Terrestrial Biodiversity Compliance Statement & Assessment

Keurboomstrand Erf 155

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Compiled for: **Bluepebble Consulting**

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Final Report

Revisions

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Draft	2025/05/19	Jamie Pote
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1 Introduction & Background

1.1 Background

Bluepebble Consulting are appointed as the independent Environmental Assessment Practitioner (EAP) to conduct the Environmental Assessments for the Proposed development of Erf 155, Keurboomstrand, Western Cape province (Figure 1). As part of this process, a terrestrial biodiversity assessment is required to support the necessary environmental applications. An assessment was conducted in 2020 for three alternative layouts. Subsequent to this, a revised layout is assessed in this updated report. The original report is updated in line with current regional planning frameworks and other legislated requirements as applicable.

Figure 1: Site locality.

1.2 Activity Location and Description

The site is a currently undeveloped Erf (Erf 155) towards the western side of Keurboomstrand as indicated in Figure 1 and Figure 3.The site is bound on the southern side by a surfaced road, being the main access road into Keurboomstrand. Undeveloped erven are present on the west and northern sides, with developed erven being adjacent on the north-west and north-east corners. The properties to the south of the site across the surfaced road is also developed. There is evidence on the site of old strictures and a pipeline, with remnant and secondary vegetation elements. The proposed site development plan is provided in Figure 2. The proposal will be to construct within a central portion of the site to accommodate two dwelling units, as well as parking and forecourt area. The undeveloped areas will be retained as natural vegetation, which will serve to provide privacy but also to allow the site to blend with the surrounding landscape and accommodate ecological connectivity.

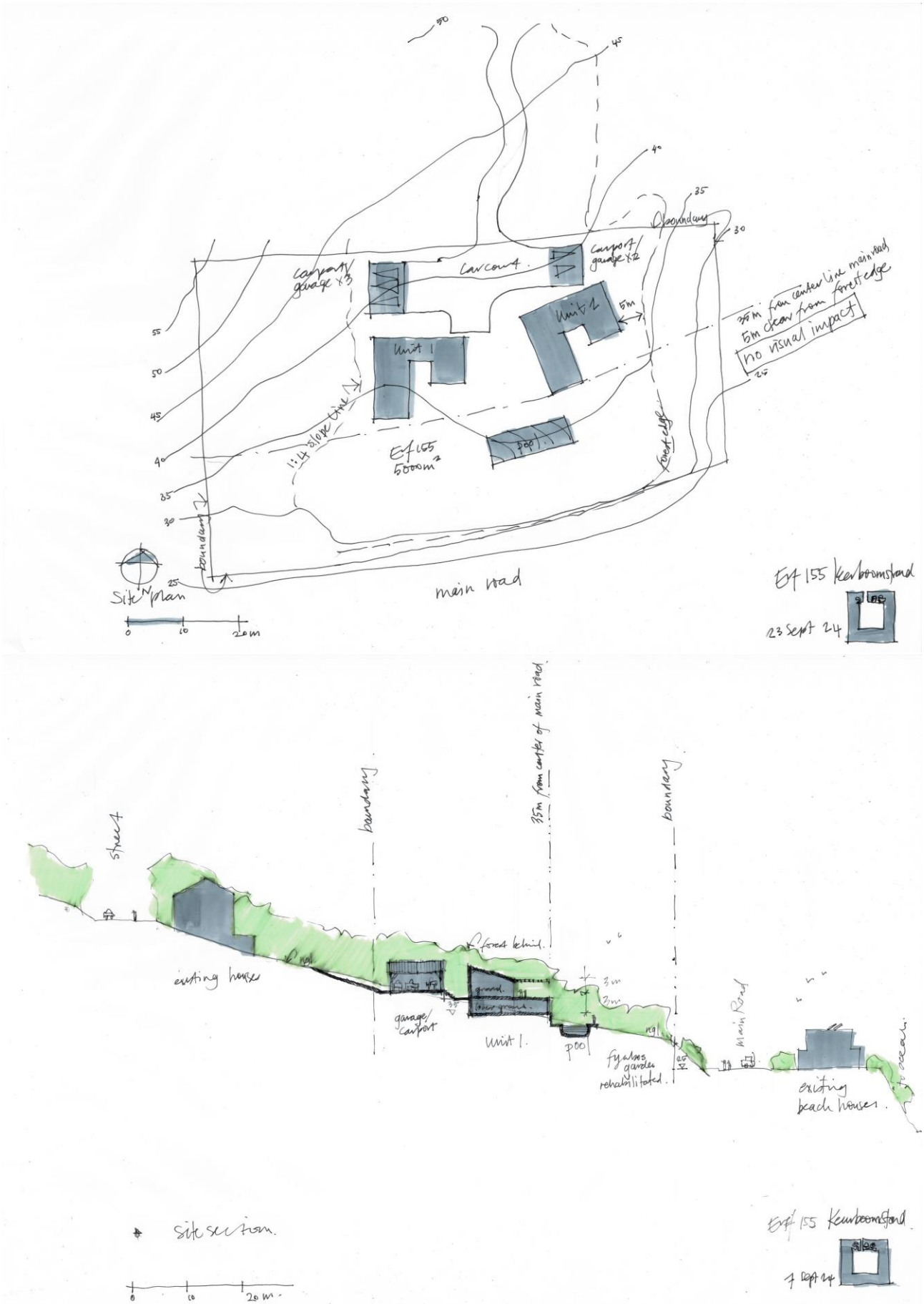

Figure 2: Revised Preferred Revised Site Development Plan (September 2024).

1.3 Aspects of the project that could potentially have Biodiversity related Impacts

The key components of the project and their respective impacts upon the terrestrial vegetation and floral environment are as follows:

Component	Potential Biodiversity and Ecological Impacts
Dwellings	
Clearing of land for construction of the dwellings will be required.	The terrestrial environment will be impacted where vegetation clearing is required for dwellings and associated infrastructure.
Infrastructure	
Clearing of vegetation and associated disturbance of habitat for roads and infrastructure (sewer, water, electrical) during operations could be required.	An access road will be constructed from the north in order to access the site. Additional vegetation clearing will be required to accommodate water, electrical and sewer infrastructure.

Figure 3: Aerial Photo showing site and surrounding developed and undeveloped Erven.

1.4 Purpose of Report

The "*Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of sections 24 (5) (a) and (h) and 44 of the Act, when applying for Environmental Authorisation*", as published on 20 March, 2020 in National Gazette, No. 43110 in terms of NEMA (Act 107 of 1998) sections 24(5)(a), (h) and 44, lists protocols and minimum report requirements for environmental impacts on terrestrial biodiversity and provides the criteria for the assessment and

reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation. The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the National web based Environmental Screening Tool. Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration, identified by the screening tool, must be confirmed by undertaking a **site sensitivity verification**, which must include the following.

1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.
2. The site sensitivity verification must be undertaken through the use of:
    a. a desk top analysis, using satellite imagery.
    b. a preliminary on -site inspection; and
    c. any other available and relevant information.
3. The outcome of the site sensitivity verification must be recorded in the form of a report that:
    a. confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool.
    b. contains a motivation and evidence of either the verified or different use of the land and environmental sensitivity; and
    c. is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

The National Web Based Screening Tool was used to generate the potential environmental sensitivity of the site which has then been compared to various online and other databases and information sources in order to verify and confirm the validity of the screening tool findings. This was further supported with on-site observations and analysis of most recent aerial photography.

This terrestrial biodiversity site verification has been undertaken as per the requirements of the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation (GN 320, 20 March 2020).

1.5 Methodology and Approach

The proposed methodology and approach followed in this assessment are outlined below:

- Conduct a comprehensive desktop study and identify potential risks relating to vegetation and flora of the site and surrounding area, for a Terrestrial Biodiversity Assessment Report. This will include the relevant Regional Planning and legislated frameworks, which will also be represented in a series of associated maps.
- Conduct a detailed site visit to assess the following:
    - Field survey of vegetation, flora, fauna and habitat present. Due to the nature of the site and relatively small area, a visual survey was conducted applying a random transect walk approach.
    - Comprehensive species list, highlighting species that are of special concern, threatened, Red Data species and species requiring permits for destruction/relocation in terms of NEMBA and the Provincial Nature Conservation Ordinance No. 19 of 1974.
    - Detailed mapping of the various habitat units and assessment of habitat integrity, ecological sensitivity, levels of degradation and transformation, alien invasion and Species of Conservation Concern, the outcome being a detailed sensitivity map ranked into high, medium or low classes.

- Reporting will be comprised of a preliminary summary, with identification of anticipated impacts and risks for any scoping phase report (where applicable), a draft detailed Assessment Report (for public review and comment) and a Final Assessment Report for submission. The draft and final detailed reports will include the following:
    - Indicate any assumptions made and gaps in available information. Assessment of all the vegetation types and habitat units within the relevant Regional Planning Frameworks.
    - A detailed species list highlighting the various Species of Conservation Concern categories (endemic, threatened, Red Data species and other protected species requiring permits for destruction/relocation and invasive/exotic weeds).
    - Description and assessment of the habitat units and site sensitivities ranked into high, medium or low classes based on sensitivity and conservation importance. A standard methodology has been developed based on other projects in the specific area.
    - Assessment of Impacts and Mitigation Measure, as well as specific measure that may be required for alternative development plans.
    - A comprehensive EMPr for inclusion in the reports and EMP with specific management actions for construction and Operation.
    - A habitat sensitivity map will be compiled, indicting the sensitivities as described above.
    - A map indicating buffers (if required) to accommodate Regional Planning and any other requirements.

1.6 Data sources and references

Data sources that were utilised for this report include the following:

- National (DFFE) Web Based Screening Tool – to generate the sites potential environmental sensitivity.
- National Vegetation Map 2018 (NVM, 2018), Mucina & Rutherford (2006) and National Biodiversity Assessment or Red Listed Ecosystems (NBA/RLE, 2022) – description of vegetation types, species (including endemic) and most recent vegetation unit conservation status.
- National and Regional Legislation including Provincial Nature Conservation Ordinance (P.N.C.O). NEM:BA Threatened or Protected Species (ToPS).
- Botanical Database of Southern Africa (BODATSA) and New Plants of Southern Africa (POSA) – lists of plant species and potential species of concern found in the general area (SANBI.)
- International Union for Conservation of Nature (IUCN) - Red List of Threatened Species.
- Animal Demography Unit Virtual Museum (VM) – potential faunal species.
- Global Biodiversity Information Facility (GBIF) – potential flora & faunal species.
- National Red Books and Lists - mammals, reptiles, frogs, dragonflies & butterflies.
- National Freshwater Ecosystem Priority Areas assessment (NFEPA, 2011) - important catchments.
- National Protected Areas Expansion Strategy (NPAES, 2018) and South Africa Protected Area database (2020) – protected area information.
- SANBI BGIS – All other biodiversity GIS datasets.
- Western Cape Biodiversity Spatial Plan (2017).
- Aerial Imagery – Google Earth, ESRI, Chief Surveyor General (http://csg.dla.gov.za).
- Cadastral and other topographical country data - Chief Surveyor General (http://csg.dla.gov.za).
- Other sources may include peer-reviewed journals, regional and local assessments, and studies in the general location of the project and its area of influence, landscape prioritization schemes (Key Biodiversity Areas), systematic conservation planning assessments and plans (as above), and any pertinent masters and doctoral theses, among others.
- Keurbooms River: Erf 155: Vegetation Sensitivity Analysis. Conservation Management Services. Prepared for Ferpa (Pty) Ltd. October 2018. Previous study conducted in 2018.

This terrestrial biodiversity assessment has been undertaken as per the requirements of the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation (GN 320, 20 March 2020).

1.6.1 Site Visit & Specialist

A mid-spring site visit was conducted on 13 & 14 October 2020. The site falls within a temperate climate with rainfall occurring throughout the year but is often higher in winter and/or early spring, hence for the purposes of this report, a single site visit is deemed to be adequate, specifically as it was within a favourable seasonal window. Since the vegetation on site is not fynbos, but rather non-deciduous trees vegetation (including natural and invasive), season will have minimal influence (i.e. '*flowering season*') in any event. The site visit and assessment are undertaken by Mr Jamie Pote, SACNASP registered ecological scientist with a BSc (Hons) degree in Botany and a BSc degree in Botany and environmental Science, with over 20 years' experience undertaking terrestrial biodiversity assessments. Refer to Section 7.4: Appendix D: Declaration, Specialist Profile and Registration, for signed declaration, CV and SACNASP registration.

1.6.2 Assumptions, Uncertainties and Gaps in Knowledge

The findings and recommendations of this report may be susceptible to the following uncertainties and limitation:

- Any botanical surveys based upon a limited sampling time-period, may not reflect the actual species composition of the site due to seasonal variations in flowering times. Additionally, the composition of fire adapted vegetation may vary depending on level of maturity or time since last burn. As far as possible, site collected data has been supplemented with desktop and database-centred distribution data.
- As far as possible, site collected data has been supplemented with desktop and database-centred distribution data as well as previous studies undertaken in the area.
- No assessment has been made of aquatic, estuarine or marine aspects relating to any wetlands, pans, and rivers/seeps and/or estuaries or marine ecosystems outside of the scope of a terrestrial biodiversity report.

2 Policy

2.1 Legislation Framework

In terms of NEMA EIA Regulations (07 April 2014, as amended), the following is applicable[1]:

- In terms of section 52 of NEMBA *(Activity (a)(i))*, the vegetation unit Goukamma Dune Thicket, has a **Least Concern** status as per National Biodiversity Assessment (2022).
- In terms of the CBA classification (WCBSP, 2017), designated Critical Biodiversity Area 1 and Protected Area overlaps partially with the site.
- In terms of the revised (draft) WC BSP (2023) designation, the site partially overlaps with designated Ecological Support Area 1 (ESA 1).

1 *The listed activities itemized are only those with Biodiversity relevance to this report and is not a complete list.*

Listing Notice 1 (GNR):

~~27. The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—~~

~~(i) the undertaking of a linear activity; or~~

~~(ii) maintenance purposes undertaken in accordance with a maintenance management plan.~~

Clearing of Indigenous Vegetation for the activity will be less than 1 hectare, as the total site area is 0.6 Ha.

Listing Notice 2 (GNR):

None are applicable

Listing Notice 3 (GNR):

12. The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

(i) Western Cape

~~i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;~~

ii. Within critical biodiversity areas identified in bioregional plans;

iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;

iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or

v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.

Clearing of Indigenous Vegetation for the activity will be greater than 300 m2 within a Critical Biodiversity Area, including 120 m² access road through an erf zoned as open space I on the north side of Erf 155. The southern boundary of the site footprint is situated approximately 100m inland from the high-water mark, hence vegetation clearing will be predominantly outside of 100m from the high watermark. A Basic Assessment is thus required.

2.1.1 DEA&DP Reporting Information Requirements (Biodiversity)

(a) Highlight the applicable biodiversity planning categories of all areas on preferred and alternative sites and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category. Also describe the prevailing level of protection of the Critical Biodiversity Area ("CBA") and Ecological Support Area ("ESA") (how many hectares / what percentages are formally protected).

Systematic Biodiversity Planning Category	CBA	~~ESA~~	~~Other Natural Area ("ONA")~~	~~No Natural Area Remaining ("NNR")~~
If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan and the conservation management objectives	CBA 1 Terrestrial: areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure. Objective is to maintain in a natural or near-natural state with no further loss of habitat. Only low-impact, biodiversity-sensitive land-uses are appropriate. ESA – not present			
Describe the site's CBA/ESA quantitative values (hectares/percentage) in relation to the prevailing level of protection of CBA and ESA (how many hectares / what	Full extent of vegetation type is approximately 728.8 km², Conservation Status is Least Concern (NBA, 2019). Conservation target is 19%, with approximately 50.6 % currently under protection (well protected) within the Garden Route National Park, Goukamma Provincial Nature Reserve, Knysna			

Systematic Biodiversity Planning Category	CBA	~~ESA~~	~~Other Natural Area ("ONA")~~	~~No Natural Area Remaining ("NNR")~~
percentages are formally protected locally and, in the province,).	National Lake Area, Robberg Nature Reserve and Lake Pleasant Private Nature Reserve Section No. 2. Area transformed is approximately 25.75 %.			

(b) Highlight and describe the habitat condition on site.

Habitat Condition	Percentage of habitat condition class (up to 100%) and area of each in square metre (m^2)		Description and additional comments and observations (including additional insight into condition, *e.g.* poor land management practises, presence of quarries, grazing/harvesting regimes, *etc.*)
Natural	66 %	37 000 m^2	The site has sensitive vegetation yet been historically disturbed and further has municipal services across it.
Near Natural *(includes areas with low to moderate level of alien invasive plants)*	18.75 %	10 500 m^2	The site has been historically disturbed and has municipal services on it.
Degraded *(includes areas heavily invaded by alien plants)*	3 %	1 500 m^2	The site has been historically disturbed and has municipal services on it.
Transformed *(includes cultivation, dams, urban, plantation, roads, etc.)*	12.5 %	7 000 m^2	The site has been historically disturbed and has municipal services on it.

(c) Complete the table to indicate:

the type of vegetation present on the site, including its ecosystem status; and

whether an aquatic ecosystem is present on/or adjacent to the site.

Terrestrial Ecosystems		Description of Ecosystem, Vegetation Type, Original Extent, Threshold (ha, %), Ecosystem Status
Ecosystem threat status as per the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	Critically Endangered	None
	Endangered	None
	Vulnerable	None
	Least Threatened (or Least Concern)	Remnant thicket biome, hosting Gouritz Dune Thicket in broad-scale vegetation mapping. It is clear from the Site Assessment, that the site does currently host the Dune Thicket, as well as some fynbos and forest elements, which are deemed to be successional precursors and successors to the Dune Thicket.

Aquatic Ecosystems	Yes	No	Unsure
Wetland (including rivers, depressions, channelled and unchannelled wetlands, flats, seeps pans, and artificial wetlands) PES: N/A (No wetlands are present, supported by Low Sensitivity as per DEA screening tool)		X	
Estuary		X	
Coastline (High water mark is situated within 100m of the site, development footprint extends over 100m inland)		X	

(d) Provide a description of the vegetation type and/or aquatic ecosystem present on the site, including any important biodiversity features/information identified on the site (e.g. threatened species and special habitats). Clearly describe the biodiversity targets and management objectives in this regard.

The Project Site is classified as having Gouritz Dune Thicket-Forest (Vulnerable in 2011; Least Threatened 2019). The vegetation on site is representative of the vegetation unit.

In terms of the EIA Listing Notices, listing notice 1 & 3, the activity is trigged as indicated above, thus requiring a Basic Assessment process.

Other potentially relevant legislation, which will be evaluated as required, includes the following:

- Liability for any environmental damage, pollution, or ecological degradation: Arising from all -related activities occurring inside or outside the area to which the permission/right/permit relates is the responsibility of the rights holder. The National Water Act and NEMA both oblige any person to take all reasonable measures to prevent pollution or degradation from occurring, continuing, or reoccurring (polluter pays principle). Where a person/company fails to take such measures, a relevant authority may direct specific measures to be taken and, failing that, may carry out such measures and recover costs from the person responsible.
- Public participation: Public consultation and participation processes prior to granting licences or authorisations can be an effective way of ensuring that the range of ways in which the activities impact on the environment, social and economic conditions are addressed, and considered when the administrative discretion to grant or refuse the licence is made.
- Constitution of Republic of South Africa (1996): Section 24(a) of the Constitution states that everyone has the right '*to an environment that is not harmful to their health or well-being*'. Construction activities must comply with South African constitutional law by conducting their activities with due diligence and care for the rights of others.
- Western Cape Nature and Environmental Conservation Ordinance 19 of 1974: Lists Protected species, requiring permits for removal (Department of Economic Development, Environmental Affairs and Tourism).
- Water Use Authorisations: The National Water Act (No. 36 of 1998): Requires that provision is made both in terms of water quantity and quality for 'the reserve', namely, to meet the ecological requirements of freshwater systems and basic human needs of downstream communities. It is essential in preparing an EMP that any impacts on water resources be they surface water or groundwater resources, and/ or impacts on water quality or flow, are carefully assessed, and evaluated against both the reserve requirement and information on biodiversity priorities. This information will be required in applications for water use licenses or permits and/or in relation to waste disposal authorisations.
- Conservation of Agricultural Resources Act 43 of 1993: Lists Alien invasive species requiring removal.

2.2 Systematic Planning Frameworks

A screening of Systematic Planning Framework for the region has been undertaken (summarised in Table 1), that included the following features:

- National Environmental Screening Tool
- Critically Endangered, Endangered and Vulnerable Ecosystems
- Critical Biodiversity and Ecological Support Areas
- River, Estuarine and Wetland Freshwater Ecosystem Priority Areas (FEPAs) and buffers
- Protected Areas (and buffers) and National Protected Area Expansion Strategy areas (NPAES).
- Critical Habitat for listed endemic or protected species.

Table 1: Summary of Regional Planning Biodiversity features.

FEATURE[2]	DESCRIPTION	IMPLICATIONS/COMMENT
National Vegetation Map (NVM, 2023)	Goukamma Dune Thicket South Outeniqua Sand Fynbos Southern Afrotemperate Forest	Least Concern (Most of site) Least Concern (elements present) Least Concern (present in the surrounding area with elements present on the site)

[2] Refer to Figure 8 to Figure 13.

FEATURE[2]	DESCRIPTION	IMPLICATIONS/COMMENT
	Cape Seashore Vegetation	Least Concern (adjacent area)
Regional Planning: Sub-Tropical Ecosystem Planning (STEP)	Gouritz Dune Thicket Tsitsikamma Plateau Fynbos Knysna Afromontane Forest	Vulnerable (Most of site) Vulnerable (elements present) Critically Endangered (surrounding area with elements present)
Regional Planning: Garden Route BSP (GRBSP, 2006)	Keurbooms Thicket-Forest Wilderness Forest-Thicket	No classification provided (Most of site)
Critically Endangered and Endangered Ecosystems (NBA 2018)	None	None
Vulnerable Ecosystems (NBA)	Garden Route Shale Fynbos?	Remnant elements of the unit present, as expected on sites that occur in areas intersected by different vegetation units and biomes (thicket/forest/fynbos/coastal)
Critical Biodiversity Areas (WC BSP, 2017)	CBA1 (Terrestrial)	Priority terrestrial CBA area – edge
Critical Biodiversity Areas (WC BSP, 2023)	ESA 1 (Terrestrial)	Revised WC Bioregional Plan has downgraded the remining vegetation specifically within the undeveloped Keurboomstrand erven from CBA 1 to ESA 1 (connectivity rather than to meet conservation targets)
Critical Biodiversity Areas (GR BSP)	CBA1 (Terrestrial)	Priority terrestrial CBA area -edge
Protected Areas (SAPAD)	None	No Protected areas are directly affected
Marine/Coastal areas or Estuaries	Site is situated within 100 m of high-water mark	Site is within 100 m of high-water mark but will have no direct or indirect affect, other than residual risk should significant sewer or other waste spills occur.
Ecological Support Areas	Site is designated ESA 1 as per WC BSP (2023)	Remnant pockets of vegetation as is typical on erven within Keurboomstrand are deemed to be important to retain ecological connectivity across the landscape.
Within 32 m of Watercourse	Site is not within 32 m of any watercourse	N/A
Within 100 m of River	Site is not within 100 m of any watercourse	N/A
Within 500 m of Wetland	No natural wetlands present	N/A
Surrounding Land Uses	Urban (coastal village), forest, coastline and beaches (recreational use)	
Critical Habitat for listed endemic/ protected species	The endemic and other protected species that are present are generally having widespread distributions and the activity is unlikely to pose any significant threat to any species or population. No specific populations of threatened species were identified within the footprint, and the affected footprint is largely disturbed or comprised of secondary vegetation. There are a number of red listed species in the surrounding vegetation units and area that are known to have limited distributions, however none were recorded on the footprint (refer to Section 3.1.8).	

2.2.1 National Environmental Screening Tool

The DEA Screening Tool (~May 2025) indicates the following, summarised in Table 1:

- Terrestrial Biodiversity is Very High (Figure 4).
- Plant species sensitivity is Medium (Figure 5).
- Animal Species sensitivity is Medium (Figure 6).
- Aquatic Sensitivity is Low (Figure 7).

Figure 4: Terrestrial Biodiversity Sensitivity

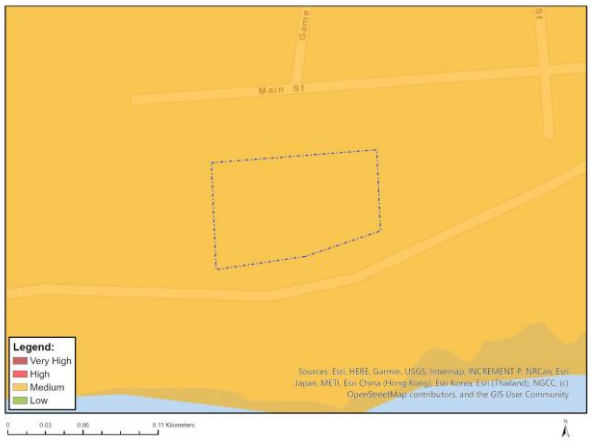

Figure 5: Plant Species Sensitivity

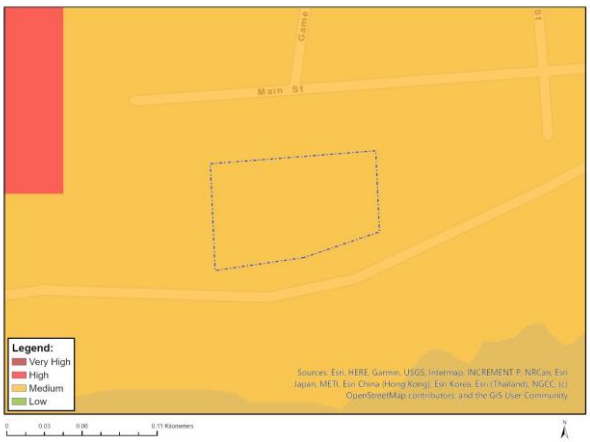

Figure 6: Animal Species Sensitivity

Figure 7: Aquatic Sensitivity

Table 2: Summary of Screening tool designations.

Terrestrial Sensitivity	**Feature(s) in proximity**
Very High	ESA 1: Terrestrial, National Protected Area Expansion Strategy (NPAES) & SANPARKS (2025) Garden Route National Park
High	None
Medium	None
Low	Present
Plant Sensitivity	
Very High	None
High	None
Medium	*Faurea macnaughtonii, Ocotea bullata, Lampranthus pauciflorus, Ruschia duthiae, Lebeckia gracilis, Amauropelta knysnaensis, Leucospermum glabrum, Selago burchellii, Erica chloroloma, Erica glandulosa subsp. fourcadei, Hermannia lavandulifolia, Acmadenia alternifolia, Muraltia knysnaensis, Erica glumiflora,* Sensitive species 657, 1032, 500 & 763
Low	Present
Animal Sensitivity	
Very High	None
High	None
Medium	*Chlorotalpa duthieae* (mammal), *Stephanoaetus coronatus* (bird), *-Afrixalus knysnae* (Amphibian), *Aloeides thyra orientis* (Insect), *Sarophorus punctatus* & *Aneuryphymus montanus* (Invertebrates) & Sensitive species 8.
Low	Present
Aquatic Sensitivity	
Very High	None
High	None
Medium	None
Low	Present

The DEA screening tool identifies Very High Terrestrial Biodiversity (Critical Biodiversity Area, NPAES, National Park), Medium Animal Species and Medium Plant Species Sensitivities as well as Low Aquatic Sensitivity. Figure 4 to Figure 7 above are extracted directly from the Screening Tool report (~May 2025). The content of this report will address the findings of the screening tool as well as any site-specific sensitivities that may not have been identified the screening tool, as applicable. The site assessment has physically screen for physical presence of these and other possible species not identified in the screening tool.

2.2.2 Vegetation of Southern Africa

The National Vegetation Type (NVM, 2023, Figure 8) indicated for the site and surrounding area are Goukamma Dune Thicket, having a **Least Concern** status, as per National Biodiversity Assessment Red Listed Ecosystems (2022). A general description of the vegetation units is provided in the section below (as per Mucina & Rutherford, 2006, as amended) as a reference point for the baseline vegetation composition.

Goukamma Dune Thicket (AT 36)

(Type history: STEP map Goukamma Dune Thicket (89 %); 2012 VEGMAP - FFd 11 Southern Cape Dune Fynbos (86 %), FFh 9 Garden Route Shale Fynbos (6 %))

Distribution: This vegetation type occurs in the Western Cape Province. 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 Keurboomstrand.

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 and Soils: The area is dominated by Strandveld and Wankoe formations. Predominantly found on land type Hb.

Climate: Non-seasonal rainfall dominates the region with MAP between 588 mm and 859 mm. Frost is present for approximately 3 days per year. The mean monthly maximum is 26.67 °C in February and the mean monthly minimum is 7.92 °C in July. Altitude ranges from 1 - 203 masl.

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

Growth form	Species
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* (e), *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*

*All taxonomic names are the latest names as they were listed in the Biodiversity Database of South Africa (BODATSA) on the 11 January 2019)

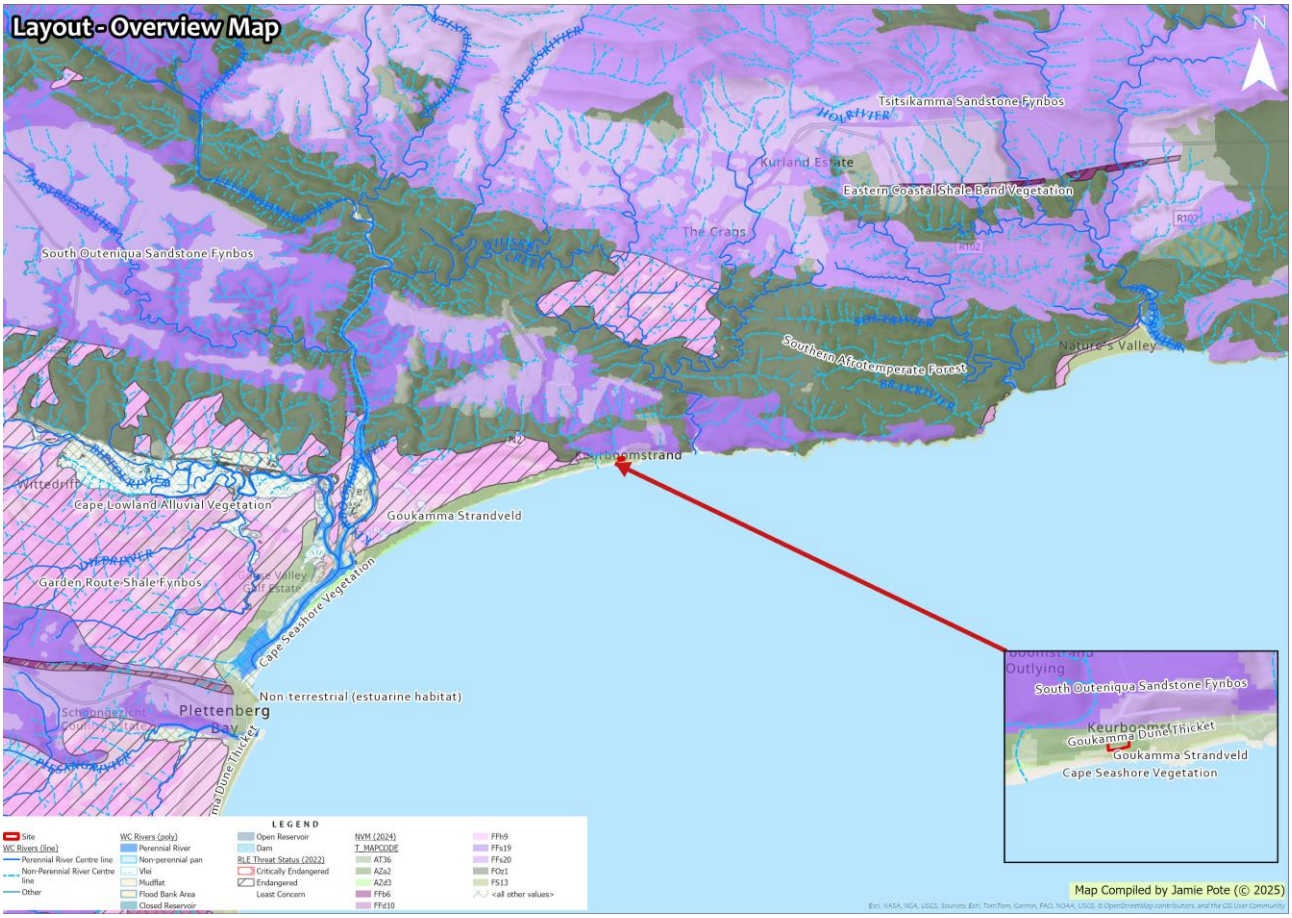

Figure 8: National Biodiversity Assessment Vegetation Type and Conservation Status (NBA, 2018).

Conservation: Least Concern

Conservation Target	19 %
Conserved in	Garden Route National Park, Goukamma Provincial Nature Reserve, Knysna National Lake Area, Robberg Nature Reserve and Lake Pleasant Private Nature Reserve Section No.2
Area transformed	25.75 %
Threat activities	No data
Protection Level	Well protected

Implications:

- Vegetation assessed on site is generally characteristic of the vegetation units.
- The vegetation unit is not currently under imminent threat, not having an elevated conservation status.
- Several South Africa and Eastern Cape endemic species are recorded from the vegetation units, some have localised distributions and others are widespread. Refer to Sections 3.1.8 for further assessment of species, although no major conflicts were noted with the intended land use change.

2.2.3 National Biodiversity Assessment and Red Listed Ecosystems

The NBA and RLE is the primary tool for monitoring and reporting on the state of biodiversity in South Africa and informs policies, strategic objectives, and activities for managing and conserving biodiversity more effectively. The NBA is especially important for informing the National Biodiversity Strategy and Action Plan (NBSAP), the National Biodiversity Framework (NBF) and the National Protected Area Expansion Strategy (NPAES) and also informs other national strategies and frameworks across a range of sectors, such as the National Spatial Development Framework, the National Water and Sanitation Master Plan and the National Biodiversity Economy Strategy. Ecosystem protection level is an indicator that tracks how well represented an ecosystem type is in the protected area network. It has been used as a headline indicator in national reporting in South Africa since 2005. It is computed by intersecting maps of ecosystem types and ecological condition with the map of protected areas. Ecosystem types are then categorised based on the proportion of the biodiversity target for each ecosystem type that is included in one or more protected areas. For terrestrial ecosystems, biodiversity targets are set for each ecosystem type using established species–area accumulation curves (ranging between 16 and 34%).

The outcome of the most recent Red Listed Ecosystems (2023) indicate that the affected vegetation type is not currently under threat. The affected vegetation unit has a Least Concern Conservation Status.

Implications:

- Vegetation unit is generally well represented regionally, and not under any imminent threats that could pose a risk to the proposed development.
- No vegetation units present have an elevated conservation status, although elements are shared with surrounding vegetation nits that do have an elevated conservation status.

2.2.4 Sub-Tropical Ecosystem Planning (STEP)

STEP identifies Gouritz Dune Thicket as being the dominant local vegetation units. At the time of the STEP classification (2002), it was deemed to be Vulnerable. The STEP classification aligns closely with the National Vegetation Map classification, as these specific units were derived from STEP. In addition, surrounding vegetation includes Tsitsikamma Plateau Fynbos and Knysna Afromontane Forest. Elements of these units may also be present, being in proximity and vegetation tends to have transitional elements.

Gouritz Dune Thicket

This unit is restricted to the Strandveld and Waenhuiskrans Formations, which consists of white dune sands with fine shell material and occasionally with calcrete lenses present. It occurs as a narrow band

(rarely more than 1 km wide) of vegetation along the coastline, usually just arid thicket of the primary dune system. Here the annual rainfall is approximately 350 mm, with approximately 150 mm falling in summer (October-March) and 200 mm occurring in winter (April-September). The mean maximum temperature during summer is 25.6 C, while mean minimum temperature during winter months is 7.7 C. The Dune Thicket vegetation is best developed in dune slacks, where it is well protected against salt laden winds from the sea and periodic fires that may penetrate the coastal zone from the inland areas. In these protected sites woody shrubs and trees, such as *Azima tetracantha, Carissa bispinosa, Mystroxylon aethiopicum, Cassine peragua, Cussonia thyrsiflora, Euclea racemosa, Grewia occidentalis, Gymnosporia capitata, Maytenus procumbens, Ptaeroxylon obliquum, Pterocelastrus tricuspidatus, Putterlickia pyracantha, Rhus glauca, Rhus lucida, Rhus pterota, Robsonodendron maritimum, Sideroxylon inerme, Tarchonanthus camphoratus* and *Zanthoxylum capense,* form a dense layer. Lianas (*e.g. Cynanchum ellipticum, Rhoicissus digitata, Sarcostemma viminale, Solanum quadrangulare, etc*.) are abundant amongst these woody species, while succulents (*e.g. Carpobrotus acinaciformis, Cotyledon orbiculata, Crassula nudicaulis, Euphorbia muirii, Gasteria acicacifolia, etc*.) are only abundant in more open sites. The crests and upper slopes of the dunes have a different subset of shrubs, often with graminoids present. Most common on these more open slopes are species such as *Chrysanthemoides monilifera, Eriocephalus paniculatus, Helichrysum patulum, Ischyrolepis eleocharis, Olea exasperata, Metalasia muricata, Myrica cordifolia, Nylandtia spinosa, Passerina rigida, Rhus crenata, Salvia africana-lutea, Stenotaphrum secundatum, Thamnochortus insignis* and *Zygophyllum morgsana*. An interesting element in this unit, is the occasional presence of stunted *Schotia afra* plants.

Endemic Species[3]**:** *Agathosma apiculata, Agathosma muirii, Athanasia cochlearifolia, Carpobrotus muirii Euchaetis albertiana, Eriospermum vermiforme, Haworthia mirabilis var. paradoxa, Hermannia muirii, Muraltia barkerae, Muraltia depressa, Muraltia knysnaensis, Pentaschistis barbata ssp. orientalis, Selago villicaulis* and *Sutera placida*.

Implications:

- Vegetation assessed on site is broadly speaking typical of the vegetation unit.
- No localised endemics were recorded within the affected footprint.

2.2.5 Garden Route BSP

The Garden Route BSP (GRBSP, 2010) identified the vegetation as being Keurbooms Thicket-Forest with Wilderness Forest-Thicket. The Garden Route BSP further indicates the site as being on the edge of designated Critical Biodiversity Area.

Coastal Dune Milkwood & Ekebergia Forest

This habitat is restricted to deep sandy soils in the lowlands. It is best developed next to extensive water bodies, where fires originate and burn upslope. The tall, closed canopy is similar to those of the Afromontane Plateau Forest, with tall *Afrocarpus falcatus* often emerging above the canopy. It does, however, differ in its floristic component and in having deciduous trees such as *Celtis africana* often locally abundant. It is most easily recognized as it has trees with a subtropical affiliation such as *Calodendrum africana*, *Ekebergia capensis, Strychnos decussata* and even sometimes *Olea europaea spp. africana* present. No rare plant species are known from this unit, but it is the habitat of the rare Knysna Woodpecker (*Campethera notata*). These forests were probably more extensive in the past as they

[3] Species classed as endemic will undergo further screening to ascertain distribution and scarceness and conservation status (3.1.8).

were initially not afforded much protection. The Tsitsikamma Dune Forest has *Sideroxylon inerme* more prevalent.

Coastal Forest Mosaic Thicket

This habitat is restricted to more nutrient rich soils that are often derived from shale. It usually occurs on steep slopes and since it often has duplex soils it tends to be sensitive to physical disturbance. Once the vegetation has been disturbed soil slip-faces occur readily after heavy rain. The outer edges consist of impenetrable stands of thorny shrubs and trees, such as *Azima tetracantha, Gymnosporia buxifolia and Scutia myrtina*, of which the canopy is not much above the ground. A non- thorny species that tend to be very abundant along the outer edge is the aromatic *Tarchonanthus camphoratus*. These are all species with specific defences against browsing, so one cannot help but to wonder if this habitat was much exposed to browsing impacts of large herbivores in the past.

Towards the inner parts the tree canopy does lift above the ground with tall trees such as *Afrocarpus falcatus, Calodendrum capense, Olinia ventosa* and *Sideroxylon inerme* present that are often adorned with climbers such as *Rhoicissus tomentosa*. This habitat is thus intermediate in structure, and the species present in the Coastal Forests and the Dune Thicket vegetation. **The species however mix to such an extent that it is impossible to separate them into two distinct units.** This habitat seems to be particularly rich in bird life, which is one of the reasons why we retained it as a distinct habitat type.

The Keurbooms Thicket-Forest occurs on steep slopes where the vegetation of south and north slopes differs much. In being centrally located it assimilated an enormous range of non-fire adapted species typical from both the western and eastern sectors. Even succulents such as *Aloe arborescens* and *Aloe pluridens* are present in arid sites.

Implications:

- The vegetation on site falls within the broad description of the above, dominant and common tree species including *Tarchonanthus camphoratus, Azima tetracantha, Gymnosporia buxifolia, Scutia myrtina* and *Sideroxylon inerme*, with occasional, generally small *Celtis africana, Ekebergia capensis* and *Olea europaea spp. africana* trees also noted. The climber *Rhoicissus tomentosa* as well as the succulents *Aloe arborescens* and *Aloe pluridens* were also noted in more open areas.
- It is noted and confirmed that this habitat is intermediate in structure, and the species present are from both the typical Coastal Forest and the Dune Thicket vegetation. The species however mix to such an extent that it is impossible to separate them into two distinct units.
- Larger trees, typical of the surrounding forest, such as *Afrocarpus falcatus* and *Calodendrum africana* were noted to be absent, suggesting that it is structurally and floristically more inclined towards dune thicket than Coastal Forest. The surrounding steeper slopes appear to have more typical coastal forest, which is generally intact, being on slopes too steep to be suitable for development.
- The Knysna Woodpecker (*Campethera notata*), although not confirmed may be a transient visitor.
- Evidence of slip faces as described above were noted in the wider area and suggest that the slopes within the site should be avoided or not blanket cleared of vegetation.
- The site is deemed to be situated on the edge of designated Critical Biodiversity Area by the GRBSP.

2.2.6 Western Cape Biodiversity Spatial Plan (WCBSP, 2017) – Terrestrial

The Western Cape is endowed with world-renowned biodiversity and natural resources. Together with this unparalleled endowment comes international responsibilities as well as significant opportunities

for our people and the biodiversity economy. The Western Cape Biodiversity Spatial Plan (WCBSP, 2017) represents the "state of the art" provincial systematic biodiversity planning product. It represents the priority biodiversity areas and ecological infrastructure that need to be secured in the long-term in order that we, together with CapeNature, fulfil our core provincial mandate for biodiversity management.

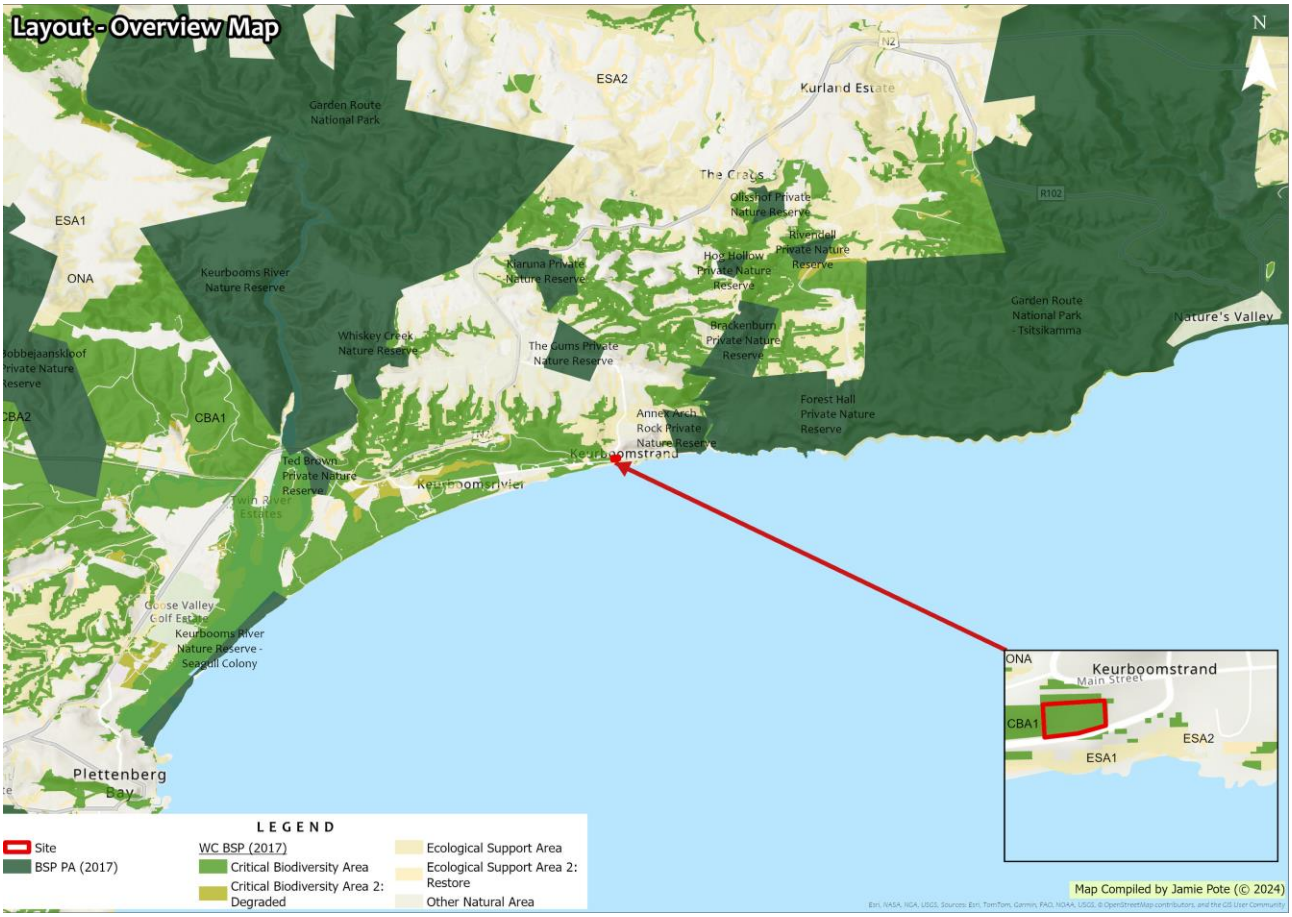

Figure 9: Western Cape Biodiversity Spatial Plan WCBSP, 2017) – Terrestrial.

The development and implementation of the Western Cape Biodiversity Spatial Plan (WCBSP, 2017) is a core output for the Provincial Biodiversity Strategy and Action Plan (2016) which is aligned to the Aichi Targets for the United Nations Convention on Biological Diversity as well as the National Biodiversity Strategy and Action Plan (2015). This *Western Cape Biodiversity Spatial Plan Handbook* thus provides all stakeholders with the strategic and practical guidance on how to ensure that planning and decision-making build resilience of our ecological infrastructure. Critically, the WCBSP must be used to inform how we invest in ecological infrastructure to ensure that our natural resources are managed to improve resilience and water security into the future. This will be crucial in enabling "future proof" development as part of our response to climate change, including adaptation and disaster risk reduction.

The Western Cape Biodiversity Spatial Plan (2017, Figure 9) indicates areas of land as well as aquatic features which must to be safeguarded in their natural state if biodiversity is to persist and ecosystems are to continue functioning.

Critical Biodiversity Areas. (CBA) incorporate:

i. areas that need to be safeguarded in order to meet national biodiversity thresholds

ii. areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or

iii. important locations for biodiversity features or rare species.

Ecological Support Areas (ESAs) are supporting zones required to prevent the degradation of Critical Biodiversity Areas and Protected Areas. An ESA may be an ecological process area that connects and therefore sustains Critical Biodiversity Areas or a terrestrial feature. None are present withi the site or immediate vicinity.

Implications:

- The site falls within a designated WC BSP designated Critical Biodiversity Area, on the eastern extremity of a band that corresponds to an extensive band of forest-thicket to the west of the site situated on steep, but undevelopable slopes.
- *Refer to implications outlined in Table 4.*
- Fragmentation of CBA, as a result of the development will be limited to the footprint, and generally within areas that already have disturbance, relating to the proposed dwellings and infrastructure requirements.
- The activities fall outside of the recommended land use parameters for the category. Dwellings are generally not acceptable within CBA 1 areas within the recommended land-use guidelines.
- Impacts to intact CBA will however be minimal with majority of impact occurring within previously disturbed areas of the site.
- A large portion of the Erf to the west, outside of the potential development footprints are likely to never be developed due to slope constraints and vegetation in these areas is intact and natural.

2.2.7 Western Cape Biodiversity Spatial Plan (WCBSP, 2022) – Terrestrial

The recently released Western Cape Biodiversity Aspatial Plan (2022) designations are changed subsequent to the previous designations of 2017. As evident from Figure 10, the site now falls within designated Ecological support Area 1 (ESA 1) rather than Critical Biodiversity Area (CBA).

Table 3: Criteria defining Critical Biodiversity Areas (Source: WC BSP, 2017/2022)

CBA MAP CATEGORY:	DEFINING CRITERIA
Protected Areas (Not present)	Areas that are proclaimed as protected areas under national or provincial legislation. Must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity. A benchmark for biodiversity.
Critical Biodiversity Areas 1 (CBA) (Present, WC BSP, 2017)	Areas in a natural 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.
Critical Biodiversity Areas 1 (CBA 2) (Not present)	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 functional, natural or near-natural state, with no further loss of natural habitat. These areas should be rehabilitated.

CBA MAP CATEGORY:	DEFINING CRITERIA
Ecological Support Areas 1 (ESA 1) (Not present - WC BSP, 2017) **(Present - WC BSP, 2023)**	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.
Ecological Support Areas 2 (ESA 2) (Not present)	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 minimise impact on ecological infrastructure functioning; especially soil and water-related services.
Other Natural Areas (ONA) (Present)	Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although they have not been prioritised for biodiversity, they are still an important part of the natural ecosystem. Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land uses, but some authorisation may still be required for high-impact land uses.
No Natural Area Remaining (NNAR) (Not present)	Areas that have been modified by human activity to the extent that they are no longer natural, and do not contribute to biodiversity targets. These areas may still provide limited biodiversity and ecological infrastructure functions, even if they are never prioritised for conservation action. Manage in a biodiversity-sensitive manner, aiming to maximise ecological functionality. Offers the most flexibility regarding potential land uses, but some authorisation may still be required for high impact land uses.

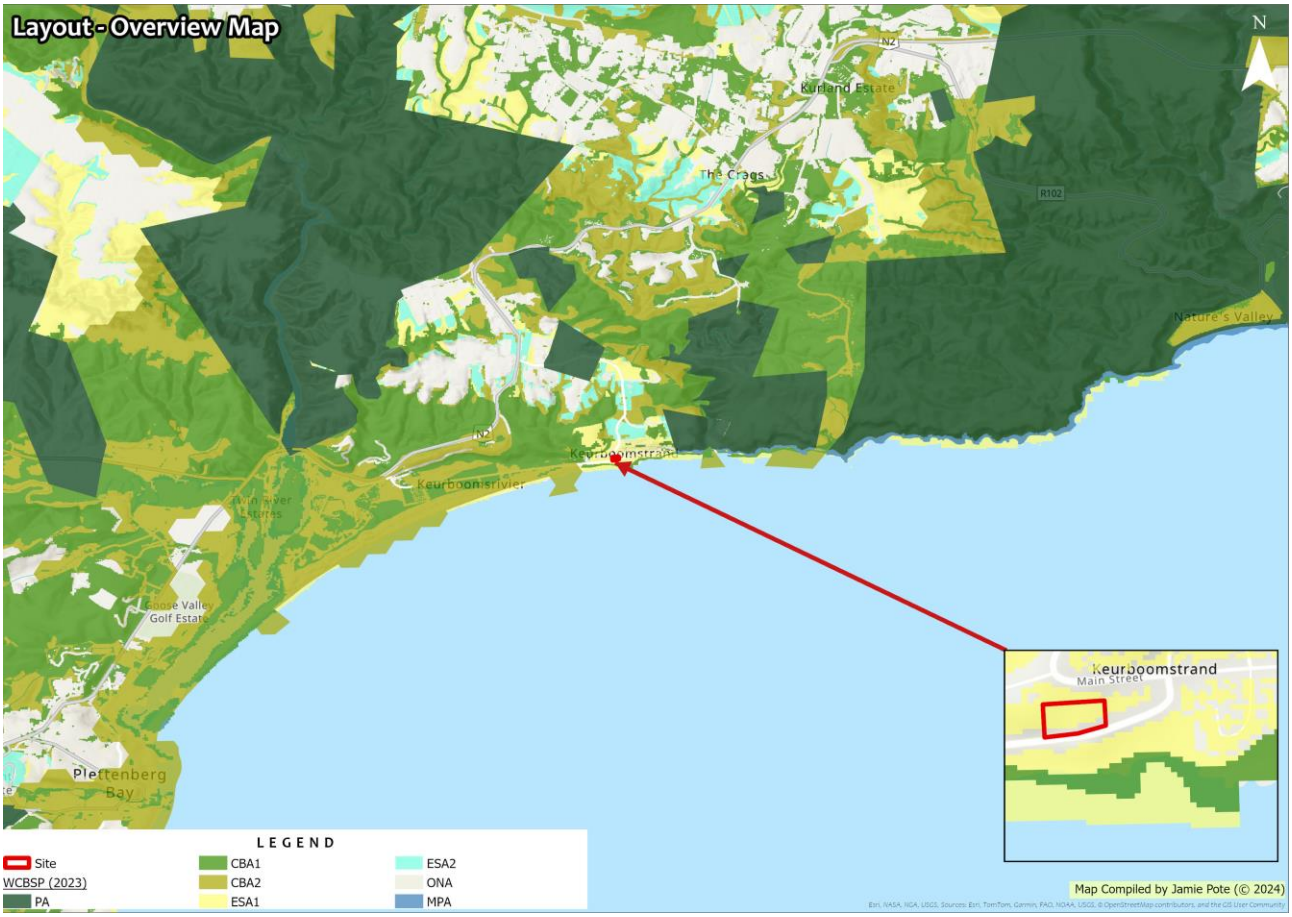

Figure 10: Western Cape Biodiversity Spatial Plan WCBSP, 2022) – Terrestrial.

2.2.8 Garden Route Biodiversity Sector Plan (2010)

The Garden Route BSP (GRBSP, 2010) identified the vegetation as being Keurbooms Thicket-Forest with Wilderness Forest-Thicket. The Garden Route BSP further indicates the site as being on the edge of designated Critical Biodiversity Area. The GRBSP is however replaced by the more recent EC BSP, and this is provided for context only.

Coastal Dune Milkwood & Ekebergia Forest

This habitat is restricted to deep sandy soils in the lowlands. It is best developed next to extensive water bodies, where fires originate and burn upslope. The tall, closed canopy is similar to those of the Afromontane Plateau Forest, with tall *Afrocarpus falcatus* often emerging above the canopy. It does, however, differ in its floristic component and in having deciduous trees such as *Celtis africana* often locally abundant. It is most easily recognized as it has trees with a subtropical affiliation such as *Calodendrum africana*, *Ekebergia capensis, Strychnos decussata* and even sometimes *Olea europaea spp. africana* present. No rare plant species are known from this unit, but it is the habitat of the rare Knysna Woodpecker (*Campethera notata*). These forests were probably more extensive in the past as they were initially not afforded much protection. The Tsitsikamma Dune Forest has *Sideroxylon inerme* more prevalent.

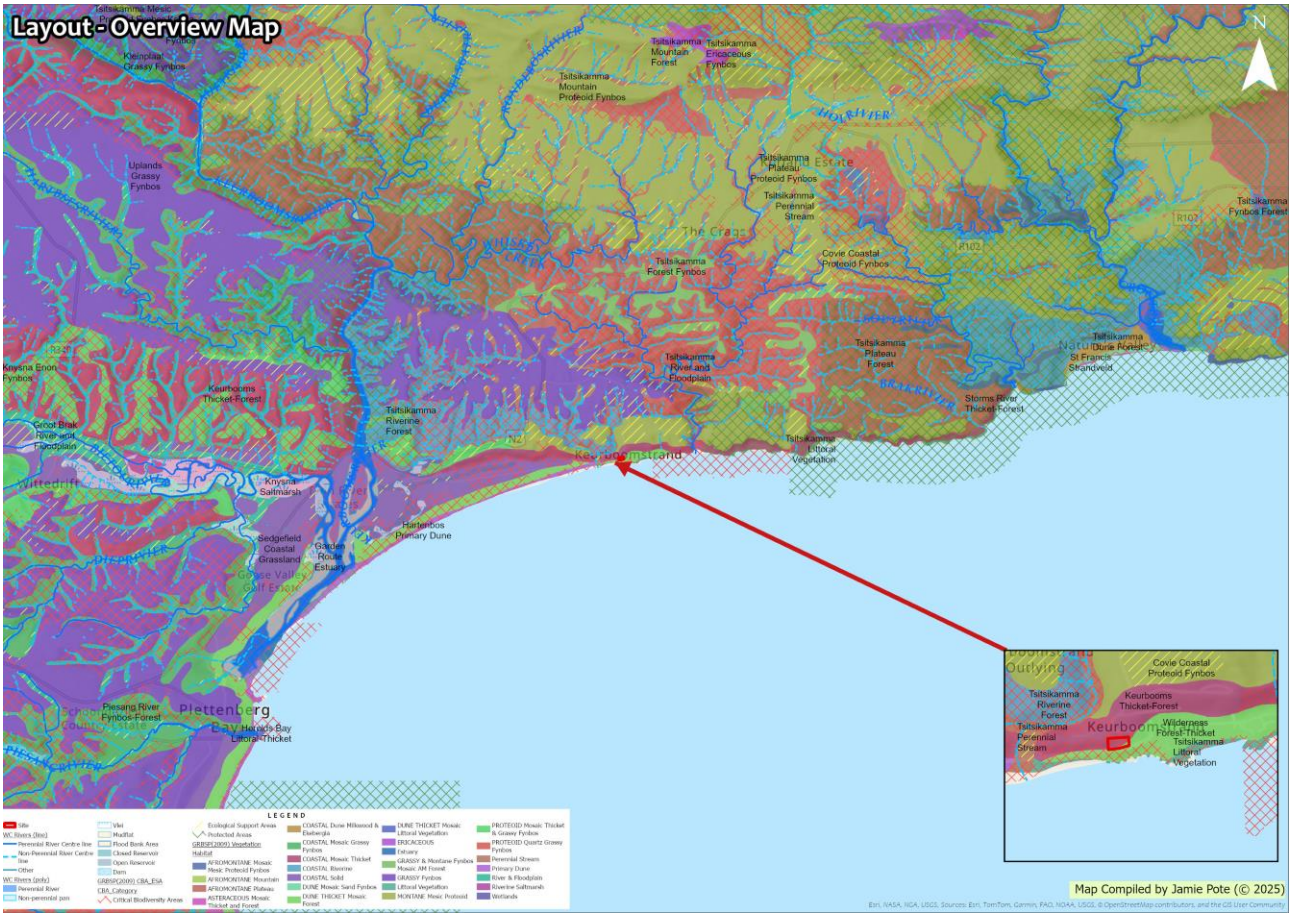

Figure 11: Garden Route Biodiversity Sector Plan (2007) vegetation designation and CBA/ESA status.

Coastal Forest Mosaic Thicket

This habitat is restricted to more nutrient rich soils that are often derived from shale. It usually occurs on steep slopes and since it often has duplex soils it tends to be sensitive to physical disturbance. Once the vegetation has been disturbed soil slip-faces occur readily after heavy rain. The outer edges consist of impenetrable stands of thorny shrubs and trees, such as *Azima tetracantha, Gymnosporia buxifolia and Scutia myrtina*, of which the canopy is not much above the ground. A non- thorny species that tend to be very abundant along the outer edge is the aromatic *Tarchonanthus camphoratus*. These are all species with specific defences against browsing, so one cannot help but to wonder if this habitat was much exposed to browsing impacts of large herbivores in the past.

Towards the inner parts the tree canopy does lift above the ground with tall trees such as *Afrocarpus falcatus, Calodendrum capense, Olinia ventosa* and *Sideroxylon inerme* present that are often adorned with climbers such as *Rhoicissus tomentosa*. This habitat is thus intermediate in structure, and the species present in the Coastal Forests and the Dune Thicket vegetation. **The species however mix to such an extent that it is impossible to separate them into two distinct units.** This habitat seems to be particularly rich in bird life, which is one of the reasons why we retained it as a distinct habitat type.

The Keurbooms Thicket-Forest occurs on steep slopes where the vegetation of south and north slopes differs much. In being centrally located it assimilated an enormous range of non-fire adapted species typical from both the western and eastern sectors. Even succulents such as *Aloe arborescens* and *Aloe pluridens* are present in arid sites.

Implications:

- The vegetation on site falls within the broad description of the above, dominant and common tree species including *Tarchonanthus camphoratus, Azima tetracantha, Gymnosporia buxifolia, Scutia myrtina* and *Sideroxylon inerme*, with occasional, generally small *Celtis africana, Ekebergia capensis* and *Olea europaea spp. africana* trees also noted. The climber *Rhoicissus tomentosa* as well as the succulents *Aloe arborescens* and *Aloe pluridens* were also noted in more open areas.
- It is noted and confirmed that this habitat is intermediate in structure, and the species present are from both the typical Coastal Forest and the Dune Thicket vegetation. The species however mix to such an extent that it is impossible to separate them into two distinct units.
- Larger trees, typical of the surrounding forest, such as *Afrocarpus falcatus* and *Calodendrum africana* were noted to be absent on the site, suggesting that it is structurally and floristically more inclined towards dune thicket than Coastal Forest. The surrounding steeper slopes appear to have more typical coastal forest-like vegetation, which is generally intact, being on slopes too steep to be suitable for development.
- The Knysna Woodpecker (Campethera notata), although not confirmed present, may be a transient visitor to the site and surrounding area.
- Evidence of slip faces as described above were noted in the wider area and suggest that the slopes within the site should be avoided or not blanket cleared of vegetation.
- The site is deemed to be situated on the edge of designated Critical Biodiversity Area by the GRBSP.

2.2.9 Rivers, Wetlands & Estuaries.

The site is situated on the western edge of the mouth of the Keurbooms River, with the Keurbooms River estuary on the north-eastern side and the beach on the south-eastern side. The Keurbooms River mouth is prone to migrating within a broader area and the site has been subject to periodic flooding during flooding of the river in the past, which required stabilisation of the outer north-east and south sides with rocks. The estuary abuts the site directly on the north and east sides. The Western Cape BSP Ecosystem Threat Status (2016) designates a *Least Threatened* status to the Keurbooms Estuarine Salt Marshes and Seashore Vegetation.

2.2.10 Strategic Water Source Areas

The site is outside of any designated Strategic Water Source Areas (SWSA).

2.2.11 Freshwater Ecosystem Priority Areas

The site is outside of any designated Freshwater Ecosystem Priority Areas (FEPAs).

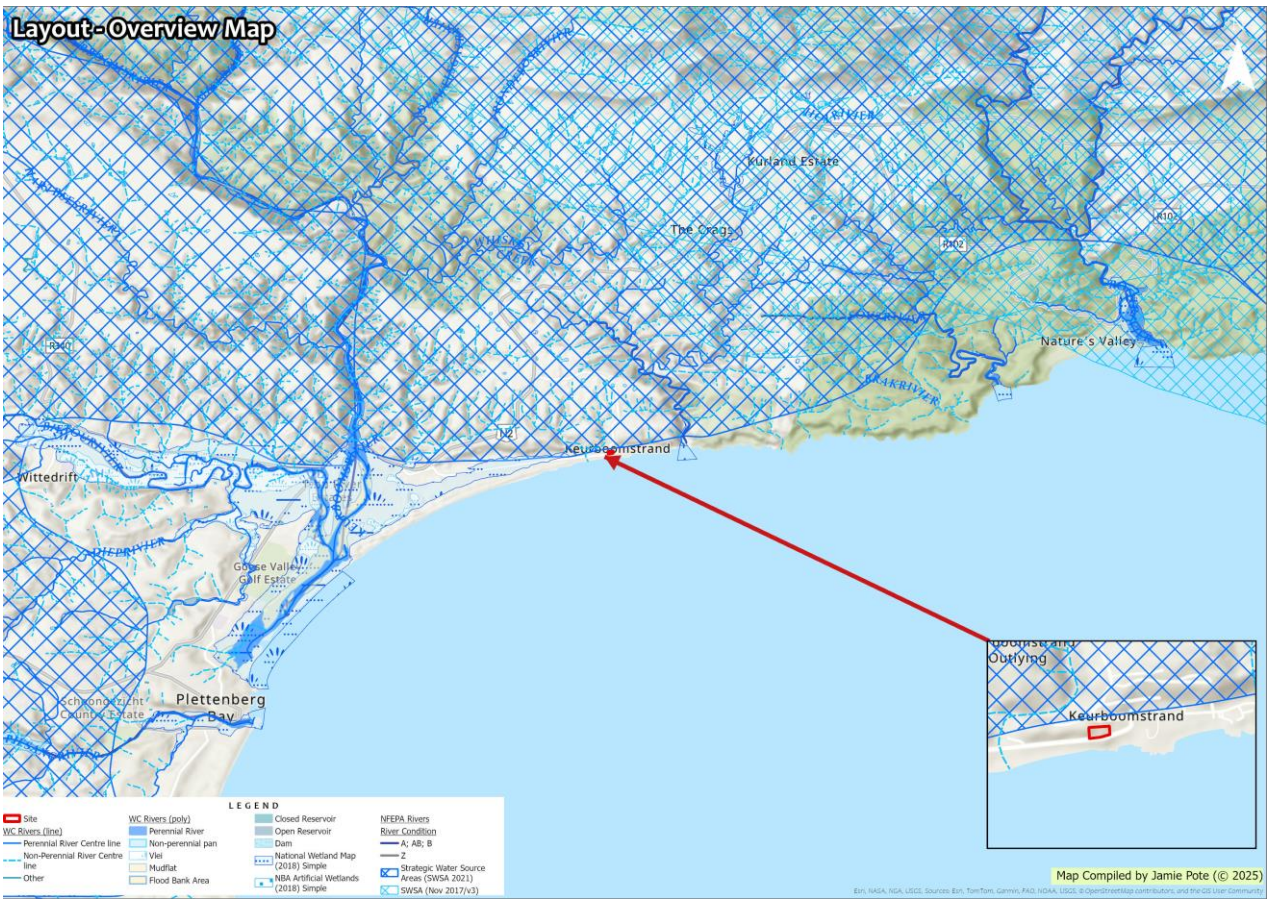

Figure 12: Rivers. Wetlands and Estuaries.

2.2.12 Protected areas

The South Africa Protected Areas Database (SAPAD) database, a comprehensive database of various protected area categories, is updated on a quarterly basis, and provides a comprehensive source of all national and private nature reserves, world heritage sites and other formal legally protected conservation areas situated within South Africa (Figure 13). Several Protected Areas are situated within 5 km of the site as per Table 4. While the site is in close proximity to some, the direct and indirect impacts are unlikely to be significant, bearing in mind the site is within an already partly developed urban area and the additional habitat transformation will be negligible within the context of existing (baseline) levels of transformation associated with the Keurboomstrand village.

When projects are located in legally protected and internationally recognized areas, clients should ensure that project activities are consistent with any national land use, resource use, and management criteria (including Protected Area Management Plans, National Biodiversity Strategy and Action Plans (NBSAP's), or similar documents).

Table 4: List of Protected Areas in vicinity

NAME	NSBA CATEGORY	SIZE (HA)	DISTANCE
Annex Arch Rock Private Nature Reserve	Nature Reserve	53 Ha	0.8 km E
Garden Route National Park	National Park	126 106 Ha	1.4 km E
The Gums Private Nature Reserve	Nature Reserve	62 Ha	1.5 km NW
Brackenburn Private Nature Reserve	Nature Reserve	91 Ha	2.0 km NE

NAME	NSBA CATEGORY	SIZE (HA)	DISTANCE
Kiaruna Private Nature Reserve	Nature Reserve	66 Ha	3.0 km N
Forest Hall Private Nature Reserve	Nature Reserve	49 Ha	3.2 km E

Figure 13: Protected Areas, NPAES, KBA's & IBA;s in the surrounding area.

The proposed site does not overlap with any SAPAD designated Protected Areas but does overlap with designated NPAES Protected area (2018), Important Bird Area (Tsitsikamma – Plettenberg Bay IBA) and/or associated buffers. The Western Cape Biodiversity Spatial Plan designates a CapeNature Keurbooms River Nature Reserve (Seagull Colony) overlapping the site, which is not represented in the SAPAD designations. The development of the site is unlikely to have any significant impacts to this, again within the context of baseline levels of disturbance associated with being an erf within the existing Keurboomstrand village. The proposed activity, being situated on an already developed Erf, is thus unlikely to exceed current baseline impacts associated with the site on this IBA.

Implications:

- The proposed activity is unlikely to have any direct, indirect, or cumulative impact of significance on any protected environment, however bird and mammal species may be transient to the site.

2.2.13 Key Biodiversity Areas

The site falls within the broader Garden Route KBA, which qualifies as a Key Biodiversity Area of international significance that meets the thresholds for 3 criteria described in the Global Standard for the Identification of KBAs. Based on current available information, 168 species meet one or more KBA criteria. No flagged criteria will be significantly at risk as a result of this development which will result

in the clearing of vegetation from a portion of the site to accommodate dwellings as per the proposed layout plan. A fringe of natural vegetation will be retained on the west, east and south sides which will accommodate connectivity with the surrounding landscape and will also serve to contribute towards the conservation of the represented vegetation units and habitat.

2.2.14 Important Bird Areas

The site is situated on the edge of the Tsitsikamma – Plettenberg Bay Important Bird Area. The Tsitsikamma-Plettenberg Bay Important Bird Area (IBA) is an ecologically significant region in South Africa. It originally covered the Tsitsikamma section of the Garden Route National Park, but its boundary has been extended westward to include important habitats around Plettenberg Bay. The Tsitsikamma section of the Garden Route National Park spans approximately 24,000 hectares and stretches for about 80 kilometres along the coast. It begins west of the Sout River near Nature's Valley and extends eastward to the Groot River. The IBA now also includes the entire Plettenberg Bay coastline and near-shore areas. The IBA encompasses diverse habitats, including steep coastal cliffs, gorges, fynbos, and forests. Notably, it includes the Keurbooms estuary spit, an essential breeding site for Kelp Gulls and other bird species.

The proposed activity, being situated on an already developed Erf, is unlikely to exceed current baseline impacts associated with the site on this IBA.

3 Biodiversity Risk Identification and Assessment

3.1 Baseline Biodiversity Description

3.1.1 Site Locality

The site is situated in Keurboomstrand, a coastal village comprised of several clusters, generally interspaced with undeveloped areas. The site is situated on the western side of such a cluster and is bound on all sides by developed erven or infrastructure. Erven in the area generally have restricted footprints that are tucked away within a natural forest-thicket matrix that is retained.

3.1.2 Topography and Drainage

The site is situated on a south facing coastal palaeodune, running in an east-west direction. The site is located on a small bench approximately 100 m inland from the high-water mark.

3.1.3 Terrestrial Landscape Features (Habitat)

Overview

The project area is generally characterised by undulating to steep south facing palaeodunes, deeply incised by drainage lines and rivers where slopes are generally vegetated in solid dune thicket with dune forest in places and occasional patches having coastal fynbos.

Within the site, the predominant vegetation is the Dune Thicket, becoming forest and with a patch of moribund pre-cursor fynbos along the southern edge and at the base of the slope (historical dune slack, which has been cut off from the coast by a surfaced road). Dominant species (typical of the dune thicket) include *Pterocelastrus tricuspidatus, Schotia afra, Sideroxylon inerme, Tarchonanthus littoralis, Azima tetracantha, Carissa bispinosa, Mystroxylon aethiopicum, Cassine peragua, Euclea racemosa, Grewia occidentalis, Gymnosporia capitata, Maytenus procumbens, Mystroxylon aethiopicum, Olea exasperata, Passerina rigida, Putterlickia pyracantha, Scutia myrtina* and various *Searsia (Rhus) spp.*

It is clear from the Site Assessment, that a portion of the site does currently host the Dune Thicket, as well as fynbos and forest elements, which are deemed to be successional pre-cursors (fynbos) and

successors (forest) to the Dune Thicket. Dune Thicket may not necessarily become forest, and fynbos may not necessarily develop into Dune Thicket.

A summary of Terrestrial Landscape Features and indicators is provided in Table 5. The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the localised impact associated with any footprint would in general be of low to very low significance with implementation of a number of mitigations, as well as some possible minor alignment adjustments.

3.1.4 Site Vegetation

Based on literature and site observations, the vegetation in a mosaic of transitional vegetation, where a coastal fynbos develops and in the absence of fire or disturbance can develop into a dune thicket vegetation. Over long time periods and with the absence of disturbances and fire, as well as where microclimate and soil conditions allow, this can become forest (Figure 24).

Figure 14: View of site from east

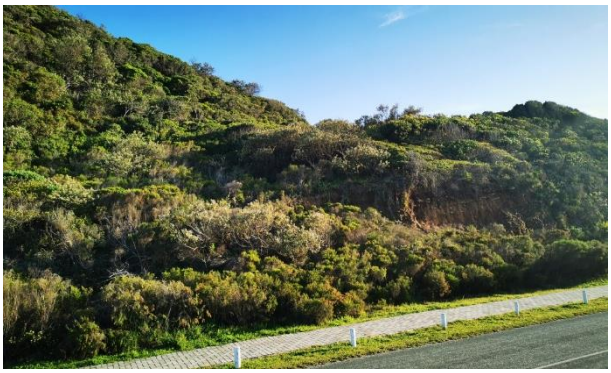

Figure 15: View of site from south-west

Figure 16: Dune Thicket

Figure 17: Dune Thicket

Figure 18: Disturbed areas

Figure 19: Disturbed areas

Figure 20: Remnant Forest elements

Figure 21: Remnant Forest elements

Figure 22: Fynbos patches

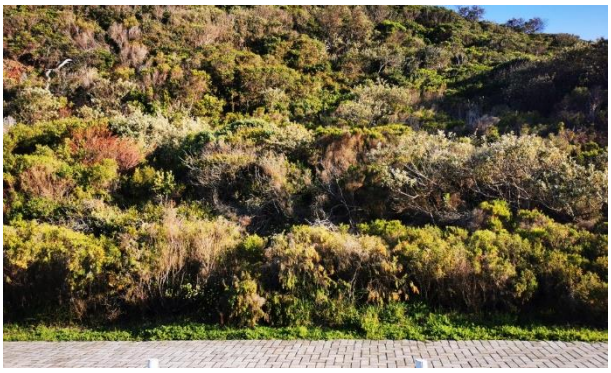

Figure 23: Fynbos patches

Figure 24: Aerial Photo of the site with mapped vegetation (habitat).

3.1.5 Present Ecological State

Table 5 provides a comprehensive description and assessment of biodiversity and ecological indicators for the site. In summary, the following general observations can be noted regarding the site:

- Vegetation on site can be considered to range from semi-intact (with pockets of still intact – dune-thicket) through varying degrees of degraded where there has been disturbance, most likely due to historical bush clearing to access the site. Evidence is present of potential historical intent to prepare a portion of the site for construction of a small dwelling or presence of an old shack type dwelling that is no longer present.
- Alien invasion is generally low.
- To the immediate west of the site is a large steep area having generally natural and undisturbed dune thicket with forest elements.
- To the east is predominantly urban development interspersed with remnant pockets and elements of natural vegetation that has been retained.

Table 5: Summary of Key Biodiversity and Ecological Indicators

ASPECT	DESCRIPTION
LANDSCAPE AND COMMUNITY DESCRIPTION	
Aspect, Slope, Topography	South facing coastal palaeodune, running in an east-west direction. The site is located on a small bench approximately 100 m plus inland from the high-water mark
Substrate	Consolidated and unconsolidated palaeodunes
Vegetation units	Dune Thicket, as well as fynbos and forest elements, which are deemed to be successional pre-cursors (fynbos) and successors (forest) to the Dune Thicket. Dune Thicket may not necessarily become forest, and fynbos may not necessarily develop into Dune Thicket.
Total Ground Cover (%)	60 – 80 %
Tree Height (m) – Median	2-8 m in dune thicket and forest 0.50 to 1.5 m in fynbos & disturbed areas
Tree Cover (%) Aerial	70 – 90 % in dune thicket < 10 % in disturbed and fynbos areas
Shrub Cover (%)	< 20 in dune thicket
Herbaceous Cover (%)	> 80 % in fynbos and disturbed areas
Grass Cover (%)	Gras cover is low in all areas, < than 5 %
Bare soil/rock (%)	Usually less than 5 %, except on rock face adjacent to road cutting to the south of the site
TERRESTRIAL LANDSCAPE FEATURES	
Forest	No distinct Forest is present within the affected footprint; forest elements can be found within thicket in protected niches.
Thicket	Predominant vegetation dominated by large to medium sized trees.
Grassland	None
Fynbos/Grassy Fynbos	Fynbos elements are present in a small patch on the south side of the development footprint. These are considered to be an element of the Dune Thicket, most likely a precursor.
Riparian	None
Wetland	None
River/Aquatic	None
Dunes/Coastal	The sit is situated on vegetated palaeodunes. No typical pioneer coastal vegetation is affected.
Rocky Outcrop Habitat	No significant rocky outcrop habitat was recorded within the proposed footprint. A small cutting on the southern boundary, due to road construction is present but is outside of the development footprint. This cutting creates artificial niche for certain species.
Fauna Nesting Sites	None present, trees may be utilised by various nesting bird, however none were noted.
Fauna Feeding Grounds	The thicket habitat may provide feeding habitat for a range of faunal species, including small mammals, which are likely to be transient to the site.

ASPECT	DESCRIPTION
Ecotones	Ecotones are not well developed on the site.
Ecological Corridors	The Dune thicket does provide an ecological corridor. Development of the footprint is unlikely to significantly disrupt this corridor, other than minor displacement during construction.
Evolutionary Processes	None of significance within terrestrial environment.
Transformed (lands)	None
Transformed (other)	Minimal, surrounding area had been developed as an urban settlement with associated disruptions.
Degraded (modified)	Degradation is present in the form of some historical vegetation clearing of small patches and pathways within the site.
Secondary vegetation	Minimal, where historical clearing has occurred, secondary vegetation is present, in small, cleared patches and pathways. Vegetation on the cutting outcrop is likely to be secondary.
DISTURBANCES, CURRENT LAND USES AND SOURCES OF DEGRADATION	
Human disturbances	Human disturbance due to urban development is present in surrounding urbanised landscape
Habitat fragmentation	Fragmentation is present ot the east, north and south of the site, as a result of urbanisation but mostly absent to the west side.
Invasive Alien Plants	Alien invasives are minimal on the site other than the occasional weedy species and a few small clumps of Rooikrantz.
Other degradation (Aquatic)	None
Remaining intact habitat:	Large areas of intact habitat are present in the surrounding landscape, in particular along the south-facing slopes to the west of the site within the affected erf.
Grazing (livestock)	None.
Hunting	None
Conservation (passive)	Intact corridors fulfil a passive conservation role to some extent.
Recreational (sport)	Recreational use of the wider area and river is present, mostly associated with beaches and urbanised landscape.
Other	None
PATTERNS OF BIODIVERSITY	
Flora	Flora diversity is moderate to high for the vegetation units, specifically due to the varied landscape, having fynbos, forest and coastal elements in the wider landscape.
Fauna	Fauna diversity is likely moderate; birds are likely to be most diverse resulting as well as mammal and likely a few amphibian species common to dune thicket and associated microclimate.
Species of Conservation Concern	Numerous species are potentially found in the region and vegetation units, none of significance were recorded on the site, other than some generally widespread PNCO species.
ECOLOGICAL PROCESSES	
Gene dispersal barriers	Roads, urban development, fences, habitat fragmentation.
Gene dispersal corridors	Dune Thicket and forest corridors as well as fynbos patches.
Aeolian (dune) processes	No aeolian (sand) dunes are present
Climatic gradients	No climatic gradients are present
Rivers and Drainage Lines (Riparian Vegetation)	None
Refuges (outcrops/islands)	Rocky and other refuges are not prevalent within the site, other than the small artificial outcrop cutting adjacent to the road.
Fire	Fire is important within the fynbos patches but unlikely to be prevalent within dune thicket and generally absent to intact forest.
Ecotones/Tension zones	Ecotones are limited because of the lack of complexity. Some is present between fynbos patches and thicket and where there has been historical disturbance and clearing of dune thicket.
Erosion	Erosion is absent. Slumping is noted to occur on dune areas on steep slopes in surrounding habitat. Such dune slopes should not be disturbed, without appropriate stabilisation, which would incur additional disturbances.
ECOLOGICAL SERVICES	

ASPECT	DESCRIPTION
Carbon storage	Dune Thicket and forest is considered a moderate to high carbon accumulator. Dune Thicket and thicket-forest in the surrounding is well developed likely to be high.
Provisioning Services	Livestock grazing: None. Timber (Building materials & fuelwood): Dune Thicket is tree dominated having several suitable timber species. Usage in the area is minimal, although where bush clearing has occurred, it is likely that some is used for building and also for fuelwood. Food: Low. None known Fibre: None in area Medicinal plants: Various species have medicinal properties and may be harvested informally in the area.
Other (ornamentals)	Few local species are considered to have ornamental value. Some species have been retained or planted at a later stage in surrounding urban gardens.
CONSERVATION IMPORTANCE	
Current Distribution (extent)	Vegetation units have a widespread regional distribution covering an extensive area outside of the site footprint and is regarded as being well-protected (NBA, 2018)
Red Listed Species and other Species of Conservation Concern	Several species are known from the surrounding area and vegetation units. None were recorded during the site visit.
Habitat for SCC (Species of Conservation Concern)	Several Species of Conservation Concern are known from specific areas in proximity to the site, as well as the vegetation units that are present. The site does potentially provide habitat for some of these species, although none were recorded during the site survey. The small patch of fynbos on the southern site of the site provides the most likely habitat for such SCC and it is recommended to not be developed.
Relative Conservation importance	The general area has been identified as a priority area for conservation (i.e. designated as CBA).
OTHER SENSITIVITIES	
Conservation importance	Intact vegetation along ecological corridors is of importance, as a connector
Topography	Slopes vegetated with forest and thicket are unlikely to be susceptible to further development other than a few strategic footprints, as can be seen in the surrounding landscape. Large tracts of dune thicket are thus unlikely to be developed in the future.
Wetlands	None
Rehabilitation potential	Dune Thicket and Forest has a low rehabilitation potential, dune fynbos is high as it is a pioneer vegetation and considered to be a pre-cursor of the dune thicket.
Community structure	Community structure is generally moderate to high, with a range of growth forms including trees, shrubs, and lianas where disturbance allows. Within climax forest, this structure tends to decrease in complexity.

3.1.6 Flora

Protected Trees present include the Milkwood Tree (*Sideroxylon inerme*). Any removal of these trees will require a permit in terms of the National Forests Act. Several flora species protected in terms of the Provincial Nature Conservation Ordinance (PNCO) are also present (Table 6) and will require permits before removal. Despite these species being generally widespread and not threatened, they are protected in terms of regional legislation and any impacts to these species requires a permit from the relevant authorities before commencement. A flora search and rescue are also recommended. The implication is that a comprehensive list of species occurring within the footprint of the proposed infrastructure is required and a permit application submitted for any of those listed as protected. A walk-through survey is therefore recommended once the final layout of the footprint as well as any temporary laydown areas have been finalised in order to obtain the required permits for destruction of these species.

A number of endemic and range restricted species are known from the general surrounding area and there is a residual likelihood that they could be present, but cannot be discounted without comprehensive seasonal sampling, which is generally outside the scope of such an assessment, unless a specific risk is identified. Due to the highly localised nature of the impact, with vegetation clearing only required for the development footprint, the risk of a species suffering any significant loss is low. There is always a residual risk to species for any activity.

3.1.7 Fauna

The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to.

Mammals

The smaller mammal species that could potentially be found on the project site, are highly mobile species that would move away from disturbance and with extensive habitat available in the immediate surrounds would unlikely be negatively affected by the development. In addition, many larger mammal species are likely to have already been displaced due to existing urban activities. No species of concern have been highlighted during the screening process, and none were recorded on site.

Small mammal species such as Bushbuck, are know from the general area, but are generally mobile and likely to be transient to the area. The minimal disturbance is unlikely to cause any significant disruptions other than minor displacement during construction. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Furthermore, such species that are present are likely to already be adapted to some extent to the unraised landscape and the additional development will have no significant impact.

Avifauna and Bats

Bird species identified by the screening tool, including *Circus maurus* (Black Harrier). This species may frequent the general area as foraging habitat; however, it is highly unlikely that the small and localised footprint will have any impact on this species. No roosting or nesting sites were observed on or nearby the site.

Passerines (perching species) are more likely to be impacted upon through habitat destruction, while ground nesting birds are more likely to be impacted through disturbance. While species may utilise the area for breeding or foraging, they are unlikely to be significantly affected, as those species present are already living withi an agricultural area. Larger species including raptors are unlikely to be significantly affected other than minor disturbance and displacement, again any species present would already be co-existing within an urbanised landscape.

Any disturbance or displacement associated with increased activity or habitat destruction is unlikely to pose a significant negative impact on birds, and when there is a specific activity, it would be temporary in nature, and within an already somewhat urbanised.

Reptiles

Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. Due to the limited loss of intact habitat, it is unlikely that there will be any significant impact to any population or species. Tetradactylus fitzsimonsi (Fitzsimons' Long-tailed Seps) is known from the general area and suitable habitat is present. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway, and such a search and rescue may only find one or two specimens for such a limited area. A retile handler should preferably be available should any specific species be found, that cannot be

moved easily by hand. Due to the localised and small size of the footprint the significance of any impact to any population of this species is minimal.

Amphibians

Afrixalus knysna (Knysna Spiny Reed Frog) is known to inhabit Coastal mosaic of Mountain Fynbos and Afromontane Forest, hence suitable habitat is present. An amphibian search and rescue are unlikely to be required before commencement, should any wetland areas be disturbed. Due to the localised and small size of the footprint the significance of any impact to any population of this species is minimal.

No other amphibians of concern are known to be present or potentially present. No wetland habitat is present or will be affected, which precludes species from these habitats being present, comprising the majority of other reptile species known from the general area.

Invertebrates

Invertebrate species noted to have an elevated conservation status, including *Aloeides pallida juno, Aloeides thyra orientis*, Sensitive species and Sensitive species 6 are known from the surrounding area and from similar habitat. There is a moderate to low likelihood that representatives of these species could be present, however their preferred habitat is predominantly fynbos habitat, and the proposed development must be outside of such fynbos areas. The recommendations contained in this report, are that these fynbos patches are not developed, in order to retain potential habitat, even if they are not present. Due to the localised and small size of the footprint, as well as the recommendation to retain the fynbos patches, the significance of any impact to any population of these species is very low.

The likelihood that there are Baboon Spiders and Scorpions, which are listed as Threatened or Protected Species (ToPS), present within the affected area and ToPS permits will be required.

3.1.8 Species of Conservation Concern occurring in the region

Several endemic and range restricted species are known from the general surrounding area and there is a residual likelihood that they could be present, and cannot be discounted without comprehensive seasonal sampling, which is generally outside the scope of such an assessment, unless a specific risk is identified. Due to the localised nature of the impact, with vegetation clearing only required for a small development footprint within a larger site, the risk of a species suffering any significant loss is low. There is however always a residual risk to species for any activity, which may not be recorded during site assessment. All reasonable measures are implemented to find such species, however it in not feasible to check every square meter of such a site.

Red Listed, Endemic and Protected Flora

The site falls within the general distribution range of several endemic species and other species with a highly localised distribution, some of which are Critically Endangered, Endangered, Vulnerable or Rare. Some of these species are only known from a single or a few populations. Several endemic species were recorded and are listed below; however, all of these are confirmed to have a wider distribution range and are not deemed to be at risk. Species (*Table 6*) were flagged from various database sources as occurring in the region as having an elevated status, and possibly present in the area, vegetation type or are associated with features that are present (such as host plant species). All were cross checked for distribution overlay and were actively screened for presence/absence on site. Other species may be endemic, but distribution range has been checked and are generally widespread. Respective permits will be required for removal during site clearing.

Table 6: Flora Species of Conservation Concern

SCIENTIFIC NAME[4]	FAMILY	STATUS[5]	COMMENT/PRESENCE
Acmadenia alternifolia	Rutaceae	NEST (M), **Vu,** End	Very restricted along the coastal headlands from Plettenberg Bay in the East to Knysna in the West, and 10-30 km inland from the coast north of Nature's Valley in the East to Bergplaas north of Sedgefield in the West. Habitat generally not suited for housing. Known range does not extend to the site. NOT RECORDED
Acrolophia lunata	Orchidaceae	EN, End, PNCO	NOT PRESENT
Afrocarpus falcatus	Podocarpaceae	NFA, LC	NOT PRESENT
Agathosma pulchella	Rutaceae	VU, End	Not recorded
Amauropelta knysnaensis	Thelypteridaceae	NEST (M), Vu	Southern Afrotemperate Forest, Damp places in coastal forest near George. Known from three locations. Potentially threatened by logging. NOT RECORDED
Aspalathus asparagoides	Fabaceae	LC, End	Not recorded
Aspalathus hystrix	Fabaceae	LC, End	Not recorded
Aspalathus spinosa	Fabaceae	LC, End	Not recorded
Chaenostoma integrifolium	Scrophulariaceae	LC, End	Not recorded
Cliffortia schlechteri	Rosaceae	NT	Not recorded
Cotyledon orbiculata	Crassulaceae	End	Not recorded
Crassula nudicaulis	Crassulaceae	End	Not recorded
Cussonia thyrsiflora	Araliaceae	End	Not recorded
Cynanchum africanum	Apocynaceae	LC, End	Not recorded
Delosperma brevipetalum	Aizoaceae	LC, End, PNCO	Not recorded
Delosperma litorale	Aizoaceae	LC, End, PNCO	Not recorded
Delosperma pageanum	Aizoaceae	LC, End, PNCO	Not recorded
Dioscorea mundii	Dioscoreaceae	NT	Not recorded
Disa hallackii	Orchidaceae	EN, PNCO	Not recorded, May be present in surrounding landscape
Ehrharta bulbosa	Poaceae	LC, End	Not recorded
Ehrharta ramosa	Poaceae	LC, End	Not recorded
Erica chloroloma	Ericaceae	NEST (M), Vu	Somewhat widespread distribution. NOT RECORDED.
Erica densifolia	Ericaceae	LC, End, PNCO	PRESENT
Erica glandulosa subsp. fourcadei	Ericaceae	NEST (M), Vu, End, PNCO	Mossel Bay (George) to Cape St Francis (Stormsrivier). Groot Brak Dune Strandveld, Kouga Grassy Sandstone Fynbos, Tsitsikamma Sandstone Fynbos, South Outeniqua Sandstone Fynbos, Southern Cape Dune Fynbos, Knysna Sand Fynbos, St Francis Dune Thicket, Hartenbos Strandveld, Goukamma Dune Thicket. Coastal fynbos. Somewhat widespread distribution. NOT RECORDED, noted in general area.
Erica glumiflora	Ericaceae	NEST (M), Vu, PNCO	EOO <6740 km², known from six locations. Although it is conserved in four nature reserves, these are all within the western portion of the range. In the eastern part of the range, coastal development and alien plant invasion are causing continuing declines to subpopulations. Wilderness to East London and extending inland around Grahamstown. South Eastern Coastal Thornveld, Groot Brak Dune Strandveld, Algoa Sandstone Fynbos, South Outeniqua Sandstone Fynbos, Suurberg Quartzite Fynbos, Southern Cape Dune Fynbos, Knysna Sand Fynbos, St Francis Dune Thicket, Nanaga Savanna Thicket, Kasouga Dune Thicket, Goukamma Dune Thicket. Sandy

[4] Species indicated in green are listed in the DEA screening tool, others are from various other database and literature sources that are known from the general area.

[5] IUCN - Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Least Concern (LC); End – Endemic; PNCO – Provincial Nature Conservation Ordinance; NFA – National Forest Act; ToPS – Threatened or Protected Species.

SCIENTIFIC NAME[4]	FAMILY	STATUS[5]	COMMENT/PRESENCE
			coastal flats and dunes and low coastal hills. Somewhat widespread distribution. NOT RECORDED.
Erica nevillei	Ericaceae	LC, End, PNCO	Not recorded
Erica newdigateae	Ericaceae	LC, End, PNCO	Not recorded
Erica onusta	Ericaceae	CR, End, PNCO	Not recorded
Erica sparsa	Ericaceae	LC, End, PNCO	Not recorded
Eulophia platypetala	Orchidaceae	VU, PNCO	Not recorded
Euphorbia silenifolia	Euphorbiaceae	LC, End	South Africa (Western and Eastern Cape)
Faurea macnaughtonii	Proteaceae	NEST (M), Rare	Widespread, but very rare species with a small and fragmented population. It has no severe threats and is therefore not suspected to be in danger of extinction. his species is widespread across eastern South Africa, from the Wolkberg in Limpopo Province southwards to the Amathole Mountains in the Eastern Cape. An isolated subpopulation occurs in the southern Cape forests around Knysna. It also occurs in eSwatini (Swaziland). NOT RECORDED.
Felicia aethiopica	Asteraceae	LC, End	Not recorded
Ficinia fascicularis	Cyperaceae	LC, End	Not recorded
Geissorhiza bracteata	Iridaceae	LC, PNCO	Not recorded
Gladiolus gueinzii	Iridaceae	LC, PNCO	Not recorded
Gymnosporia capitata	Celastraceae	End	PRESENT
Helichrysum teretifolium	Asteraceae	LC, End	Not recorded
Hermannia lavandulifolia	Malvaceae	NEST (M), VU	widespread and common species, with an extent of occurrence (EOO) of 12 018 kmÂ². It is declining due to severe, ongoing habitat loss and degradation. Based on the observed rate of habitat loss, a population reduction of 31% over three generations is inferred. It is therefore listed as Vulnerable under criterion A. NOT RECORDED.
Indigofera erecta	Fabaceae	End	Not recorded
Indigofera erecta	Fabaceae	End	Not recorded
Indigofera hispida	Fabaceae	VU, End	Not recorded
Isoglossa woodii	Acanthaceae	LC, End	South Africa (Eastern Cape, KwaZulu-Natal)
Lachenalia youngii	Hyacinthaceae	LC, PNCO	South Africa (Western and Eastern Cape), Not recorded
Lampranthus pauciflorus	Aizoaceae	NEST (M), En	EOO 1270 km², four known locations remain after most of this species' habitat has been transformed for coastal development. Habitat loss continues, especially around Plettenberg Bay, Mossel Bay and Knysna. Cape Infanta to Plettenberg Bay. Groot Brak Dune Strandveld, Blombos Strandveld, Overberg Dune Strandveld, Potberg Sandstone Fynbos, Garden Route Granite Fynbos, Albertinia Sand Fynbos, Knysna Sand Fynbos, Hartenbos Strandveld, Goukamma Dune Thicket Rocky coastal slopes and clayish hills. NOT RECORDED.
Lebeckia gracilis	Fabaceae	NEST (M), En	A population reduction of at least 70% is estimated based on habitat loss to agriculture, forestry plantations, alien plant invasion and coastal development in the past 120 years (generation length 50-80 years), resulting in local extinctions at 73% of known locations. Only between two and five locations within an EOO of 4000 kmÂ² are likely to remain, and these continue to decline due to ongoing habitat loss. It is therefore assessed as Endangered under criteria A and B. Somewhat widespread distribution. Records from Plettenberg Bay area. NOT RECORDED.
Leucadendron eucalyptifolium	Proteaceae	LC, End, PNCO	South Africa (Western Cape), Not recorded
Leucospermum cuneiforme	Proteaceae	LC, End, PNCO	South Africa (Western and Eastern Cape), Not recorded
Leucospermum glabrum	Proteaceae	NEST (M), En, PNCO	EOO 1005 km², AOO 54 km², 14 severely fragmented subpopulations continue to decline due to alien plant invasion, afforestation and fire break maintenance. Fire-related population fluctuations occur in small subpopulations, only

SCIENTIFIC NAME[4]	FAMILY	STATUS[5]	COMMENT/PRESENCE
			three subpopulations have more than 100 plants. Total population is less than 1000 mature individuals. Dormant subpopulations are easily missed in vegetation surveys and EIAs. Outeniqua and Tsitsikamma Mountains. Tsitsikamma Sandstone Fynbos, South Outeniqua Sandstone Fynbos, Garden Route Shale Fynbos, Garden Route Granite Fynbos. 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. It is pollinated by birds. George inland and Kurland inland. NOT RECORDED
Lichtensteinia interrupta	Apiaceae	LC, End	Not recorded
Limonium scabrum	Plumbaginaceae	NE	Not recorded
Linum gracile	Linaceae	LC, End	Not recorded
Lobelia neglecta	Lobeliaceae	LC, End	South Africa (Western and Eastern Cape), Not recorded
Metalasia muricata	Asteraceae	LC, End	PRESENT
Mohria caffrorum	Anemiaceae	LC, End	Not recorded
Moraea bellendenii	Iridaceae	LC, PNCO	Not recorded
Morella cordifolia	Myricaceae	End	Not recorded
Muraltia knysnaensis	Polygalaceae	NEST (M), EN	EOO 2046 km², between three and eight severely fragmented subpopulations remain on remnants of natural habitat after most of this species' habitat has been transformed for crop cultivation, forestry plantations and coastal development around Knysna and Plettenberg Bay. It continues to decline due to ongoing habitat degradation as a result of fire exclusion on small fragments. Coastal lowlands between Mossel Bay and the Keurbooms River. Fynbos, on dry flats and hills. Albertinia to Plett. NOT RECORDED.
Ocotea bullata	Lauraceae	NEST (M), NFA,	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. Estimate minimum 50% population reduction in the last 240 years (generation length 80 years). Widespread in South Africa from the Cape Peninsula to the Wolkberg Mountains in Limpopo. NOT RECORDED.
Otholobium fruticans	Fabaceae	LC, End	Not recorded
Otholobium virgatum	Fabaceae	LC, End	Not recorded
Othonna parviflora	Asteraceae	LC, End	Not recorded
Oxalis duriuscula	Oxalidaceae	NT, End	Not recorded
Passerina rigida	Thymelaeaceae	End	PRESENT
Pentameris thuarii	Poaceae	LC, End	Not recorded
Phalaris arundinacea	Poaceae	NE, Not Ind; Nat	Europe, Asia, northern Africa and North America, Not recorded
Podalyria myrtillifolia	Fabaceae	LC, End	South Africa (Western and Eastern Cape), Not recorded
Polygala microlopha	Polygalaceae	LC, End	Not recorded
Polygala peduncularis	Polygalaceae	LC, End	Not recorded
Polygala triquetra	Polygalaceae	LC, End	Not recorded
Polypogon viridis	Poaceae	NE, Not Ind; Nat	Not recorded
Prionium serratum	Thurniaceae	LC, End	Not recorded
Psoralea laxa	Fabaceae	LC, End	Not recorded
Pterygodium newdigateae	Orchidaceae	CR, End, PNCO	Not recorded
Putterlickia pyracantha	Celastraceae	LC, End	PRESENT
Robsonodendron maritimum	Celastraceae	End	Not recorded
Ruschia duthiae	Aizoaceae	NEST (M), Vu, End	NOT RECORDED A highly range restricted (EOO 191 km²), but locally still fairly common species. It is known from fewer than 10 locations and continues to decline due to ongoing habitat loss and degradation., Sedgefield to Nature's Valley. Natures Valley, Knysna-Sedgefield, Tsitsikamma Sandstone Fynbos, Garden

SCIENTIFIC NAME[4]	FAMILY	STATUS[5]	COMMENT/PRESENCE
			Route Shale Fynbos, Knysna Sand Fynbos. Gentle north-facing sandstone or shale slopes with grassy fynbos. coastal fynbos habitat. Fairly common around Sedgefield. NOT RECORDED.
Satyrium stenopetalum	Orchidaceae	LC, End, PNCO	Not recorded
Searsia pterota		End	PRESENT
Sebaea stricta	Gentianaceae	LC, End	Not recorded
Selago burchellii	Scrophulariaceae	NEST (M), Vu, End	EOO 2700 kmÂ², known from six locations. It has lost at least 40% of its habitat to commercial forestry plantations and crop cultivation. Decline is continuing due to coastal development, crop cultivation and alien plant invasion. At least 40% of this species' habitat is already transformed to forestry plantations and for crop cultivation, and habitat loss to agricultural expansion is ongoing. In addition, remaining subpopulations are threatened by competition from alien invasive plants and further habitat loss to coastal development. NOT RECORDED.
Selago glomerata	Scrophulariaceae	LC, End	Not recorded
Senecio elegans	Asteraceae	LC, End	Not recorded
Senecio ilicifolius	Asteraceae	LC, End	Not recorded
Sensitive species 1032		NEST (M), Vu	Somewhat widespread distribution including a population around St Francis. Not recorded on site but found in surrounding area. NOT RECORDED.
Sensitive species 500		NEST (M), En	Somewhat widespread distribution. NOT RECORDED.
Sensitive species 657		NEST (M), EN	Somewhat widespread distribution. NOT RECORDED.
Sensitive species 763		NEST (M), Vu	Localised distribution George & possibly extending to De Hoop. NOT RECORDED.
Sideroxylon inerme (Southern White Milkwood)	Sapotaceae	NFA	Several individuals, likely remnant of original Dune Thicket. NFA permits would be required to prune, trim or remove.
Stipa dregeana	Poaceae	LC, End	Not recorded
Strelitzia alba	Strelitziaceae	LC, End	Not recorded
Struthiola martiana	Thymelaeaceae	LC, End	Not recorded
Tetragonia fruticosa	Aizoaceae	LC, End, PNCO	Not recorded
Tetragonia sarcophylla	Aizoaceae	LC, End, PNCO	Not recorded
Thamnochortus glaber	Restionaceae	LC, End	Not recorded
Thamnochortus insignis	Restionaceae	End	Not recorded
Thesium ericaefolium	Santalaceae	LC, End	Not recorded
Thesium frisea	Santalaceae	DD, End	Not recorded
Tribolium uniolae	Poaceae	LC, End	Not recorded
Ursinia heterodonta	Asteraceae	LC, End	Not recorded

As per *Table 6*, no Endangered or Critically Endangered or screening tool listed flora species were confirmed to be present nor are known to be present in the site or in close proximity to the site. Species known from the broader area around Keurboomstrand, include *Leucospermum glabrum, Erica glumifera* & *Ruschia duthiae* (generally occurring in inland mountain areas), Lampranthus pauciflorus (usually occurring in Strandveld type vegetation that is not present within site footprint). The remaining flagged species are generally found in areas where the distribution does not extend to the site. None of the species were found to occur during the site assessment.

A NFA (National Forests Act) permit for any *Sideroxylon inerme* (Milkwood trees) that may require pruning or removal for the proposed activity, may be required before removal. PNCO (Provincial Nature Conservation Ordinance) permits may also be required for the removal or relocation of several species protected under this legislation.

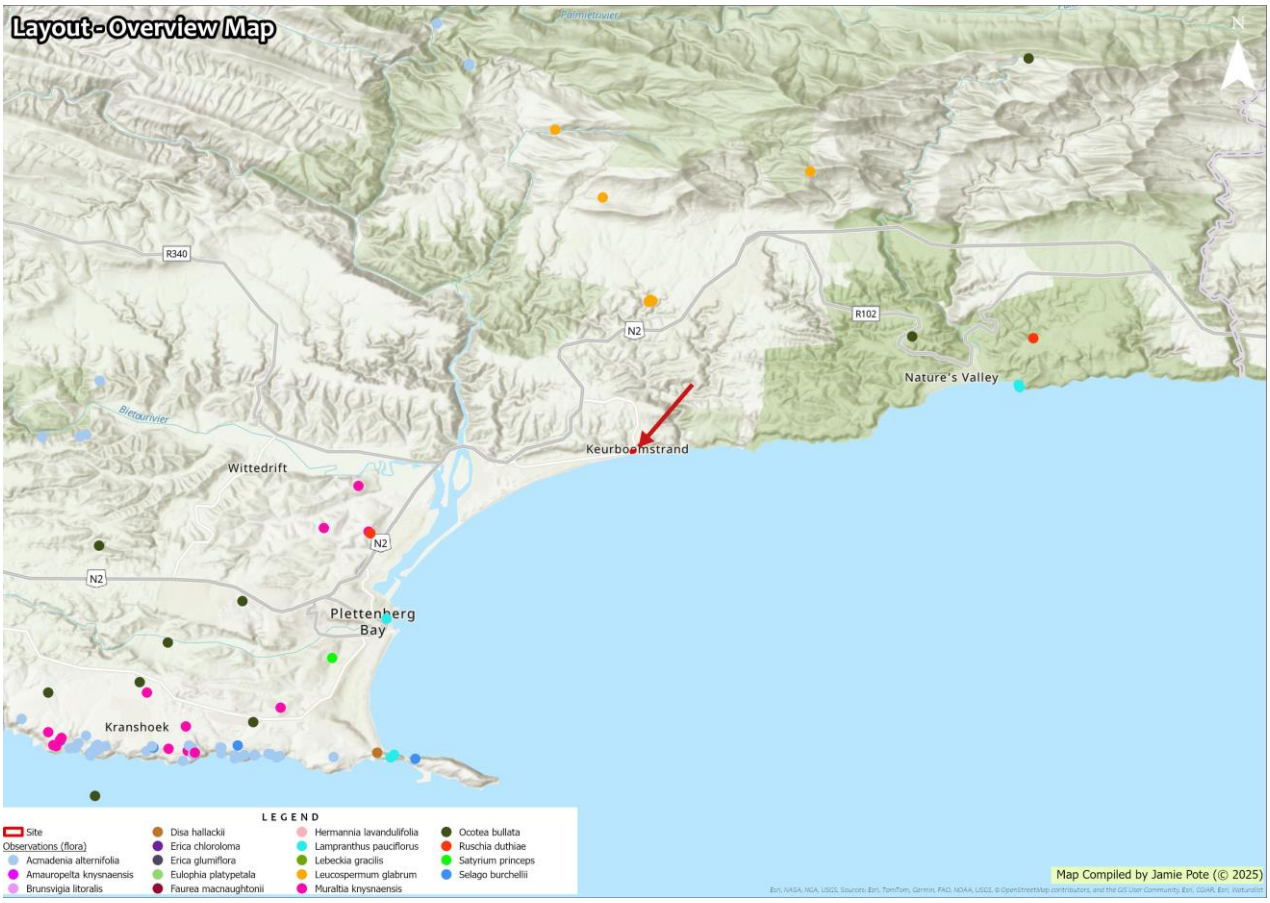

Figure 25: Distribution of Flora Species of Conservation Concern (local).

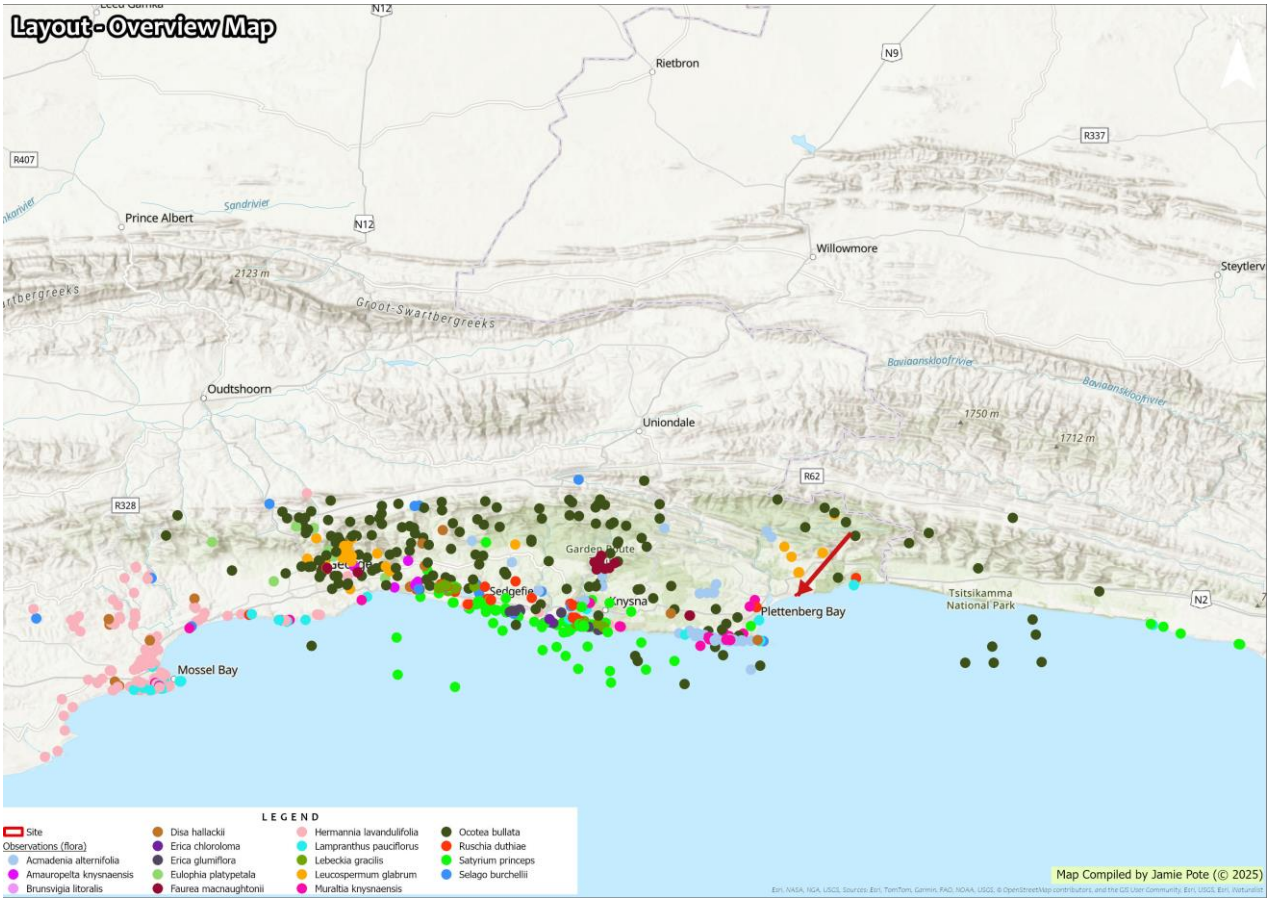

Figure 26: Distribution of Flora Species of Conservation Concern (regional).

Red Listed and Protected Fauna

The site falls within the general distribution range of a single faunal SCC, however none are confirmed to be present. Since the project footprint is relatively small, is situated directly adjacent to urban and disturbed areas and also surrounded by extensive outlying areas of natural habitat, any disturbance or displacement associated with increased activity or habitat destruction as a direct result of the activity is unlikely to pose a significant negative impact faunal species and in particular the Species of Conservation Concern.

As per *Table 7*, no Endangered or Critically fauna species were found to be present nor are known to be present in close proximity to the affected area or are likely to be directly affected by the proposed activity. Dune Thicket is well represented in the surrounding area and the limited size of the development footprint (mostly outside of forest or fynbos habitat), no significant risk to these species is anticipated. While the site does provide suitable habitat (forest) for *Afrixalus knysna* (Knysna Spiny Reed Frog) and *Sarophorus punctatus* (Tunnelling Dung Beetle), the limited footprint is unlikely to prose any significant risk, also being represented in the immediate surrounding area. Sensitive species 1 in unlikely to be present, the site being outside of its normal range. Sensitive species 8 may be present, as described above, but also unlike to be affected by the proposed activity as the species is known to frequent low density settlements where thicket/forest is present.

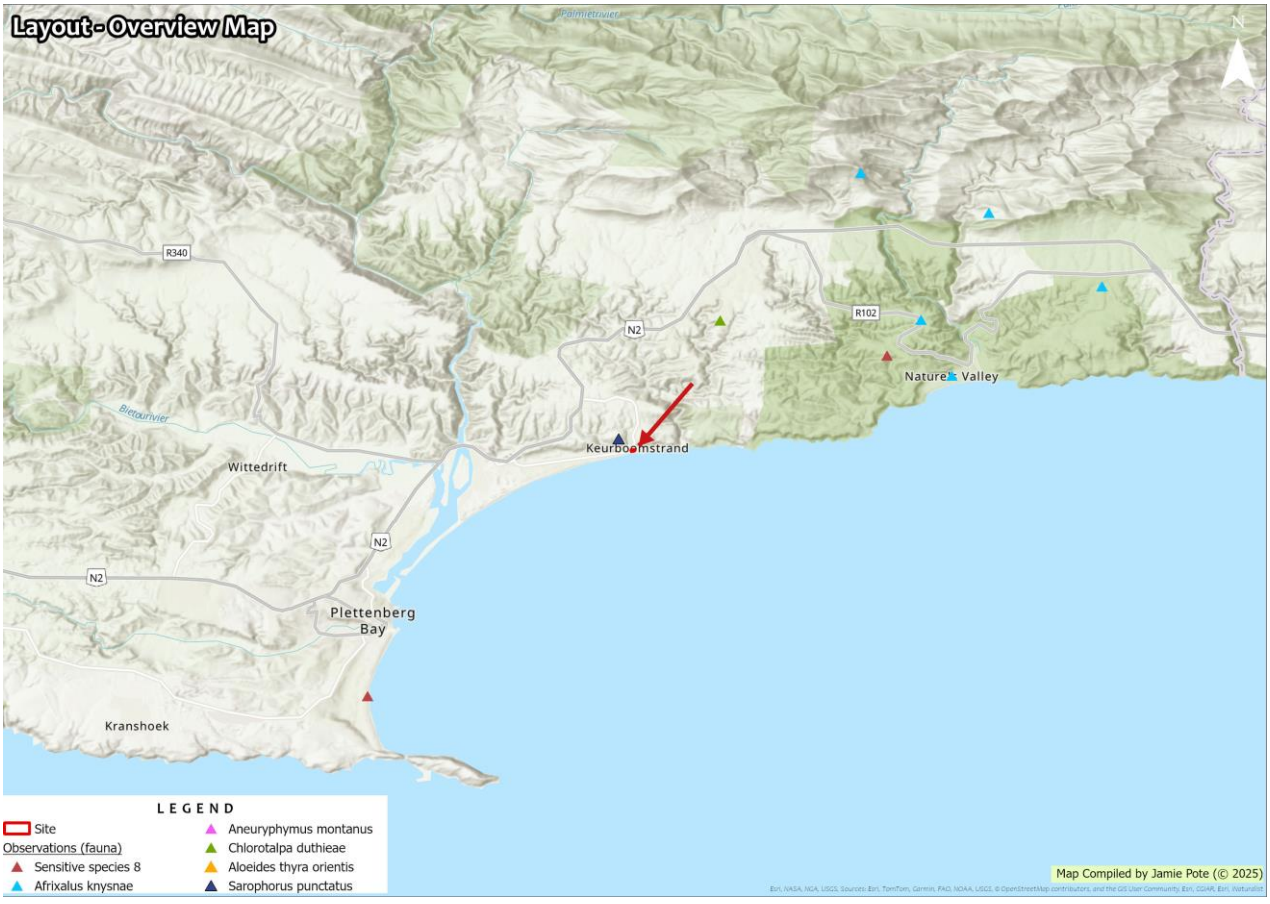

Figure 27: Distribution of Fauna Species of Conservation Concern (local).

Figure 28: Distribution of Fauna Species of Conservation Concern (regional).

Table 7: Fauna Species of Conservation Concern

SCIENTIFIC NAME[6]	COMMON NAME	STATUS[7]	COMMENT/PRESENCE
MAMMALS			
Chlorotalpa duthieae	Duthies Golden Mole	NEST (M), Vu	Known form the broader area, no evidence of any Golden Moles on site during the assessment. The limited footprint is unlikely to pose any risk to this species even if it does occur in the wider area. Not recorded.
Sensitive species 8		NEST (M), Vu	Not recorded on site but does occur in the surrounding area. The species is likely a transient visitor in the village, as while a shy species, they are often found around low-density urban settlements in coastal forest/thicket. Not likely to be affected above baseline levels due to the proposed activity within an urbanised area. Not recorded.
BIRDS[8]			
Stephanoaetus coronatus	Crowned Eagle	NEST (M), Vu	Known records from the Keurboomstrand area. May be present in surrounding landscape, but unlikely to be affected by scope of proposed limited footprint development. Not recorded.
REPTILES			
None	-	-	-
AMPHIBIANS			

[6] Species indicated in green are listed in the DEA screening tool, others are from various other database and literature sources that are known from the general area.

[7] PNCO - Provincial Nature Conservation Ordinance (1974); ToPS – Threatened or Protected Species

[8] BLSA – Birdlife South Africa

SCIENTIFIC NAME[6]	COMMON NAME	STATUS[7]	COMMENT/PRESENCE
Afrixalus knysna	Knysna Spiny Reed Frog	NEST (M), En	Suitable habitat is present, but unlikely to be affected by scope of proposed limited footprint development. Occurs in Wilderness, George inland. Groenvlei in the west to Covie in the east and is confined to the coastal region by the Outeniqua and Tsitsikamma mountains, also fairly common around Natures Valley. Coastal mosaic of Mountain Fynbos and Afromontane Forest. Not recorded.
INVERTEBRATES			
Aneuryphymus montanus	Yellow-winged Agile Grasshopper	NEST (M), Vu	No records from vicinity and not recorded on site. Unlikely to be present nor affected by the proposed limited footprint activity and habitat not suitable. Not recorded.
Sarophorus punctatus	Dung beetle	NEST (M), En	Known record from Keurboomstrand area. Unlikely to be present nor affected by the proposed limited footprint activity. Not recorded.
Aloeides thyra orientis	Red Copper or Brenton Red Russet	NEST (M), En	Suitable habitat, but site is situated outside the known distribution range (Brenton to the west of Knysna) and habitat within proposed footprint is not suitable. Not recorded.

No fauna PNCO permits are anticipated to be required but are recommended as a precaution as small species such as lizards, geckos and snakes may be present in the rocky landscaped areas.

Alien Invasive Species

On 1 August 2014, the Minister of Environmental Affairs published the Alien and Invasive Species Regulations ("the Regulations") which came into effect on the 1st of October 2014 in a bid to curb the negative effects of IAPs. The Regulations call on landowners and sellers of land alike to assist the Department of Environmental Affairs to conserve our indigenous fauna and flora and to foster sustainable use of our land. Non-adherence to the Regulations by a landowner or a seller of land can result in a criminal offence punishable by a fine of up to R 5 million (R 10 million in case of a second offence) and/or a period of imprisonment of up to 10 years.

Category 1a and 1b listed invasive species must be controlled and eradicated. Category 2 plants may only be grown if a permit is obtained and the property owner ensures that the invasive species do not spread beyond his or her property. The growing of Category 3 species is subject to various exemptions and prohibitions. Some invasive plants are categorised differently in different provinces. For example: the Spanish Broom plant is categorised as a category 1b (harmful) invasive plant in Eastern Cape and Western Cape, but it is a category 3 (less harmful) invasive plant in the other seven provinces.

Invasive alien plants have a significant negative impact on the environment by causing direct habitat destruction, increasing the risk and intensity of wildfires, and reducing surface and sub-surface water. Landowners are under legal obligation to control alien plants occurring on their properties. Alien Invasive Plants require removal according to the Conservation of Agricultural Resources Act 43 of 1983 (CARA) and the National Environmental Management: Biodiversity Act (10 of 2004; NEMBA): Alien and Invasive Species Lists (GN R598 and GN R599 of 2014). Alien control programs are long-term management projects and a clearing plan, which includes follow up actions for rehabilitation of the cleared area, is essential. This will save time, money, and significant effort. Collective management and planning with neighbours allow for more cost-effective clearing and maintenance considering aliens seeds as easily dispersed across boundaries by wind or water courses. All clearing actions should be monitored and documented to keep track of which areas are due for follow-up clearing. A general rule of thumb is to first target lightly infested areas before tackling densely invaded areas and prioritize sensitive areas such as riverbanks and wetlands. Alien grasses are among the worst invaders in lowland

ecosystems adjacent to farms but are often the most difficult to detect and control. The act required the removal of these species, being the responsibility of the landowner, as described in Section 2.1 & Table 8 .

Table 8: Legislation regarding invasive alien species.

The Conservation of Agricultural Resources Act 43 of 1983 (Gazette No. 8673, Notice No. 883, dated 27 April 1983) stipulates the following:

6. Control measures

(1) In order to achieve the objects of this Act the Minister may prescribe control measures which shall be complied with by land users to whom they apply.

(2) Such control measures may relate to –

(I) the control of weeds and invader plants.

(3) A control measure may –

(a) contain a prohibition or an obligation with regard to any matter referred to in subsection (2).

(5) Any land user who refuses or fails to comply with any control measure which is binding on him, shall be guilty of an offence.

In this regard, Government Notice R. 598 - National Environmental Management: Biodiversity Act (10/2004): Alien and Invasive Species Regulations, 2014 (Gazette number 37885), dated August 2014, further stipulates the following:

CHAPTER 2: CATEGORIES OF LISTED INVASIVE SPECIES

2. Category 1a Listed Invasive Species

(1) Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combatted or eradicated.

(2) A person in control of a Category 1a Listed Invasive Species must-

(a) comply with the provisions of section 73(2) of the Act.

(b) immediately take steps to combat or eradicate listed invasive species in compliance with sections 75(1), (2) and (3) of the Act; and

(c) allow an authorised official from the Department to enter onto land to monitor, assist with or implement the combatting or eradication of the listed invasive species.

If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must combat or eradicate the listed invasive species in accordance with such programme.

3. Category 1b Listed Invasive Species

(1) Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled.

(2) A person in control of a Category 1 b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act.

(3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.

(4) A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act.

4. Category 2 Listed Invasive Species

(1) Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.

(2) Unless otherwise indicated in the Notice, no person may carry out a restricted activity in respect of a Category 2 Listed Invasive Species without a permit.

(3) A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit.

(4) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.

(5) Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1 b Listed Invasive Species and must be managed according to Regulation 3.

(6) Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.

5. Category 3 Listed Invasive Species

(1) Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.

(2) Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3.

(3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.

CHAPTER 7: ISSUING, AMENDMENT AND CANCELLATION OF PERMITS

29. Sale or transfer of alien and listed invasive species

(1) If a permit-holder sells a specimen of an alien or listed invasive species or sells the property on which a specimen of an alien or listed invasive species is under the permit-holder's control, the new owner of such specimen or such property must apply for a permit in terms of Chapter 7 of the Act.
(2) The new permit-holder contemplated in sub-regulation (1) will be subject to the same conditions as the permit-holder who has sold the specimen of an alien or listed invasive species, or the property on which a specimen of an alien or listed invasive species occurs, unless specific circumstances require all such permit conditions to be revised, in which case full reasons must be giving in writing by the issuing authority.
(3) The seller of any immovable property must, prior to the conclusion of the relevant sale agreement, notify the purchaser of that property in writing of the presence of listed invasive species on that property.

CHAPTER 9: COMPLIANCE AND ENFORCEMENT
35. Offences and penalties
(1) Any offence committed in terms of section 101 of the Act shall, upon conviction, carry the penalties referred to in section 102 of the Act.
(2) Any person who contravenes or fails to comply with a provision of these regulations is guilty of an offence and is liable, on conviction, to-
(a) a fine not exceeding five million rand, and in the case of a second or subsequent conviction, to a fine not exceeding R 10 million; or
(b) imprisonment for a period not exceeding 10 years; or
(c) to both such fine and imprisonment.

The seller of any immovable property must also, prior to the conclusion of the relevant sale agreement, notify the purchaser of that property in writing of the presence of listed IAPs on the property. Property sales agreements dated 1 October 2014 and onwards, should also incorporate a clause in terms of which the purchaser acknowledges that he has acquainted himself with the extent and the nature of the property he is buying and that he accepts the property as such, including the vegetation on the property.

A single exotic invasive (*Acacia cyclops*) was noted within the site, particularly in disturbed areas, generally on the margins of intact vegetation patches. Additional weed species that are known to proliferate in disturbed areas, include predominantly herbaceous species such as Scotch Thistle, Blackjack, Thorn Apple, Verbena, Mexican Poppy, and a range of other common weeds. A weed management programme, as part of the construction and operational phases will be required to manage the weeds and invasives within the site and as a responsible land manager to minimise the spread into surrounding areas. A list of species is included in *Table 9*.

Table 9: Alien (exotic) invasive and other weed species and status.

SCIENTIFIC NAME	COMMON NAME	FAMILY	STATUS[9]	COMMENT/PRESENCE
Acacia cyclops	Rooikrantz	Fabaceae	CARA 1	Scattered clumps/ individuals

Eradication protocol

Specific eradication and management procedures must be stipulated in the EMP as to the methods to be implemented to remove and control the various alien invasive species and weeds, as they tend to require species specific techniques. A comprehensive management plan should be incorporated into the EMP and a detailed action plan compiled and implemented by the landowner. Any removed alien trees must either be removed from site or disposed of at a registered waste disposal facility. Alternatively, the plant material can be mulched using a woodchipper on site. And seed-bearing material is to be disposed of at a registered landfill.

3.1.9 Aquatic Habitat

Perennial & non-perennial watercourse and wetlands are present within the study area. Specific assessment of these features will be addressed as a separate specialist assessment; however, it is noted that these aquatic systems do not function in isolation and in terms of ecological processes, the

[9] CARA - Conservation of Agricultural Resources Act (1993); National List of Invasive Species in Terms Sections 70(1), 71(3) and 71A (2016). Refer to Section 2.1 & Table 8 for detailed procedures and requirements.

aquatic systems are very closely linked to the terrestrial system. For the purposes of this report, the following has been undertaken and will be incorporated into the terrestrial component:

- Aquatic features (wetlands, dams, perennial rivers, and non-perennial drainage lines) have been delineated from aerial photographs and/or based on vegetation characteristics. This is not a physical delineation, which would be the responsibility of the aquatic specialist, but they have been delineated for the purposes of demarcating any vegetation associated directly with such aquatic features. This includes the riparian vegetation and reedbeds surrounding watercourses and found within and around wetlands and/or farm dams. This also serves to identify the aquatic features within the terrestrial landscape.
- All aquatic features are given a high sensitivity as default in this terrestrial assessment report, since the purpose of this report is of a terrestrial nature, not aquatic. The condition of the high rating is not that they are determined to be no go areas, but that the aquatic specialist will determine, within their field of expertise, what the specific sensitivities are.
- Watercourse centre lines have been corrected from topographical and NFEPA data sources, and any watercourse polygons have similarly been adjusted to incorporate fine scale mapping.

No aquatic habitat was recorded withi the site or immediate surrounds.

3.2 Site Ecological Importance Criteria & Methodology

Site Ecological Importance (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:

SEI = BI + RR where BI = CI + FI

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

3.2.1 Conservation importance

Conservation importance (CI) is evaluated in accordance with recognised established internationally acceptable principles and criteria for the determination of biodiversity-related value, including the IUCN Red List of Species, Red List of Ecosystems and Key Biodiversity Areas (KBA; IUCN [2016]).

Conservation importance is defined here as *'The importance of a site for supporting biodiversity features of conservation concern present, e.g. populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.'*

CI	FULFILLING CRITERIA
Very high	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare[10] or Critically Rare[11] species that have a global EOO of < 10 km^2. Any area of natural habitat[12] of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent[13]) of natural habitat of EN ecosystem type. Globally significant populations of congregatory species (> 10% of global population).
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species. Globally significant populations of congregatory species (> 1% but < 10% of global population).
Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.
Low	No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC.
Very Low	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

3.2.2 Functional Integrity

Functional integrity (FI) of the receptor (e.g. the vegeta tion/fauna community or habitat type) is defined here as the receptors' current ability to maintain the structure and functions that define it, compared to its known or predict- ed state under ideal conditions. Simply stated, FI is '*A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural ar- eas and the degree of current persistent ecological impacts.*'

FI	FULFILLING CRITERIA
Very high	Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing).
High	Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.

[10] For butterflies, as per Armstrong et al. (2013).

[11] For plants, as per Raimondo et al. (2009).

[12] This excludes areas of transformed habitat within a defined ecosystem even if these are partially restored, e.g. Highveld grasslands that have been converted to maize fields and then abandoned so that some form of functional grassland is restored; this is not natural habitat as it does not and will not in the future have species composition representative of the original natural habitat.

[13] This can be calculated from the threatened ecosystem of South Africa shapefile available from the SANBI (current available version 2011: http://bgis.sanbi.org/Projects/Detail/49).

FI	FULFILLING CRITERIA
Medium	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.
Low	Small (> 1 ha but < 5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
Very Low	Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts.

3.2.3 Biodiversity Importance

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

FUNCTIONAL INTEGRITY	CONSERVATION IMPORTANCE				
	VERY HIGH	HIGH	MEDIUM	LOW	VERY LOW
Very High	Very High	Very High	High	Medium	Low
High	Very High	High	Medium	Medium	Low
Medium	High	**Medium**	Medium	Low	Very Low
Low	Medium	Medium	Low	Low	Very Low
Very Low	Medium	Low	Very Low	Very Low	Very Low

Receptor resilience

Receptor resilience (RR) *is defined here as* 'The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.

RR	FULFILLING CRITERIA
Very high (Intact)	Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High (Near natural)	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75%[14] of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Moderate (Degraded)	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

[14] There is currently no consensus on the selection of appropriate restoration endpoints, which vary greatly between habitat types, type of habitat degradation and opinion of the restoration scientists. We suggest here a relatively generic endpoint of three quarters of the original species composition and functionality, as it is likely to be a good middle ground based on the available literature. Specialists should bear in mind that data of restoration times for all habitats is not available and therefore, for some habitat types, resilience should be assessed based on a conservative estimate of habitat restoration time. For this reason, a relatively high proportion of the original species composition and functionality is used to estimate resilience as it assumes a precautionary approach and should result in lower resilience estimates in the face of uncertainty.

RR	FULFILLING CRITERIA
	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 (Invaded)	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
Very Low (Transformed)	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

3.2.4 Site Ecological Importance (SEI)

Site Ecological Importance is thus calculated as follow:

RECEPTOR RESILIENCE	BIODIVERSITY IMPORTANCE				
	VERY HIGH	HIGH	MEDIUM	LOW	VERY LOW
Very High	Very High	Very High	High	Medium	Low
High	Very High	Very High	High	Medium	Very Low
Medium	Very High	High	Medium	Low	Very Low
Low	High	Medium	Low	Very Low	Very Low
Very Low	Medium	Low	Very Low	Very Low	Very Low

3.2.5 Site Ecological Importance

The calculated Site Ecological Importance (SEI) is indicated in Table 10 & illustrated in *Figure 29*. Based on the Site Ecological Importance calculation (Table 10), the habitat types can be scored as follows (*Figure 29*):

- Forest – Very High SEI
- Fynbos - High SEI
- Scrub-forest (degraded/secondary) – Moderate SEI
- Transformed (vegetated) – Low SEI
- Transformed (hardened surfaces) – Very Low SEI

Table 10: Overall Site Ecological Importance (Habitat/Species).

HABITAT	SITE ECOLOGICAL IMPORTANCE				
	CONSERVATION IMPORTANCE	FUNCTIONAL INTEGRITY	BIODIVERSITY IMPORTANCE	RECEPTOR RESILIENCE	SITE ECOLOGICAL IMPORTANCE
Forest	High	High	High	High	Very High
Fynbos	Medium	High	Medium	High	High
Scrub-forest (secondary)	Medium	High	Medium	Medium	Medium
Transformed (vegetated)	Low	Medium	Low	Medium	Low
Transformed (road)	Low	Very Low	Very Low	Very Low	Very Low

Figure 29 Site Ecological Importance Map.

The required management actions as per the SEI protocols, are as follows:

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

The proposed development activities do fall within the accepted mitigation hierarchy and mitigation measures pertaining to the Site Ecological Importance. The calculated Site Ecological Importance (SEI) is also aligned with the overall specialist designated Terrestrial Ecology Sensitivity (see section below).

3.3 Terrestrial Vegetation Sensitivity Assessment

An overall vulnerability assessment, incorporating key vegetation and ecological indicators (summarised in *Table 5*) was undertaken and includes the following key criteria:

- relative levels of *intactness* i.t.o overall loss of indigenous vegetation cover.

- presence, diversity, and abundance of *Species of Conservation Concern* (weighted in favour of local endemic species).
- extent of *invasion* (severity and overall ecological impact), as well as the degree to which successful rehabilitation could take place.
- overall degradation incorporating above factors.
- relative importance of the vegetation communities relative to regional conservation status - indicated as vulnerability of the area because of loss.

3.3.1 Intactness

Three basic classes are differentiated as follows:

- **Low:** > 75 % of original vegetation has been removed or lost; and/or no Species of Conservation Concern present that are critically endangered, endangered, or endemic with highly localised distribution.
- **Moderate:** 25 - 75 % of original vegetation has been removed/lost; and or presence of Species of Conservation Concern but not having high conservation status or high levels of endemicity or highly localised distributions.
- **High:** < 25 % of original vegetation has been removed or lost; and or presence of species with a highly endemicity and or high conservation status (endangered or critically endangered).

3.3.2 Alien Invasion

Three classes are differentiated as follows:

- **Low:** no or few scattered individuals.
- **Moderate:** individual clumps of invasives present but cover less than 50% or original area.
- **High:** dense, impenetrable stands of invasives present, or cover > 50 % of area with substantial loss functioning. Rehabilitation will most likely require specialised techniques over an extended period (> 5 years).

3.3.3 Degradation

Overall Degradation is determined from the above alien invasion and intactness scores, according to the following matrix:

INTACTNESS	INVASION		
	LOW	MODERATE	HIGH
High	Pristine	Near Pristine	Moderately Degraded
Moderate	Near Pristine	Moderately Degraded	Severely Degraded
Low	Moderately Degraded	Severely Degraded	Transformed

3.3.4 Overall Sensitivity score

Overall vulnerability (or Sensitivity) of the vegetation within the site is calculated according to the following matrix which combines degradation and overall conservation status of the vegetation units of the site. An overall Vegetation and Sensitivity map is provided in *Figure 30*.

DEGRADATION	CONSERVATION STATUS			
	LEAST THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED
Severely degraded/ Transformed	Very Low	Low	Moderate	Moderate - High
Moderately degraded	Low	Moderate	High	High
Ecologically Pristine or near Pristine	Moderate	Moderate - High	High	Very High (No-Go area)

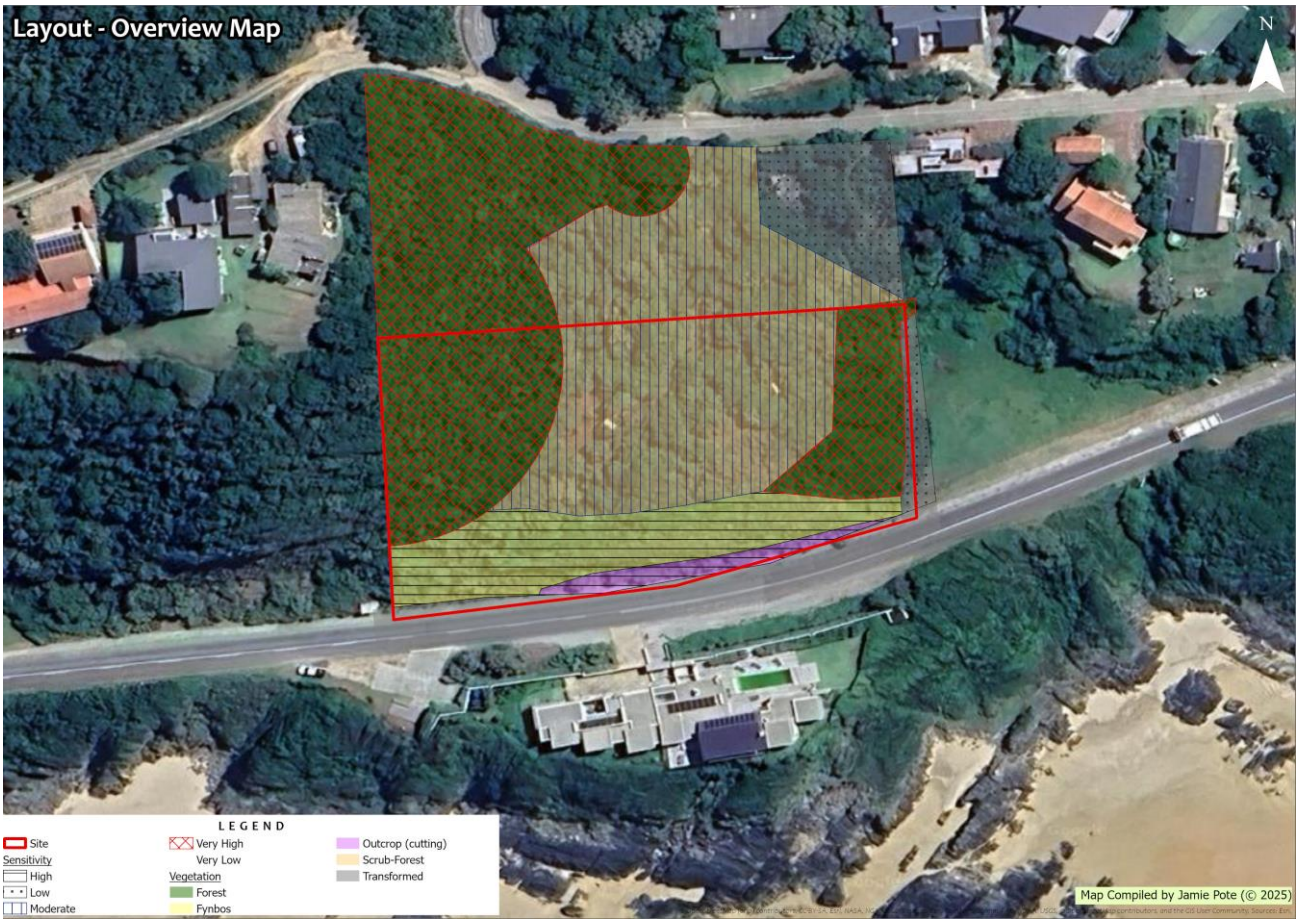

Figure 30: Vegetation and Sensitivity of the mapped vegetation and habitat.

3.3.5 Habitat Sensitivity

Site sensitivity can be summarised as follows:

- Areas scoring an overall LOW Sensitivity include the portions of the site that are completely transformed or severely degraded, that have a low conservation status, or where there is very dense alien infestation. Loss of these areas will not significantly compromise the current conservation status of the vegetation unit at a regional level, nor is its loss likely to compromise the ecological functioning of surrounding areas. Low sensitivity areas include disturbed and transformed areas including various pipelines and other infrastructure passing through the site (these are not mapped) as well as the road and pathway on the southern side.
- Areas scoring an overall MODERATE Sensitivity include the portions of natural vegetation that is mostly intact, but not having specific biodiversity related issues of significance or where proposed activity will have limited overall impact, and recovery will be good with minimal intervention. Moderate sensitivity area includes the central part of the site, where development is proposed.
- Areas scoring an overall HIGH Sensitivity include those areas deemed to have a sensitivity, including being potential critical habitat for fauna and/or flora species. High sensitivity areas include a dune fynbos patch and rocky outcrop (road cutting) on the southern side of the site, which could provide potential habitat for a number of species of conservation concern. Only sewer infrastructure will be sited within this area and will be negligible.
- Areas scoring an overall VERY HIGH Sensitivity (No-Go Areas) include areas having a Critically Endangered or Endangered conservation status, or that are irreplaceable in terms of Critical Biodiversity Areas, or are critical habitat for any faunal species that is endangered or critically endangered. Very High sensitivity terrestrial areas on site were identified that are to be excluded. This includes a dune to the north-west having intact Dune Thicket and Forest Thicket.

GENERAL COMMENT: Some degradation and transformation is already present in the surrounding area and additional habitat loss and fragmentation will be negligible within the scope of existing impacts and as a result of the small footprint. No flagged criteria will be significantly at risk as a result of this development which will result in the clearing of vegetation from a portion of the site to accommodate dwellings as per the proposed layout plan. A fringe of natural vegetation will be retained on the west, east and south sides which will accommodate connectivity with the surrounding landscape and will also serve to contribute towards the conservation of the represented vegetation units and habitat. The site could potentially provide transient habitat for several faunal species that do occur in the surrounding area, but this is not deemed irreplaceable as there is extensive similar habitat in the surrounding area where residential development has fragmented the landscape. Any species that will come onto this site would also likely be somewhat desensitised to the human habitation already in the surrounding area and the additional (cumulative impact is not likely to pose a significant additional (cumulative) risk.

No-Go Areas

Recommended No-go areas (*Figure 31*) include the following:

- dune-thicket along the eastern slope
- the fynbos pocket on the southern portion
- forest-thicket due on the north-western and south-eastern side of the site.

Figure 31: Recommended No-Go Areas.

3.3.6 Conservation Targets

Development of the limited footprint, within a site less than 1 Ha (0.6 Ha) will not pose any significant risk to conservation targets and occurs within an urban erf. The revised Site Development Plan is sensitive to the identified sensitivities and will minimise loss of the high sensitivity areas, targeting the less sensitive central portion of the erf.

3.3.7 Potential Development Footprints

- The site does provide a potential footprint where there is some disturbance and is relatively flat compared to the surrounding landscape.
- The fynbos patch should not be significantly disturbed, other than for construction of sewage and other services, which are likely to rehabilitate affectively in the short term.

4 Risks and Potential Impacts to Biodiversity

4.1 Summary of actions, activities, or processes that have sufficiently significant impacts to require mitigation

The main impacts likely to result from the proposed activity include the following:

1. Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.
2. Loss of Species of Conservation Concern during pre-construction site clearing activities. Numerous Species of Conservation Concern are present within the affected area, which will be destroyed during site preparation.
3. Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.
4. Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.
5. Disturbances to ecological processes. Activity may result in disturbances to ecological processes.
6. Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of Species of Conservation Concern.
7. Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.
8. Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.

4.1.1 Potential Terrestrial Biodiversity Impacts (Direct)

Table 11 lists the terrestrial biodiversity impacts that may potentially occur in the site.

Table 11: Potential Impacts to Terrestrial Biodiversity

IMPACT	Nature of Impact
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.
Flora Species	Loss of Species of Conservation Concern during pre-construction site clearing activities. Numerous Species of Conservation Concern are present within the affected area, which will be destroyed during site preparation.
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.
Ecological Processes	Disturbances to ecological processes: Activity may result in disturbances to ecological processes.
Aquatic and Riparian processes	Aquatic and Riparian processes: Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of Species of Conservation Concern.
Faunal Habitat	Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.
Faunal Processes	Impacts to faunal processes because of the activity
Faunal Species	Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.

4.2 Assessment of Risks and Impacts to Biodiversity

4.2.1 Criteria of assigning significance to potential impacts

Criteria as per the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP). The assessment criteria utilised in the Basic Assessment Report is based on, and adapted from, the Guideline on Impact Significance, Integrated Environmental Management Information Series 5 (Department of Environmental Affairs and Tourism (DEAT), 2002) and the Guideline 5: Assessment of Alternatives and Impacts in Support of the Environmental Impact Assessment Regulations (DEAT, 2006).

Site specific	On site or within 100 m of the site boundary, but not beyond the property boundaries.
Local	The impacted area includes the whole or a measurable portion of the site and property, but could affect the area surrounding the development, including the neighbouring properties and wider municipal area.
Regional	The impact would affect the broader region (e.g., neighbouring towns) beyond the boundaries of the adjacent properties.
National	The impact would affect the whole country (if applicable).

Determination of Duration:

Temporary	The impact will be limited to the construction phase.
Short term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than 8 months after the completion of the construction phase.
Medium term	The impact will last up to the end of the construction phase, where after it will be entirely negated in a period shorter than 3 years after the completion of construction activities.
Long term	The impact will continue for the entire operational lifetime of the development but will be mitigated by direct human action or by natural processes thereafter.
Permanent	This is the only class of impact that will be non-transitory. Such impacts are regarded to be irreversible, irrespective of what mitigation is applied.

Determination of Probability:

Improbable	The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
Probable	There is a possibility that the impact will occur to the extent that provisions must therefore be made.
Highly probable	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up to mitigate the activity before the activity commences.
Definite	The impact will take place regardless of any prevention plans.

Determination of Significance (without mitigation):

No significance	The impact is not substantial and does not require any mitigation action.
Low	The impact is of little importance but may require limited mitigation.
Medium	The impact is of sufficient importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
Medium-High	The impact is of high importance and is therefore considered to have a negative impact. Mitigation is required to manage the negative impacts to acceptable levels.
High	The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.
Very High	The impact is critical. Mitigation measures cannot reduce the impact to acceptable levels. As such the impact renders the proposal unacceptable.

Determination of Significance (with mitigation):

No significance	The impact will be mitigated to the point where it is regarded to be insubstantial.
Low	The impact will be mitigated to the point where it is of limited importance.
Medium	Notwithstanding the successful implementation of the mitigation measures, the impact will remain of significance. However, taken within the overall context of the project, such a persistent impact does not constitute a fatal flaw.
High	Mitigation of the impact is not possible on a cost-effective basis. The impact continues to be of great importance, and taken within the overall context of the project, is considered to be a fatal flaw in the project proposal.

Determination of Reversibility:

Completely Reversible	The impact is reversible with implementation of minor mitigation measures
Partly Reversible	The impact is partly reversible but more intense mitigation measures
Barely Reversible	The impact is unlikely to be reversed even with intense mitigation measures
Irreversible	The impact is irreversible, and no mitigation measures exist

Determination of Degree to which an Impact can be Mitigated:

Can be mitigated	The impact is reversible with implementation of minor mitigation measures
Can be partly mitigated	The impact is partly reversible but more intense mitigation measures
Can be barely mitigated	The impact is unlikely to be reversed even with intense mitigation measures
Not able to mitigate	The impact is irreversible, and no mitigation measures exist

Determination of Loss of Resources:

No loss of resource	The impact will not result in the loss of any resources
Marginal loss of resource	The impact will result in marginal loss of resources
Significant loss of resources	The impact will result in significant loss of resources
Complete loss of resources	The impact will result in a complete loss of all resources

Determination of Cumulative Impact:

Negligible	The impact would result in negligible to no cumulative effects
Low	The impact would result in insignificant cumulative effects
Medium	The impact would result in minor cumulative effects
High	The impact would result in significant cumulative effects

Determination of Consequence significance:

Negligible	The impact would result in negligible to no consequences
Low	The impact would result in insignificant consequences
Medium	The impact would result in minor consequences
High	The impact would result in significant consequences

4.2.2 Assessment of Terrestrial Biodiversity Impacts (Direct)

Construction and Operations can result in a range of negative impacts on terrestrial, marine, and other aquatic ecosystems if not effectively managed. The predicted significance of these during the construction and operational phases are summarised in Table 12, as per DEA&DP requirements.

Table 12: Terrestrial Biodiversity Impact Assessment Scores.

ALTERNATIVE 1: PREFERRED ALTERNATIVE	
PLANNING, DESIGN AND DEVELOPMENT PHASE:	
Potential impact and risk:	
Nature of impact:	Impact on biodiversity (flora and fauna)
Extent and duration of impact:	Local, short-term
Consequence of impact:	Negative
Probability of occurrence:	High
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	Low
Indirect impacts:	Negligible, loss of 0.0003 percent of vegetation unit that is already well protected and exceeds conservation target of 19 %.
Cumulative impact prior to mitigation:	Low risk
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium
Degree to which the impact can be avoided:	High
Degree to which the impact can be managed:	High
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	Most sensitive areas are excluded from development footprint. Dwelling should not extend into the fynbos on the south, the dune forest-thicket on the north-west and a band of dune thicket-forest along the slope on the eastern boundary. Refer to Table 11 for additional
Residual impacts:	Negligible

ALTERNATIVE 1: PREFERRED ALTERNATIVE	
Cumulative impact post mitigation:	Negligible, loss of 0.0003 percent of vegetation unit that is already well protected and exceeds conservation target of 19 %.
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
CONSTRUCTION PHASE:	
Potential impact and risk:	
Nature of impact:	Impact on biodiversity (flora and fauna)
Extent and duration of impact:	Local, short-term
Consequence of impact:	Negative
Probability of occurrence:	High
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	Low
Indirect impacts:	Negligible, loss of 0.0003 percent of vegetation unit that is already well protected and exceeds conservation target of 19 %.
Cumulative impact prior to mitigation:	Low risk
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium
Degree to which the impact can be avoided:	High
Degree to which the impact can be managed:	High
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	Most sensitive areas are excluded from development footprint Refer to Table 11 for additional
Residual impacts:	Minor
Cumulative impact post mitigation:	Negligible, loss of 0.0003 percent of vegetation unit that is already well protected and exceeds conservation target of 19 %.
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
OPERATIONAL PHASE	
Potential impact and risk:	
Nature of impact:	Impact on biodiversity (flora and fauna)
Extent and duration of impact:	Local, short-term
Consequence of impact:	Negative
Probability of occurrence:	Low
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	High
Indirect impacts:	Negligible
Cumulative impact prior to mitigation:	Low risk
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be avoided:	High
Degree to which the impact can be managed:	High
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	Retained natural vegetation must not be cleared (recommend incorporating into title deed)
Residual impacts:	Negligible
Cumulative impact post mitigation:	Negligible, loss of 0.0003 percent of vegetation unit that is already well protected and exceeds conservation target of 19 %.
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Very Low
DECOMMISSIONING AND CLOSURE PHASE	

ALTERNATIVE 1: PREFERRED ALTERNATIVE	
Potential impact and risk:	
Nature of impact:	Impact on biodiversity (flora and fauna)
Extent and duration of impact:	Local, short-term
Consequence of impact:	Negative
Probability of occurrence:	Low
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	High
Indirect impacts:	Negligible
Cumulative impact prior to mitigation:	Low risk
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be avoided:	High
Degree to which the impact can be managed:	High
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	Retained natural vegetation must not be cleared (recommend incorporating into title deed)
Residual impacts:	Negligible
Cumulative impact post mitigation:	Negligible, loss of 0.0003 percent of vegetation unit that is already well protected and exceeds conservation target of 19 %.
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Very Low

In summary, all terrestrial biodiversity impacts are anticipated to be as follows:

- All impacts are assessed to be of medium to low significance before mitigation and can be reduced to low or very low with the implementation of the prescribed mitigation measures.
- All development alternatives are similar in extent and location within the site and hence impact significance). The preferred (linear) option should be adjusted to ensure that the dwellings do not extend into the dune on the north-western side of the site.
- Under status quo conditions it is likely that the disturbed areas will develop into Dune Thicket in time and the dune fynbos patch may develop into Dune Thicket also, if fire and other disturbance is excluded. It is likely that species diversity may decrease due to lack of disturbance.

The following mitigation measures to reduce residual risk or enhance opportunities are recommended:

- Rehabilitation is necessary to control erosion and sedimentation of all eroded areas (where works will take place).
- Areas where construction is completed should be rehabilitated immediately.
- Areas to be disturbed in future activities will be kept as small as possible (i.e. conducting the operations in phases), thereby limiting the scale of erosion.
- Slopes will be profiled to ensure that they are not subjected to excessive erosion but capable of drainage runoff with minimum risk of scour (maximum 1:3 gradient).
- Existing vegetation will be retained as far as possible to minimize erosion problems.

4.2.3 Terrestrial Biodiversity Impact Reversibility

In general, impacts will have a high reversibility in the grassland and savanna habitat, as well as transformed or degraded areas and low reversibility in solid thicket or forest habitat.

4.2.4 Impacts and Risks to Irreplaceable Biodiversity Resources

Risks to Irreplaceable Biodiversity Resources is low.

4.2.5 Residual Risks and Uncertainties

No significant ancillary linear infrastructure, such as roads, conveyors, power lines, pipelines, and railways, which can impact on biodiversity and ecosystem services are expected other than minor access roads

4.2.6 Potential Terrestrial Biodiversity Impacts (Indirect)

No significant additional ancillary linear infrastructure, such as roads, conveyors, power lines, pipelines, and railways, which can impact on biodiversity and ecosystem services are expected other than minor access roads.

4.2.7 Potential Terrestrial Biodiversity Impacts (Cumulative)

The site is situated within the small coastal town of Keurboomstrand, which is a small coastal town comprising of developed erven within a forest-like vegetation (Dune Thicket). The dwellings within the area tend to comprise development of a portion of the respective erven, with natural tree elements retained. This creates a mosaic of vegetation and development. Development of a portion of the site will result in marginal additional fragmentation of the vegetation locally mbu Keurboomstrand is surrounded by extensive areas of unfragmented intact habitat representative of the affected vegetation units (Dune Thicket and Fynbos) The result of this cumulative loss is not deemed to be significant and the vegetation represented is not currently under threat. The flora species present are generally widespread and no flagged flora species of conservation concern, nor fauna species of conservation concern were found to occur within the site. While it is feasible in principle that such faunal species may be occasionally transient to the site, it is unlikely that the loss resulting from the proposed development will result in any significant additional impact within the context of the broader baseline conditions nor significant loss of irreplaceable or critical habitat. No significant cumulative impacts of significance are thus expected to arise as a result of the proposed development of a portion of the site, providing recommendation and mitigation measures are adhered to, due to the limited likely disturbance of intact vegetation and concentration of the development in already transformed or degraded areas within the site.

A fringe of natural vegetation will be retained on the west, east and south sides which will accommodate connectivity with the surrounding landscape and will also serve to contribute towards the conservation of the represented vegetation units and habitat.

5 Findings, Outcomes and Recommendations

5.1 Summary of Findings

The characteristics of the surrounding village and the complexity of the terrain limits the potential for mass clearing to take place. It is evident that the character of the village is such that elements of the natural environment are still retained between development. It is thus feasible to develop the portion of the site without significantly changing ecological processes. The following key characteristic support this conclusion:

- The vegetation is not considered to be under any imminent threat at a national level, nor at a regional level and can withstand further development without compromising conservation target significantly.
- No-go areas include the following:
  - dune-thicket along the eastern slope
  - the fynbos pocket on the southern portion
  - forest-thicket due on the north-western side of the site
- No cumulative impacts of significance are expected because of the development of the dwellings, providing recommendation and mitigation measures are adhered to, due to the limited disturbance of intact vegetation and concentration within an already urbanised context.
- Within the Erf 155 (±5.6 Ha), a portion of vegetation will be removed and the remaining natural, near natural and degraded Dune Thicket and Forest Thicket will not be developed within the greater Erf.
- The proposed ~2 500 m² footprint accounts for a nominal 0.0003 percent of the total Goukamma Dune Thicket occurring nationally, hence the proposed activity will not pose any risk to conservation targets.
- It is reiterated that around 70 % of the site will not be developed and is unlikely to be developed due to slope, which far exceeds the conservation target of 19 %, within a vegetation unt where conservation targets are already exceeded in designated protected areas.
- All impacts are assessed to be of low significance before mitigation and can be reduced to low or very low with the implementation of the mitigation measures.
- All development alternatives are similar in extent and location within the site and hence impact significance). The preferred (linear) option should be adjusted to ensure that the dwellings do not extend into the dune on the north-western side of the site.
- Under status quo conditions it is likely that the disturbed areas will develop into Dune Thicket in time and the dune fynbos patch may develop into Dune Thicket also, if fire and other disturbance is excluded. It is likely that species diversity may decrease due to lack of disturbance.
- The findings of this report are aligned with the findings of a previous assessment undertaken for the site in 1018, *'Keurbooms River: Erf 155: Vegetation Sensitivity Analysis'* (Conservation Management Services, October 2018).
- The specialist thus deems the proposed development to be within acceptable limits for development of such a site in terms of potential loss of habitat as well as risks to flora and fauna species of conservation concern.
- No additional alternatives have been considered as the proposed layout is deemed to be the most appropriate for the site and was developed in alignment with the preliminary sensitivity analysis. No alternative acceptable or low sensitivity footprints are deemed to be applicable.

5.2 Recommendations

- It is the conclusion of this terrestrial biodiversity assessment that the limited footprint site and associated infrastructure, including pipeline, sewer and other services can be constructed within acceptable terrestrial biodiversity impact limits.
- The portions of intact vegetation should be retained as per the recommendation of this report, including the dune-thicket and scrub forest-thicket along the eastern slope, the fynbos pocket on the southern portion and the forest-thicket due on the north-western side of the site.
- Vegetation that will not require direct clearing for the dwellings to be constructed should be retained as far as possible, in order to fit in with the surrounding developed landscape.

- The undeveloped portions of Erf 155 have limited development potential due to the steep slope. These areas have good representation of dune thicket and forest-thicket as well as some fynbos patches at the base (between the dune base and the road). It is unlikely that these will be developable due to slope and should thus be retained. In this regard, development of the 2 500 m² within the dwelling footprints will only be 50 % of the proposed subdivision area (5 000 m². In conjunction with the reminder of Erf 155 that will not be developed (± 4 Ha of Dune Thicket and Dune Forest, excluding some coastal vegetation and beach that falls on the south of the road but within the erf boundary), the footprint is well within regional and national conservation targets, even tho situated within a CBA area.
- It is noted that around 70 % of the site will not be developed and is unlikely to be developed due to slope, which far exceeds the conservation target of 19 %, within a vegetation unt where conservation targets are already exceeded in designated protected areas.

6 Management Programs

Table 13 lists specific mitigation measures that must be implemented and adhered to. These must be considered to be conditions of authorisation.

Table 13: Specific Mitigation Measures and Recommendations

IMPACT	MITIGATION MEASURES
Vegetation	• Final siting of any pipelines or other underground services should be undertaken in consultation with respective specialists, including a botanist. • Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. No clearing outside of minimum required footprint to take place. • Topsoil must be striped and stockpiled separately during site preparation and replaced over the servitude on completion. • Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses.
Flora Species	• The protected species that are present are primarily geophytes and are conducive to relocation. • These geophytic species will most likely persist after removal and replacement of topsoil during construction. • Respective permits must be obtained timeously (1 – 2 months) before vegetation clearing commences and a flora search and rescue plan must be implemented. Rescued plants should be replanted into nearby disturbed areas of similar habitat. • Permits from DEDEAT must always be kept on site and in the possession of the flora search and rescue team. • Once flora search and rescue are complete, a clearance certificate must be issued by the botanist and copies of a post audit report supplied to DEDEAT
Alien Invasive Species	• Alien trees must be removed from the site as per NEMBA requirements. • A suitable weed management strategy to be implemented in construction and operation phases. • After clearing is completed, an appropriate cover crop may be required, should natural re-establishment of grasses not take place in a timely manner.
Erosion	• Suitable measures must be implemented in areas that are susceptible to erosion (i.e. on slopes and near watercourses), including but not limited to gabions and runoff diversion berms (if necessary). Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. • Topsoil must be stripped and stockpiled separately and replace over servitude on completion.

IMPACT	MITIGATION MEASURES
	• Disturbances to the watercourses must be kept to a minimum and measures implemented to mitigate any erosion risk. • If natural vegetation re-establishment does not occur, a suitable grass crop must be applied.
Ecological Processes	• Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. • Disturbances to the watercourses must be kept to a minimum. • On completion of temporary discharge point, any areas that have been affected must be rehabilitated to the approval of the botanist/ECO. A suitable after care period (recommended minimum 2 years) must be allowed in order to monitor and rehabilitate any erosion.
Aquatic and Riparian processes	• Impacts to terrestrial components related to aquatic and riparian processes are negligible. Refer to separate aquatic/estuarine report. • Removal of riparian vegetation at crossings should be kept to minimum. • Post construction weed management is critical in riparian areas, including a suitable after-care period. • Riparian and drainage line crossings must be kept to minimal number and length, and the final route should be verified during a final site walkdown with appropriate specialists before commencement or clearing commences.
Faunal Habitat	• Blanket clearing of vegetation must be limited to the footprint. • It is important that clearing activities are kept to the minimum and take place in a phased manner. This allows animal species to move into safe areas and prevents wind and water erosion of the cleared areas.
Faunal Processes	• The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. • Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of Species of Conservation Concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. • Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A retile handler should be on call for such circumstances. • Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including suspending works in the affected area temporarily) should be implemented.
Faunal Species	• A faunal search and rescue may be undertaken before bush clearing by a competent person, especially for reptiles, if deemed necessary on commencement. • No animals are to be harmed or killed during operations. • Workers are NOT allowed to snare any faunal species.

6.1 Site Preparation and Vegetation Clearing Plan

The following flora relocation plan is recommended for inclusion in the EMP and Flora removal permit applications:

- Once the final planting plan has been determined the botanist will be consulted in order to finalise the plant relocation and vegetation clearing plan.
- Areas to be cleared of vegetation will be clearly demarcated before clearing commences.
- Flora search and rescue is to be conducted before vegetation clearing takes place.
- Plants to be rescued should include both Species of Conservation Concern requiring removal for relocation as well as species that would be suitable for use in rehabilitation and that are amenable to transplanting.
- Areas should only be stripped of vegetation as and when required and in particular once Species of Conservation Concern have been relocated for that area.
- Once site boundaries are demarcated, the area to be cleared of vegetation will be surveyed by the vegetation and plant search and rescue team clearing under the supervision of the botanist to identify and remove species suitable for rescue and commence removal of plants.
- Depending on growth form this material should be appropriately removed from its locality and immediately relocated where it may be required elsewhere or into adjacent areas of similar habitat that will not be disturbed by construction.
- Small trees and shrubs (<1 m in height), where possible will be rescued and planted temporarily in potting bags for later use.
- Wherever possible, any seed-bearing material will be collected immediately and stored for later use, particularly species that occur in low numbers or those that will be well-suited for rehabilitation.
- Protected plant species will be removed from the site prior to development taking place. A suitable timeframe must be allowed before construction commences (1 month) to undertake the plant rescue and relocation operation. Search and Rescue is best undertaken during Spring/Summer.
- Should site construction occur in a phased manner, then clearing activities should take place also in a phased manner, ahead of construction work.
- Rescued plants will be replanted directly into a suitable adjacent area and will include some non-protected succulent species that will help support the protected species.
- Succulent and geophytic species can be temporarily stored for at least 2 weeks in a suitable shaded area before replanting. The contractor will be responsible for periodic watering of the replanted flora until they become acclimatised, and some rain occurs.

6.2 Rehabilitation and Landscaping Plan

- On completion of construction, the surface of the processing areas especially if compacted due to hauling and dumping operations shall be scarified to a depth of at least 200 mm and graded to an even surface condition and the previously stored topsoil will be returned to its original depth over the area.
- The area shall be fertilised, if necessary, to allow vegetation to establish rapidly. The site shall be seeded with suitable grasses and local indigenous seed mix.
- Excavations may be used for the dumping of construction wastes. This *shall* be done in such a way as to aid rehabilitation.
- Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects

on the soil arising from the activity, be corrected and the area be seeded with a vegetation seed mix to his or her satisfaction. This *must* be done in conjunction with the ECO.

- Final rehabilitation *must* comply with the requirements mention in the Rehabilitation Plan.

6.3 Open Space Management/Conservation Plan

None are applicable for this project.

6.4 Maintenance Management Plan

Ongoing maintenance is likely to be required in the long-term, which could include ongoing stabilisation measures on the dune and estuary sides. All measures of this report, including the EMPr should be adhered for any maintenance requirements. Any excavated areas must be stabilised and rehabilitated as per the measures indicated in this report.

6.5 Organizational Capacity and Competency

Successful Implementation will be in part be dependent on the organisational capacity and competency of the applicant and any implementing agents. The following aspects are likely to pose risk to the successful mitigation of the project:

- Budget constraints – budget allocated for environmental management tends to be inadequate for construction projects.
- Organisational Structure – implementing agents may or may not have adequate capacity and competency to ensure appropriate and adequate environmental management.

6.6 Emergency Preparedness and Response

Emergency Preparedness Plan must be included in the EMPr and should address specific measures relating to the following emergency risks:

- Fire management and response.
- Spill management and incident response.
- Waste management and incident response.
- Response to emergency site shutdown, including labour and protest actions.

6.7 Stakeholder Engagement

Possible Stakeholders relating to Biodiversity could include the following key groups:

- Neighbouring Property Owners
- Local Regional and National Conservation Authorities

No Stakeholder Engagement was conducted specifically by the Specialist. Stakeholder Engagement will be undertaken by the EAP as part of the environment application public participatory process. Any comments raised relating to Biodiversity will be addressed by the specialist in the final report.

6.8 Monitoring and Review

Key monitoring activities should include the following:

1. Pre-construction
   a) Ensure flora permits are in place timeously (PNCO only) – allow at least 1 or 2 months before commencement.
   b) Environmental Awareness and training (EAT) – Ensure all labour are informed and plant operators are aware of risks, issues, do's and don'ts and no-go areas.
2. Bush clearing
   a) Ensure working plant has no oil or hydraulic leaks

b) Check delineated footprints area not exceeded.

3. Construction
   a) Regular checks on trenches for trapped animals and possible drowning risks
   b) Regular checks of fences for snares
4. Rehabilitation
   a) Check quality of topsoil and weed free.
   b) Check for weed regrowth and manage timeously (before seed is set)
5. Operation monitoring
   a) Weed management on ongoing basis.
   b) Erosion to be addressed on ongoing basis

7 Appendices

7.1 Appendix A: References

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7.2 Appendix B: Abbreviations & Glossary

7.2.1 Abbreviations

CARA	Conservation of Agricultural Resources Act, Act 43 of 1983
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs (*now DFFE, see below*)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DFFE	The Department of Environmental Affairs was renamed the Department of Forestry, Fisheries & the Environment (DFFE) in April 2021, incorporating the forestry and fisheries functions from the previous Department of Agriculture, Forestry and Fisheries.
DEMC	Desired Ecological Management Class
DWS	Department of Water Affairs and Sanitation
DWAF	Department of Water Affairs and Forestry (former department name)
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMC	Ecological Management Class
EMP	Environmental Management Plan
EMPr	Environmental Management Programme report
ER	Environmental Representative
ESS	Ecosystem Services
IAP's	Interested and Affected Parties
IEM	Integrated Environmental Management
LM	Local Municipality
masl	meters above sea level
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act, Act 107 of 1998
NFA	National Forests Act
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NFA	National Forest Act, Act 84 of 1998
PEMC	Present Ecological Management Class
PES	Present Ecological State
PNCO	Provincial Nature and Environment Conservation Ordinance (No. 19 of 1974).
RDL	Red Data List
RHS	Right Hand Side
RoD	Record of Decision
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SoER	State of the Environment Report
SCC	Species of Conservation Concern
ToPS	Threatened of Protected Species
ToR	Terms of Reference
+ve	Positive
-ve	Negative

7.2.2 Glossary

Alien Invasive Species (AIS)	An alien species whose introduction and/or spread threaten biological diversity (Convention on Biological Diversity). Note: "*Alien invasive species*" is considered to be equivalent to "*invasive alien species*". An alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity (*IUCN*).
Best Environmental Practice	The application of the most appropriate combination of environmental control measures and strategies (Stockholm Convention).
Best Management Practice	Established techniques or methodologies that, through experience and research, have proven to lead to a desired result (BBOP).
Biodiversity	Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.
Biodiversity Offset	Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure and ecosystem function and people's use and cultural values associated with biodiversity (BBOP).
Bioremediation	The use of organisms such as plants or microorganisms to aid in removing hazardous substances from an area. Any process that uses microorganisms, fungi, green plants, or their enzymes to return the natural environment altered by contaminants to its original condition.
Boundary	Landscape patches have a boundary between them which can be defined or fuzzy (Sanderson and Harris, 2000). The zone composed of the edges of adjacent ecosystems is the boundary.
Catchment	In relation to a watercourse or watercourses or part of a watercourse, means the area from which any rainfall will drain into the watercourse or watercourses or part of a watercourse, through surface flow to a common point or common points.
Connectivity	The measure of how connected or spatially continuous a corridor, network, or matrix is. For example, a forested landscape (the matrix) with fewer gaps in forest cover (open patches) will have higher connectivity.
Corridors	Have important functions as strips of a landscape differing from adjacent land on both sides. Habitat, ecosystems or undeveloped areas that physically connect habitat patches. Smaller, intervening patches of surviving habitat can also serve as "steppingstones" that link fragmented ecosystems by ensuring that certain ecological processes are maintained within and between groups of habitat fragments.
Critically Endangered (CR)	A category on the IUCN Red List of Threatened Species which indicates a taxon is considered to be facing an extremely high risk of extinction in the wild (*IUCN*).
Cultural Ecosystem Services	The non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, e.g. knowledge systems, social relations, and aesthetic values (Millennium Ecosystem Assessment).
Cumulative Impacts	The total impact arising from the project (under the control of the developer), other activities (that may be under the control of others, including other developers, local communities, government) and other background pressures and trends which may be unregulated. The project's impact is therefore one part of the total cumulative impact on the environment. The analysis of a project's

	incremental impacts combined with the effects of other projects can often give a more accurate understanding of the likely results of the project's presence than just considering its impacts in isolation (BBOP).
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat(IUCN).
Degraded Habitat/Land	Land that has been impacted upon by human activities (including introduction of invasive alien plants, light to moderate overgrazing, accelerated soil erosion, dumping of waste), but still retains a degree of its original structure and species composition (although some species loss would have occurred) and where ecological processes still occur (albeit in an altered way). Degraded land is capable of being restored to a near-natural state with appropriate ecological management.
Disturbance	An event that significantly alters the pattern of variation in the structure or function of a system, while fragmentation is the breaking up of a habitat, ecosystem, or land-use type into smaller parcels. Disturbance is generally considered a natural process.
Ecological Function	How each of the elements in the landscape interacts based on its life cycle events [Producers, Consumers, Decomposers Transformers]. Includes the capacity of natural processes and components to provide goods and services that satisfy human needs, either directly or indirectly.
Ecological Pattern	The contents and internal order of the landscape, or its spatial (and temporal) components. May be homogenous or heterogenous. Result from the ecological processes that produce them.
Ecological Process	Includes *Physical processes* [Climate (precipitation, insolation), hydrology, geomorphology]; *Biological processes* [Photosynthesis, respiration, reproduction]; *Ecological processes* [Competition, predator-prey interactions, environmental gradients, life histories]
Ecological Processes	Ecological processes typically only function well where natural vegetation remains, and where the remaining vegetation is well-connected with other nearby patches of natural vegetation. Loss and fragmentation of natural habitat severely threatens the integrity of ecological processes. Where basic processes are intact, ecosystems are likely to recover more easily from disturbances or inappropriate actions if the actions themselves are not permanent. Conversely, the more interference there has been with basic processes, the greater the severity (and longevity) of effects. Natural processes are complex and interdependent, and it is not possible to predict all the consequences of loss of biodiversity or ecosystem integrity. When a region's natural or historic level of diversity and integrity is maintained, higher levels of system productivity are supported in the long run and the overall effects of disturbances may be dampened.
Ecological Structure	The composition, or configuration, and the proportion of different patches across the landscape. Relates to species diversity, the greater the diversity, the more complex the structure. A description of the organisms and physical features of environment including nutrients and climatic conditions.
Ecosystem	All the organisms of a habitat, such as a lake or forest, together with the physical environment in which they live. A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.
Ecosystem Services	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. Supporting Ecosystem services are those that are necessary for the maintenance of all other ecosystem

	services. Some examples include biomass production, production of atmospheric oxygen, soil formation and retention, nutrient cycling, water cycling, and provisioning of habitat.
Ecosystem Status	Ecosystem status of terrestrial ecosystems is based on the degree of habitat loss that has occurred in each ecosystem, relative to two thresholds: one for maintaining healthy ecosystem functioning, and one for conserving the majority of species associated with the ecosystem. As natural habitat is lost in an ecosystem, its functioning is increasingly compromised, leading eventually to the collapse of the ecosystem and to loss of species associated with that ecosystem (Millennium Ecosystem Assessment).
Ecotone	The transitional zone between two communities. Ecotones can arise naturally, such as a lakeshore, or can be human created, such as a cleared agricultural field from a forest. The ecotonal community retains characteristics of each bordering community and often contains species not found in the adjacent communities. Classic examples of ecotones include fencerows; forest to marshlands transitions; forest to grassland transitions; or land-water interfaces such as riparian zones in forests. Characteristics of ecotones include vegetational sharpness, physiognomic change, and occurrence of a spatial community mosaic, many exotic species, ecotonal species, spatial mass effect, and species richness higher or lower than either side of the ecotone.
Edge	The portion of an ecosystem near its perimeter, where influences of the adjacent patches can cause an environmental difference between the interior of the patch and its edge. This edge effect includes a distinctive species composition or abundance in the outer part of the landscape patch. For example, when a landscape is a mosaic of perceptibly different types, such as a forest adjacent to a grassland, the edge is the location where the two types adjoin. In a continuous landscape, such as a forest giving way to open woodland, the exact edge location is fuzzy and is sometimes determined by a local gradient exceeding a threshold, as an example, the point where the tree cover falls below thirty-five percent.
Emergent Tree	Trees that grow above the top of the canopy
Endangered (En)	Endangered terrestrial ecosystems have lost significant amounts (more than 60 % lost) of their original natural habitat, so their functioning is compromised. A taxon (species) is Endangered when the best available evidence indicates that it meets any of the criteria for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild (*IUCN*).
Endemic	A plant or animal species, or a vegetation type, which is naturally restricted to a defined region or limited geographical area. Many endemic species have widespread distributions and are common and thus are not considered to be under any threat. They are however noted to be unique to a region, which can include South Africa, a specific province or a bioregion, vegetation type, or a localised area. In cases where it is highly localised or known only from a few or a few localities, and is under threat, it may be red listed either in terms of the South Africa Threatened Species Programme, NEMBA Threatened or Protected Species (ToPS) or the IUCN Red List of Threated Species.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Estuary	a partially or fully enclosed body of water - (a) which is open to the sea permanently or periodically; and (b) within which the sea water can be diluted, to an extent that is measurable, with fresh water drained from land.
Evolutionary Processes	The process by which genetic changes have taken place and continue to take place in populations of plants and animals over successive generations in response to environmental changes. Evolutionary Processes includes the

	mechanisms that produce the biodiversity of life and include Mutation and Migration (Gene Flow), Genetic Drift, Natural Selection, Common Descent, Speciation, Sexual Selection, and Biogeography. Disruptions to evolutionary processes can prevent ecosystems and species from adapting to environmental change over time. Significant fragmentation is considered to be an important disrupter of evolutionary processes. Series of actions which enable new species to evolve in response to changing Biodiversity is maintained by ecological processes at the micro-scale (such as in pollination and nutrient cycling via microbial action) through to the mega-scale (natural events e.g. fire, flood; migration of species along river valleys or coastal areas, quality and quantity of water feeding rivers and estuaries; marine sand movement and the seasonal mountain-to-coast migration of birds that pollinate plants).
Exotic	Non-indigenous; introduced from elsewhere, may also be a *weed* or alien *invasive* species. Exotic species may be invasive or non-invasive.
Fragmentation (Habitat Fragmentation)	The 'breaking apart' of continuous habitat into distinct pieces. Causes land transformation, an important current process in landscapes as more and more development occurs.
Habitat	The home of a plant or animal species. Generally, those features of an area inhabited by animal or plant which are essential to its survival.
Habitat Banking	A market where credits from actions with beneficial biodiversity outcomes can be purchased to offset the debit from environmental damage. Credits can be produced in advance of, and without ex-ante links to, the debits they compensate for, and stored over time (IEEP).
IFC PS6	International Finance Corporation Performance Standard 6 – A standard guiding biodiversity conservation and sustainable management of living natural resources for projects financed by the International Finance Corporation (IFC)
Indicator	Information based on measured data used to represent an attribute, characteristic, or property of a system.
Indicator species	A species whose status provides information on the overall condition of the ecosystem and of other species in that ecosystem. They reflect the quality and changes in environmental conditions as well as aspects of community composition.
Indigenous	Native; occurring naturally in a defined area.
Indigenous Species (Native species)	A species that has been observed in the form of a naturally occurring and self-sustaining population in historical times (*Bern Convention 1979*). A species or lower taxon living within its natural range (past or present) including the area which it can reach and occupy using its natural dispersal systems (*modified after the Convention on Biological Diversity*)
Indirect Impact	Impacts triggered in response to the presence of a project, rather than being directly caused by the project's own operations (BBOP)
Instream habitat	Includes the physical structure of a watercourse and the associated vegetation in relation to the bed of the watercourse;
Intact Habitat / Vegetation	Land that has not been significantly impacted upon by man's activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and functioning of ecological processes.
Intrinsic Value	The inherent worth of something, independent of its value to anyone or anything else.
Keystone Species	Species whose influence on ecosystem function and diversity are disproportionate to their numerical abundance. Although all species interact, the interactions of some species are more profound and far-reaching than others, such that their elimination from an ecosystem often triggers cascades of direct and indirect changes on more than a single trophic level, leading eventually to losses of habitats and extirpation of other species in the food web.

Landscape	An area of land that contains a mosaic of ecosystems, including human-dominated ecosystems (Millennium Ecosystem Assessment).
Landscape Approach	Dealing with large-scale processes in an integrated and multidisciplinary manner, combining natural resources management with environmental and livelihood considerations (FAO).
Landscape connectivity	The degree to which the landscape facilitates or impedes movement among resource patches.
Least threatened / Least Concern (LC)	These ecosystems have lost only a small proportion (more than 80 % remains) of their original natural habitat and are largely intact (although they may be degraded to varying degrees, for example by invasive alien species, overgrazing, or overharvesting from the wild). A taxon (species) is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category (IUCN).
Matrix	The "*background ecological system*" of a landscape with a high degree of connectivity.
Natural Forest (Indigenous Forest)	The definition of "*natural forest*" in the National Forests Act of 1998 (NFA) Section 2(1)(xx) is as follows: 'A natural forest means a group of indigenous trees. • whose crowns are largely contiguous. • or which have been declared by the Minister to be a natural forest under section 7(2)? This definition should be read in conjunction with Section 2(1)(x) which states that 'Forest' includes: • A natural forest, a woodland, and a plantation • The forest-produce in it; and • The ecosystems which it makes up. The legal definition must be supported by a technical definition, as demonstrated by a court case in the Umzimkulu magisterial district, relating to the illegal felling of Yellowwood (Podocarpus latifolius) and other species in the Gonqogonqo forest. From scientific definitions (also see Appendix B) we can define natural forest as: • A generally multi-layered vegetation unit • Dominated by trees that are largely evergreen or semi-deciduous. • The combined tree strata have overlapping crowns, and crown cover is >75% • Grasses in the herbaceous stratum (if present) are generally rare. • Fire does not normally play a major role in forest function and dynamics except at the fringes. • The species of all plant growth forms must be typical of natural forest (check for indicator species) • The forest must be one of the national forest types
Near Threatened (NT)	A taxon (species) is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future (IUCN).
Patch	A term fundamental to landscape ecology, is defined as a relatively homogeneous area that differs from its surroundings. Patches are the basic unit of the landscape that change and fluctuate, a process called patch dynamics. Patches have a definite shape and spatial configuration and can be described compositionally by internal variables such as number of trees, number of tree species, height of trees, or other similar measurements.
Protected Area	A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.

Range restricted species	Species with a geographically restricted area of distribution. Note: Within the IFC PS6, restricted range refers to a limited extent of occurrence (EOO): • For terrestrial vertebrates and plants, restricted-range species are defined as those species that have an EOO less than 50,000 square kilometres (km2).
Refugia	A location which supports an isolated or relict population of a once more widespread species. This isolation can be due to climatic changes, geography, or human activities such as deforestation and overhunting.
Rehabilitation	Measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and/ or minimised. Rehabilitation emphasizes the reparation of ecosystem processes, productivity and services, whereas the goals of restoration also include the re-establishment of the pre-existing biotic integrity in terms of species composition and community structure (BBOP).
Resilience	The capacity of a natural system to recover from disturbance (OECD).
Restoration	The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. An ecosystem has recovered when it contains sufficient biotic and abiotic resources to continue its development without further assistance or subsidy. It would sustain itself structurally and functionally, demonstrate resilience to normal ranges of environmental stress and disturbance, and interact with contiguous ecosystems in terms of biotic and abiotic flows and cultural interactions (IFC).
Riparian	Pertaining to, situated on or associated with the banks of a watercourse, usually a river or stream.
Riparian Habitat	Includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.
River Corridors	River corridors perform several ecological functions such as modulating stream flow, storing water, removing harmful materials from water, and providing habitat for aquatic and terrestrial plants and animals. These corridors also have vegetation and soil characteristics distinctly different from surrounding uplands and support higher levels of species diversity, species densities, and rates of biological productivity than most other landscape elements. Rivers provide for migration and exchange between inland and coastal biotas.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED).
Terrestrial	Occurring on, or inhabiting, land.
Threatened Species	Umbrella term for any species categorised as Critically Endangered, Endangered or Vulnerable by the IUCN Red List of Threatened Species (*IUCN*). Any species that is likely to become extinct within the foreseeable future throughout all or part of its range and whose survival is unlikely if the factors causing numerical decline or habitat degradation continue to operate (EU).
Traditional Ecological Knowledge	Knowledge, innovations and practices of indigenous and local communities around the world. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is transmitted orally from generation to generation. It tends to be collectively owned and takes the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of plant species and animal breeds. Traditional knowledge is mainly of a practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, and forestry (CBD).

Transformation	In ecology, transformation refers to adverse changes to biodiversity, typically habitats or ecosystems, through processes such as cultivation, forestry, drainage of wetlands, urban development or invasion by alien plants or animals. Transformation results in habitat fragmentation – the breaking up of a continuous habitat, ecosystem, or land-use type into smaller fragments.
Transformed Habitat/Land	Land that has been significantly impacted upon as a result of human interferences/disturbances (such as cultivation, urban development, mining, landscaping, severe overgrazing), and where the original structure, species composition and functioning of ecological processes have been irreversibly altered. Transformed habitats are not capable of being restored to their original states.
Tributary	A small stream or river flowing into a larger one.
Untransformed Habitat/Land	Land that has not been significantly impacted upon by man's activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and functioning of ecological processes.
Vulnerable (Vu)	Vulnerable terrestrial ecosystems have lost some (more than 60 % remains) of their original natural habitat and their functioning will be compromised if they continue to lose natural habitat. A taxon (species) is Vulnerable when the best available evidence indicates that it meets any of the criteria for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild (*IUCN*).
Watercourse	Natural or man-made channel through or along which water may flow. A river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows. and a reference to a watercourse includes, where relevant, its bed and banks;
Weed	An indigenous or non-indigenous plant that grows and reproduces aggressively, usually a ruderal pioneer of disturbed areas. Weeds may be unwanted because they are unsightly, or they limit the growth of other plants by blocking light or using up nutrients from the soil. They can also harbour and spread plant pathogens. Weeds are generally known to proliferate through the production of large quantities of seed.
Wetlands	A collective term used to describe lands that are sometimes or always covered by shallow water or have saturated soils, and where plants adapted for life in wet conditions usually grow.

7.3 Appendix C: Biodiversity Environmental Management Plan

Specific measures relating to management of Biodiversity Impacts that must be included in the project Environmental Management Programme (EMPr). This Environmental Management Plan (EMP) contains guidelines, operating procedures and rehabilitation control requirements, which will be binding on the holder of the environmental authorisation after approval of the EMP. The impacts identified will be managed / controlled as set out under mitigating measures and as detailed in this section, which provides general management guidelines, which may or may not be appropriate, depending on the specific circumstances.

7.3.1 Protection of Flora and Fauna

The following actions must be implemented at construction phase, where deemed necessary.

- No animals are to be harmed or killed during the course of operations.
- No domestic animals are permitted on the site.
- Trees and shrubs that are directly affected by the operations may be felled or cleared but only by the expressed written permission of the ECO.
- Rehabilitation of vegetation of the site *must* be done as described in the Rehabilitation Plans.

7.3.2 Alien and Invasive Plan Management Plan

The following mitigation measures have been identified in order to ensure that the introduction and spread of alien invasive vegetation is minimised, where deemed necessary:

- Alien species must be removed from the site as per the National Environmental Management: Biodiversity Act (No. 10 of 2004) requirements.
- A suitable weed management strategy must be implemented in the construction phase and carried through the operational phase.
- The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas.
- All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site. Should brushwood be utilised for soil stabilization or mulching, it must be seed free.
- After clearing is completed, an appropriate cover crop may be required, should natural re-establishment of grasses not take place in a timely manner.

7.3.3 Fires

The following mitigation measures have been identified in order to minimise fire risks, where deemed necessary:

- The Contractor must ensure that an emergency preparedness plan is in place in order to fight accidental fires or veld fires, should they occur. The adjacent landowners/users/managers *should* also be informed or otherwise involved.
- Enclosed areas for food preparation should be provided, and the Contractor *must* strictly prohibit the use of open fires for cooking and heating purposes.
- The use of branches of trees and shrubs for fire-making *must* be strictly prohibited.
- The Contractor *should* take all reasonable and active steps to avoid increasing the risk of fire through their activities on-site. No fires may be lit except at places approved by the ECO.

- The Contractor *must* ensure that the basic fire-fighting equipment is to the satisfaction of the Local Emergency Services.
- The Contractor *must* supply all living quarters, site offices, kitchen areas, workshop areas, materials, stores and any other relevant areas with tested and approved fire-fighting equipment.
- Fires and "hot work" *must* be restricted to demarcated areas.
- The Contractor *must* take precautions when working with welding or grinding equipment near potential sources of combustion. Such precautions include having a suitable, tested and approved fire extinguisher immediately at hand and the use of welding curtains.

7.3.4 Soil Aspects

The following mitigation measures have been identified in order to minimise soil loss, where deemed necessary:

- Sufficient topsoil must be stored for later use during decommissioning, particularly from outcrop areas.
- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- The stockpiled topsoil shall be protected from being blown away or being eroded. The application of a suitable grass seed/runner mix will facilitate this and reduce the minimise weeds.

7.3.5 Dust

The following mitigation measures have been identified in order to minimise dust, where deemed necessary:

- If required, water spray vehicles *will* be used to control wind cause by strong winds during activities on the works.
- No over-watering of the site or road surfaces.
- Wind screens *should* be used to reduce wind and dust in open areas.

7.3.6 Infrastructural Requirements

The following mitigation measures have been identified in order to minimise impacts of infrastructure requirements, where deemed necessary:

Topsoil

- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- The stockpiled topsoil shall be protected from being blown away or being eroded. The use of a suitable grass seed/runner mix will facilitate soil protection and minimise weeds/weed growth.

Stormwater and Erosion Control

- Stormwater Management Plans *must* be developed for the site and should include the following:
  - The management of stormwater during construction.
  - The installation of stormwater and erosion control infrastructure.

- The management of infrastructure after completion of construction.

- Temporary drainage works may be required to prevent stormwater to prevent silt laden surface water from draining into river systems in proximity to the site. Stormwater *must* be prevented from entering or running off site.
- To ensure that site is not subjected to excessive erosion and capable of drainage runoff with minimum risk of scour, their slopes *should* be profiled at a maximum 1:3 gradient.
- Diversion channels *should* be constructed ahead of the open cuts, and above emplacement areas and stockpiles to intercept clean runoff and divert it around disturbed areas into the natural drainage system downstream of the site.
- Rehabilitation is necessary to control erosion and sedimentation of all eroded areas (where works will take place).
- Existing vegetation *must* be retained as far as possible to minimise erosion problems.
- It is importation that the rehabilitation of site is planned and completed in such a way that the runoff water will not cause erosion.
- Sediment-laden runoff from cleared areas *must* be prevented from entering rivers and streams.
- No river or surface water may be affected by silt emanating from the site.

Site Office / Camp Sites

- No site offices or camp sites will be constructed on the site under current operating conditions; existing structures will be used.

Operating Procedures in the Site

- Construction shall only take place within the approved demarcated site.
- Construction may be limited to the areas indicated by the Regional Manager on assessment of the application.
- The holder of the environmental authorisation shall ensure that operations take place only in the demarcated areas as described in this report.
- Watering to minimise the effect of dust generation should be carried out as frequently as necessary. Noise should also be kept within reason.
- No workers will be allowed to damage or collect any indigenous plant or snare any animal.
- Grass and vegetation of the immediate environment or adapted grass / vegetation will be re-established on completion of construction activities, where applicable.
- No firewood to be collected on site and the lighting of fires must be prohibited.
- Cognisance is to be taken of the potential for endangered species occurring in the area. It is considered unlikely, however, that these species will be affected by the proposed activity, or the access road.

Excavations

Whenever any excavation is undertaken, the following procedures shall be adhered to:

- Topsoil shall be handled as described in this EMP.
- Excavations shall take place only within the approved demarcated site.
- Excavations must follow the contour lines where possible.
- The construction site will not be left in any way to deteriorate into an unacceptable state.
- The excavated area must serve as a final depositing area for waste rock and overburden during the rehabilitation process.

- Once excavations have been filled with overburden, rocks and coarse natural materials and profiled with acceptable contours (including erosion control measures), the previous stored topsoil shall be returned to its original depth over the area.
- The area shall be fertilised, if necessary, to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally occurring flora.

Rehabilitation of Processing and Excavation Areas

- On completion of construction, the surface of the processing areas especially if compacted due to hauling and dumping operations shall be scarified to a depth of at least 200 mm and graded to an even surface condition and the previously stored topsoil will be returned to its original depth over the area.
- The area shall be fertilised, if necessary, to allow vegetation to establish rapidly. The site shall be seeded with suitable grasses and local indigenous seed mix.
- Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations.
- Final rehabilitation *must* comply with the requirements mention in the Rehabilitation Plan.

7.3.7 Rehabilitation Plan

The following mitigation measures have been identified in order to maximise rehabilitation success, where deemed necessary.

Rehabilitation Objective

The overall objective of the rehabilitation plan is to minimize adverse environmental impacts associated with the activity whilst maximizing the future utilization of the property. Significant aspects to be borne in mind in this regard is, revegetation of undeveloped footprint and stability and environmental risk. The depression and immediate area of the working must also be free of alien vegetation. Additional broad rehabilitation strategies / objectives include the following:

- Rehabilitating the worked-out areas to take place concurrently within prescribed framework established in the EMP.
- All infrastructure, equipment, plant and other items used during the construction period will be removed from the site.
- Waste material of any description, including scrap, rubble and tyres, will be removed entirely from the site and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on site.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.

Topsoil and Subsoil Replacement

Topsoil and subsoil will be stripped and stockpiled separately and only used in rehabilitation work towards the end of the operation. This is in contract to the gravel activity where rehabilitation and topsoil replacement was earmarked at the completion of each phase.

Stripped overburden will be backfilled into the worked-out areas where needed. Stripped topsoil will be spread over the re-profiled areas to an adequate depth to encourage plant regrowth. The vegetative cover will be stripped with the thin topsoil layer to provide organic matter to the relayed material and to ensure that the seed store contained in the topsoil is not diminished. Reseeding may be required should the stockpiles stand for too long and be considered barren from a seed bank point of view. Stockpiles should ideally be stored for no longer than a year.

The topsoil and overburden will be keyed into the reprofiled surfaces to ensure that they are not eroded or washed away. The topsoiled surface will be left fairly rough to enhance seedling establishment, reduce water runoff and increase infiltration.

Revegetation

All prepared surfaces will be seeded with suitable grass species to provide an initial ground cover and stabilize the soil surface. The following grass seed that is commonly available and suitable.

Botanical name	Common name	Approx seed mixture /Ha
Cynodon dactylon	Kweek	12 kg/ Ha
Eragrostis curvula	Weeping Love Grass	6 kg/ Ha
Eragrostis tef	Teff	2 kg/ Ha
Digitaria eriantha	Smuts Grass	4 kg/ Ha
Other indigenous veld grasses can be added to the seed mix		± 4 kg/Ha

The overall revegetation plan will, therefore, be as follows:

- Ameliorate the aesthetic impact of the site.
- Stabilise disturbed soil and rock faces.
- Minimize surface erosion and consequent siltation of natural water course located on site.
- Control wind-blown dust problems.
- Enhance the physical properties of the soil.
- Re-establish nutrient cycling.
- Re-establish a stable ecological system.

Every effort must be made to avoid unnecessary disturbance of the natural vegetation during operations.

Drainage and Erosion Control

To control the drainage and erosion at site the following procedures will be adopted:

- Areas where construction is completed should be rehabilitated immediately.
- Areas to be disturbed in future activities will be kept as small as possible (i.e. conducting the operations in phases), thereby limiting the scale of erosion.
- Slopes will be profiled to ensure that they are not subjected to excessive erosion but capable of drainage runoff with minimum risk of scour (maximum 1:3 gradient).
- Existing vegetation will be retained as far as possible to minimize erosion problems.

Visual Impacts Amelioration

The overall visual impact of the proposed activities will be minimised by the following mitigating measures:

- Confining the footprint to an area as small as possible
- Re-topsoiling and vegetating all disturbed areas.

7.3.8 Monitoring and Reporting

Adequate management, maintenance and monitoring will be carried out annually by the applicant to ensure successful rehabilitation of the property until a closure certificate is obtained.

To minimise adverse environmental impacts associated with operations it is intended to adopt a progressive rehabilitation programme, which will entail carrying out the proposed rehabilitation procedures concurrently with activity.

7.3.9 Closure objectives and extent of alignment to pre-construction environment

Closure Objectives

The closure of the site will involve removal of all debris and rehabilitation of areas disturbed during the construction phase of the project. This will comprise the scarification of compacted areas, reshaping of areas, topsoiling and rehabilitating all prepared surfaces.

7.4 Appendix D: Declaration, Specialist Profile and Registration

DECLARATION OF THE SPECIALIST

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

I Jamie Pote (Mr)....., 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.

13 February 2026

Signature of the Specialist: Date:

N/A

Name of company (if applicable):

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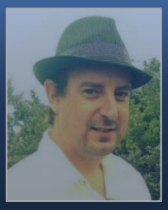

Jamie Pote

BIODIVERSITY ADVISOR, ECOLOGIST AND ENVIRONMENTAL SCIENTIST

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Jamiepote
Bluesky-SA

ABOUT ME

20 years broad professional experience in Terrestrial Biodiversity, Ecological and Vegetation Assessments on over 350 projects in southern, western and central Africa. Environmental Assessment Practitioner on over 50 projects in the mining, infrastructure, housing and agricultural sectors. Environmental monitoring and auditing on over 50 civil infrastructure and construction projects. Have managed all aspects of projects from inception through to implementation. Advanced GIS mapping and analysis.

EDUCATION

Bachelor of Science
Rhodes University
2002 (Botany & Environmental Science)

Bachelor of Science (Honours)
Rhodes University
2003 (Botany)

Professional Natural Scientist
SACNASP: 2016 (Ecological Science)

SERVICES

Terrestrial Biodiversity Specialist Assessments
IFC PS6 Biodiversity & Critical Habitat Assessments
Terrestrial Biodiversity Compliance Statements
Geographic Information Systems
Environmental Management Plans & Programmes
Environmental Compliance & Monitoring
Independent Environmental & Ecological reviews
Bioremediation, Restoration & Rehabilitation Plans
Permit and License applications (Flora & Fauna)
Flora Search & Rescue Plans & Relocations
Invasive Alien Plant Control & Management Plans
Environmental & Mining Applications

EXPERIENCE AND CLIENTS

Key Sectors

- *Wind, Solar Energy Facilities*
- *Infrastructure and Housing*
- *Agriculture and Forestry*
- *Mining and Industrial*

Key Projects

- *Over 350 independent Biodiversity/Ecological Assessments throughout southern, western and central Africa across all sectors.*
- *Basic Assessments, Mining applications and compliance monitoring on over 50 projects for various clients including the Eastern Cape Department of Roads and Public Works, Department of Transport and the South African National Roads Agency (SANRAL) throughout the Eastern Cape, including over 300 individual borrow pits.*
- *Environmental applications, construction monitoring and auditing for a wide range of projects, including infrastructure and housing clients.*
- *Various agricultural expansion and infrastructure projects.*
- *Various wind and solar energy and associated infrastructure projects.*
- *Numerous infrastructure projects including electrical, water and roads.*
- *Environmental Screening and Risk Assessments for several projects, including Wind Energy and Solar.*
- *Various Environmental Management and Rehabilitation Plans.*

25/01/2023

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Jamie Robert Claude Pote

Registration Number: 115233

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Ecological Science (Professional Natural Scientist)

Effective **20 July 2016** Expires **31 March 2026**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

PROJECT EXPERIENCE

PERFORMANCE STANDARD BIODIVERSITY AND CRITICAL HABITAT ASSESSMENTS (IFC PS6)

- DBSA Environmental & Social Safeguards Standards 9: Biodiversity Conservation and Sustainable Management Assessment: The Ilitha Fibre Project, Ethekwini 2021
- Critical Habitat & Biodiversity Assessment - Roggeveld Wind Energy Project 2020
- Biodiversity Assessment for Kalukundi Copper/Cobalt Mine, Democratic Republic of Congo 2008

TERRESTRIAL BIODIVERSITY ASSESSMENTS AND COMPLIANCE STATEMENTS

- Terrestrial Biodiversity Assessment (Addo BSD Offices) 2021
- Terrestrial Biodiversity Assessment (Blaauwater Farms) 2021
- Terrestrial Biodiversity Assessment (Buffelshoek Farm, Loerie) 2021
- Terrestrial Biodiversity & Aquatic Assessment & Review (Falcon Ridge Dam) 2021
- Terrestrial Biodiversity Assessment (Gubenxa Valley Deciduous Fruit) 2021
- Terrestrial Biodiversity Assessment (Little Chelsea Mixed-use) 2021
- Terrestrial Biodiversity Compliance Statement (Maidenhead Farm) 2021
- Terrestrial Biodiversity Review, Mulilo Total Hydra Storage Project Grid Interconnection 2021
- Terrestrial Biodiversity Compliance Statement (Lahlangubo River Bridge) 2021
- Terrestrial Biodiversity Assessment (Mbashe access roads - 3 sites) 2021
- Terrestrial Biodiversity Assessment (Burlington Farm Citrus Development, Cookhouse) 2020
- Terrestrial Biodiversity Compliance Statement: CHDM Cluster 9 Phase 3D Pipeline 2020
- Terrestrial Biodiversity Review, Mulilo Total Hydra Storage Project BESS 2020
- Terrestrial Biodiversity Assessment (Mbashe housing projects, Dutywa & Willowvale) 2020
- Terrestrial Biodiversity Assessment (Helpmekaar Dam, Tarkastad) 2020
- Terrestrial Biodiversity Assessment (Herbertsdale pipeline, Mossel Bay) 2020
- Terrestrial Biodiversity Assessment (Keurbooms Erf 155, Keurboomstrand) 2020
- Terrestrial Biodiversity Assessment (Lowmar Hydroelectric Project, Cradock) 2020
- Terrestrial Biodiversity Assessment (Mossel Bay Gas Power Plant) 2020
- Terrestrial Biodiversity Assessment (Erf 1820, Mthatha) 2020
- Terrestrial Biodiversity Assessment (Newlyn Manganese Terminal, Coega SEZ) 2020
- Terrestrial Biodiversity Assessment Thornhill Phase 2 Sanitation Link 2020

ENERGY PROJECTS (WIND FARM AND PHOTOVOLTAIC INFRASTRUCTURE)

- Preliminary Biodiversity Screening for Chrisdelina Ranch Agricultural Project, Kizenga District 2020
- Preliminary Biodiversity Screening and GIS mapping for Balekani Photovoltaic Solar Project 2020
- Preliminary Biodiversity Screening and GIS mapping for Sihhoye Photovoltaic Solar Project 2020
- Preliminary Biodiversity Screening and GIS mapping Mpaka Photovoltaic Solar Project 2020
- Preliminary Biodiversity Screening and GIS mapping for Chiwelwa Hydroelectric project 2020
- Ecological Assessment for Vermaak Boerdery Hydro Turbine (Cookhouse), Eastern Cape 2020
- Ecological Assessment for Windcurrent Wind Farm, Eastern Cape 2012
- Ecological Assessment for Universal Windfarm, NMB 2011
- Ecological Assessment for Inca Energy Windfarm, Northern Cape 2011
- Ecological Assessment for Broadlands Photovoltaic Farm, Eastern Cape 2011
- Botanical Assessment for Electrawinds Windfarm Coega, NMB 2010
- Botanical Assessment and Open Space Management Plan for Mainstream WEF Phase 2, Eastern Cape 2010

SPECIALISED ECOLOGICAL REPORTS AND REVIEWS

- Rebels Vlei Riparian delineation 2021

- Buck Kraal Dam Rehabilitation Plan Review 2020
- Rehabilitation Plan for Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017
- Green Star Rating Ecological Assessment for SANRAL office, Bay West City, NMBM 2015
- Section 24G Assessment and Rehabilitation Plan for Bingo Farm, Eastern Cape 2014
- Mapping and Ecological services for Congo Agriculture, Republic of Congo 2013
- Rehabilitation Plan for Nieu Bethesda, Eastern Cape 2011
- Mapping of pipeline for Kenton Water Board, Eastern Cape 2010
- Rehabilitation Plan for N2 Upgrade - Coega to Colchester, NMB 2010
- Representative for landowner group for Seaview burial Park, NMB 2010
- Botanical Sensitivity Analysis for LSDF, Greenbushes-Hunters Retreat, NMB 2008
- Forestry Rehabilitation Assessment Report for Amahlathi Forest Rehabilitation, Eastern Cape 2007
- Botanical & Riparian Assessment for Orange River Weirs-Boegoeberg, Douglas Dam and Sendelingsdrif, Northern Cape 2006
- Botanical Assessment for State of the Environment Report for Chris Hani District Municipality SoER, Eastern Cape 2003

ROAD AND RAILWAY INFRASTRUCTURE PROJECTS

- Ecological Assessment for CDC IDZ Mn Terminal, conveyor and railway line, NMB 2013
- Ecological Assessment Review for Penhoek Road widening, Eastern Cape 2012
- Ecological Assessment for R61 road widening, Eastern Cape 2012
- Botanical Assessment for Chelsea RD - Walker Drive Ext., NMB 2010
- Botanical Assessment for Motherwell - Blue Water Bay Road, NMB 2010
- Ecological Assessment for Port St John Road, Eastern Cape 2010
- Botanical Basic Assessment for Bholani Village Rd, Port St Johns, Eastern Cape 2009
- Botanical Report, EMP and Rehab Plan for Coega-Colchester N2 Upgrade, NMB 2009
- Botanical Assessment for Manganese Conveyor Screening Report, NMB 2008
- Ecological Assessment for Road Layout for Whiskey Creek- Kenton, Eastern Cape 2006

MINING PROJECTS

- Ecological Assessment for Bochum Borrow Pits, Limpopo 2013
- Ecological Assessment and Mining and Rehabilitation Plan for Greater Soutpansberg Mining Project, Limpopo (3 proposed Mines) 2013
- Ecological Assessment for Thulwe Road Borrow Pits, Limpopo 2013
- Ecological Assessment and Mining and Rehabilitation Plan for Baghana Mining, Ghana 2010
- Botanical Assessment for Zwartenbosch Quarry, Eastern Cape 2008
- Botanical description & map production for Quarry - Rudman Quarry, Eastern Cape 2008
- Botanical Basic Assessment, Rehab Plan & Maps for Borrow Pit - Rocklands/Patensie, Eastern Cape 2008
- Botanical Assessment & Maps for Sandman Sand Gravel Mine, Eastern Cape 2008
- Botanical Assessment & GIS maps for Shamwari Borrow Pit, Eastern Cape 2008
- Detailed Botanical Assessment, EMP and Rehab Plan for Kalukundi Copper/Cobalt Mine, Democratic Republic of Congo 2008
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit Humansdorp/Oyster Bay, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Cala, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Camdeboo, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Somerset East, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Nkonkobe, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Ndlambe, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Blue Crane Route, Eastern Cape 2008

- Botanical Assessment, EMP and Rehabilitation Plan for AWRM - Cathcart, Eastern Cape 2008
- Botanical Assessment, GIS maps and Rehab Plan for Mthatha Prospecting, Eastern Cape 2008
- Regional Botanical Map for mining prospecting permit, Welkom 2008
- Botanical Assessment for Scoping Report and Detailed Botanical Assessment and Rehab Plan for Elitheni Coal Mine, Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Oyster Bay, Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Bathurst/GHT, Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit – Jeffreys Bay, Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Storms River/Kareedouw, Eastern Cape 2007
- Biophysical Assessment for Humansdorp Quarry, Eastern Cape 2006
- Botanical Assessment, Rehab Plan & Maps for Quarry-Cathcart & Somerset East, Eastern Cape 2006
- Botanical Assessment, Rehab Plan & Maps for Quarry - Despatch Quarry, NMB 2006
- GIS Mapping & Botanical Assessment and Rehab Plan for Quarry - JBay Crushers, Eastern Cape 2006
- Botanical Assessment, EMP and Rehabilitation Plan for Polokwane Silicon Smelter, Limpopo 2006
- Application for Mining Permit for Bruce Howarth Quarry, Eastern Cape 2006

POWERLINE INFRASTRUCTURE PROJECTS

- Ecological Assessment: Dieprivier-Karreedouw 132kV Powerline realignment, Kouga LM 2016
- Eskom Ecological Walkdown: Dieprivier-Karreedouw 132 kV Powerline, Kouga LM 2016
- Eskom Solar one Ecological Walkdown: Nieuwehoop 400 kV powerline 2015
- Rehabilitation Plan and Auditing for Grassridge-Poseidon Powerline Rehab, Eastern Cape 2013
- Ecological Assessment for Dieprivier Karreedouw 132kV Powerline, Eastern Cape 2012
- Flora and Fauna search and Rescue plan for Van Stadens Windfarm Powerline, NMB 2012
- Botanical Assessment for Dedisa-Grassridge Powerline, Eastern Cape 2010
- Ecological Assessment for Grahamstown-Kowie Powerline, Eastern Cape 2010
- Species of Special Concern Mapping Transmission Line for San Souci to Nivens Drift 132kV powerline, NMB 2009
- Botanical Assessment for Eskom Powerline - Albany-Kowie, Eastern Cape 2009
- Botanical Assessment for Eskom 132 kV Dedisa Grassridge Power line-Coega, NMB 2006
- Botanical Assessment for Eskom Power line – Tyalara-Wilo, Eastern Cape 2006
- Botanical Assessment for Steynsburg - Teebus 132 kV powerline, Eastern Cape 2004

PIPELINE INFRASTRUCTURE PROJECTS

- Terrestrial Biodiversity Assessment for Thornhill Phase 2 Sanitation Link, Ndlambe, Eastern Cape 2020
- Botanical Assessment for Ngqamakhwe Regional Water Supply Scheme (Phase 3) 2018
- Ecological Assessment for Butterworth Emergency Bulk Water Supply Scheme 2017
- Ecological Assessment for Karringmelkspruit Emergency Bulk Water Supply (Lady Grey) 2017
- Ecological Assessment for Wanhoop-Willowmore Bulk Water Supply, Eastern Cape 2016
- Ecological Assessment for Steytlerville Bulk Water Supply, Eastern Cape (Phase 4) 2013
- Ecological Assessment for Steytlerville Bulk Water Supply, Eastern Cape (Phase 5) 2013
- Detailed Ecological Assessment for Suikerbos Pipeline, Gauteng 2012
- Basic Botanical Assessment for Wanhoop farm pipeline, Eastern Cape 2010
- Basic Botanical Assessment for Chatty Sewer, NMB 2010
- Species of Special Concern Mapping for Seaview Pipeline, NMB 2009
- Species of Special Concern Mapping for Chelsea Bulk Water Pipeline, NMB 2009
- Map Production for Russell Rd Stormwater, NMB 2008
- Basic Botanical Assessment for Albany Pipeline, Eastern Cape 2008
- Environmental Risk Assessment for Elands River pipeline, Eastern Cape 2007

- Detailed Botanical Assessment for Motherwell Pipeline, NMB 2007
- Detailed Botanical Assessment, GIS maps for Erasmuskloof Pipeline, Eastern Cape 2007
- Botanical & Floristic Report for Hankey pipeline, Eastern Cape 2006
- Detailed Botanical Assessment for Port Alfred water pipeline, Eastern Cape 2004

GENERAL INFRASTRUCTURE DEVELOPMENT PROJECTS

- Ecological Assessment for Amalinda crossing, BCM, Eastern Cape 2019
- Ecological Assessment for Cookhouse Bridge rehabilitation and temporary deviation, Eastern Cape 2019
- Ecological Assessment for Nelson Mandela University Access Road, NMB 2019
- Botanical Assessment for Zachtevlei Dam (Lady Grey), Eastern Cape 2017
- Botanical Assessment for Gcebula River bridge (Peddie), Eastern Cape 2017
- Botanical Assessment for Kouga Dam wall upgrade, Eastern Cape 2012
- Botanical Assessment for Jansenville Cemetery, Eastern Cape 2009
- Botanical Assessment for Radar Mast construction for South African Weather Service – BCM & NMB 2008
- Botanical Assessment and GIS mapping for golf course realignment for East London Golf Course, BCM, Eastern Cape 2007
- Botanical Assessment for PE Airport Extention, NMB 2006
- Botanical Assessment for Kidd's Beach Desalination Plant, BCM, Eastern Cape 2006

HOUSING DEVELOPMENT PROJECTS

- Terrestrial Biodiversity Assessment for Erf 1820 Mthatha, KSDM, Eastern Cape 2020
- Ecological Assessment for Erf 599 Walmer Mixed Use Development, Nelson Mandela Bay 2019
- Ecological Assessment Portion 21-23 and 41 of Farm 807, Gonubie, Buffalo City 2019
- Ecological Assessment for Emerald Sky Housing Project, BCMM 2019
- Ecological Assessment for Erf 14, Kabega, Port Elizabeth 2017
- Ecological Assessment for Fairwest Rental Housing, Port Elizabeth 2017
- Ecological Assessment for Hankey Housing, Kouga District Municipality 2015
- Ecological Assessment for Lebowakgoma Housing, Limpopo 2013
- Ecological Assessment for Giyani Development, Limpopo 2013
- Ecological Assessment for Palmietfontein Development, Limpopo 2013
- Ecological Assessment for Seshego Development, Limpopo 2013
- Botanical Assessment for Sheerness Road, BCM, Eastern Cape 2013
- Ecological Assessment for Ethembeni Housing, NMB 2012
- Ecological Assessment for Pelana Housing, Limpopo 2012
- Flora Search and Rescue Plan for Kwanobuhle Housing, Western Cape 2011
- Botanical Assessment for The Crags 288/03, Western Cape 2010
- Ecological Assessment Revision Report for Fairview Housing, NMB 2010
- Botanical Assessment, EMP and Open Space Management Plan for Hornlee Housing Development, Western Cape 2010
- Botanical Assessment for Little Ladywood, Western Cape 2010
- Botanical Assessment and Open Space Management Plan for Motherwell NU31, NMB 2010
- Botanical Assessment and Open Space Management Plan for Plett 443/07, Western Cape 2010
- Botanical Assessment for Willow Tree Farm, NMB 2010
- Botanical Assessment for Kouga RDP Housing, Eastern Cape 2009
- Botanical Assessment for Fairview Erf 1226 (Wonderwonings), NMB 2009
- Species List Compilation for Zeekoerivier Humansdorp, Eastern Cape 2009
- Botanical Assessment for Woodlands Golf Estate (Farm 858), BCM, Eastern Cape 2009

- Botanical Assessment for Plettenberg Bay - 438/4, Western Cape 2009
- Vegetation Assessment for Kwanokuthula RDP housing project, Western Cape 2008
- Site screening assessment for Greenbushes Site screening, NMB 2008
- Botanical Assessment for Fairfax development, Eastern Cape 2008
- Botanical Assessment for Plettenberg Bay Brakkloof 50&51, Western Cape 2008
- Botanical Assessment, GIS mapping for Theescombe Erf 325, NMB 2008
- Site Screening for Mount Road, NMB 2008
- Botanical Assessment for Greenbushes Farm 40 Swinburne 404, NMB 2008
- Botanical Assessment for Greenbushes 130, NMB 2008
- Botanical Assessment for Greenbushes Kuyga no. 10, NMB 2008
- Botanical Assessment for Plettenberg Bay - 438/24, Western Cape 2007
- Botanical Assessment for Plettenberg Bay - Olive Hills 438/7, Western Cape 2007
- Botanical Assessment for Gonubie Portion 809/9, BCM, Eastern Cape 2006
- Botanical Assessment for Glengariff Farm 723, BCM, Eastern Cape 2006
- Botanical Assessment for Gonubie Portion 809/10, BCM, Eastern Cape 2006
- Botanical Assessment for Gonubie Portion 809/4 & 5, BCM, Eastern Cape 2006
- Botanical Assessment for Plettenberg bay - Ladywood 438/1&3, Western Cape 2006
- Botanical Assessment and Rehab Plan for Winterstrand Desalination Plant, BCM 2006
- Botanical Assessment for Bosch Hoogte, NMB 2006
- Botanical Assessment for Plettenberg bay Farm 444/38, Western Cape 2006
- Botanical Assessment for Plettenberg Bay - 444/27, Western Cape 2006
- Botanical Assessment for Leisure Homes, BCM, Eastern Cape 2006
- Botanical Basic Assessment for Trailees Wetland Assessment, Eastern Cape 2005
- Botanical Assessment and Rehab Plan for Arlington Racecourse - PE, NMB 2005
- Botanical Assessment for Smart Stone, NMB 2005
- Botanical Assessment for Peninsular Farm (Port Alfred), Eastern Cape 2005
- Botanical Assessment for Mount Pleasant - Bathurst, Eastern Cape 2005
- Botanical Assessment and RoD amendments for Colchester Erven 1617 & 1618 (Riverside), NMB 2005
- Basic Botanical Assessment for Parsonsvlei 3/4, Eastern Cape 2005
- Botanical Assessment for Bridgemead – Malabar PE, NMB 2004

AGRICULTURAL PROJECTS

- Ecological Assessment for Vermaak Boerdery Hydro Turbine (Cookhouse)2020 2020
- Thornhill Eggland Specialist Ecological Assessment 2020
- Ecological Assessment for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape 2015
- Ecological Assessment for Citrus expansion on farm 960, Patensie (AIN du Preez Boerdery) 2014
- Ecological Assessment for Doornkraal Pivot (Hankey), Eastern Cape 2014
- Ecological Assessment for Tzaneen Chicken Farm, Limpopo 2013
- Botanical Assessment and Open Space Management Plan for Kudukloof, NMB 2010
- Botanical Assessment and Open Space Management Plan for Landros Veeplaats, NMB 2010
- Botanical Assessment and Flora Relocation Plan for Wildemans Plaas, NMB 2006

GOLF ESTATE AND RESORT DEVELOPMENT PROJECTS

- Species List& Comments Report for Kidds Beach Golf Course, BCM, Eastern Cape 2009
- Botanical Assessment for Plettenberg Bay -Farm 288/03, Western Cape 2009
- Botanical Assessment for Rockcliff Golf Course, BCM, Eastern Cape 2008
- Botanical Assessment for Rockcliff Resort Development, BCM, Eastern Cape 2007
- Botanical Assessment, EMP and Rehabilitation Plan for Tiffendel Ski Resort, Eastern Cape 2006

MIXED USE DEVELOPMENT PROJECTS

- Ecological Assessment for South-End Precinct Mixed Use Development, Nelson Mandela Bay 2018
- Botanical Assessment, EMP and Open Space Management Plan for Bay West City, NMB 2010
- Botanical Assessment, GIS maps, Open Space and Rehab Plans for Fairview Erf 1082, NMB 2009
- Botanical Assessment and GIS maps for Utopia Estate PE, NMB 2008
- Botanical Assessment and GIS mapping for Madiba Bay Leisure Park, NMB 2007
- Botanical Assessment and GIS mapping for Madiba Bay Leisure Park, NMB 2007
- Botanical Basic Assessment for Cuyler Manor (Farm 320), Uitenhage, NMB 2007

BUSINESS AND INDUSTRIAL DEVELOPMENT PROJECTS

- Ecological Assessment for Parsonsvlei Erf 984 & 1134 Parsonsvlei, NMB 2020
- Mthatha Retails and Service Center 2020
- Ecological Assessment for Walmer Erf 11667 - Bidfood Warehousing Development, NMB 2020
- Ecological Assessment for Portion 87 of the Farm Little Chelsea No 10, NMB 2020
- Ecological Assessment for Bay West City ENGEN Service Station, NMB 2015
- Ecological Assessment for Green Star grading for SANRAL, NMB 2014
- Ecological Assessment for OTGC Tank Farm, NMB 2012
- Botanical Assessment and Open Space Management Plan for Petro SA Refinery, Coega IDZ, NMB 2010
- Botanical Assessment for Bluewater Bay Erf 805, NMB 2009
- Ecological Assessment for Bay West City, NMB 2007
- Botanical Assessment for Kenton Petrol Station, Eastern Cape 2005
- Botanical Assessment and RoD amendments for Colchester Petrol Station, NMB 2005

ECO-ESTATE DEVELOPMENT PROJECTS

- Botanical Re-Assessment of Swanlake Eco Estate, Aston Bay, Eastern Cape 2018
- Detailed Botanical Assessment and Open Space Management Plan for Olive Hills, Western Cape 2010
- Botanical Assessment and EMP for Zwartenbosch Road, Eastern Cape 2010
- Botanical Assessment - Poultry Farm for Coega Kammaskloof Farm 191, NMB 2008
- Botanical Assessment - Housing development for Coega Ridge, NMB 2008
- Botanical Assessment, Rehabilitation Plan, EMP and GIS maps for Amanzi Estate, NMB, 2008
- Botanical Assessment for Roydon Game farm, Queenstown, Eastern Cape 2007
- Botanical Assessment for Winterstrand Estate (Farm 1008), BCM, Eastern Cape 2007
- Botanical Assessment for Homeleigh Farm 820, BCM, Eastern Cape 2007
- Botanical Basic Assessment, Rehab Plan & Maps for Candlewood, Tsitsikamma, Western Cape 2007
- Botanical Assessment, EMP and Rehab Plan for Carpe Diem Eco development, Eastern Cape 2007
- Botanical Assessment, EMP and Rehabilitation Plan for Seaview Eco-estate, NMB 2006
- Botanical Assessment for Kidd's Beach portion 1076, BCM, Eastern Cape 2006
- Botanical Assessment for Palm Springs, Kidds Beach East London, BCM, Eastern Cape 2006
- Botanical Assessment for Nahoon Farm 29082, BCM, Eastern Cape 2006
- Botanical Assessment for Rosehill Farm, Eastern Cape 2005
- Botanical Assessment for Resolution Game Farm, Eastern Cape 2005
- Botanical Assessment for Gonubie Portion 809/11, BCM, Eastern Cape 2005
- Botanical Assessment for Kidd's Beach portion 1075, BCM, Eastern Cape 2005

FLORA AND FAUNA RELOCATION PLANS, PERMITS AND IMPLEMENTATION

- Flora Search and Rescue for Nelson Mandela University Phase 2 & 3 Residences, Eastern Cape 2020

- Flora Search and Rescue for Fairwest Housing Estate, Nelson Mandela Bay, Eastern Cape 2019
- Flora Search and Rescue for Utopia Estate, Nelson Mandela Bay, Eastern Cape 2019
- Flora Search and Rescue for Citrus expansion on Boschkraal Citrus Farm, Sunland, Eastern Cape 2018
- Flora Search and Rescue for Wanhoop pipeline, Willowmore, Eastern Cape 2018
- Flora Search and Rescue for Wilgekloof pipeline, Willowmore, Eastern Cape 2018
- Flora Search and Rescue for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017
- Flora Search and Rescue for Steytlerville Bulk Water Supply, Eastern Cape (Phase 5) 2016
- Flora Search and Rescue for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery) 2016
- Flora Search and Rescue for Steytlerville Bulk Water Supply & WTW, Eastern Cape (Phase 4) 2015
- Flora and Fauna Search and Rescue for Riversbend Citrus Farm, NMB 2014
- Flora and Fauna Search and Rescue for Mainstream Windfarm, Eastern Cape 2013
- Flora Search and Rescue for Steytlerville Bulk Water Supply, Eastern Cape (Phase 1, 2 & 3) 2013
- Flora and Fauna Search and Rescue for OTGC Tank Farm, Coega IDZ, NMB 2013
- Flora and Fauna Search and Rescue for Jeffreys Bay School, Eastern Cape 2013
- Flora Search and Rescue Plan for Red Cap Wind Farm, Eastern Cape 2012
- Flora Relocation for Disco Poultry Farm, NMB 2010
- Flora Relocation for Mainstream Windfarm, Eastern Cape 2010

ENVIRONMENTAL MANAGEMENT PLANS

- Final Environmental Management Programme (EMPr) and Maintenance Management Plan for South End Precinct Mixed Use Zone, Nelson Mandala Bay Municipality 2020
- Final Environmental Management Programme (EMPr) for Coega Land-Based Aquaculture Development Zone (ADZ), Coega Industrial Development Zone (IDZ), Nelson Mandela Bay Municipality 2019
- Basic Botanical Assessment for Kromensee EMP (Jeffries Bay), Eastern Cape 2010
- Wetland Management Plan for NMB Portnet, NMB 2010
- Baseline Botanical Study, Vegetation mapping and EMP for Local Nature Reserve for Plettenberg Bay Lookout LNA, Western Cape 2009
- Biodiversity & Ecological Processes for Bathurst-Commonage, Eastern Cape 2006
- EMP for Kromensee EMP (Jeffries Bay), Eastern Cape 2006
- Floral Survey for Mbotyi Conservation Assessment, Eastern Cape 2005
- Identifying and Assessment on Aquatic Weeds for Pumba Private Game Reserve, Eastern Cape 2005

BASIC ASSESSMENT APPLICATION PROJECTS (DEDEAT)

- Basic Assessment Application for Parsonsvlei Erf 984 & 1134 Parsonsvlei 2020
- Construction of Deviation and Rehabilitation of Bridge along DR02481 road 2020
- Basic Assessment Application for Vermaak Boerdery Hydro Turbine (Cookhouse) 2020
- Basic Assessment Application for Walmer Erf 11667 Bidfood Warehousing Development 2020
- Basic Assessment Application for Portion 87 of the Farm Little Chelsea No 10 2020
- Basic Assessment Application for Nelson Mandela University Access Road, NMB 2019
- Basic Assessment, WULA and Borrow Pit/Quarry Mining Application, Clarkebury Rd, Idutywa 2019

- Basic Assessment Application for Erf 599 Walmer Mixed Use Development, Nelson Mandela Bay 2019
- Basic Assessment Application for Cookhouse Bridge rehabilitation and temporary deviation 2019
- Basic Assessment Application for Erf 14 Kabega, NMBM 2017
- Basic Assessment Application for Hankey Housing, Kouga District Municipality 2017
- Basic Assessment Application for Fairwest Rental Housing, Nelson Mandela Bay 2017
- Basic Assessment Application for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape 2015

- Basic Assessment Application for Hankey Housing, Kouga District Municipality 2015
- Basic Assessment Application for Citrus expansion on farm 960, Patensie (AIN du Preez Boerdery) 2014
- Basic Assessment Application for South-End Precinct Mixed Use Development, Nelson Mandela Bay 2018

MINING PERMIT/ENVIRONMENTAL MANAGEMENT PROGRAMME APPLICATIONS (DMR)

- Mining BAR/EMP's for Blue Crane Route & Camdeboo LM 12 Borrow Pits – (DoT) 2019
- Mining BAR/EMP's for Elundini LM 6 Borrow Pits (DoT)
- Mining BAR/EMP's for Baviaans LM 6 Borrow Pits (DoT)
- Mining BAR/EMP's for Kouga & Koukamma LM 12 Borrow Pits (DoT)
- Mining BAR/EMP's for Sakhisizwe & Engcobo LM 12 Borrow Pits (DoT)
- Mining BAR/EMP's for Senqu LM 12 Borrow Pits (DoT)
- Mining BAR/EMP's for 24 Borrow Pits in 6 districts within the Eastern Cape– (SANRAL) 2018
- Mining BAR/EMP's for Ingquza Hill LM Borrow Pits – (SANRAL) 2017
- Mining BAR/EMP's for Baviaans LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Senqu LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Inkwanca (Enoch Mgijima) LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Sakhisizwe/Engcobo LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Raymond Mahlaba LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Camdeboo LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Elundini LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Emalahleni/Intsika Yethu LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Nkonkobe LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Mbhashe LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Mbizana LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Senqu LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Elundini LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Emalahleni LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Emalahleni LM Borrow Pits – (DRPW) 2016
- Mining BAR/EMP's for Ikwezi/Baviaans LM Borrow Pits – (DRPW) 2016
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (Tarkastad) (DRPW) 2015
- Mining BAR/EMP's for Chris Hani DM Borrow Pits – Intsika Yethu and Emalahleni (DRPW) 2015
- Mining BAR/EMP's for Joe Gqabi DM Borrow Pits – Senqu (DRPW) 2015
- Mining BAR/EMP's for Makana/Ndlambe LM Borrow Pits – Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Amahlathi LM Borrow Pits – Amatole (DRPW) 2015
- Mining BAR/EMP's for Mbashe/Mqume LM Borrow Pits – Amatole (DRPW) 2015
- Mining BAR/EMP's for Sundays River Valley LM Borrow Pits – Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Kouga LM Borrow Pits – Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR02581 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08041, DR08247, DR08248 & DR08504 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08599, DR08601 & DR08570 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08235, DR08551 & DR08038 (DRPW) 2014
- Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08092, DR08093 & DR08649 (DRPW) 2014
- Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08090, DR08412, DR08425, DR08129, DR08109, DR08106, DR08104 & DR08099 – Matatiele (DRPW) 2014

ENVIRONMENTAL COMPLIANCE AUDITING

- Environmental Compliance Audit (Habata Boerdery) 2021
- Environmental Compliance Audit (Sontule Farm) 2021

ENVIRONMENTAL MANAGEMENT, AUDITING, COMPLIANCE AND MONITORING PROJECTS

- Environmental Auditing Services Pre-construction and Construction (Rocky Coast Farm) 2021
- Environmental Auditing Services (Middledrift Breeder Facility) 2021
- Coega Aquaculture Development Zone Environmental Compliance and Monitoring for Construction (24 Months) 2020
- Construction of NMU West End Student Residences Phases 1 & 3 Environmental Control Office (30 Months) 2020
- Environmental Auditing and construction monitoring for construction of Phase 1 River Park (South End Precinct) 2020
- Waste Management License audit for Bedford Recycling project 2020
- Auditing for Construction of Fairwest Village Housing Project 2019
- Auditing for Construction of Utopia Estate monthly auditing 2019
- ECO for DRPW IRM Road Maintenance projects, Baviaans LM 2019
- ECO for DRPW IRM Road Maintenance projects, Senqu LM 2019
- ECO for DRPW IRM Road Maintenance projects, Kouga/Koukamma LM 2019
- ECO for DRPW IRM Road Maintenance projects, Sakhisizwe/Engcobo LM 2019
- ECO for DRPW IRM Road Maintenance projects, Elundini LM 2019
- ECO for DRPW IRM Road Maintenance projects, Emalahleni/Intsika Yethu LM 2019
- ECO for Construction of Fairwest Village Housing Project 2019
- ECO for Construction of Utopia Estate Mixed Use Project 2019
- ECO for Construction of NMU West End Student Residences Phases 1 & 3 2019
- ECO for Construction of Eco-Pullets pullet rearing facility, Paterson 2018
- ECO for DRPW IRM Road Maintenance projects, Raymond Mahlaba LM 2018
- ECO for DRPW IRM Road Maintenance projects, Inkwanca (Enoch Mgijima) LM 2018
- ECO for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery) 2017
- ECO for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017
- DEO for improvement of national route R67 section 5 from Whittlesea (km 0.00) to Swart Kei river (km 15.40) – Murray & Roberts 2017
- ECO for SANRAL RRP Road Maintenance projects, Mbizana LM 2017
- ECO and Botanical Specialist for the special maintenance of national route R61 Section 2 from Elinus Farm (km 42.2) to N10 (km 85.0) (SANRAL) 2016
- Environmental Control Officer (ECO): Construction of NSRI Slipway - Port Elizabeth Harbour 2016
- ECO for SANRAL RRP Road Maintenance projects, Mbashe LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Nkonkobe LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Mbizana LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Senqu LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Elundini LM 2016
- ECO and Environmental Management for closure of Bushmans River Landfill site 2016
- ECO for DRPW IRM Road Maintenance projects, Amahlathi Municipality 2015
- ECO for DRPW IRM Road Maintenance projects, Makana/Ndlambe Municipality 2015
- ECO for DRPW IRM Road Maintenance projects, Mbashe/Mqume Municipality 2015
- ECO for DRPW IRM Road Maintenance projects, Port St Johns, Mbizana, Ingquza Hill LM's 2015
- ECO for Riversbend Citrus Farm, NMB 2014
- ECO for Alfred Nzo DM Road resurfacing - DR08071, DR08649, DR08092, DR08418, DR08452, DR08015, DR08085, DR08639 & DR08073, Eastern Cape - MSBA 2014

- ECO Audits for Koukamma Flood Damage Road Repairs – Hatch Goba 2014
- EMP and ECO for Utopia Estate, NMB 2013
- Final EMPr submission for Seaview Garden Estate, NMB 2012
- ECO audits for NMB Road surfacing, NMB (multiple contacts) 2011
- EMPr submission and ECO for Seaview Garden Estate, NMB 2010
- ECO for Mainstream Windfarm wind monitoring mast installation, Eastern Cape 2010
- EMP and ECO for Sinati Golf Estate EMP, BCM, Eastern Cape 2009
- Flora Relocation Plan and Permit application for Wildemans Plaas, NMB 2006

ENVIRONMENTAL SCREENING PROJECTS

- Somerset East Stormwater Environmental Screening Report 2021
- Woodlands Diary Road Upgrade Environmental Screening Report, Kouga LM 2021
- Risk Assessment and Screening for proposed Heatherbank access road, NMB 2020
- Environmental Screening Report for Proposed Life Hospital parking expansion, NMB 2019
- Environmental Screening Report for Erf 984 & 1134 development, Parsonsvlei, NMB 2019
- Environmental Screening Report for proposed Khayalethu School, Buffalo City 2018
- Environmental Screening Report for Proposed Housing Development of Erf 8700, Kabega Park, NMB 2017
- Environmental Screening Report for Proposed Housing Development of Erf 14, Kabega Park, NMB 2017
- Environmental Screening Report for Proposed Fairwest Social Housing project, Fairview, NMB 2016
- Environmental Screening Report for Development of Little Chelsea No 25, NMB 2016
- Terrestrial Vegetation Risk Assessment for proposed Skietnek Citrus Farm development (Kirkwood) 2015
- Preliminary Environmental Risk Assessment: NSRI Slipway Port Elizabeth 2015
- Environmental Screening Report for Proposed Development of a Dwelling on Erf 899, Theescombe 2015
- Environmental Screening Report for Proposed Development on Erf 559, Walmer, Port Elizabeth 2015
- Environmental Screening Report for Proposed Housing Scheme Development of Erf 8709, Wells Estate 2015
- Environmental Screening Report for Development of Portion 10 of Little Chelsea No 87, NMB 2015

SECTION 24G APPLICATIONS

- 12 000 ML Dam constructed on farm 960, Patensie (MGM Trust) 2015
- Illegal clearing of 20 Ha of lands on Hitgeheim Farm, Sunland, Eastern Cape 2015

CONFERENCES AND PUBLICATIONS

- Pote, J., Shackleton, C.M., Cocks, M. & Lubke, R. 2006. *Fuelwood harvesting and selection in Valley Thicket*, South Africa. Journal of Arid Environments, 67: 270-287.
- Pote, J., Cocks, M., Dold, T., Lubke, R.A. and Shackleton, C. 2004. *The homegarden cultivation of indigenous medicinal plants in the Eastern Cape*. Indigenous Plant Use Forum, 5 - 8 July 2004, Augsburg Agricultural School, Clanwilliam, Western Cape.
- Pote, J. & Lubke, R.A. 2003. *The selection of indigenous species suitable for use as fuelwood and building materials as a replacement of invasive species that are currently used by the under-privileged in the Grahamstown commonage.* Working for Water Inaugural Research Symposium 19 - 21 August 2003, Kirstenbosch. Poster presentation.
- Pote, J. & Lubke, R.A. 2003. *The screening of indigenous pioneer species for use as a substitute cover crop for rehabilitation after removal of woody alien species by WfW in the grassy fynbos biome in the Eastern Cape*. Working for Water Inaugural Research Symposium 19 - 21 August 2003, Kirstenbosch, South Africa.

OTHER RESEARCH EXPERIENCE

- Resource assessment of bark stripped trees in indigenous forests in Weza/Kokstad area (June 2000; Dr C. Geldenhuis & Mr. M. Kaplin).
- Working for Water research project for indigenous trees for woodlots (December 2000/January 2001; Prof R.A. Lubke, Rhodes University).
- Project coordinator and leader of the REFYN project – A BP conservation gold award: Conservation and Restoration of Grassy-Fynbos. A multidisciplinary project focusing on management, restoration and public awareness/education (2001 – 2002).
- Conservation Project Management Training Workshops: Royal Geographical Society, London 2001 – Fieldwork Techniques, Habitat Assessment, Biological Surveys, Project Planning, Public Relations and Communications, Risk Assessment, Conservation Education
- Selection and availability of wood in Crossroads village, Eastern Cape, South Africa. Honours Research Project 2002. Supervisors: Prof. R.A. Lubke & Prof. C. Shackleton.
- Floral Morphology, Pollination and Reproduction in Cyphia (LOBELIACEAE). Honours Research Project 2002. Supervisor: Mr. P. Phillipson.
- Forestry resource assessment of bark-stripped species in Amatola District (December 2002; Prof R.A. Lubke).
- Homegarden Cultivation of Medicinal Plants in the Amathole area. Postgraduate Research Project (2003-2005; Prof R.A. Lubke, Prof C.M. Shackleton and Ms C.M., Cocks).

7.5 Appendix E: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity

SCOPE

The protocol (*Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation* (GN 320, 20 March 2020)) provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation.

The protocol (*Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of sections 24(5)(a) and (h) and 44 of NEMA, gazetted on 30 October 2020*), provides the criteria for the assessment and reporting of impacts on plant and animal species for activities requiring environmental authorisation.

These protocols replace the requirements of Appendix 6 of the Environmental Impact Assessment Regulation[15].

The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (https://screening.environment.gov.za/screeningtool). The requirements for terrestrial biodiversity are for landscapes or sites which support various levels of biodiversity. The relevant terrestrial biodiversity data in the screening tool has been provided by the South African National Biodiversity Institute[16].

SITE SENSITIVITY VERIFICATION AND MINIMUM REPORT CONTENT REQUIREMENTS

Prior to commencing with a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool must be confirmed by undertaking a site sensitivity verification.

2.1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.

2.2. The site sensitivity verification must be undertaken through the use of:

(a) a desk top analysis, using satellite imagery,

(b) a preliminary on-site inspection; and

(c) any other available and relevant information.

2.3. The outcome of the site sensitivity verification must be recorded in the form of a report that:

(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;

(b) contains a motivation and evidence (e.g., photographs) of either the verified or different use of the land and environmental sensitivity; and

[15] The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act 107 of 1998).

[16] The biodiversity dataset has been provided by the South African National Biodiversity Institute (for details of the dataset, click on the options button to the right of the various biodiversity layers on ther screening tool).

(c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

REF	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REF
TERRESTRIAL BIODIVERSITY SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS		
1	**General Information**	-
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being "*very high sensitivity*" for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment.	✓
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being ***'low sensitivity'*** for terrestrial biodiversity, must submit a Terrestrial Biodiversity Compliance Statement.	✓
1.3	However, where the information gathered from the site sensitivity verification differs from the designation of ***'very high'*** terrestrial biodiversity sensitivity on the screening tool and it is found to be of a '***low***' sensitivity, then a Terrestrial Biodiversity Compliance Statement must be submitted.	✓
1.4	Similarly, where the information gathered from the site sensitivity verification differs from that identified as having a ***'low'*** terrestrial biodiversity sensitivity on the screening tool, a Terrestrial Biodiversity Specialist Assessment must be conducted.	✓
1.5	If any part of the proposed development footprint falls within an area of ***'very high'*** sensitivity, the assessment and reporting requirements prescribed for the ***'very high'*** sensitivity apply to the entire footprint, excluding linear activities for which impacts on terrestrial biodiversity are temporary and the land in the opinion of the terrestrial biodiversity specialist, based on the mitigation and remedial measures, can be returned to the current state within two years of the completion of the construction phase, in which case a compliance statement applies. Development footprint in the context of this protocol means the area on which the proposed development will take place and includes any are that will be disturbed.	✓
	VERY HIGH SENSITIVITY RATING for terrestrial biodiversity features	
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,	✓
	LOW SENSITIVITY RATING – for terrestrial biodiversity features	
4	**Terrestrial Biodiversity Compliance Statement**	✓
4.1	The compliance statement must be prepared by a specialist registered with the SACNASP and having expertise in the field of ecological sciences.	✓
4.2	The compliance statement must:	
4.2.1	be applicable to the preferred site and proposed development footprint;	✓
4.2.2	confirm that the site is of 'low' sensitivity for terrestrial biodiversity; and	✓
4.2.3	indicate whether or not the proposed development will have any impact on the biodiversity feature.	✓
4.3	The compliance statement must contain, as a minimum, the following information:	
4.3.1	the contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	✓
4.3.2	a signed statement of independence by the specialist;	✓
4.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
4.3.4	a baseline profile description of biodiversity and ecosystems of the site;	✓
4.3.5	the methodology used to verify the sensitivities of the terrestrial biodiversity features on the site, including equipment and modeling used, where relevant;	✓
4.3.6	in the case of a linear activity, confirmation from the terrestrial biodiversity specialist that, in their opinion, based on the mitigation and remedial measures propped, the land can be returned to the current state within two years of completion of the construction phase;	✓

REF	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REF
4.3.7	where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;	✓
4.3.8	a description of the assumptions made and any uncertainties or gaps in knowledge or data; and	✓
4.3.9	any conditions to which this statement is subjected.	EAP
4.4	A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	EAP
PLANT SPECIES SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS		
1	**General Information**	✓
1.1	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 "*very high*" or "*high*" sensitivity for terrestrial plant species must submit a **Terrestrial Plant Species Specialist Assessment Report**.	
1.2	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 Terrestrial Plant Species Specialist Assessment Report or a Terrestrial Plant Species Compliance Statement**, depending on the outcome of a site inspection undertaken in accordance with paragraph 4.	✓
1.3	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 "*low*" sensitivity for terrestrial plant species must submit a **Terrestrial Plant Species Compliance Statement.**	✓
1.4	Where the information gathered from the site sensitivity verification differs from the screening tool designation of "*very high*" or "*high*", for terrestrial plant species sensitivity and it is found to be of a "*low*" sensitivity, then a **Terrestrial Plant Species Compliance Statement** must be submitted.	✓
1.5	Where the information gathered from the site sensitivity verification differs from the screening tool designation of "*low*" terrestrial plant species sensitivity and it is found to be of a "*very high*" or "*high*" terrestrial plant species sensitivity, a **Terrestrial Plant Species Specialist Assessment** must be conducted.	✓
1.6	If any part of the development falls within an area of confirmed "*very high*" or "*high*" sensitivity, the assessment and reporting requirements prescribed for the "*very high*" or "*high*" sensitivity, apply to the entire development footprint. Development footprint in the context of this protocol means, the area on which the proposed development will take place and includes the area that will be disturbed or impacted.	✓
1.7	The Terrestrial Plant Species Specialist Assessment and the Terrestrial Plant Species Compliance Statement must be undertaken within the study area.	✓
1.8	Where the nature of the activity **is not** expected to have an impact on species of conservation concern (SCC) beyond the boundary of the preferred site, the study area means the proposed development footprint within the preferred site.	✓
1.9	Where the nature of the activity **is** expected to have an impact on SCC beyond the boundary of the preferred site, the *project areas of influence* (PAOI) must be determined by the specialist in accordance with *Species Environmental Assessment Guideline*[17], and the study area must include the PAOI, as determined.	✓
	VERY HIGH AND HIGH SENSITIVITY RATING for terrestrial plant species	
2	**Terrestrial Plant Species Specialist Assessment**	
	VERY HIGH SENSITIVITY RATING	✓

[17] Available at https://bgis.sanbi.org/

REF	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REF
	1. Critical habitat for range-restricted species[18] of conservation concern, that have a global range of less than 10 km^2. 2. SCC listed on the IUCN Red List of Threatened Species[19] or on South Africa's National Red List website[20] as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare. 3. Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle. 4. The number of mature individuals that ranks the site among the largest 10 aggregations known for the species. These areas are irreplaceable for SCC. HIGH SENSITIVITY RATING 1. Confirmed habitat for SCC. 2. SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare. These areas are unsuitable for development due to a very likely impact on SCC.	
2.3.12	identify any alternative development footprints within the preferred site which would be of "*low*" or "*medium*" sensitivity as identified by the screening tool and verified through the site sensitivity verification.	✓
2.4	The findings of the assessment must be written up in a **Terrestrial Plant Species Specialist Assessment Report**.	✓
3	**Terrestrial Plant Species Specialist Assessment Report**	✓
3.1.13	a motivation must be provided if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having "*low*" or "*medium*" terrestrial plant species sensitivity and were not considered appropriate.	✓
4	**MEDIUM SENSITIVITY SPECIES OF CONSERVATION CONCERN CONFIRMATION**	
	MEDIUM SENSITIVITY RATING – for terrestrial plant species:	
	1. Suspected habitat for SCC based either on there being records for this species collected in the past, prior to 2002, or being a natural area included in a habitat suitability model[21]. SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	✓
4.6	2. Where SCC are found on site or have been confirmed to be likely present, a **Terrestrial Plant Species Specialist Assessment** must be submitted in accordance with the requirements specified for "*very high*" and "*high*" sensitivity in this protocol.	✓
4.7	3. Similarly, where no SCC are found on site during the site inspection or the presence is confirmed to be unlikely, a **Terrestrial Plant Species Compliance Statement** must be submitted.	✓
5	4. **LOW SENSITIVITY RATING – for terrestrial plant species**	
	Terrestrial Plant Species Compliance Statement 1. Areas where no natural habitat remains. **5.** Natural areas where there is no suspected occurrence of SCC.	✓

[18] Species with a geographically restricted area of distribution.

[19] https://www.iucnredlist.org/

[20] This category includes the categories Extremely Rare, Critically Rare and Rare

[21] The methodology by which habitat suitability models have been developed are explained within the Species Environmental Assessment Guideline.

REF	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REF
5.1	The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Botanical Science or Ecological Science).	✓
5.2	The compliance statement must:	✓
5.2.1	be applicable to the study area;	✓
5.2.2	confirm that the study area, is of "*low*" sensitivity for terrestrial plant species; and	✓
5.2.3	indicate whether or not the proposed development will have any impact on SCC.	✓
5.3	The compliance statement[22] must contain, as a minimum, the following information:	✓
5.3.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;	✓
5.3.2	a signed statement of independence by the specialist;	✓
5.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
5.3.4	a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;	✓
5.3.5	where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	✓
5.3.6	a description of the assumptions made and any uncertainties or gaps in knowledge or data;	✓
5.3.7	the mean density of observations/ number of samples sites per unit area[23]; and	✓
5.3.8	any conditions to which the compliance statement is subjected.	✓
6	A signed copy of the **Terrestrial Plant Species Compliance Statement** must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.	✓
ANIMAL SPECIES SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS		
1	**General Information**	
1.1	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 "*very high*" or "*high*" sensitivity for terrestrial animal species must submit a **Terrestrial Animal Species Specialist Assessment Report.**	✓
1.2	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 animal species must submit **either a Terrestrial Animal Species Specialist Assessment Report or a Terrestrial Animal Species Compliance Statement**, depending on the outcome of a site inspection undertaken in accordance with paragraph 4.	✓
1.3	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 "*low*" sensitivity for terrestrial animal species must submit a **Terrestrial Animal Species Compliance Statement.**	✓
1.4	Where the information gathered from the site sensitivity verification differs from the screening tool designation of "*very high*" or "*high*", for terrestrial animal species sensitivity and it is found to be of a "*low*" sensitivity, then a **Terrestrial Animal Species Compliance Statement** must be submitted.	✓
1.5	Where the information gathered from the site sensitivity verification differs from the screening tool designation of "*low*" terrestrial animal species sensitivity and it is found to be of a "*very high*" or "*high*" terrestrial animal species sensitivity, a **Terrestrial Animal Species Specialist Assessment** must be conducted.	✓
1.6	If any part of the development falls within an area of confirmed "*very high*" or "*high*" sensitivity, the assessment and reporting requirements prescribed for the "*very high*" or "*high*" sensitivity, apply to the entire development footprint. Development footprint in the	✓

[22] An example of a what is contained in a Compliance Statement for Plant Species Impact Assessment can be found in the Species Environmental Impact Assessment Guideline

[23] Refer to the Species Environmental Assessment Guideline

REF	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REF
	context of this protocol means, the area on which the proposed development will take place and includes the area that will be disturbed or impacted.	
1.7	The **Terrestrial Animal Species Specialist Assessment** and the **Terrestrial Animal Species Compliance Statement** must be undertaken within the *study area*.	✓
1.8	Where the nature of the activity **is not** expected to have an impact on species of conservation concern (SCC) beyond the boundary of the preferred site, the study area means the proposed development footprint within the preferred site.	✓
1.9	Where the nature of the activity **is** expected to have an impact on SCC beyond the boundary of the preferred site, the *project areas of influence* (PAOI) must be determined by the specialist in accordance with *Species Environmental Assessment Guideline*[24], and the study area must include the PAOI, as determined.	✓
	VERY HIGH AND HIGH SENSITIVITY RATING for terrestrial animal species	
2	**Terrestrial Animal Species Specialist Assessment**	
	VERY HIGH SENSITIVITY RATING 1. Critical habitat for range-restricted species[25] of conservation concern, that have a global range of less than 10 km². 2. SCC listed on the IUCN Red List of Threatened Species[26] or on South Africa's National Red List website[27] as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare. 3. Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle. 4. The number of mature individuals that ranks the site among the largest 10 aggregations known for the species. These areas are irreplaceable for SCC.	✓
	HIGH SENSITIVITY RATING 1. Confirmed habitat for SCC. 2. SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare. These areas are unsuitable for development due to a very likely impact on SCC.	✓
2.2.12	identify any alternative development footprints within the preferred site which would be of "*low*" or "*medium*" sensitivity as identified by the screening tool and verified through the site sensitivity verification.	✓
2.3	The findings of the assessment must be written up in a **Terrestrial Animal Species Specialist Assessment Report**.	✓
3	**Terrestrial Animal Species Specialist Assessment Report**	
3.1.13	a motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above that were identified as having "*low*" or "*medium*" terrestrial animal species sensitivity and were not considered appropriate.	✓
4	**MEDIUM SENSITIVITY SPECIES OF CONSERVATION CONCERN CONFIRMATION**	
	MEDIUM SENSITIVITY RATING – for terrestrial animal species: 1. Suspected habitat for SCC based either on historical records (prior to 2002) or being a natural area included in a habitat suitability model for this species[28].	✓

[24] Available at https://bgis.sanbi.org/

[25] Species with a geographically restricted area of distribution.

[26] https://www.iucnredlist.org/

[27] This category includes the categories Extremely Rare, Critically Rare and Rare

[28] The methodology by which habitat suitability models have been developed are explained within the Species Environmental Assessment Guideline.

REF	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REF
	SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	
4.6	Where SCC are found on site or have been confirmed to be likely present, a **Terrestrial Animal Species Specialist Assessment** must be submitted in accordance with the requirements specified for "*very high*" and "*high*" sensitivity in this protocol.	✓
4.7	Similarly, where no SCC are found on site during the site inspection or the presence is confirmed to be unlikely, a **Terrestrial Animal Species Compliance Statement** must be submitted.	✓
5	**LOW SENSITIVITY RATING – for terrestrial animal species**	
	Terrestrial Animal Species Compliance Statement 1. Areas where no natural habitat remains. Natural areas where there is no suspected occurrence of SCC.	✓
5.1	The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Zoological Science or Ecological Science).	✓
5.2	The compliance statement must:	✓
5.2.1	be applicable to the study area;	✓
5.2.2	confirm that the study area, is of "*low*" sensitivity for terrestrial animal species; and	✓
5.2.3	indicate whether or not the proposed development will have any impact on SCC.	✓
5.3	The compliance statement[29] must contain, as a minimum, the following information:	✓
5.3.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;	✓
5.3.2	a signed statement of independence by the specialist;	✓
5.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
5.3.4	a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;	✓
5.3.5	the mean density of observations/ number of samples sites per unit area[15].	✓
5.3.6	where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	✓
5.3.7	a description of the assumptions made and any uncertainties or gaps in knowledge or data; and	✓
5.3.8	any conditions to which the compliance statement is subjected.	✓
6	A signed copy of the **Terrestrial Animal Species Compliance Statement** must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.	✓

7.6 Appendix F: Site Sensitivity Verification Report

7.6.1 Background

Bluepebble Consulting are appointed as the independent Environmental Assessment Practitioner (EAP) to conduct the Environmental Assessments for the Proposed development of Erf 155, Keurboomstrand, Western Cape province (Figure 1). As part of this process, a terrestrial biodiversity assessment is required to support the necessary environmental applications. An assessment was conducted in 2020 for three alternative layouts. Subsequent to this, a revised layout is assessed in this

[29] An example of a what is contained in a Compliance Statement for Animal Species Impact Assessment can be found in the Species Environmental Impact Assessment Guideline

updated report. The original report is updated in line with current regional planning frameworks and other legislated requirements as applicable.

Figure 32: Site locality.

7.6.2 Activity Location and Description

The site is a currently undeveloped Erf (Erf 155) towards the western side of Keurboomstrand as indicated in Figure 1 and Figure 3.The site is bound on the southern side by a surfaced road, being the main access road into Keurboomstrand. Undeveloped erven are present on the west and northern sides, with developed erven being adjacent on the north-west and north-east corners. The properties to the south of the site across the surfaced road is also developed. There is evidence on the site of old strictures and a pipeline, with remnant and secondary vegetation elements.

7.6.3 Purpose of Report

The "*Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of sections 24 (5) (a) and (h) and 44 of the Act, when applying for Environmental Authorisation*", as published on 20 March, 2020 in National Gazette, No. 43110 in terms of NEMA (Act 107 of 1998) sections 24(5)(a), (h) and 44, lists protocols and minimum report requirements for environmental impacts on terrestrial biodiversity and provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation. The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the National web based Environmental Screening Tool. Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration, identified by the screening tool, must be confirmed by undertaking a **site sensitivity verification**, which must include the following.

4. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.
5. The site sensitivity verification must be undertaken through the use of:
    a. a desk top analysis, using satellite imagery.
    b. a preliminary on -site inspection; and
    c. any other available and relevant information.
6. The outcome of the site sensitivity verification must be recorded in the form of a report that:
    a. confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool.
    b. contains a motivation and evidence of either the verified or different use of the land and environmental sensitivity; and
    c. is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

The National Web Based Screening Tool was used to generate the potential environmental sensitivity of the site which has then been compared to various online and other databases and information sources in order to verify and confirm the validity of the screening tool findings. This was further supported with on-site observations and analysis of most recent aerial photography.

This terrestrial biodiversity site verification has been undertaken as per the requirements of the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation (GN 320, 20 March 2020).

7.6.4 Data sources and references

Data sources that were utilised for this report include the following:

- National (DFFE) Web Based Screening Tool – to generate the sites potential environmental sensitivity.
- National Vegetation Map 2018 (NVM, 2018), Mucina & Rutherford (2006) and National Biodiversity Assessment or Red Listed Ecosystems (NBA/RLE, 2022) – description of vegetation types, species (including endemic) and most recent vegetation unit conservation status.
- National and Regional Legislation including Provincial Nature Conservation Ordinance (P.N.C.O). NEM:BA Threatened or Protected Species (ToPS).
- Botanical Database of Southern Africa (BODATSA) and New Plants of Southern Africa (POSA) – lists of plant species and potential species of concern found in the general area (SANBI.)
- International Union for Conservation of Nature (IUCN) - Red List of Threatened Species.
- Animal Demography Unit Virtual Museum (VM) – potential faunal species.
- Global Biodiversity Information Facility (GBIF) – potential flora & faunal species.
- National Red Books and Lists - mammals, reptiles, frogs, dragonflies & butterflies.
- National Freshwater Ecosystem Priority Areas assessment (NFEPA, 2011) - important catchments.
- National Protected Areas Expansion Strategy (NPAES, 2018) and South Africa Protected Area database (2020) – protected area information.
- SANBI BGIS – All other biodiversity GIS datasets.

- Western Cape Biodiversity Spatial Plan (2017).
- Aerial Imagery – Google Earth, ESRI, Chief Surveyor General (http://csg.dla.gov.za).
- Cadastral and other topographical country data - Chief Surveyor General (http://csg.dla.gov.za).
- Other sources may include peer-reviewed journals, regional and local assessments, and studies in the general location of the project and its area of influence, landscape prioritization schemes (Key Biodiversity Areas), systematic conservation planning assessments and plans (as above), and any pertinent masters and doctoral theses, among others.

This terrestrial biodiversity assessment has been undertaken as per the requirements of the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation (GN 320, 20 March 2020).

7.6.5 Site visit

A mid-spring site visit was conducted on 13 & 14 October 2020. The site falls within a temperate climate with rainfall occurring throughout the year but is often higher in winter, hence for the purposes of this report, a single site visit is deemed to be adequate, specifically due to the somewhat disturbed nature of the site.

7.6.6 Assumptions, Uncertainties and Gaps in Knowledge

The findings and recommendations of this report may be susceptible to the following uncertainties and limitation:

- No assessment has been made of aquatic or estuarine aspects relating to any wetlands, pans, and rivers/seeps and/or estuaries or marine ecosystems outside of the scope of a terrestrial biodiversity report. Refer to separate reporting.
- Any botanical surveys based upon a limited sampling time-period, may not reflect the actual species composition of the site due to seasonal variations in flowering times. Additionally, the composition of fire adapted vegetation may vary depending on level of maturity or time since last burn. As far as possible, site collected data has been supplemented with desktop and database-centred distribution data.
- As far as possible, site collected data has been supplemented with desktop and database-centred distribution data as well as previous studies undertaken in the area.

7.6.7 National Environmental Screening Tool

The DEA Screening Tool indicates the following, summarised in Table 14 :

- Terrestrial Biodiversity is Very High (Figure 33).
- Plant species sensitivity is Medium (Figure 34).
- Animal Species sensitivity is Medium (Figure 35).
- Aquatic Sensitivity is Low (Figure 36).

Table 14: Summary of Screening tool designations.

Terrestrial Sensitivity	Feature(s) in proximity
Very High	CBA 1: Terrestrial, National Protected Area Expansion Strategy (NPAES) & Garden Route National Park
High	None
Medium	None
Low	Present

Plant Sensitivity	
Very High	None
High	None
Medium	*Faurea macnaughtonii, Ocotea bullata, Lampranthus pauciflorus, Ruschia duthiae, Lebeckia gracilis, Amauropelta knysnaensis, Leucospermum glabrum, Selago burchellii, Erica chloroloma, Erica glandulosa subsp. fourcadei, Hermannia lavandulifolia, Acmadenia alternifolia, Muraltia knysnaensis, Erica glumiflora,* Sensitive species 657, 1032, 500 & 763
Low	Present
Animal Sensitivity	
Very High	None
High	None
Medium	*Chlorotalpa duthieae* (mammal), *Stephanoaetus coronatus* (bird), *-Afrixalus knysnae* (Amphibian), *Aloeides thyra orientis* (Insect), *Sarophorus punctatus* & *Aneuryphymus montanus* (Invertebrates) & Sensitive species 8.
Low	Present
Aquatic Sensitivity	
Very High	None
High	None
Medium	None
Low	None

Figure 33: Terrestrial Biodiversity Sensitivity

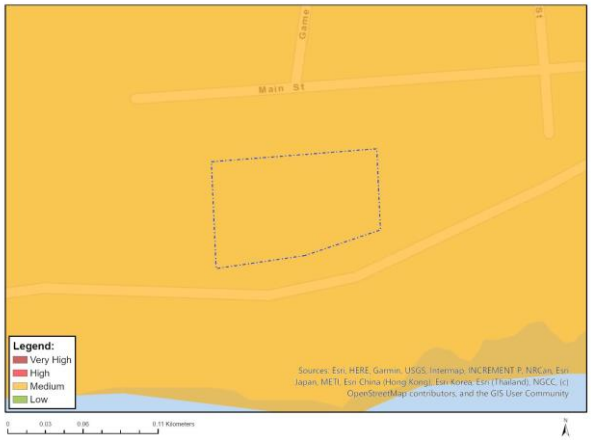

Figure 34: Plant Species Sensitivity

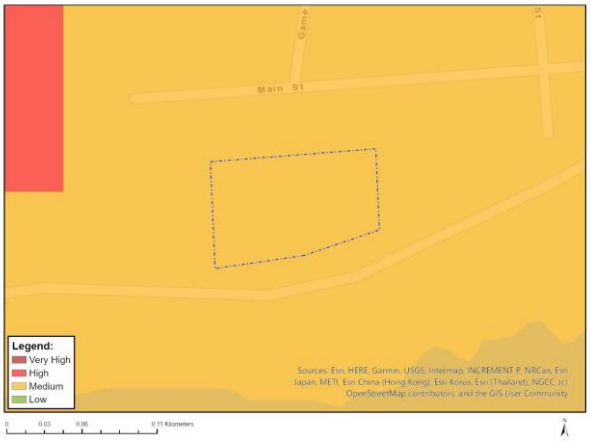

Figure 35: Animal Species Sensitivity

Figure 36: Aquatic Sensitivity

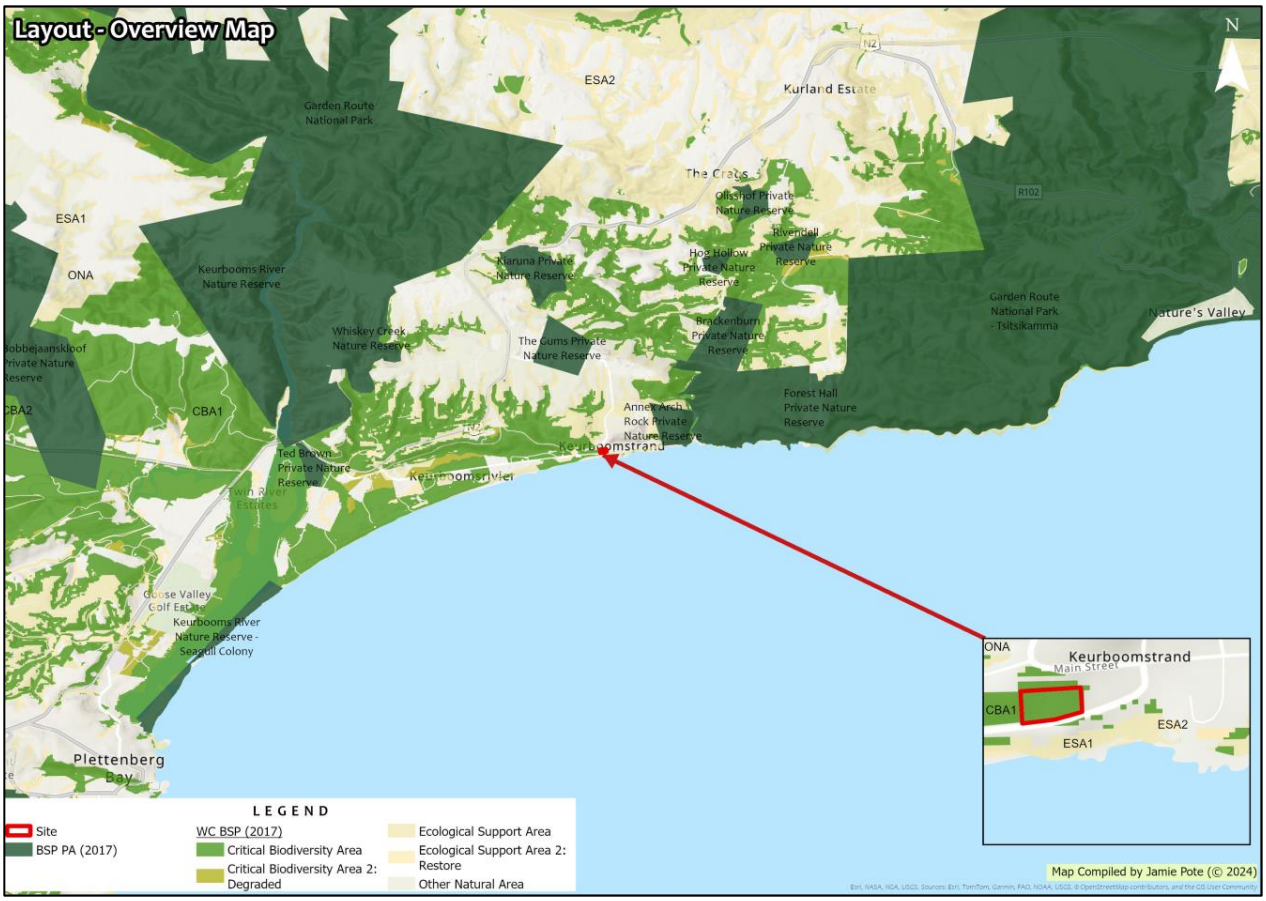

Figure 37: Western Cape Biodiversity Spatial Plan (2017) – site does partially overlap with CBA.

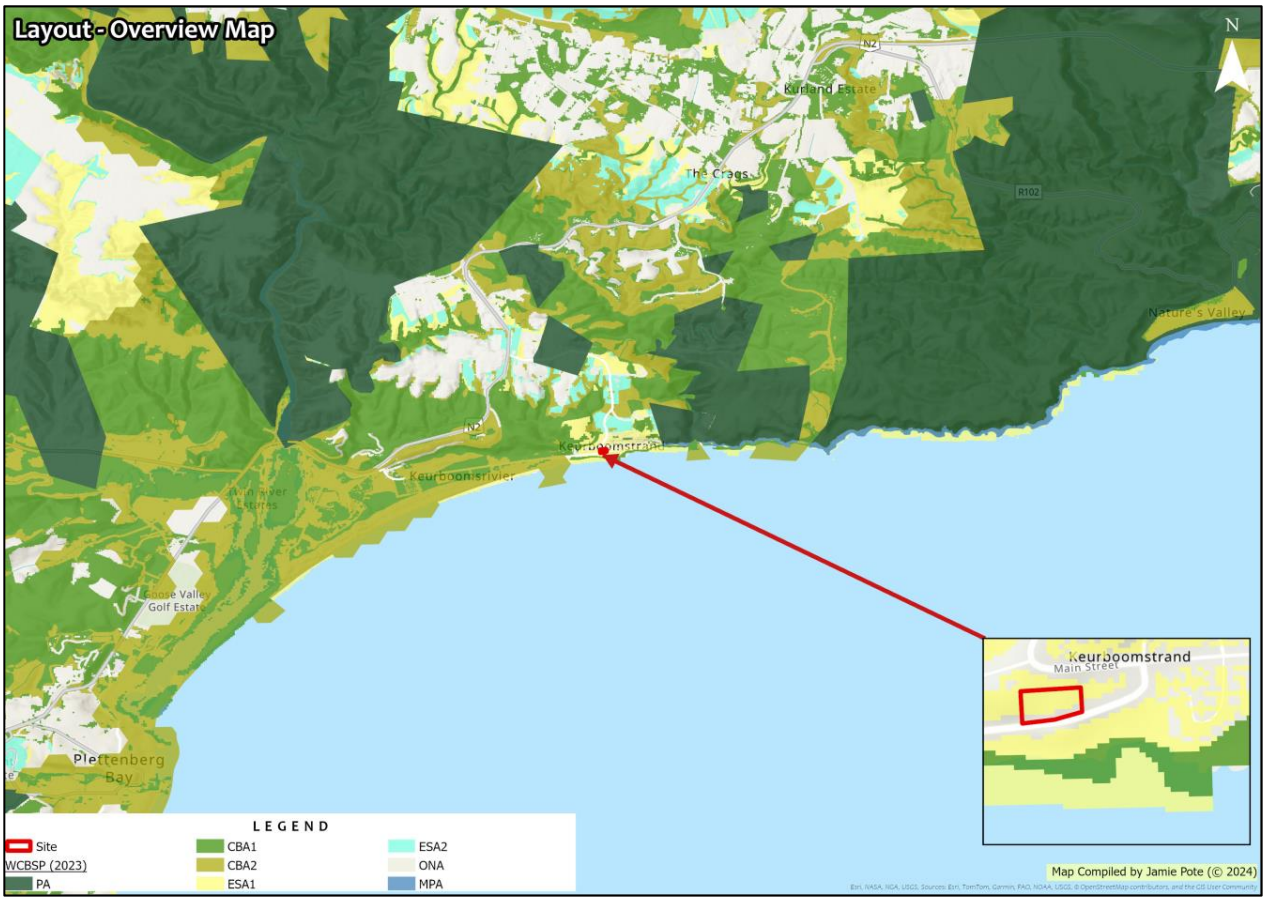

Figure 38: Western Cape Biodiversity Spatial Plan (2023) – site does partially overlap with ESA.

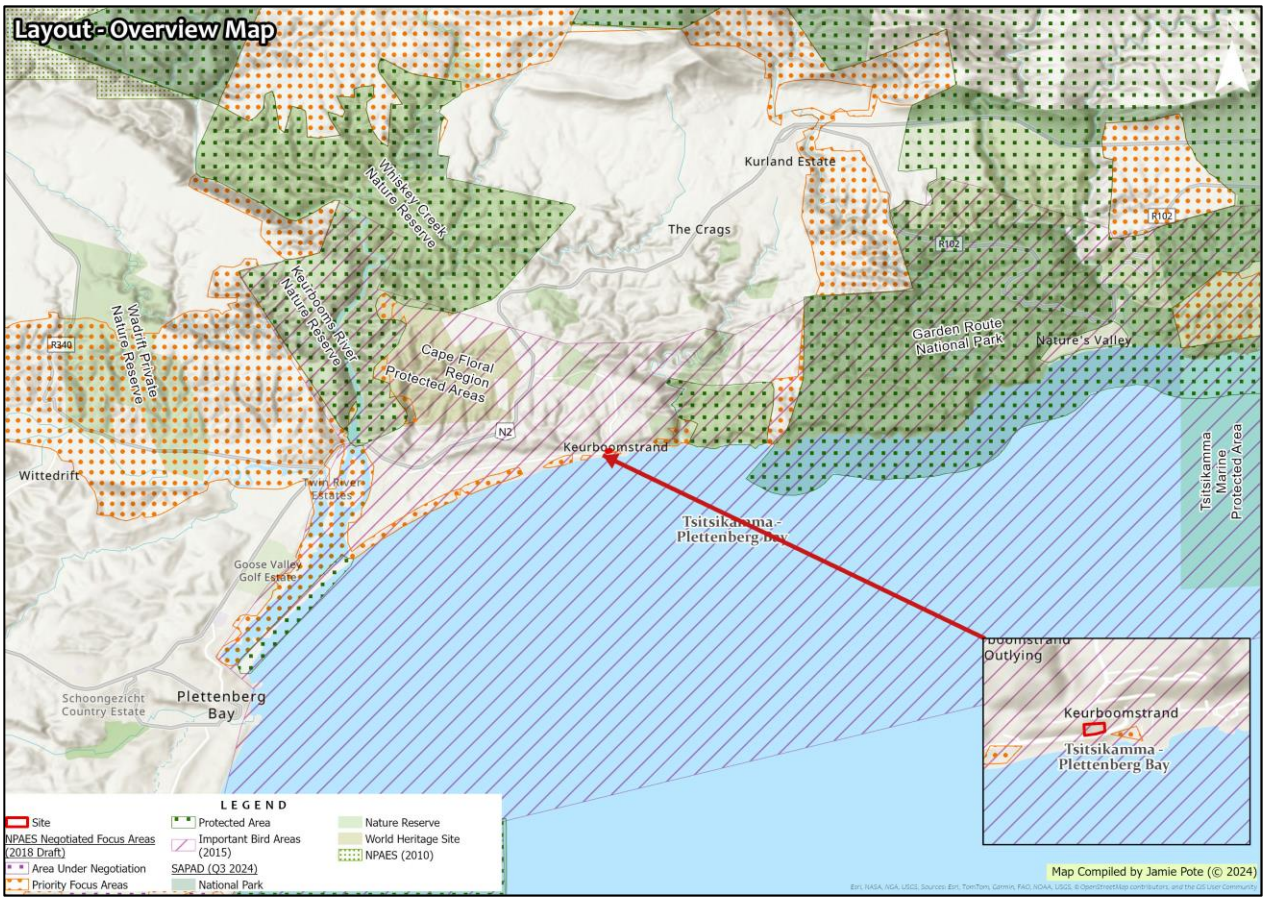

Figure 39: Protected Areas and NPAES in vicinity.

The DEA screening tool identifies Very High Terrestrial Biodiversity (Critical Biodiversity Area, NPAES, National Park), Medium Animal Species and Medium Plant Species Sensitivities as well as Low Aquatic Sensitivity. Figure 33 to Figure 36above are extracted directly from the Screening Tool report (~May 2025). The content of this report will address the findings of the screening tool as well as any site-specific sensitivities that may not have been identified the screening tool, as applicable. The site assessment has physically screen for physical presence of these and other possible species not identified in the screening tool.

7.6.8 Findings, Outcomes and Recommendations

Terrestrial Biodiversity

Site verification of the Terrestrial Biodiversity sensitivities is summarised in Table 15 and depicted in *Figure 37* (WC BSP, 2017) and Figure 38 (WC BSP, 2023), where CBA is light green, ESA is yellow and Protected Area is dark green. The 2017 CBA designation is revised to an ESA designation as per the revised WC BSP (2023); hence the Screening Tool designated CBA is disputed. The site is situated within an urban erf and is not within a protected area, hence the protected area designation is also disputed.

Table 15: Terrestrial Biodiversity Features flagged in the National Environmental Screening Tool.

Feature		COMMENT
Critical Biodiversity Area (WC BSP, 2019)	CBA 1	**Dispute** – the site is within an urban erf, most recent WC BSP designation is ESA, not CBA and the site is an urban erf and not a protected area.
Ecological Support Area (EC BSP, 2023)	ESA 1	
Protected Area		

The Very High Terrestrial Biodiversity sensitivity is thus disputed, and a Low Terrestrial Biodiversity Sensitivity is designated by the specialist. The development of a portion of the site is unlikely to compromise ecological processes and connectivity (i.e. ESA) significantly above baseline levels in an already developed landscape.

Plant Species (Flora)

National Environmental Screening Tool flagged several flora species. Almost the entire site is situated within a landscaped garden where little natural vegetation remains. A few small pockets of natural vegetation do remain, primarily as Milkwood trees with some associated dune thicket elements, where retained within or on the edge of the developed Erf. Any such pockets were checked for flora species of conservation concern, and it is confirmed that no species of conservation concern having an elevated status and/or limited distribution range as flagged in the screening tool are present.

The SSVR thus disputes the flagged flora ('plant') species of conservation concern and medium plant species designations, as no flagged species were found within the site and a Low plant species sensitivity is thus designated by the specialist.

Animal Species (Fauna)

National Environmental Screening Tool flagged several fauna species. The site is within an urban area (coastal village), where the village is comprised of many developed residential erven and dwellings that are situated within a dune thicket/fynbos/forest vegetation were elements of the vegetation are retained within the erven. This creates a forest-village landscape, and the proposed site development plan will align with this. It is thus not likely to conflict significantly with any faunal species that are present within the landscape.

The broader area is known to provide refuge and habitat for Sensitive Species 8. While the species is generally shy, it is occasionally observed in quiet urban settings that are in proximity to its habitat. The species may thus occasionally be seen in the broader area but the proposed activity, is unlikely to pose a risk to this species, were it to occur or be a transient visitor. Standard measures of checking open trenches, in particular after rain and not leaving trenches open for extended time periods would be advisable as a precautionary measure, however the species would likely be able to escape all but the deepest of trenches. It is also unlikely that this species would favour the more densely populated areas, however the site is adjacent to some less developed vegetated patches where it is feasible the species could pass while in transit.

The SSVR thus disputes the flagged fauna ('animal') species of conservation concern designations and medium animal species designations, and a Low animal species sensitivity is thus designated by the specialist.

Aquatic

Wetland and River features are present in the broader area. Aquatic aspects are beyond the scope of this Terrestrial Biodiversity Assessment but are given consideration in terms of terrestrial processes that may be influenced by the nearby aquatic estuarine component. In terms of terrestrial Biodiversity, no such aspects are relevant in this assessment.

7.6.9 Conclusions

The site verification thus confirms that the site does not fall within the terrestrial biodiversity screening tool designated CBA or Protected Area. The Very High Terrestrial Biodiversity sensitivity is thus disputed, and a Low Terrestrial Biodiversity Sensitivity is designated by the specialist.

It further disputes that any of the screening tool flagged flora or fauna species of conservation concern are likely to be affected significantly by the proposed activity, comprising development of a portion of an erf within an urbanised landscape, where forest-elements within the site are to be retained and only a portion developed. The Very High Plant & Animal Species sensitivities are thus disputed, and a Low Plant & Animal Sensitivity is thus designated by the specialist. While the site is deemed to have a Low Sensitivity, the specialist is still of the opinion that a Compliance Statement has shortcomings and will not suffice in this context, hence a full assessment is compiled which includes impact assessment methodology and mitigation measures.

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KEURBOOMS RIVER
ERF 155: VEGETATION SENSITIVITY ANALYSIS

PREPARED FOR FERPA (PTY) LTD

OCTOBER 2018

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CONTENTS

1. INTRODUCTION

1.1 Terms of reference

Ken Coetzee of Conservation Management Services was contracted by Mr Andre Swart on behalf of his client to carry out a site sensitivity analysis of Erf 155 Keurbooms River in terms of a proposal by the landowner to develop the property for residential purposes.

The site was visited on Wednesday 3 October by Ken Coetzee and Bruce Taplin of Conservation Management Services to collect biophysical and landscape information for the study.

1.2 Credentials of the author

The author of this report, Mr Ken Coetzee, is registered with the South African Council for Natural Scientific Professions (Reg No 400099/08) as a “Professional Natural Scientist”, in the field of Ecological Science.

Mr Coetzee is a Master of Technology graduate of the School of Forestry and Nature Conservation of the Nelson Mandela Metropolitan University (Saasveld Campus) in the field of Ecological Science.

Mr Coetzee has over 40 years of relevant experience in the field of nature conservation and management, the most recent 20 years of which were self-employed as a biodiversity specialist consultant, involved in a wide variety of nature conservation, landscape planning, habitat evaluation, commercial game ranch and other development projects.

1.3 Methodology used for the survey

The method used was to traverse the study site from north to south and from west to east and to explore off each of these lines along animal and human footpaths wherever possible. Much of this exploration was done on hands and knees. It is very difficult to accurately survey a site on which visibility is poor or screened by bush and trees but we are confident that we have done so well enough for the requirement.

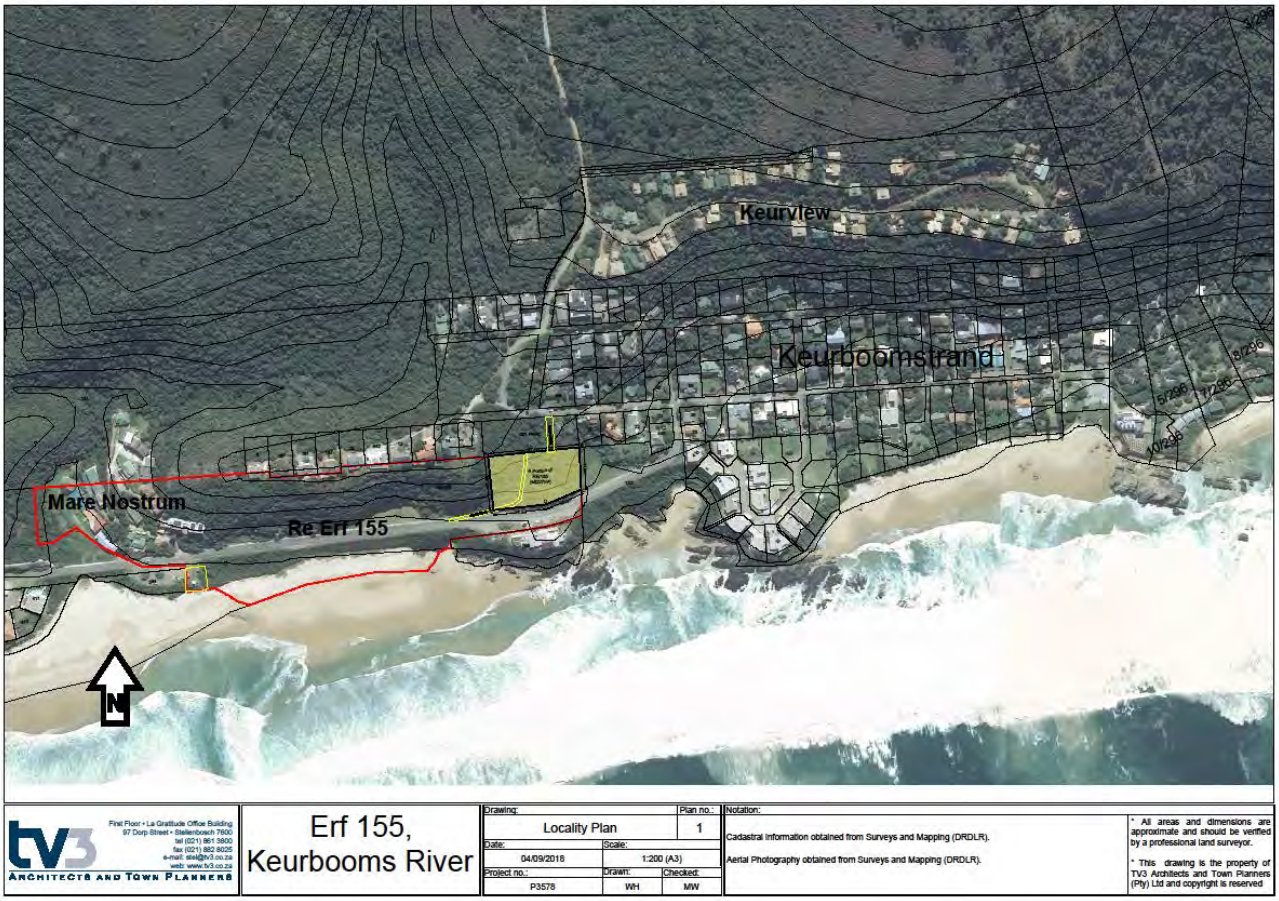
GPS co-ordinate readings were taken at sites of importance for the marking of the edges of the sensitive scrub forest patches (see Appendix 1).

A checklist was made of all the plants encountered along the exploration pathways as well as along the outer edges of the study site.

2. DESCRIPTION OF THE STUDY SITE

2.1 Locality and layou6t of the study site

Figure 1 shows the locality of the study site on the South Cape coast near to Plettenberg Bay.



<u>FIGURE 1</u>: Locality of the Keurbooms River Erf 155 study site.

Figure 2 shows the layout of the Erf 155 study site in relation to the other nodes of residential development in the area. Figure 2 does not clearly show that developed plots 13, 14, 15, 20 & 21 are all on top of a coastal escarpment and that Erf 155 is actually on a descending slope, from the top of the escarpment down to sea level.

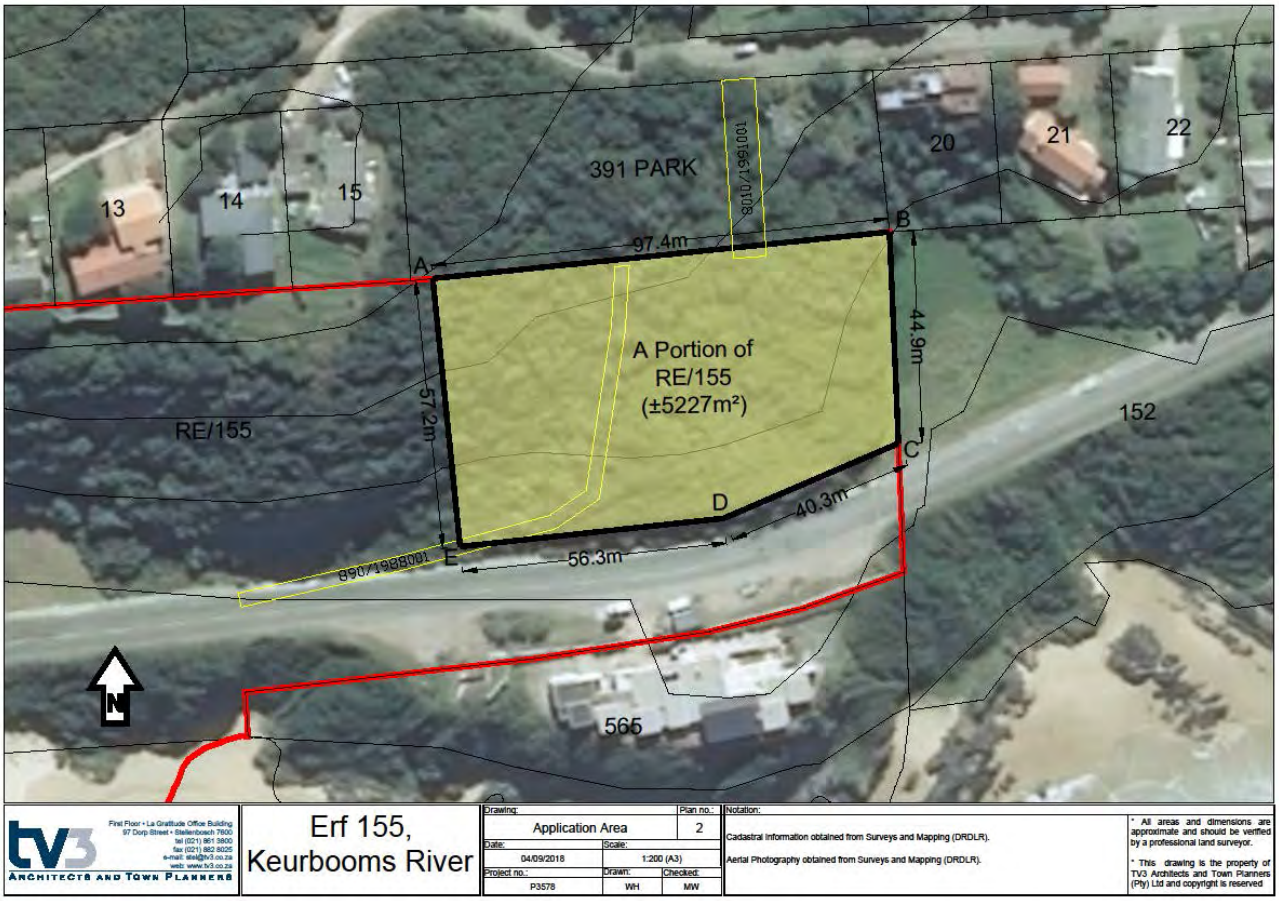


FIGURE 2: The layout of the study site. The potential access to the property is also shown.

2.2 Vegetation description

According to Mucina & Rutherford (2006) the study site lies within the Garden Route Shale Fynbos vegetation type, a feature of which is Afrotemperate scrub forest in the more fire protected areas and on the shale substrates. On the study site the fynbos and forest overlap somewhat and in the absence of fire the fynbos is changing into forest (see Plate 1). The site can be described as pristine coastal scrub forest and disturbed scrub forest/former fynbos. This description is similar to that of Vlok et al (2008) who at a fine scale, describe the vegetation of most of the study site as Keurbooms Thicket/Forest. A narrow band of fynbos still occurs along the Southern boundary.

2.2.1 Disturbed scrub forest/former fynbos: The disturbed part lies along a north/south central line of overgrown paths which are open and vegetated with large shrubs and fynbos plants. An old pipeline lies on an east/west axis roughly at the northern edge of the study site. The pipeline lies under a narrow terrace cut through the forest at about 4m wide (see plate 2). This “cutline” provided enough disturbance to encourage alien *Acacia cyclops* and *Acacia mearnsii* to invade the area as well as a number of other alien plants such as Crassula sp. and Yucca sp., presumably originating in dumped garden refuse. Because of the access paths there has been some dumping of rubble, rubbish and bits of pipe along the northern edge of the study site.

PLATE 1: Shale Fynbos at the extreme Southern edge of the study site.

PLATE 2: The narrow pipeline route through the upper part of the study site.

Within the disturbed Scrub-forest we found evidence that bark had been removed from the trunk of an indigenous tree, as is done for the indigenous healer Muthi-trade (see Plate 3).

PLATE 3: Bark removed from a tree, the stem is ringbarked and cut marks are visible above the removed section of bark.

The disturbed scrub forest was probably originally shale fynbos that has advanced closer towards a forest state due to a long-term lack of fire on the site. This vegetation type therefore represents a pioneer scrub forest phase and, in terms of forest vegetation, is less sensitive than the pristine scrub forest (see plate 4).

Typical plant species in this vegetation type are *Diospyros dichrophylla, Passerina falcifolia, Grewia occidentalis, Osyris compressum, Polygala myrtifolia, Pelargonium peltatum, Searsia lucida, Searsia crenata, Rhoicissus digitata, Osteospermum monilifera* and *Asparagus densiflorus.*

2.2.2 Pristine scrub forest: The pristine scrub forest consists of closed canopy forest with a leaf mould cover on the forest floor (see plate 5). This scrub forest has no undergrowth or growing plant ground cover on the shaded forest floor which indicates that it is undisturbed and therefore pristine. This scrub forest occurs on the steeper shale slopes (see Plate 6) of the general area and can thus be considered as very sensitive to disturbance from both a slope and vegetation point of view.

Typical plant species in this vegetation type are *Scolopia zeyheri, Sideroxylon inerme, Tarchonanthus camphoratus, Cassine peragua, Gymnosporia heterophylla, Scutia myrtina, Rapanea melanophloeos* and *Buddleja saligna.*

PLATE 4: An example of the disturbed pioneer scrub-forest.

PLATE 5: An example of the Pristine scrub-forest.

PLATE 6: The Pristine Scrub-forest on a steep slope as seen from the "outside".

2.2.3 Plant checklist

The following checklist is by no means a complete list of all the plants that occur on the study site. It contains the common and most plentiful plants and it provides a broad idea of what the vegetation consists of.

The pristine forest/thicket is probably most poorly represented in the checklist due to the density and height of the canopy (±4-5m). The disturbed forest/thicket is better represented as it is more open and the plants are more accessible.

Acacia cyclops
Acacia mearnsii
Buddleja saligna
Carissa bispinosa
Cassine peragua
Cassine tetragona
Chrysanthemoides monilifera
Diospyros dichrophylla
Ekebergia capensis
Grewia occidentalis
Gymnosporia heterophylla
Mystroxylon aethiopicum
Osyris compressum
Passerina falcifolia

Pelargonium peltatum
Pennisetum clandestinum
Polygala myrtifolia
Pterocelastrus tricuspidatus
Putterlickia pyracantha
Rapanea melanophloeos
Rhoicissus digitata
Scolopia zeyheri
Scutia myrtina
Searsia crenata
Searsia lucida
Searsia undulata
Senecio angularis
Sideroxylon inerme
Stenotaphrum secundatum
Tarchonanthus camphoratus
Tetragonia decumbens

2.3 Landscape connectivity

Figure 1 shows that Erf 155 is largely isolated in terms of landscape connectivity. There is thus no natural or important corridor on a north/south axis or on an east/west axis. East of the study site is completely developed, South of the study site is the coastal road and the sea.

West of the study site is an area of natural vegetation but it is cut off by residential development further to the West. To the north the area is relatively sparsely developed but roads and a line of houses prevents any useful corridor movement northwards.

In terms of landscape-connectivity the study site is not an important corridor, nor will a sensitively placed residence on it cut off any important existing landscape linkages. Micro-corridor movement onto and off the study site will continue as it has always done via the undisturbed scrub forest patches. The most important fauna in the forested area is the birds which will not be significantly affected by the proposed development. The proposed development footprint will, however, result in a small loss of avifaunal habitat.

The spoor and droppings of the ubiquitous bushbuck *(Tragelaphus scriptus)* was found on the paths on the study site. These animals probably use the site as part of a larger range within the relatively built up area. There is no danger of disadvantaging the local bushbuck population by means of the proposed development. A small area of habitat will be lost but bushbuck appear to adapt well to development and there will be more than enough space in the general area to accommodate the occasional bushbuck on Erf 155.

2.4 Site sensitivity

The entire study site lies within a Critical Biodiversity Area (CBA), so zoned in the hope of protecting what is left of the natural vegetation along the coast from ill-advised residential expansion and agricultural transformation.

The Garden Route Shale Fynbos is an endangered vegetation type, more than half of it has already been transformed for cultivation and pine plantations and much of the remaining natural veld has been converted into pastures (Mucina & Rutherford, 2006).

In the Garden Route Biodiversity Sector Plan for George, Knysna and Bietou Municipalities Vromans et al (2010) recommend that the desired management objective for a CBA is to maintain natural land, rehabilitate degraded land to natural or near natural and to manage for no further degradation. They state that land-use should not be approved.

This is somewhat of a problem in terms of the development of the study site as it lies within such a CBA area and the objective of proposed residential development is thus contrary to the Biodiversity Sector Plan.

It is a fact however that the vegetation on the study site can no longer be described as Garden Route Shale Fynbos because it has become forest/thicket due to the long exclusion of fires. The original fynbos has mostly been shaded-out. It does, however, still contain a few of the larger elements of the original Fynbos vegetation such as *Polygala myrtifolia, Passerina falcifolia, Osyris compressum* and *Osteospermum moniliferum.*

Forest vegetation in the area is also protected in terms of the Forest Act and the Directorate of Forestry and Water Affairs will certainly express an opinion about the proposed development of the site. The areas of scrub forest are sensitive in terms of the steeper slopes and vegetation type and they should definitely not be directly or indirectly disturbed by the proposed development. Construction on the steeper slopes in forested areas requires innovative attention to the possibility of soil erosion and even land-slipping. This possibility must be clearly mitigated in the planning of the development.

The proposed development layout will not fit into the less sensitive part of the vegetation on the site. The development footprint will thus have to be considerably reduced for it to avoid the more sensitive scrub forest areas (see Figure 3).

3. PROPOSED DEVELOPMENT AND THE SUGGESTED ALTERNATIVE

The development that has been proposed is illustrated in Figure 3.

In the proposed development layout, the portion on the right of the Figure (Eastern end indicated with a red arrow) encroaches on the area of pristine scrub forest. This forest area has been shown to be sensitive and should thus be avoided in the development layout.

3.1 Constraints of the site

The primary constraint is the presence of patches of protected scrub forest on the property. These are pristine forest habitats that should not be impacted by the development. The approximate extent of the scrub forest is shown in Figure 4.

Another constraint is the degree of slope, the steeper slopes presumably being less desirable for development. The scrub forest is associated with steeper slopes so both these sensitivities can be avoided by restricting development to the flattest part of the property. The location of this feature is also shown in Figure 4.

3.2 The most sensible development option (alternative)

The most sensible development option would thus be to:

a) reduce the size of the footprint to fit into the available site
b) restrict the development to the flattest part of the study site
c) completely avoid any direct or indirect impact on the scrub forest
d) preserve the balance of the property for the conservation of fynbos and forest

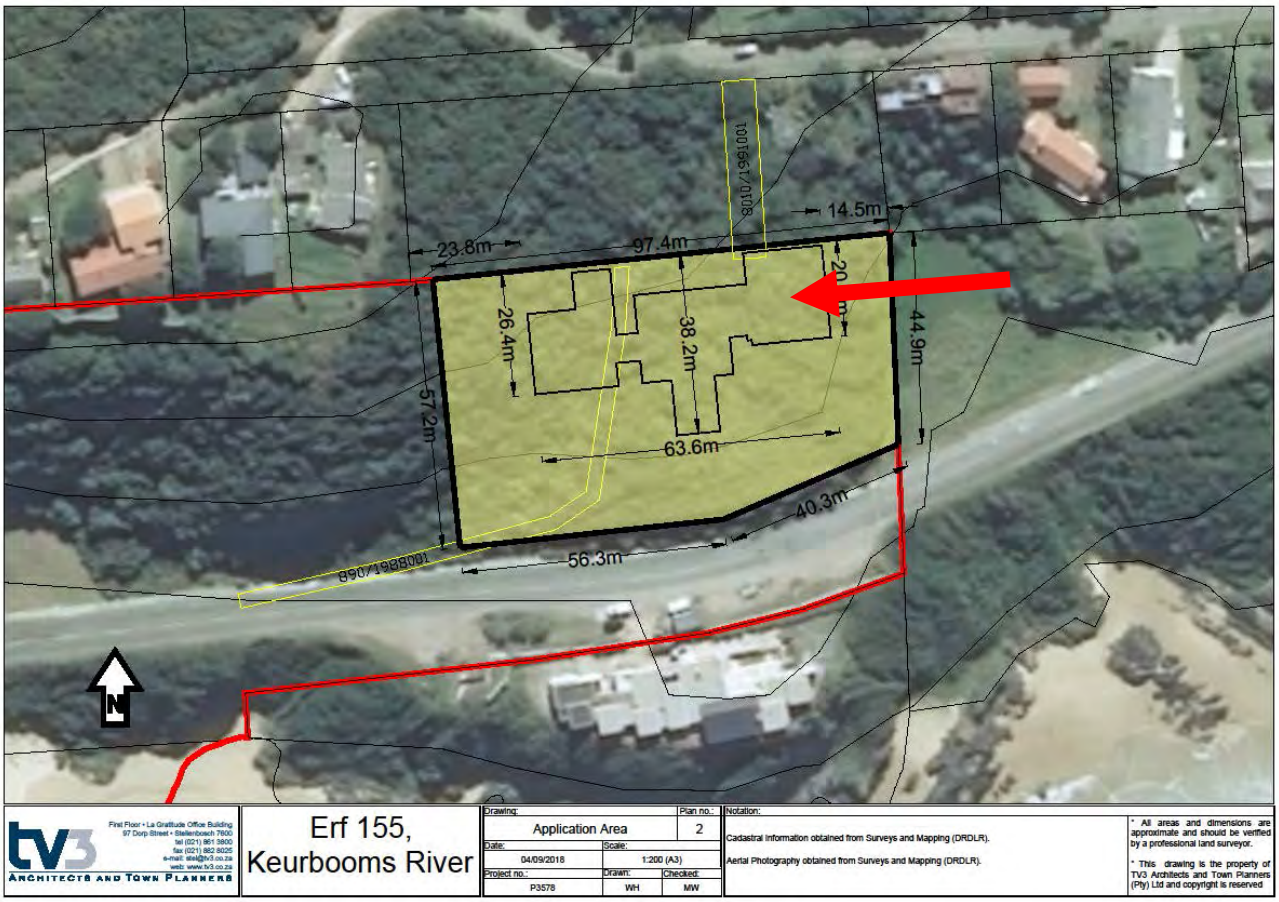


FIGURE 3: Proposed development layout

4. CONCLUSION

The study site contains vegetation that can be described as highly sensitive. Both the former Shale fynbos and the scrub forest are threatened vegetation types and the entire area is classified as a Critical Biodiversity Area. This means that any proposal to develop the site must be done in the most sensitive manner possible.

The originally proposed development layout will have to be reconsidered in terms of the size of the footprint and its positioning, which must be on the flattest part of the property and well clear of the scrub forest areas which should remain completely unaffected by the development, services included.

A fine scale contour map should be used to inform the final placement of the development and the access to it. The scrub forest patches should be clearly demarcated physically and then treated as no go areas. This can be done by fencing it off at two heights with highly visible plastic “danger” tape attached to the trees.

The construction phase must be strictly limited to a demarcated footprint area to ensure that no indigenous vegetation is unnecessarily removed or damaged.

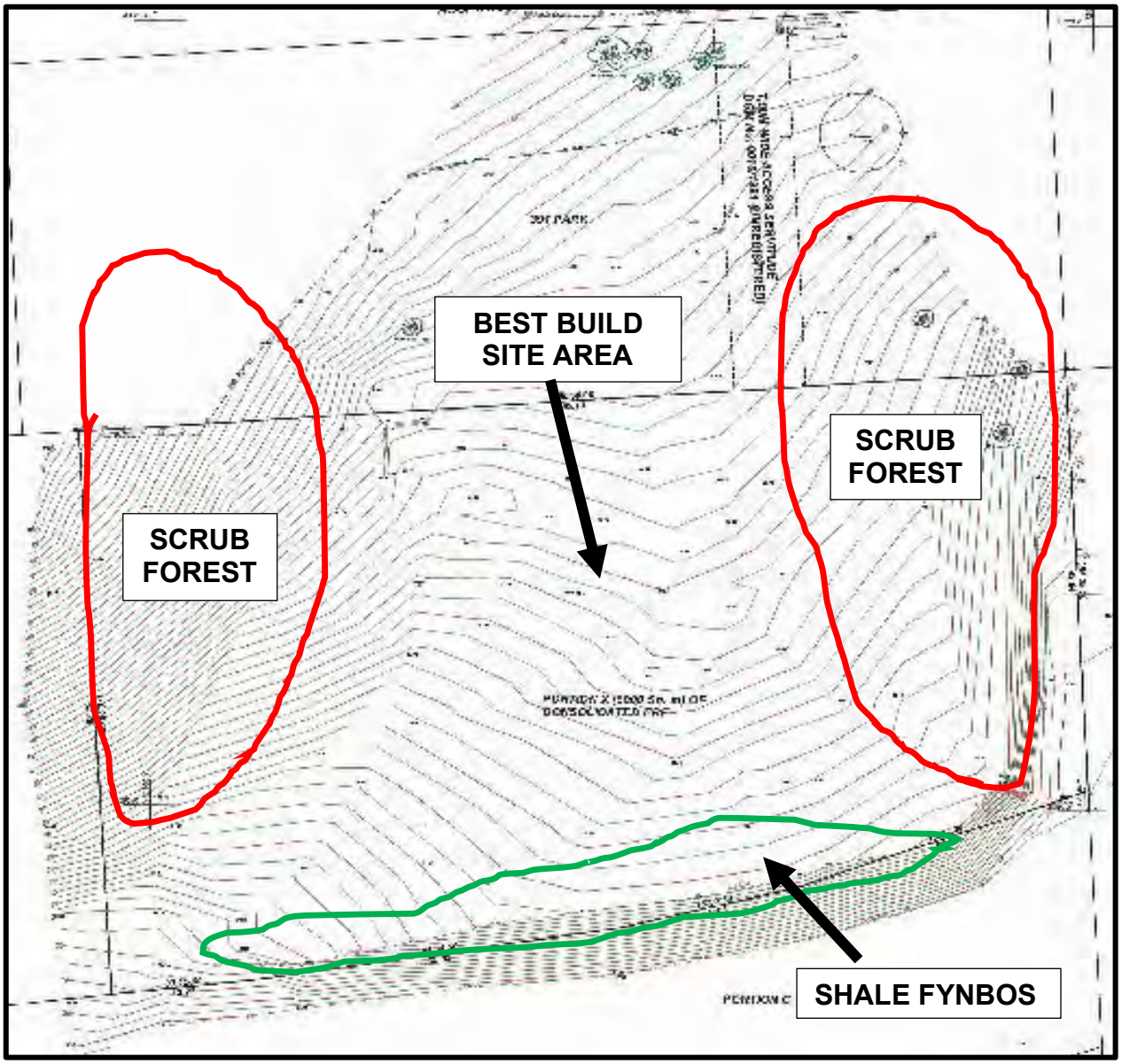


FIGURE 4: Locality of the scrub forest patches and the best locality for development being the flattest area.

5. REFERENCES

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Vlok, JHJ, Euston-Brown DIW, & Wolf T. 2008. A Vegetation Map for the Garden Route Initiative. Unpublished 1:50 000 scale mapping.

Vromans,DC, Maree, KS, Holness S, Job N & Brown AE. 2010. Garden Route Biodiversity Sector Plan for George, Knysna and Bietou Municipalities. Unpublished Garden Route Initiative guideline document.

<u>APPENDIX 1</u>: Location of GPS points recorded during the field survey. Canopy Forest 1,1, Canopy Forest 1,2 and DS3, DS4, DS10 and DS11 are all relevant to the study site.