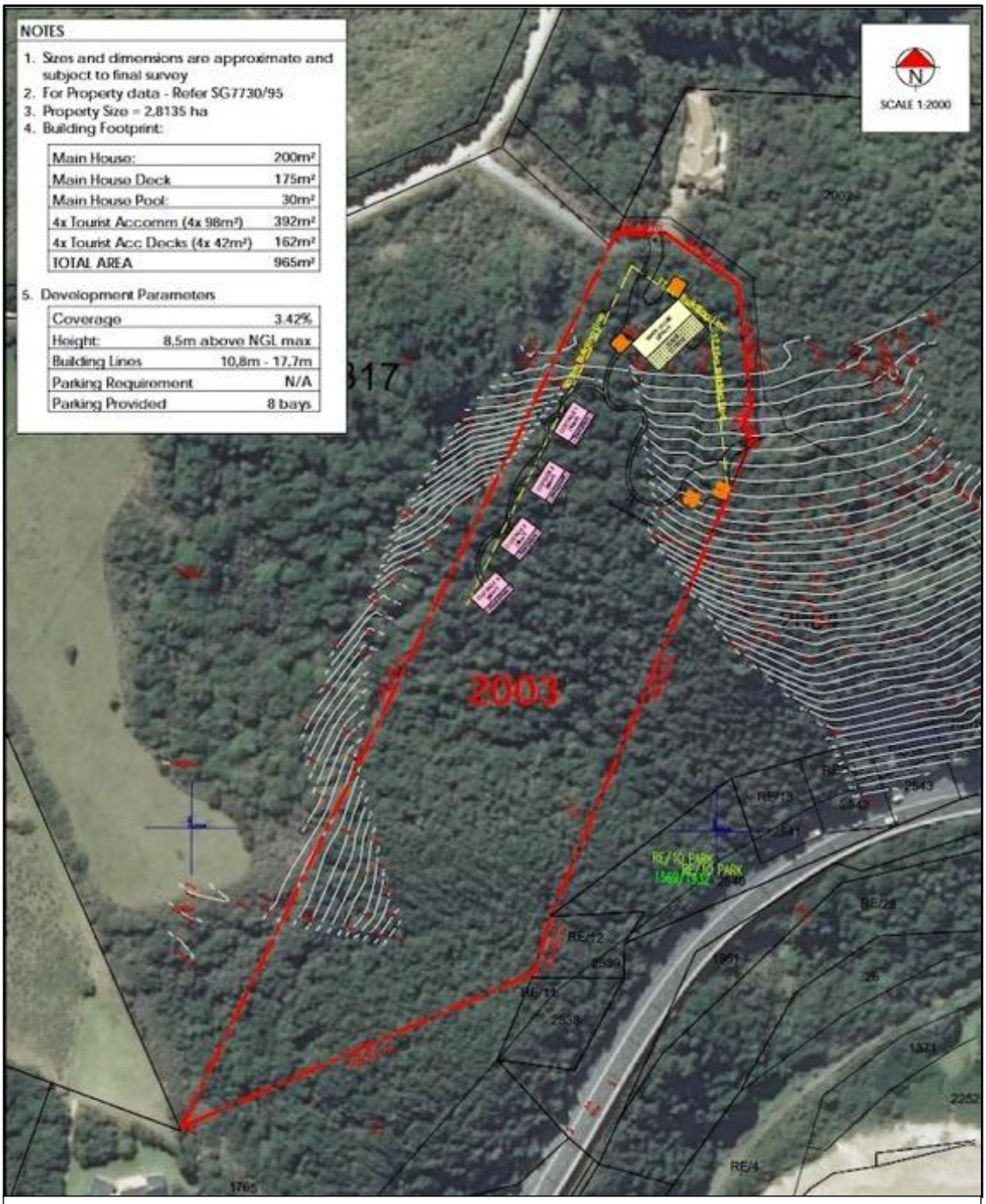

Figure 10: Proposed area in which units would be placed.

Discussion

The requirements of this study were to undertake a specialist study to describe the vegetation and flora of the site and to evaluate whether any indigenous habitat of conservation value occurs on site. The vegetation study identified that the entire site consists of intact temperate forest that is probably a transition to thicket. This vegetation pattern is continuous towards the east, as well as into the dissected river valleys that make up the Kaaiman's River catchment. The site is therefore connected to a more extensive natural system within this general area around Wilderness.

The site is mapped as occurring within a protected ecosystem called Garden Route Shale Fynbos, listed as Vulnerable and considered to be Critically Endangered within the Garden Route area. However, the vegetation on site is not fynbos and has been shown to be floristically and structurally a transition between forest and thicket. It is therefore more accurate to classify it as Southern Afrotemperate Forest with some floristic elements from Goukamma Dune Thicket.

The entire site is shown to be within a CBA1 area that is linked to a more widely distributed area of high biodiversity value. CBA1 areas are required to meet conservation planning objectives within the Province and are designed to incorporate the best biodiversity characteristics in the smallest amount of area. In principle, it is therefore desirable to limit any loss of habitat within these critical areas. The current development proposal is within these areas of biodiversity importance. However, the intention is to minimise the footprint of proposed development, as well as locate it in the best possible location to avoid specific sensitive features. This can be achieved by avoiding the majority of the site, including the central drainage area, locating any infrastructure as close as possible to the the existing access road, and minimising the total footprint of the infrastructure. Any remaining habitat is then retained in a natural state without affecting ecological connectivity. Localised impacts can be further reduced by using a sensitive construction method that does not fully displace indigenous vegetation.

A big regional threat to biodiversity is invasion by alien invasive plant species. There is currently no invasion by alien plants on site but the invasive species, *Acacia mearnsii*, *Acacia melanoxylon*, and *Acacia cyclops* occur in nearby areas and have the potential to rapidly colonise disturbed areas and to then displace indigenous vegetation. Management of alien invasive plants is the biggest positive impact that could occur on site and the most important way in which biodiversity on site and in surrounding areas can be protected.

Conclusion

The following conclusions can be made with regards to the proposed development of the site:

- The site is indicated at a regional scale as being within a CBA1 area. In addition, it is in a listed threatened ecosystem. All regional assessments therefore indicate that the site is of high conservation value and of high importance for conservation of biodiversity patterns.

- The regional vegetation type is mapped as being Garden Route Shale Fynbos (a listed threatened ecosystem), but on the basis of vegetation structure and species composition, it can be more accurately described as Southern Afrotemperate Forest with elements of Goukamma Dune Thicket.

- The vegetation on site is mostly in a natural state, and also in relatively good condition. There are nearby areas of transformation and the entire band of vegetation north of the property boundary is partially disturbed. The biggest disturbance associated with the site is the existing access road that wraps around the north-eastern boundary of the site.

- There are four threatened or near threatened plant species and five threatened or near threatened animal species that were assessed as having a high probability of occurring on site. This is on the basis of geographical distribution, habitat requirements, and observations that show that they occur in nearby areas with similar habitat. None of these species were seen on site, although it is possible that at least two of the animal species occur there.

- There are three protected tree species that occur on site, the most common of which is the milkwood, Sideroxylon inerme. The other two species are *Curtisia dentata* and *Pittosporum viridiflorum*. No impacts are expected on these species due to the current proposal. However, if such impacts do occur, a permit will be required.

- There is a wellp-defined drainage valley on site in which a clear drainage channel exists. This is a natural feature and is an important component of the hydrological functioning of the site. No impacts are expected on these areas due to the current proposal.

- Development of the proposed footprint area will be restricted to the area adjacent to the existing access road, will be limited in extent, will avoid damaging any significant trees, and will utilise design and construction methods that will limit the permanent footprint area.

Recommendations

Based on the botanical assessment, this section of the report provides recommendations for the project. The following recommendations are made:

- The proposed development will result in loss of relatively small areas of natural habitat. This is not considered to be a significant threat to the habitat or threatened plant or animal species on site or in neighbouring areas. On the basis of having a minimal impact on natural features, it is recommended that the proposed development be approved but on condition that surrounding indigenous forest is ecologically managed to enhance the biodiversity value and protected from damage.

- Remaining areas of thicket in surrounding areas is dominated by the protected tree, *Sideroxylon inerme*, and also contains individuals of the protected tree, *Pittosporum viridflorum* and *Curtisia dentata*. In the event that there are any impacts on individuals of any of these species, it would require a permit in terms of the National Forests Act.

- If possible, no significant trees must be damaged by the proposed development. The proposal to raise units above the forest floor is supported, especially if these footprint areas are allowed to return to forest understorey. It would be preferable if no formal gardens are developed around the proposed units, but that the indigenous forest vegetation is retained as a feature of the development.

- The drainage area (as mapped hrere), as well as a buffer of 30 m, should not be impacted upon.

- It is recommended that pre-emptive control of alien invasive species is undertaken using registered control methods and that an Alien Invasive Management Plan is implemented to control potential invasions on site and in neighbouring areas, especially within areas of remaining natural habitat.

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Appendix 1: Red / Orange List plant species that could potentially occur within the area in which the study area is situated.

Taxon	*Latest (IUCN version 3.1) Conservation Status***	*Habitat*	*Probability of occurrence**
Acmadenia alternifolia **(RUTACEAE)**	Vulnerable (VU)	Knysna to Plettenberg Bay, possibly extending as far as Nature's Valley. Coastal headlands and steep slopes, exposed positions on dry coastal cliffs. Recorded from inland of Knysna and along the coastal cliffs west of Robberg.	**Unlikely**
Acmadenia maculata **(RUTACEAE)**	Near Threatened (NT)	Outeniqua and Kammanassie Mountains. South-facing slopes 600-762 m.	**Unlikely**
Acrolophia lunata **(ORCHIDACEAE)**	Endangered (EN)	Swellendam to Kouga Mountains. Mesic fynbos from sea level to 750 m. Sandstone fynbos.	**Unlikely**
Aloe micracantha **(ASPHODELACEAE)**	Near Threatened (NT)	From Uniondale eastwards along the coastal mountains to Port Elizabeth and inland to the Kap River Mountains north-east of Grahamstown. Lower slopes and flats in grassy fynbos, 0-700 m. Sandstone and quartzite fynbos.	**Unlikely**
Agathosma muirii **(RUTACEAE)**	Vulnerable (VU)	Stilbaai to Mossel Bay. Deep sands on coastal dunes associated with limestone.	**Unlikely**
(Amauropelta) Thelypteris knysnaensis **(Knysna Wood Fern) (THELIPTERIDACEAE)**	Vulnerable (VU)	George District, Southern Afrotemperate Forest, damp places in coastal forest. Moist evergreen temperate forest, growing near streams, on seepage zones or, on the shaded forest floor away from water. Locally frequent in the forests around George and Knysna, 200 - 600 m.	**High possibility (not seen on site)**

Aspalathus bowieana **(FABACEAE)**	Endangered (EN)	Outeniqua and Tsitsikamma Mountains. Slopes and foothills below 850 m in fynbos. Sandstone fynbos.	**Unlikely**
Brunsvigia josephinae **(AMARYLLIDACEAE)**	Vulnerable (VU)	Eastern Cape, Northern Cape, Western Cape, Nieuwoudtville to Baviaanskloof. Heavy clay soils. Renosterveld.	**Unlikely**
Sensitive species 657	Endangered (EN)	Great Brak River to Port Elizabeth. **Coastal sands.** Core distribution is around Cape St. Francis and Port Elizabeth.	**Unlikely**
Diosma passerinoides **(RUTACEAE)**	Vulnerable (VU)	Robertson and Caledon to Bredasdorp, Albertinia and eastwards to Baviaanskloof. Dry clayish soils in renosterveld, associated with patches of silcrete.	**Unlikely**
Sensitive species 419	Vulnerable (VU)	George to Humansdorp. Damp sandstone slopes in coastal fynbos.	**Unlikely**
Dioscorea mundii **(DIOSCORIACEAE)**	Near Threatened (NT)	Nature's Valley to George. Coastal forest on fixed dunes and edges of Afromontane forest. Observed multiple times in Wilderness area in similar habitat as found on site. Fairly cryptic small creeper.	**High possibility**
Sensitive species 500 **(ORCHIDACEAE)**	Endangered (EN)	Cape Flats to Port Elizabeth. Lowland sandy flats, stabilised dunes and coastal rock promonotories. Sand fynbos, dune strandveld, dune thicket, Garden Route Granite Fynbos.	**Unlikely**
Erica chloroloma **(ERICACEAE)**	Vulnerable (VU)	Wilderness to Fish River mouth. Coastal dune fynbos.	**Unlikely**
Erica glandulosa subsp. fourcadei **(ERICACEAE)**	Vulnerable (VU)	Mossel Bay to Cape St. Francis. Coastal fynbos. Common in Goukamma Nature Reserve but seems to be found in vegetated coastal dunes close to the coast.	**Unlikely**

Erica glumiflora **(ERICACEAE)**	Vulnerable (VU)	Wilderness to East London, extending inland to Grahamstown. Sandy coastal flats and dunes in low coastal hills.	**Unlikely**
Erica inconstans **(ERICACEAE)**	Vulnerable (VU)	Outeniqua and Tistsikamma Mountains. Damp, upper south-facing slopes above forests.	**Unlikely**
Erica onusta **(ERICACEAE)**	Critically Endangered (CR)	Knysna District. Southern Afrotemperate Forest in coastal ***fynbos patches*** between forest.	**Unlikely**
Erica stylaris **(ERICACEAE)**	Vulnerable (VU)	Mossel Bay to Humansdorp. Fynbos on moist slopes, including Tsitsikamma Sandstone Fynbos.	**Unlikely**
Sensitive species 763 **(ORCHIDACEAE)**	Vulnerable (VU)	Riversdale to Port St. Johns. Dry coastal renosterveld and grassy places in coastal forest.	**Unlikely**
Felicia westae **(ASTERACEAE)**	Endangered (EN)	Knysna to Humansdorp. Streambanks in low-lying areas near the coast, including in Tsitsikamma Sandstone Fynbos anmd South Outeniqua Sandstone Fynbos.	**Unlikely**
Freesia leichtlinii subsp. alba **(IRIDACEAE)**	Near Threatened (NT)	Stilbaai to Plettenberg Bay. Sandy coastal dunes and flats or limestone fynbos, usually in rocky places.	**Unlikely**
Gladiolus engysiphon **(IRIDACEAE)**	Vulnerable (VU)	Lower foothills of the Langeberg Mountains, including Garden Route Granite Fynbos, clay loam at the interface of shale and sandstone strata. Known from Groot Brak westwards.	**Unlikely**
Sensitive species 1081 **(IRIDACEAE)**	Endangered (EN)	Uniondale to George and Knysna. Fynbos, heavy soils either clay or loam at the sandstone-shale transition, often near streams.	**Unlikely**
Gladiolus huttonii **(IRIDACEAE)**	Vulnerable (VU)	East London to Plettenberg Bay. Sandy loam, clay or moderately fertile soils derived from the Witteberg slopes, mostly confined to coastal plain. Distribution ends east of site near Plett.	**Unlikely**

Sensitive species 800 **(IRIDACEAE)**	Vulnerable (VU)	Cape Peninsula to Knysna. Limestone and clay loam soil, fynbos and renosterveld on coastal lowlands.	**Unlikely**
Gnidia chrysophylla **(THYMELAEACEAE)**	Near Threatened (NT)	Kleinmond to Knysna, fynbos, coastal flats.	**Unlikely**
Hermannia lavandulifolia **(MALVACEAE)**	Vulnerable (VU)	Worcester to the Overberg, and extending along the southern Cape coastal lowlands as far east as Plettenberg Bay. Strandveld, renosterveld, dune thicket.	**Unlikely**
Indigofera hispida **(FABACEAE)**	Vulnerable (VU)	Uniondale to Port Elizabeth in montane fynbos, including Tsitsikamma Sandstone Fynbos	**Unlikely**
Lachnaea filicaulis **(THYMELAEACEAE)**	Near Threatened (NT)	Palmiet River in Caledon district eastwards to Riversdale. Distribution ends far west of site. Flats and low mountain slopes. Fynbos.	**Unlikely**
Lampranthus fergusoniae **(AIZOACEAE)**	Vulnerable (VU)	Pearly Beach to Knysna. Calcareous soils often associated with limestone dunes. Strandveld, limestone fynbos, sand fynbos, dune thicket.	**Unlikely**
Lampranthus pauciflorus **(AIZOACEAE)**	Endangered (EN)	Cape Infanta to Plettenberg Bay. Rocky coastal slopes and clayish hills.	**Unlikely**
Lebeckia gracilis **(FABACEAE)**	Endangered (EN)	Port Elizabeth to Bredasdorp. Coastal fynbos in deep sandy soils below 300 m. Recorded on Dune Molerat Trail.	**Unlikely**
Leucadendron conicum **(PROTEACEAE)**	Near Threatened (NT)	Tsitsikamma and Kouga. Forest margins and riparian and wetland habitats in sandstone fynbos.	**Unlikely**
Leucaspermum glabrum **(PROTEACEAE)**	Endangered (EN)	Outeniqua and Tsitsikamma Mountains. Wet south slopes in sandstone fynbos. Reseeder, myrmecochorous. Recorded from fynbos at Whiskey Creek.	**Unlikely**
Mimetes pauciflorus **(PROTEACEAE)**	Vulnerable (VU)	Outeniqua and Tsitsikamma Mountains. Moist south-facing slopes in sandstone	**Unlikely**

		fynbos, 450-1400 m. Reseeder, myrmecochorous.	
Mimetes splendidus **(PROTEACEAE)**	Endangered (EN)	Langeberg to Tsitsikamma Mountains. Moist south-facing slopes with peaty soils, 600-1200 m. Reseeder, myrmecochorous.	**Unlikely**
Muraltia knysnaensis **(POLYGALACEAE)**	Endangered (EN)	Coastal lowlands between Mossel Bay and Keeurbooms River. Coastal fynbos on dry flats and hills. Recorded in Dune Molerat Trail.	**Unlikely**
Nanobubon hypogaeum **(APIACEAE)**	Endangered (EN)	Mossel Bay to Knysna. Sandy coastal fynbos.	**Unlikely**
Ocotea bullata **(LAURACEAE)**	Endangered (EN)	Widespread in South Africa from the Cape Peninsula to the Wolkberg Mountains in Limpopo. High, cool, evergreen Afromontane forests.	**High possibility (not seen on site)**
Osteospermum pterigoideum **(ASTERACEAE)**	Endangered (EN)	George and Humansdorp. Low sandstone slopes, including Tsitsikamma Sandstone fynbos.	**Unlikely**
Psydrax capensis **(RUBIACEAE)**	Vulnerable (VU)	Langeberg Mountains near Grootvadersbos to Knysna. Coastal and submontane forests.	**High possibility (not seen on site)**
Sensitive species 1024 **(ORCHIDACEAE)**	Endangered (EN)	Riversdale to Knysna and northern slopes of Langeberg mountains. Renosterveld and fynbos. Relatively dry to moist slopes, up to 200 m.	**Unlikley**
Sensitive species 1032 **(ORCHIDACEAE)**	Vulnerable (VU)	Wilderness to Port Alfred. Among bushes in open places on fixed dunes close to the shoreline, up to 150 m.	**Unlikely**
Ruschia duthiae **(AIZOACEAE)**	Vulnerable (VU)	Sedgefield to Nature's Valley. Gentle north-facing sandstone or shale slopes with grassy fynbos.	**Unlikely**

Selago burchellii **(SCROPHULARIACEAE)**	Vulnerable (VU)	George to Plettenberg Bay. Coastal slopes and flats. Sand fynbos, dune fynbos.	**Unlikely**
Selago rotundifolia **(SCROPHULARIACEAE)**	Vulnerable (VU)	Knysna to Port Elizabeth. Forest margins or grassy flats near the coast, 90-210 m.	**Unlikely**
Selago villicaulis **(SCROPHULARIACEAE)**	Vulnerable (VU)	Stilbaai to Knysna. Fixed dunes up to 150 m.	**Unlikely**
Serruria fasciflora **(PROTEACEAE)**	Near Threatened (NT)	Malmesbury to Tsitsikamma. Sandstone and sand fynbos over a wide variety of habitats. Mountains.	**Unlikely**
Wahlenbergia polyantha **(CAMPANULACEAE)**	Vulnerable (VU)	Kleinmond to Knysna. Sandy flats (coastal). Strandveld, sand fynbos, dune thicket..	**Unlikely**
Watsonia aletroides **(IRIDACEAE)**	Near Threatened (NT)	Bot River to Knysna and Uniondale. Fynbos on clay flats.	**Unlikely**

Appendix 2: Checklist of plant species found on site

Species	Category
Acokanthera oppositifolia	
Aloe arborescens	**PROTECTED WC**
Asparagus aethiopicus	
Asparagus asparagoides	
Asparagus macowanii	
Asparagus setaceus	
Asplenium rutifolium	
Bonatea speciosa	**PROTECTED WC**
Canthium inerme	
Capparis sepiaria	
Carex lancea	
Carissa bispinosa	
Carpobrotus edulis	
Cassine peragua	
Curtisia dentata	**PROTECTED**
Cussonia thyrsiflora	
Cynanchum obtusifolium	
Dovyalis rhamnoides	
Ehrharta erecta	
Elaeodendron croceum	
Euphorbia kraussiana	
Gerbera cordata	
Grewia occidentalis	
Gymnosporia buxifolia	
Gymnosporia nemerosa	
Habenaria arenaria	**PROTECTED WC**
Hypoestes forskaolii	
Lauridia tetragona	
Liparis remota	**PROTECTED WC**
Mystroxylon aethiopicum	
Nidorella ivifolia	
Olea capensis	
Oxalis incarnarta	
Pittosporum viridiflorum	**PROTECTED**
Polygala myrtifolia	
Pterocelastrus tricuspidatus	
Putterlickia pyracantha	
Rhoicissus digitata	

Rumohra adiantiformis	
Scolopia zeyheri	
Scutia myrtina	
Searsia chirindensis	
Searsia lucida	
Senecio angulatus	
Sideroxylon inerme subsp. inerme	**PROTECTED**
Stachys aethiiopica	
Streptocarpus rexii	**PROTECTED WC**
Trichocladus crinitus	
Trimeria grandifolia	
Virgilia oroboides	

Appendix 3: Flora protected under the Cape Nature and Environmental Conservation Ordinance 19 of 1974

SCHEDULE 3: Endangered Flora
As per the Cape Nature and Environmental Conservation Ordinance 19 of 1974

Family: APOCYNACEAE	Common name / Additional notes
Pachypodium namaquanum	Halfmens (currently listed as LC)
Family: GESNERIACEAE	
Charadrophila capensis	Cape Gloxinia (currently listed as Rare)
Family: LILIACEAE	
Aloe pillansii	Now called *Aloidendron pillansii*, currently listed as Endangered
Aloe buhrii	Currently listed as Vulnerable
Aloe erinacea	Now called *Aloe melanacantha*, currently listed as Least Concern
Family: PROTEACEAE	
Mimetes capitulates	Currently listed as Endangered
Mimetes hottentoticus	Currently listed as Critically Endangered
Mimetes stokoei	Currently listed as Critically Endangered
Orothamnus zeyheri	Currently listed as Vulnerable
Protea odorata	Currently listed as Critically Endangered
Family: STANGERIACEAE	
Stangeria eriopus	Bobbejaankos (currently listed as Vulnerable)
Family: ZAMIACEAE	
Encephalartos spp.	Cycads, all species

SCHEDULE 4: PROTECTED SPECIES
As per the Cape Nature and Environmental Conservation Ordinance 19 of 1974

Family:AMARYLLIDACEAE	All species
Family: APOCYNACEAE	All species except those listed in Schedule 3
Family: AQUIFOLIACEAE	All species
Ilex mitis	
Family: ARACEAE	
Zantedeschia elliottiana	Yellow arum lily (currently DDT)
Family: ASCLEPIADACEAE (now Apocynaceae)	All species

Family: BORAGICNACEAE	
Echiostachys spicatus	
Family: BRUNIACEAE	All species
Family: COMPOSITAE (now Asteraceae)	
Senecio colyphyllous (*coleophyllous*?)	
Cotula duckitteae	
Family: CRASSULACEAE	
Crassula columnaris	
Crassula perfoliata	
Crassula pyramidalis	
Kalanchoe thyrsiflora	
Rochea coccinea (now Crassula cochinea)	
Family: CUNONIACEAE	
Cunonia capensis	
Platylophus trifoliatus	
Family: DIOSCOREACEAE	
Testudinaria sylvatica (now Dioscorea sylvatica)	
Testudinaria elephantipes (now Dioscorea elephantipes)	
Family: ERICACEAE	All species
Family: EUPHORBIACEAE	
Euphorbia bupleurifolia	
Euphorbia fasciculata	
Euphorbia globosa	
Euphorbia horrida	
Euphorbia meloformis	
Euphorbia obesa	
Euphorbia schoenlandii	
Euphorbia symmetrica	
Euphorbia valida	
Family: GEISSOLOM(AT)ACEAE	All species
Family: GESNERIACEAE	
Streptocarpus	All species
Family: GRAMINAE (now Poaceae)	
Arundinaria tessellata (Thamnocalamus tessellatus)	
*Secale africanum (*now *Secale strictum* subsp. *africanum)*	
Family: GRUBBIACEAE	All species
Family: IRIDACEAE	**All species**
Family: LEGUMINOSAE (now Fabaceae)	
Erythrina acanthocarpa	
Erythrina humeana	
Liparia comantha	
Liparia sphaerica	

Liparia splendens	
Podalyria calyptrata	
Priestleya vestita	
Priestleya tomentosa	
Family: LILIACEAE (now split into a number of families)	
All species of the genus ALOE except those specified in Schedule 3 and the species *Aloe ferox*	
Gasteria beckeri	
Gloriosa superba	
All species of the genus Haworthia	
All species of the genus Kniphofia	
All species of the genus Lachenalia	
Littonia modesta	
Sandersonia aurantiaca	
All species of the genus Velthemia	
Agapanthus walshii	
Daubenya aurea	
Family: MELIACEAE	
Nymania capensis	
Family: MESEMBRYANTHEMACEAE (now Aizoaceae)	**All species**
Family: MUSACEAE (now Strelitziaceae)	
Strelitzia	All species
Family: NYMPHAECEAE	
Nymphaea capensis (now N. nouchali)	
Family: ORCHIDACEAE	All species
Family: OXALIDACEAE	
Oxalis nutans (no such species)	
Family: PENAEACEAE	All species
Family: POLYGALACEAE	
Muraltia minuta	
Family: POLYPODIACEAE	
Adiantium (now Family Pteridaceae)	All species
Hemitelia capensis (now Alsophila capensis, Family Cyathaceae)	
Polystichum adiantiforme (now Rumohra adiantiformis, Family Dryopteridaceae)	
Family: PORTULACACEAE	
Anacampseros (now Family Anacampserotaceae)	All species
Family: PROTEACEAE	
All species	
Family: RANUNCULACEAE	
Anemone capensis (now A.tenuifolia)	

Family: RESTIONACEAE	
Chondropetalum	
Acockii pillans (no such species)	
Elegia fenestrata	
Restio acockii	
Restio micans	
Restio sabulosus	
Family: RETZIACEAE (now Stilbaceae)	
Retzia capensis	
Family: RHAMNACEAE	
Phylica pubescens	
Family: RORIDULACEAE	All species
Family: RUTACEAE	All species
Family: SCROPHULARIACEAE	
Diascia	All species
Harveya	All species
Nemesia strumosa	
Halleria	All species
Family: THYMELAEACEAE	
Lachnaea aurea	

Appendix 4: List of protected tree species (National Forests Act 84 of 1998).

Vachellia (Acacia) erioloba	Vachellia (Acacia) haematoxylon
Adansonia digitata	Afzelia quanzensis
Balanites subsp. maughamii	Barringtonia racemosa
Boscia albitrunca	Brachystegia spiciformis
Breonadia salicina	Bruguiera gymnhorrhiza
Cassipourea swaziensis	Catha edulis
Ceriops tagal	Cleistanthus schlectheri var. schlechteri
Colubrina nicholsonii	Combretum imberbe
Curtisia dentata	Elaedendron (Cassine) transvaalensis
Erythrophysa transvaalensis	Euclea pseudebenus
Ficus trichopoda	Leucadendron argenteum
Lumnitzera racemosa var. racemosa	Lydenburgia abottii
Lydenburgia cassinoides	Mimusops caffra
Newtonia hildebrandtii var. hildebrandtii	**Ocotea bullata**
Ozoroa namaensis	Philenoptera violacea (Lonchocarpus capassa)
Pittosporum viridiflorum	Podocarpus elongatus
Afrocarpus (Podocarpus) falcatus	**Podocarpus henkelii**
Podocarpus latifolius	Protea comptonii
Protea curvata	Prunus africana
Pterocarpus angolensis	Rhizophora mucronata
Sclerocarya birrea subsp. caffra	Securidaca longependunculata
Sideroxylon inerme subsp. inerme	Tephrosia pondoensis
Warburgia salutaris	Widdringtonia cedarbergensis
Widdringtonia schwarzii	