# Erf 301, Whites Road of Hoekwil, Western Cape

Terrestrial Animal Species Specialist Assessment:

Site Sensitivity Verification Report and Impact Assessment


**Prepared For:** Eco Route Environmental Consultancy
**Author:** Monica Leitner (MSc)
Confluent Environmental Pty (Ltd)
7 St. Johns Street,
Dormehls Drift,
George, 6529
**SACNASP:** Professional Natural Scientist (Ecological Sciences), 166055


**Date:** May 2024
**Version:** Final


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Monica Leitner (MSc)

May 2024

## SUMMARY OF EXPERIENCE AND ABRIDGED CV - MONICA LEITNER

**Core skills**

- MSc. Zoology (University of Pretoria) and 5 years of work experience (project management and field work) for ecological research projects aimed at invertebrate diversity, ecological functioning, and large mammal ecology.
- Extensive ecological and field work experience (before, during and after postgraduate degrees) across a range of environments (mesic to arid savanna, grasslands and mountain terrain, sub-Antarctic) and taxa (invertebrates, avifauna, amphibians, reptiles, small mammals and large mammals).
- Two overwintering years on Marion Island, with extensive field work as Environmental Conservation Officer and seabird monitor (2018-2019), and a marine mammal ecologist (2022-2023).

**Work experience**

- 2022-2023: Marine mammal field assistant on sub-Antarctic Marion Island (Marion Island Marine Mammal Programme, University of Pretoria)
- 2016-2018; 2019-2022: Project Coordinator (University of Pretoria) for international Soil Fauna in Africa consortium (funded by the United Kingdom's Royal Society and Department for International Development).
- 2019-2022: Research assistant for Marion Island Marine Mammal Programme (University of Pretoria).
- 2018-2019: Environmental Conservation Officer on sub-Antarctic Marion Island (Department of Environmental Affairs).
- 2016-2018: Research assistant for Sani Pass (Drakensburg) long term invertebrate and ecosystem monitoring project (Centre for Invasion Biology, University of Pretoria).

**Qualifications**

- BSc. Environmental Sciences (2011, University of Pretoria)
- BSc. Honours Zoology (with distinction, 2012, University of Pretoria)
- MSc. Zoology (with distinction, 2015, University of Pretoria)

**Publications**

- Trisos MO, Parr CL, Davies AB, Leitner M & February EC. 2021. Mammalian herbivore movement into drought refugia has cascading effects on savanna insect communities. Journal of Animal Ecology, https://doi.org/10.1111/1365-2656.13494
- Leitner M, Davies AB, Robertson MP, Parr CL & Van Rensburg BJ. 2020. Termite mounds create heterogeneity in invertebrate communities across a savanna rainfall gradient. Biodiversity and Conservation, 29(4), pp.1427-1441
- Leitner M, Davies AB, Parr CL, Eggleton P & Robertson MP. 2018. Woody encroachment slows decomposition and termite activity in an African savanna. Global change biology, 24(6), pp.2597-2606

**SACNASP Registration -** Professional Natural Scientist (Ecological Sciences), 166055.

**References**

- Dr. Michelle Thompson – Former colleague on Marion Island and University of Pretoria
  M2 Environmental Connections
  Email: ml.thompson89@gmail.com; Tel: +27 71 869 9042
- Prof. Mark Robertson – Previous employer (Soil Fauna in Africa Research Consortium)
  Department of Zoology and Entomology, University of Pretoria
  E-mail: mrobertson@zoology.up.ac.za; Tel: +27 84 718 5484

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## ABBREVIATIONS AND ACCRONYMS

| | |
|---|---|
| **CBA** | Critical Biodiversity Area |
| **CD:NGI** | Chief Directorate: National Geo-spatial Information |
| **DFFE** | Department of Forestry, Fisheries, and the Environment |
| **ESA** | Ecological Support Area |
| **EWT** | Endangered Wildlife Trust |
| **NEMA** | National Environmental Management Act |
| **SANBI** | South African National Biodiversity Institute |
| **SCC** | Species of Conservation Concern |
| **SDP** | Site Development Plan |
| **SSVR** | Site Sensitivity Verification Report |
| **WCBSP** | Western Cape Biodiversity Spatial Plan |

# 1. INTRODUCTION

## 1.1 Background and Site Location

Confluent Environmental Pty (Ltd.) was contracted by Eco Route Environmental Consultancy to undertake a specialist assessment for Erf 301, Hoekwil, Western Cape. Erf 301 is located just north of the Touws River estuary and to the east of the town of Wilderness (Figure 1). The property is ca. 3.9 ha in extent and almost entirely comprising of a steep south-facing slope ranging from 10 - 90m above sea-level.

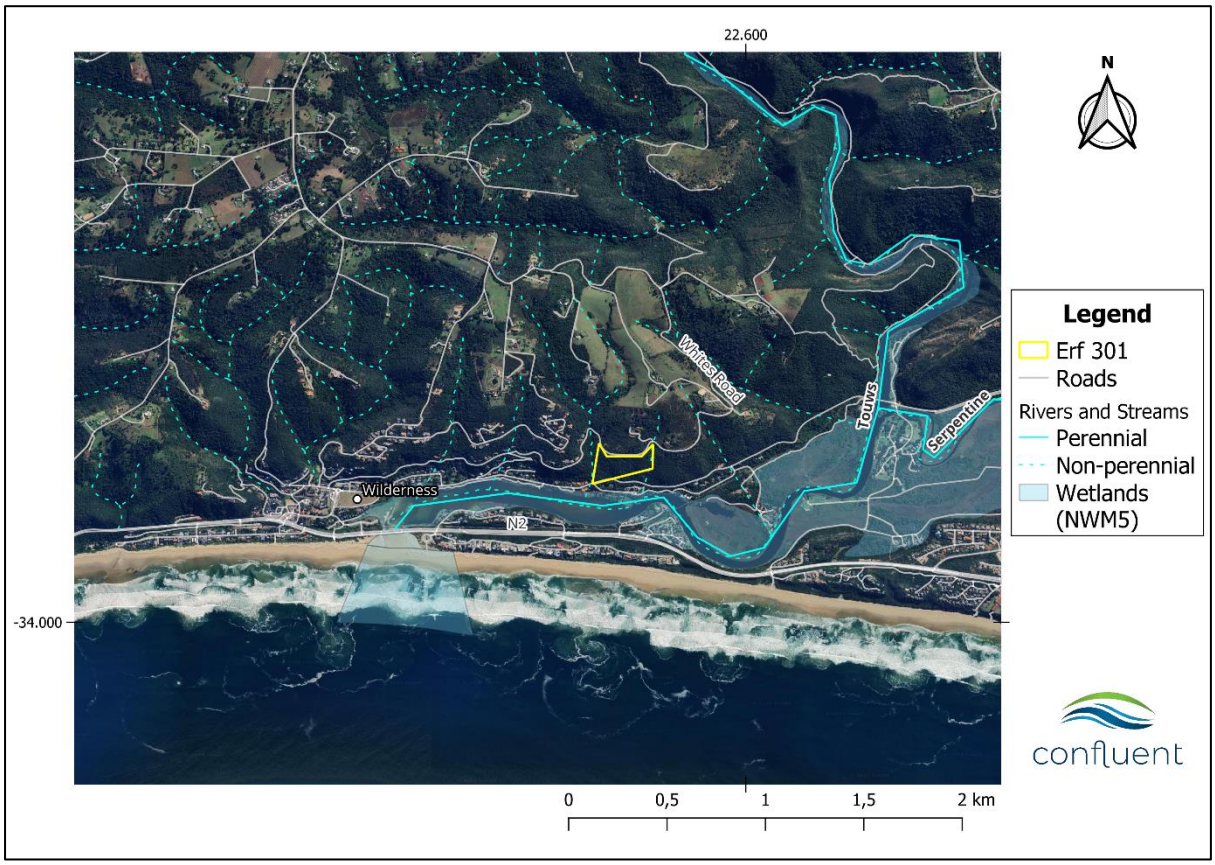


*Figure 1: The general location of Erf 301 with nearby water courses and wetlands.*

## 1.2 Development Layout

At the time of writing this report, the site development plan (SDP) consisted of a primary dwelling and six additional smaller dwellings (called “Pods”) (Figure 2). The owner of the site intends to protect the majority of Erf 301 in its natural state. Construction is planned to take place in two phases: Phase 1 includes the construction of the primary dwelling and four pods; Phase 2 includes the construction of the remaining two pods. A driveway to access the primary dwelling is planned from Whites Road in the north.

- The primary dwelling (including a store and garage) will cover a total of 446 $m^2$ with the front half raised off the ground (on pylons/stilts) to minimise the disturbance footprint on the vegetation and habitats, effectively reducing the permanent footprint to ca. 200 $m^2$.

- Each of the pods will cover ca. 38 $m^2$, with only a quarter of that area representing a permanent footprint on site (9.5 $m^2$) and the rest to be raised on pylons/stilts.

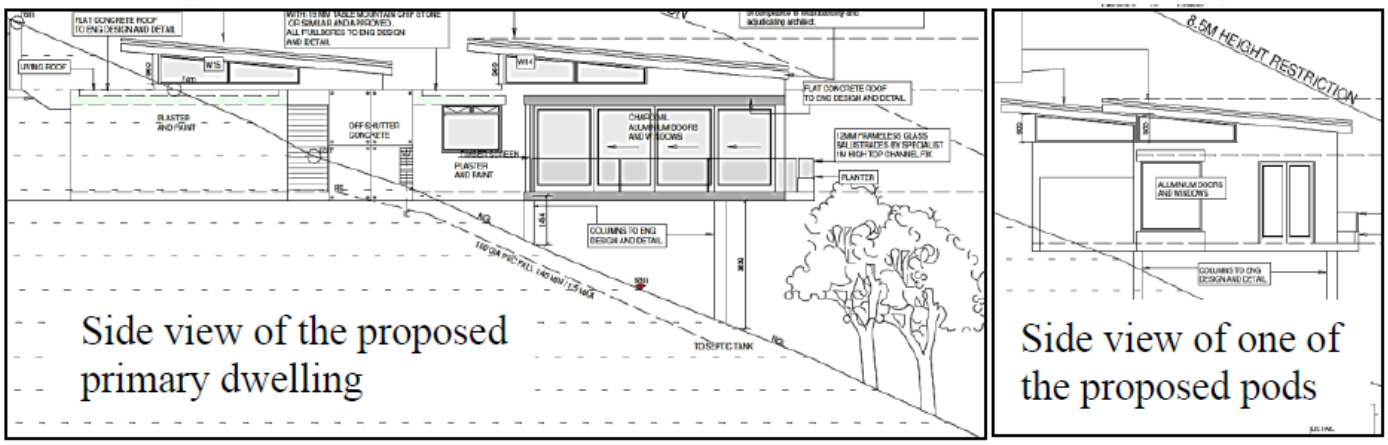


*Figure 2: The Site Development Plan (SDP) for the proposed primary dwelling and pods on Erf 301, Hoekwil.*

## 2. TERMS OF REFERENCE

### 2.1 Online Screening Tool

The scope of work for this report is guided by the legislative requirements of the National Environmental Management Act (NEMA; Act 107 of 1998). The Department of Forestry, Fisheries and the Environment (DFFE) Screening Tool determined a HIGH sensitivity for the terrestrial animal species theme across the development area (Figure 3), with several animal Species of Conservation Concern (SCC) highlighted (Table 1).

As per Published Government Notice No. 1150 of the Government Gazette 43855 (30 October 2020):

A **HIGH** sensitivity rating indicates:

- Confirmed habitat for SCC.
- 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 the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.

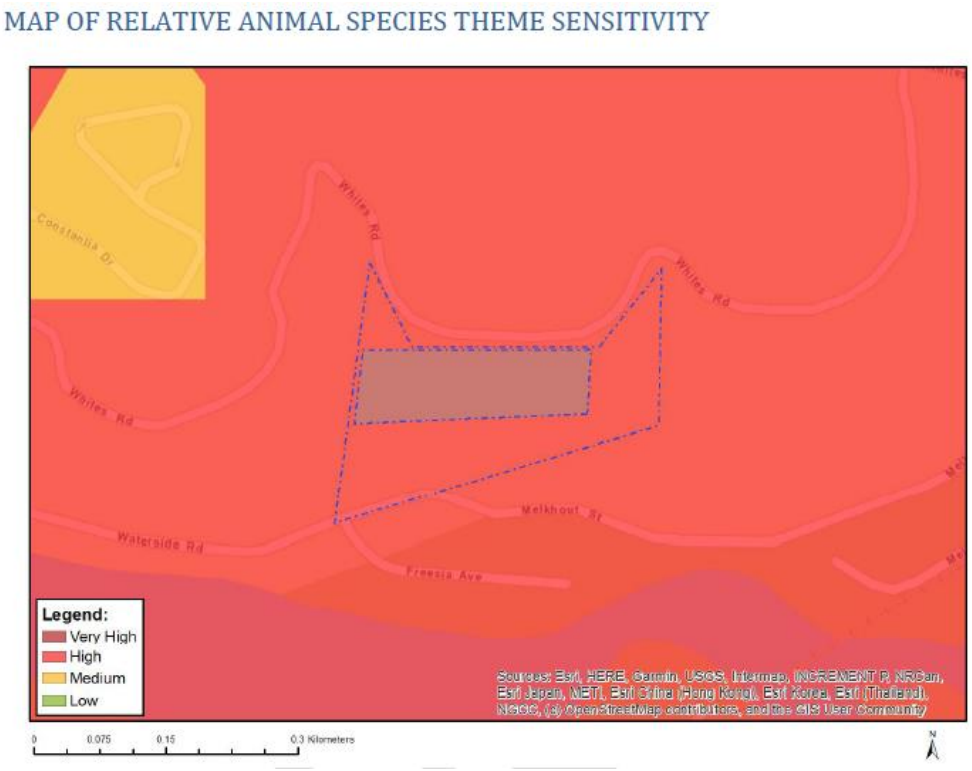


*Figure 3. DFFE Online Screening Tool outcome for the terrestrial animal species theme for Erf 301 Hoekwil. The property boundary is indicated by the blue dashed line.*

*Table 1. Species of Conservation Concern highlighted by the DFFE Online Screening Tool for Erf 301, Hoekwil.*

| Sensitivity | Classification | Scientific name | Common name | Red list status |
|---|---|---|---|---|
| High | Avifauna | *Circus ranivorus* | African Marsh Harrier | Endangered |
| High | Avifauna | *Stephanoaetus coronatus* | Crowned Eagle | Vulnerable |
| High | Avifauna | *Bradypterus sylvaticus* | Knysna Warbler | Vulnerable |
| High | Avifauna | *Hydroprogne caspia* | Caspian Tern | Vulnerable |
| Medium | Amphibian | *Afrixalus knysnae* | Knysna Leaf-folding Frog | Endangered |
| Medium | Invertebrate | *Aloeides thyra orientis* | Red Copper Butterfly | Endangered |
| Medium | Invertebrate | *Chlorotalpa duthieae* | Duthie's Golden Mole | Vulnerable |
| Medium | Invertebrate | *Sensitive species 8* | - | Vulnerable |
| Medium | Invertebrate | *Aneuryphymus montanus* | Yellow-winged Agile Grasshopper | Vulnerable |

## 2.2 Scope of Work

The purpose of this report is to verify the site sensitivity of Erf 301, Hoekwil for the terrestrial animal species theme in accordance with the protocols specified in the Published Government Notice No. 1150, Government Gazette 43855 (30 October 2020). The site sensitivity verification includes:

- A desktop assessment, to:

  - Characterize the vegetation, climate, general habitat features and topography of the property.
  - Assess the property's location within the context of the Western Cape Biodiversity Spatial Plan (WCBSP).
  - Conduct a historical assessment of the property and immediate surroundings for any disturbances, development and changes in land use or habitat characteristics over time.
  - Provide information on the habitat requirements for Species of Conservation concern highlighted by the DFFE online screening tool, in addition to other SCC indicated through online resources (e.g. Virtual Museum, iNaturalist) for the property and surrounding areas.
- On-site inspection(s) and field assessments to:
  - Verify the current land use and identify current impacts or disturbances on the property.
  - Characterize faunal habitats, determine the habitat suitability and the likelihood of SCC occurring on the property.
  - Conduct taxa-specific sampling for SCC in suitable habitats.
- Any other available and relevant information
- Should the site sensitivity verification indicate a **LOW** sensitivity, then a Terrestrial Animal Species Compliance Statement will be issued.
- Should the site sensitivity verification indicate a **HIGH** sensitivity, then a Terrestrial Animal Species Specialist Assessment including an Impact Assessment will be compiled.

# 3. DESKTOP ASSESSMENT

## 3.1 Vegetation, Climate and General Habitat

Hoekwil in the Western Cape experiences a warm and temperate climate with average temperatures ranging between 26℃ and 6℃, The hottest days are experienced from December to March peaking around 36℃ and the coldest days experienced from June-August falling to -1℃. Rain occurs throughout the year in a bimodal pattern with peaks in autumn (April) and spring (October-November) (Figure 4). The mapped vegetation type at the site includes Garden Route Granite Fynbos (Critically Endangered) and Goukamma Dune Thicket (Least Concern) - a detailed botanical specialist assessment is available for the site (B. Fouche, Confluent Environmental).

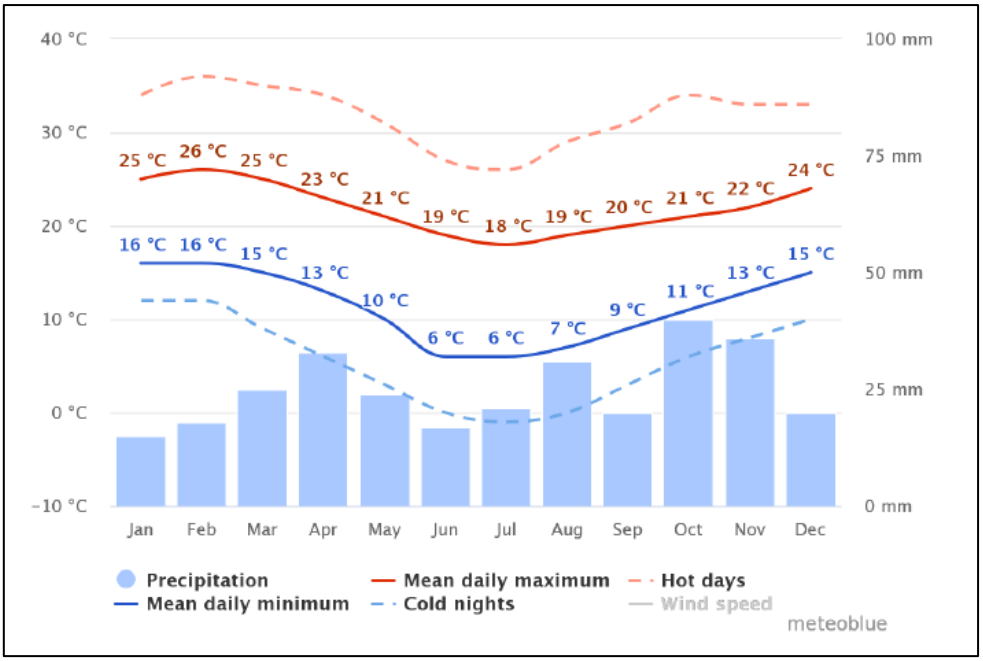


*Figure 4. Summary of historical climate (modelled) for Hoekwil, Western Cape (www.meteoblue.com).*

Satellite imagery shows the entire site to be densely vegetated with indigenous vegetation. Mapped contours show the southern slope of the property, with one non-perennial stream in the eastern section of the property and another just outside the western boundary (Figure 5).

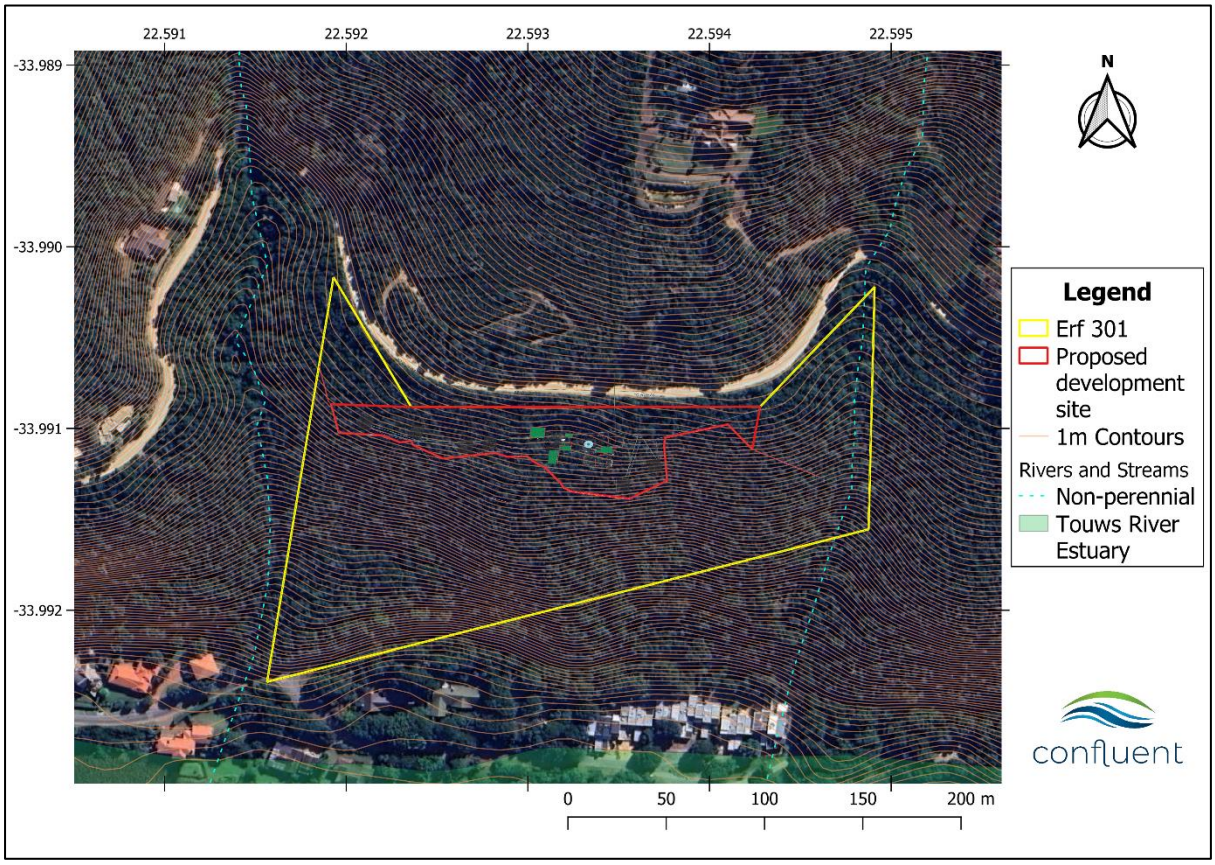


*Figure 5. Satellite imagery for Erf 301 Hoekwil (in yellow) and the proposed development area (in red) with mapped watercourses and 1m contours.*

## 3.2 Western Cape Biodiversity Spatial Plan

Additional mapping layers were applied to the site to include the Western Cape Biodiversity Spatial Plan (CapeNature, 2017), with Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) and Other Natural Areas (ONAs) assessed in Figure 6 and Table 2. The vast majority of the property and the entire development area falls within a CBA1 area. There are also ESA2 areas present in close proximity to the north and south of the property. The reason for these CBA1 and ESA2 assignments are because the property falls within areas flagged for protection within the WCBSP (CapeNature, 2017):

- The Bontebok extended distribution range.
- Coastal Resource protection
- Eastern fynbos renosterveld granite fynbos floodplain wetland.
- FEPA River corridor, water source protection
- Touws, Watercourse protection
- South-eastern Coastal Belt.
- Wilderness core estuary.
- Critically Endangered Garden Route Granite Fynbos / Wolwedans Grassy Fynbos.

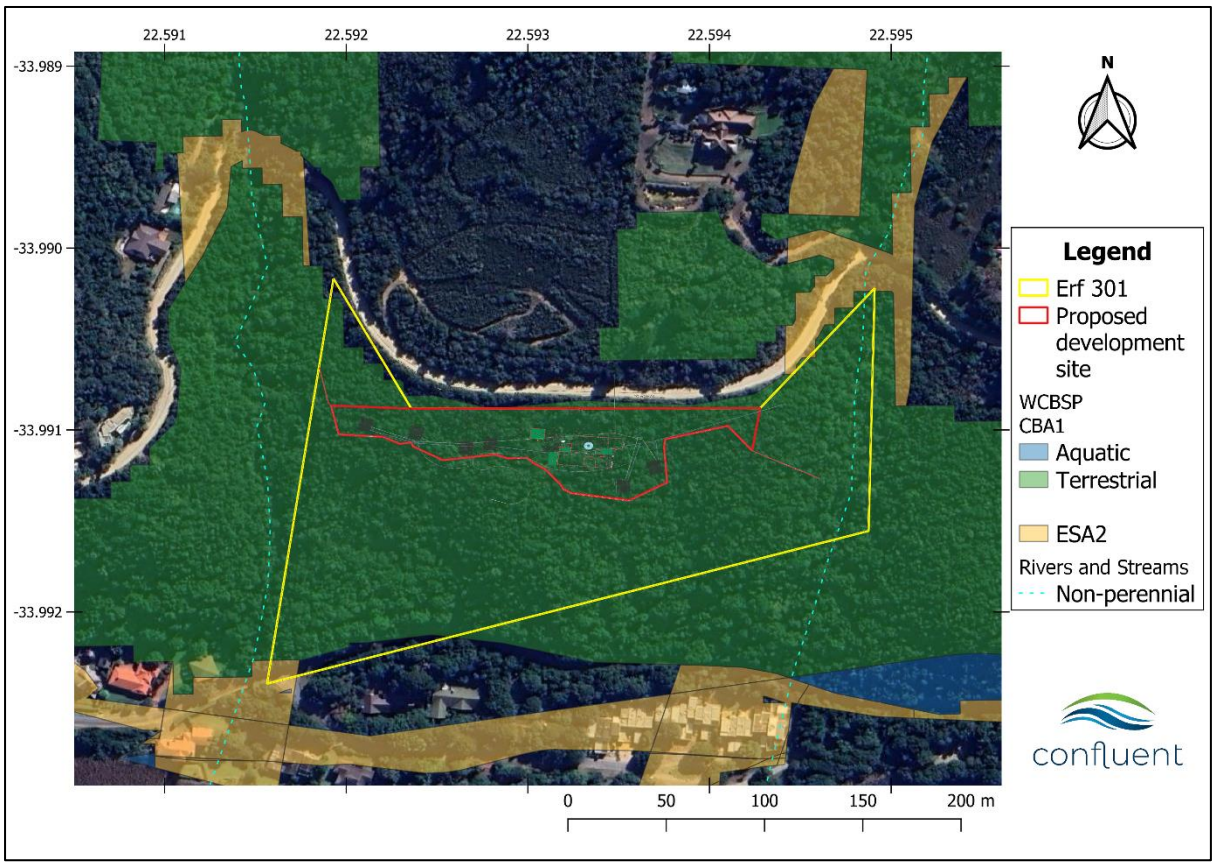


*Figure 6. Erf 301 (in yellow) with the development area (red) and layers for the Western Cape Biodiversity Spatial Plan's Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA).*

*Table 2. Definitions and objectives for the conservation categories identified in the Western Cape Biodiversity Spatial Plan (CapeNature, 2017).*

| WCBSP Category | Definition | Management Objective |
|---|---|---|
| Critical Biodiversity Area 1 (CBA1) | Areas in a natural condition. 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. |
| Ecological Support Area 2 (ESA 2) | Areas severely degraded or have no natural cover and ecological functioning severely impaired. Not essential for meeting biodiversity targets but support ecological functioning and delivering ecosystem services. | Restoration required to return ecological functioning. Some limited habitat loss may be acceptable. A greater range of land uses over wider areas is appropriate but ensures the underlying biodiversity objectives and ecological functioning are not compromised. |

## 3.3 Historical Assessment of Project Area

Erf 301 has remained natural with limited to no anthropogenic disturbances evident over the last 88 years (Figure 7). In 1936 no agricultural transformation is seen on the property, despite evidence of agricultural fields to the north-east of the site. By 1957 additional sections of land have been cleared to the north of the site but no disturbance is seen on the property. In 1973 more vegetation clearing has happened to the north of Erf 301. Images from 2005 show that the vegetation north of Erf 301 is still anthropogenically modified, but still no disturbance visible on Erf 301. Recent imagery from 2022 continues to indicate no visible disturbance on Erf 301 with ongoing disturbance on properties to the north.

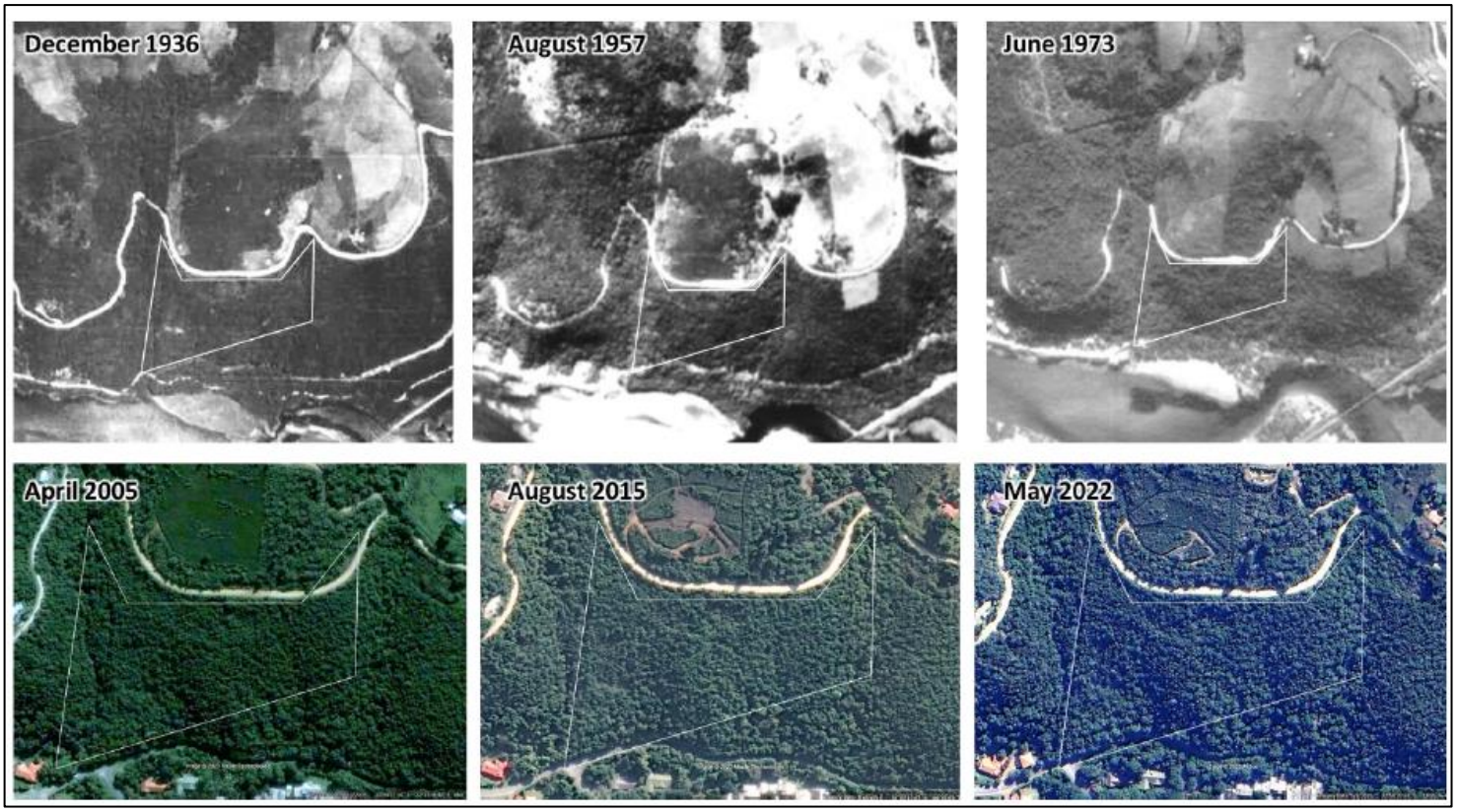


*Figure 7. Historical imagery of development area sourced from the CD: NGI geospatial portal and Google Earth. The property boundary is indicated by the white line.*

## 3.4 Species of Conservation Concern

In addition to the SCC highlighted by the DFFE screening tool (Table 1), the following public resources were consulted to provide additional SCC for Erf 301 Hoekwil and its immediate surroundings:

1. iNaturalist (all taxa) within a 1 km x 1 km radius of the property.
2. Virtual Museum for herpetofauna, mammals and invertebrate taxa within the Quarter Degree Squares (QDS) 3322DC: DungBeetleMAP, FrogMAP, LacewingMAP, LepiMAP, MammalMAP, OdonataMAP, ReptileMAP, ScorpionMAP, SpiderMAP.
3. South African Bird Atlas Project (SABAP2) for pentad 3355_2235.

Some SCC reported on the platforms were highly unlikely to occur at the site given either clearly unsuitable habitat or being deemed a vagrant/transient animal. For the purposes of this report these animals were excluded from further assessment (see also Section 4.2 and Appendix 1 for additional information).

The combined list of SCC (from DFFE Screening Tool and public resources) possibly occurring on the site, along with their habitat, breeding and feeding requirements are listed in Table 3. The information for each SCC presented in Table 3 stems largely from the online SANBI Red List of South African Species (http://speciesstatus.sanbi.org) in addition to a few key resources for each taxa:

1. Avifauna: Roberts Birds of Southern Africa VII (Roberts, Hockey, Dean, & Ryan, 2005)

2. Mammals: The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005)
3. Invertebrates:
    - Field guide to the insects of South Africa (Picker, Griffiths, & Weaving, 2019)
    - Field guide to the butterflies of South Africa (Woodhall, 2005)
    - Field guide to the spiders of South Africa (Dippenaar-Schoeman, 2023)
4. Amphibians: A complete guide to the frogs of Southern Africa (Du Preez & Carruthers, 2015)
5. Reptiles: A guide to the reptiles of Southern Africa (Alexander, 2013)

Any information presented from different sources is cited in the text.

*Table 3. Summary of habitat, breeding and feeding requirements for animal SCC potentially occurring on Erf 301. Bold text indicates SCC identified by the DFFE Online Screening Tool.*

| Red list status | Species | Habitat | Breeding | Feeding |
|---|---|---|---|---|
| **AVIFAUNA** | | | | |
| Endangered A2c+3c+4c;C1 | ***Circus ranivorus***<br><br>**Marsh Harrier** | Considered a waterbird. Roosts on taller trees around wetland edges from where it has a good vantage point. Can adapt to novel wetland habitats such as wastewater treatment works. | Breeding occurs between September and December. Egg-laying is from August to November in South Africa. Nests made of grass, reed stems or sticks in reedbeds, short sedge areas or in trees along the water's edge. The same nest is often reused by the same pair in following years. | Dietary assessment (Simmons et al., 1991) of pellets and prey deliveries to nests includes birds, frogs, fish, eggs and micromammals (*Rhabdomys, Otomys*, and Shrews). Hunts primarily in wetland habitats using various flight methods including soaring, hovering and low flight over wetlands and along the water's edge. May hunt in open grasslands or pastures near wetland areas. |
| Vulnerable A3c; B2b(ii,iii,v); C1+2a(i) | ***Bradypterus sylvaticus***<br><br>**Knysna warbler** | Inhabits dense understorey vegetation along riverbanks in fynbos forest patches, riverine woodland and afromontane forest and has even adapted to thickets of non-native brambles (e.g. *Rubus*). (BirdLife International, 2016). | Breeds from August and December coinciding with the greatest abundance of invertebrate species (BirdLife International, 2016). | Mostly on ground, creeping through dense, matted vegetation and scratches in humus. Eats mostly grasshoppers, insect larvae, spiders, slugs, worms |
| Vulnerable A2a;C1; D1, D2 | ***Hydroprogne caspia***<br><br>**Caspian Tern** | Marine and estuarine waters in sheltered bays but also at large inland lakes/dams (natural or anthropogenic. Usually solitary but family groups persist for 8 months | Monogamous, pair-bond lasts 1 year. Breeding resident, with breeding sites possible threatened. Colonial (sometimes with other terns) or solitary nester. Mainly breeds on offshore islands but also sandy beach and at saltworks; inland breeds on small islets in pans/dams. Territorial and defends nest area. Nest is shallow scrape in ground lined with some vegetation. Laying dates in Western Cape | Almost entirely feeds on fish, in clear shallow water. Hunts with bill held vertically and travelling horizontally across water (3-20 m above water), pauses, hovers and then dives head-first into water. |

| Red list status | Species | Habitat | Breeding | Feeding |
|---|---|---|---|---|
| | | | mainly Oct-Jan. Incubation 22-24 days. | |
| Vulnerable<br>C1; D1 | ***Stephanoaetus coronatus***<br><br>**Crowned eagle** | Forest (including gallery forest), dense woodlands and forested gorges in savannas and grasslands. Also in Eucalyptus and Pine plantations. Perches for long periods, resting in canopy. Sometimes soars high over territory, then descends vertically to perch. Manoeuvres agilely through thick forest, can take off vertically from forest floor. | Monogamous, possibly long-term pair bond. Territorial (at least 10 km2), solitary nester. Tallest trees used to build large stick platform nest (sticks/branches up to 1.5m long, 3cm thick). Nest copiously lined with beachwood (*Faurea saligna*), Pine or *Eucalyptus* leaves/needles. Nest often reused and added to in consecutive years, can reach up 2-3m diameter, 3m high. Nest trees often at the base of cliff/ravine or at the edge of plantation. Nest trees usually White-stinkwood (*Celtis africana*), yellowwoods (*Podocarpus* spp.), Cabbage tree (*Cussonia spicata*) but also *Eucalytus* and Pine species. Incubation 49-51 days. | Predominantly feeds on mammals (96% diet) and mostly on hyrax, antelope and primates. Will also take porcupine, hares, mongoose, sometimes domestic stock and domestic cats/dogs. Avian prey includes Hadeda Ibis, Egyptian geese and domestic chickens. Reptile prey mainly monitor lizards. Most prey taken on ground, but occasionally crashes into dense foliage in pursuit. Frequently still-hunts (stalks prey) and hunts from concealed perches frequently above waterholes in evening waiting for antelope to drink. Pair sometimes hunt monkeys cooperatively. Prey struck with downward blow of open foot, massive hind claw penetrates the skull killing instantly. Large prey that cannot be lifted are partly eaten and dismembered on the ground and then cached in trees. |
| Near Threatened<br>C1 | *Campethera notata*<br><br>Knysna Woodpecker | Territorial, occurring in thornveld, Euphorbia thickets, riparian and montane evergreen forests. Marginal occurrence in Protea communities, coastal white Milkwood (*Sideroxylon inerme*) thickets and alien trees. | Monogamous, solitary nester Hole in trunk/branch of tree, usually in a dead stem 1.2-6m off the ground. Holes infrequently reused in successive years, but a new hole can be excavated in the same branch. Laying from August-November | Forages at all levels of trees, especially mid-canopy. Pecks and probes for ants and termites on dead branches, but occasionally forages on ground. |

| Red list status | Species | Habitat | Breeding | Feeding |
|---|---|---|---|---|
| Near Threatened A2bc | *Crithagra leucoptera*<br><br>Protea Canary | Mountain fynbos with scattered large Protea bushes. Also along edges of forest and scrub along rivers. Can occur along Karoo fringes with Protea species. Locally nomadic, responding to flowering, fruiting and fire patterns in landscape. | Monogamous, solitary nester. Nest lined with *Helichrysum* stems and leaves forming a flimsy framework, then thickly lined with Protea leaves. Nest 2-4 m above ground in forked branch inside canopy of Protea bush. Eggs laid Aug-Oct, incubation 17 days. | Eats seeds of Proteas, restios but also foliage, flowers and nectar from variety of spp. Forages mainly in canopy of trees, scrubs, but also on ground under Protea bushes. Favours large seeds of *Protea* spp. |
| Least Concern (Regional), Near Threatened (Global) | *Buteo trizonatus*<br><br>Forest Buzzard | Afromontane forests and plantations (mainly Pine, but also Eucalyptus). Generally unobtrusive, perching on large branches partially concealed under canopy, sometimes perching in open at the edge of forest edge. | Monogamous, territorial, solitary nester. Nest is platform of sticks, cup-lined with green leaves. Nests in plantations are smaller than in native forests. Laying dates from August-November. Breeding is confined to the Western Cape and Eastern Cape Provinces. | Forages along forest edges and within (also plantations). Hunts mainly from perch. Diet consists of small mammals (mice and moles), small birds, snakes, lizards, frogs and invertebrates. |
| **MAMMALS** | | | | |
| Vulnerable B1ab(iii)+2ab(iii) | ***Chlorotalpa duthieae***<br><br>**Duthie's Golden Mole** | Occur on alluvial sands and sandy loams in southern Cape Afrotemperate forests (Bronner, 2014). Preference for forest vegetation over fynbos. Narrow coastal band 275 km long between Wilderness and Port Elizabeth with fairly disjunct populations. Can occur in gardens and pastures adjoining forests. Mainly active at night. | Little is known but a female was recorded with a litter of two young in November (Bronner, 2014). | Shallow subsurface foraging tunnels radiate outwards from beneath the roots of trees. Forages at night in tunnels and through the leaf litter. Diet includes earthworms. |

| Red list status | Species | Habitat | Breeding | Feeding |
|---|---|---|---|---|
| Vulnerable C1 | *Panthera pardus*<br><br>Leopard | Wide habitat tolerance, but generally associated with rocky outcrops, hills, mountains and forests. Manage to persist in areas of development provided there is adjacent cover of rocky hills or forest | Solitary animals with males and females holding territories and defend against same sex. No specific breeding season but has been found to peak in unison with some ungulate prey species births in certain regions (i.e. impala in Kruger National Park). Oestrous lasts 7 days during which male and female copulate frequently. Gestation 106 days and cubs remain with mother for 12months after which siblings remain together for a further 2-3 months. | Nocturnal, solitary hunter. Small to medium animals, usually ungulates < 70kg (Impala, Klipspringer, Grey Rhebuck, Cape Grysbok, Duiker) but also take Baboons, Hyrax, hares, rodents, reptile, livestock or domestic cats/dogs. Usually drags larger prey items into cover (dense shrubs) or up trees. |
| Vulnerable B2ab(ii,iii,v)+C2a(i) | **Sensitive Species 8** | Specialised habitat requirements within a home range of approximately 0.75 ha. Strong habitat preference for dense vegetation with good undergrowth providing good cover in which to retreat. Forest, thicket, dense coastal bush, independent of water. Can inhabit forest edges and transitional zones. Requires diverse plant community with variety of tree and shrub species. Can adapt to fragmented habitat given sufficient cover and food availability. Actively avoids open grasslands, and areas with human disturbance. | This species can breed throughout the year. Males establish territories and exhibit aggressive behaviours towards other males and to attract females. | Highly selective feeders, often feeding on food below troops of monkeys or frugivorous birds which drop lots of material. Preference for fruit, but also fallen leaves, flowers and insects. Seldom actively browse. Active in the early morning and late afternoon, foraging for around 8 hours a day within their territory. |
| Near Threatened B2b(iii) | *Amblysomus corriae*<br><br>Fynbos Golden Mole | Sandy soils and soft loams in Mountain Fynbos, Grassy Fynbos and Renosterveld of South West Cape. Also Afromontane forest and southern African moist savanna | Fynbos Golden Moles probably breed a seasonally because pregnant females have been captured in August, May, and December. Mean litter size is two; | Insectivorous, mainly feeding on earthworms and insects. |

| Red list status | Species | Habitat | Breeding | Feeding |
|---|---|---|---|---|
| | | along the southern Cape coast. Favours richer and wetter soils (Broom 1907) preferring forest fringes and associated fynbos. Thrives in gardens, cultivated lands, golf courses and livestock paddocks. Present also in exotic plantations, but apparently at lower densities (Bronner 2013). | young are altricial and hairless at birth. | |
| Near Threatened C2a(i) | *Aonyx capensis*<br><br>Cape Clawless Otter | Primarily aquatic and do not wander far water. Move freely along rivers up tributaries, also occurs in lakes, swamps, dams. Areas surrounding suitable aquatic habitats with sufficient food can be diverse, with animals ranging from forest, woodland, open grassland and even very dry areas (Orange River in the Northern Cape). | Generally solitary but sometimes in pairs or small family groups. Little known about breeding seasons but suggestions of litters being born at the end of the dry season or beginning of wet season, thought to coincide with prey availability. Gestation estimated at 60-64 days. | Crabs are most important food item (freshwater and marine), supplemented by fish, frogs and other aquatic life. Will opportunistically take waterbirds. Most active at dusk and to lesser extent dawn. |
| **INVERTEBRATES** | | | | |
| Endangered Criterion B | ***Aloeides thyra orientis***<br><br>**Red Copper Butterfly/Giant Russet** | Restricted range taxon endemic to the Western Cape from Witsand to Gouritsmond in the west, to the Brenton Peninsula near Knysna in the east. Declining because of alien plant encroachment and lack of regular burning of the fynbos. Coastal fynbos on flat sandy ground (either naturally occurring or from anthropogenic disturbances such as footpaths or unsurfaced track) between 40 m to 240 m above sea level. | Adults are on wing from July to April with peaks in October and February. Several generations per year through the warmer months (Woodhall, 2005) | Larvae feed on *Aspalathus acuminata, A. laricifolia* and *A. cymbiformis*. The larvae are attended to by *Lepisiota capensis* ants (Woodhall, 2005). |

| Red list status | Species | Habitat | Breeding | Feeding |
|---|---|---|---|---|
| Vulnerable B2ab(iii,v) | ***Aneuryphymus montanus***<br><br>**Yellow-winged Agile Grasshopper** | Very low area of occupancy between 100 and 1 000 km2. Threatened by declining habitat due to invasion by aliens and habitat transformation. Strong association with sclerophyllous fynbos vegetation on the southern slopes of the Outeniqua mountains, post-fire. Threats to the species include habitat transformation and invasion by alien plants. | Not known | Not known |
| Vulnerable B2ab(i,ii,iii); D2 | *Syncordulia gracilis*<br><br>Yellow Presba | Montane streams and rivers, with undisturbed fynbos margins. Clear, fast, hard-bottomed rivers in treeless river valleys (Samways 2006). Rare everywhere in its range, and for a long time it has not been seen at many sites where it historically was present (e.g., Michell's Pass). With the removal of invasive alien trees, it has recovered at some localities (e.g., Franschhoek Pass). Two populations are known; one in the Western Cape, and one in the eastern Cape. conservation of catchments through the removal of alien invasive trees is clearly beneficial for this species. | Not known. | Little is known, but taxon is insectivorous. |

| Red list status | Species | Habitat | Breeding | Feeding |
|---|---|---|---|---|
| Vulnerable B2ab(i,ii,iii) | *Syncordulia venator*<br><br>Mahogany Presba | This species is very sensitive to impacts from invasive alien trees, but has shown rapid recovery when these trees are removed. Clear mountain streams with deposition pools. High, rocky, montane streams partially fringed with trees (Samways 2006). | Not known. | Little is known, but taxon is insectivorous. |
| Near Threatened Criterion B | *Aloeides pallida littoralis*<br><br>Knysna Pale Copper Butterfly | Endemic taxon to the Western Cape Province. Relatively flat terrain near the coast, coastal Fynbos | Little known, but *Lepisiota capensis* ants are hosts for subspecies *A. p. grandis.* | Little is known, but larval food for the subspecies *A. p. pallida* and A. *p. jonathani* feed on *Aspalathus* species. The larvae of subspecies *A. p. grandis* are fed by trophallaxis by *Lepisiota capensis* ants and feed on these ant eggs. |
| Near Threatened B1ab(i,iii) | *Ceratogomphus triceraticus*<br><br>Cape Thorntail Dragonfly | Wide range throughout the Western Cape. Pools in streams, and occasionally in reservoirs. Rocky, shallow rivers, with deposition pools, and possibly farm dams. Usually in fairly open or hilly country side. Main threat is invasive alien trees, loss of habitat, water pollution and to lesser extent agriculture. Clearing of alien trees greatly benefits species. | Not known. | Little is known, but taxon is insectivorous. |

| Red list status | Species | Habitat | Breeding | Feeding |
|---|---|---|---|---|
| Near Threatened | *Ecchlorolestes nylephtha*<br><br>Queen Malachite Damselfly | Known from streams near Storms River and in the Tsitsikamma Forest (Western Cape and Eastern Cape) (Samways 2006 in press). Endemic to South Africa. Occupies a very specific microhabitat inhabits small, fern-fringed streams in the deep shade of the forest at relatively southerly latitudes (ca 34°S). | Little known, but the Genus typically lays eggs on tender green shoots of vegetation overhanging streams | Little is known, but taxon is insectivorous. |
| **AMPHIBIANS** | | | | |
| Endangered B1ab(i,ii,iii,v)+ 2ab(i,ii,iii,v) | ***Afrixalus knysnae***<br><br>**Knysna Leaf-folding Frog** | Typically inhabit endorheic (inward draining) wetlands with shallow water (< 50cm), high clarity, and sufficient vegetation suitable for breeding (De Lange & Du Preez, 2018). No streaming or running water recorded at any of the sites where they've been recorded. The frog is associated with vegetation it can use for breeding which includes indigenous and exotic species. For example, slender knotweed (*Persicaria decipiens*) and kikuyu grass (*Pennisetum clandestinum*)..It requires a habitat with diverse plant species, including shrubs, grasses, and ferns, providing shelter and breeding sites (Lange and Preez, 2018). | Females lay eggs on leaves which are folded and sealed by males, creating a protected environment (Du Preez & Carruthers, 2017). Breeding occurs during warmer wetter months such as September to November (De Lange, 2019). Breeding takes place near deeper parts of the waterbody, but still close to the water's edge. | The Knysna Leaf-folding Frog is an insectivorous amphibian feeding on small invertebrates found in its habitat (e.g. insects and spiders). Foraging behaviour includes actively searching for prey on the forest/fynbos floor and in the leaf litter. The frog uses its sticky, projectile tongue to capture and quickly ingest prey. It is primarily active at night, relying on its vision to locate and capture prey in the darkness. |

# 4. FIELD ASSESSMENT

## 4.1 Methods

Following the Species Environmental Assessment Guidelines (SANBI, 2020) and Table 3, taxa-specific sampling techniques were conducted in habitats where SCC were likely to occur. Taxa-specific sampling was interspersed with a meander across the project area to collect additional opportunistic data for all fauna and inspect all habitat types (Table 4).

*Table 4. Sampling techniques conducted for potential SCC occurring on the site.*

| Taxa | Field methods | Public platform where observations were reported |
|---|---|---|
| Avifauna | • Meander* across site for direct observations.<br>• 4 point counts (5-minute bird counts). | Birdlasser (species lists), iNaturalist (photos) |
| Mammals | • Meander* across site for direct observations, tracks, scats and signs. | iNaturalist (photos) |
| Amphibia | • Meander* across site for direct observations.<br>• Active searching. | iNaturalist (photos) |
| Invertebrates | • Meander* across site for direct observations.<br>• Active searching.<br>• Sweep netting. | iNaturalist (photos) |

* Meandering involved slow walking across the site through various habitat types and key landscape features. Active observations took place for all fauna throughout this walk which was then supplemented by taxa specific sampling methods in habitats deemed most suitable for SCC.

## 4.2 Assumptions and Limitations

1. While the public platforms mentioned in Section 3.4 are excellent sources of additional information for animal species occurring within an area, these results require some expert interpretation to determine which of the SCC are relevant to include in the faunal assessment of the project area. For example, the coarse spatial scale of reporting within the Virtual Museum platforms (Quarter Degree Square level (27km x 27km) or SABAP2 pentad level (9km x 7 km)) can result in species records from habitats quite different to those present on site. Additionally, these platforms include sightings of vagrant or transient animals upon which an assessment cannot reasonably be based. Expert interpretation is therefore applied to the full list of SCC identified by the various public platforms (see Appendix 1) and some species are then excluded from further assessment due to the project area clearly lacking suitable habitat or the species clearly representing a vagrant or transient animal outside its normal range. The SCC assessed in this report therefore represents those which may reasonably occur on site. However, there is always the possibility that some SCC (although highly unlikely to occur on site) are overlooked in this process.
2. One field visit took place to the site for the faunal assessment. This only represents a “snap-shot” in time and it is possible that SCC occurring on site were not observed during this visit. These results should therefore be interpreted with this in mind and not be treated as an exhaustive list of species occurring on site.

3. The site visit took place during daylight hours so the likelihood of encountering nocturnal species was limited.
4. The owner of the property has on occasion deployed camera traps in recent years and supplied the Fauna Specialist with photos of various animals from the site. This information is included in the report, and while useful, the results are treated as supplementary and with caution given that it was not collected first-hand by the Fauna Specialist. Information supplied by the property owner is indicated specifically in the report and distinguished from any specialist observations.
5. The site visit coincided with autumn for the site. This may be of consequence for detecting some species showing seasonal variation in breeding and activity patterns. For the frog SCC this time falls outside its breeding season and decreases the likelihood of detection. Golden moles are generally most active in warmer and wetter conditions, but given the temperate climate and year-round rainfall in the project area, their likelihood of detection is not anticipated to be greatly affected by the generally cooler seasonal temperatures of autumn. Nevertheless, the precautionary principle is applied where appropriate.
6. Evidence of animals in the form of tracks, scats and signs always brings with it a level of uncertainty, but best efforts were made in this regard and uncertainties are highlighted in the report.

### 4.3 Site Inspection Details

One site visit took place to the property on the 12th of April 2024. Weather was warm to hot and sunny. Habitat types found on the site included: 1) Dense thicket/forest vegetation; 2) small patch of fynbos; 3) one non-perennial stream in the west of the property and another just outside the eastern boundary (Figure 8). An effort was made to cover the project area with the meander to conduct taxa specific sampling techniques across a range of suitable habitats for potential SCC (Figure 9).


*Figure 8. Habitat types relevant to fauna species identified on Erf 301. *One non-perennial stream was located within the eastern section of the property (bottom right photo) while a larger non-perennial stream was found just outside the western boundary.*

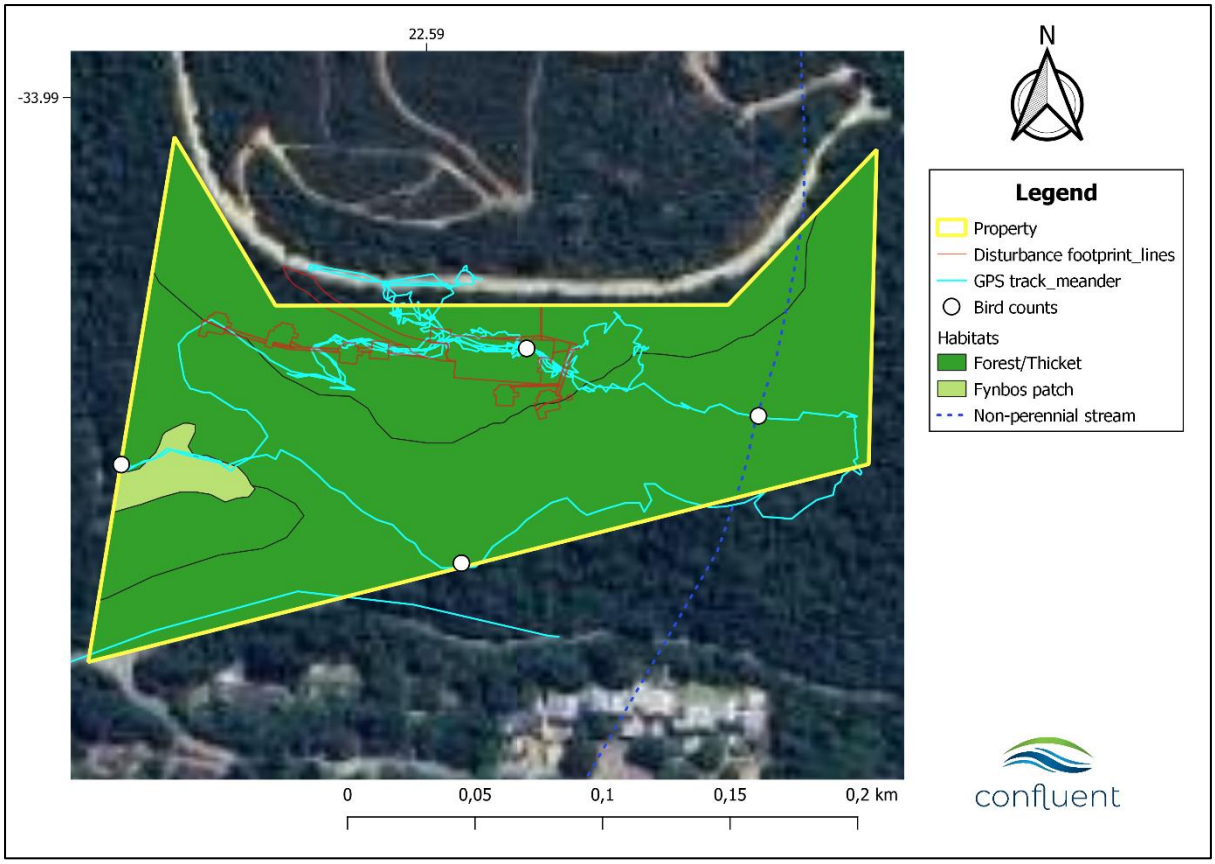


*Figure 9. Habitat types, GPS track and field work for Erf 301 Hoekwil following a site visit in April 2024.*

## 4.4 Results

### *4.4.1* Avifauna

No SCC were encountered during the site visits. Four bird counts were conducted across the property, in addition to opportunistic sightings noted throughout the meander. A total of 8 bird species were identified during the site visit (See Appendix 2).

### *4.4.2* Mammals

Evidence of the Golden Mole SCC was seen on site, with typical sub-surface tunnels observed at multiple locations throughout the meander on the property, indicating their presence and activity across the site (Figure 10). While not possible to determine the species based on the tunnels alone, the forest/thicket habitat is more indicative of Duthie's Golden Mole, with the site also predicted to be suitable habitat based on the DFFE Screening Tool. However, the precautionary principle is also applied to the presence of the Fynbos Golden Mole being present on site given that elements of fynbos habitat also occur on site.

Tracks of a small antelope were also seen on site (Figure 11). While it is not possible to be entirely sure of the species of antelope based on spoor alone, given the small size (< 3cm), the suitable thicket habitat and the known nearby occurrence of Sensitive Species 8 in the surrounding landscape, the precautionary principle is applied the SCC deemed present on site.

*Figure 10. Sub-surface tunnelling typical of golden moles seen on Erf 301, Hoekwil during a site visit in April 2024. Dimension of the tunnels (top left image, 4 cm diameter) correspond to the size typical of golden moles expected to occur in region. Tunnel lengths observed on the surface are indicated by the yellow tape measure, with right image showing a tunnel of 1.4m long.*

*Figure 11. Spoor of small antelope seen on Erf 301, Hoekwil. While not possible to confirm species based on spoor alone, given the suitable thicket habitat, similar spoor size (< 3cm) and confirmed nearby occurrence, the precautionary principle is applied and Sensitive Species 8 is suspected.*

A Bushbuck was seen crossing Whites Road into the property and tracks indicating the presence of this species were also seen on site. Camera trap images supplied by the owner of the property provide additional evidence of mammals in recent years (Figure 12 and See Appendix 3 for more details).


*Figure 12. Camera trap images supplied by owner showing animals occurring on Erf 301, Hoekwil: Bushbuck (top images), domestic dog (middle left), Bushpig (middle right), Cape Genet (bottom images). See Appendix 3 for further species information.*

### *4.4.3 Terrestrial Invertebrates*

No SCC was found during the site inspection on the property. The non-perennial river in the east of the property had very little flow and limited water pools present despite substantial rains experienced a few days prior to the site visit – indicating the very temporary nature of this aquatic habitat and likely limiting its suitability to sustain any of the Odonata (dragonfly/damselfly) and mammal SCC on site. By contrast, the stream outside the western boundary of the property was flowing and more water pools were present. Two Odonata species were observed here but neither were an SCC. Invertebrates from a total of 6 Families were seen during the site visit (See Appendix 4).

### 4.4.4 Amphibians

No SCC were not found during the site visit, and no suitable endorheic habitat/waterbodies occurred on the property. Only one species was heard calling from the non-perennial river in the east of the property (Clicking Stream Frog, see Appendix 5 for more information).

### 4.4.5 Likelihood of Occurrence for SCC

Following the terrestrial fauna surveys and site inspection, the possible SCC occurring on Erf 301 were evaluated according to their likelihood of occurrence. It is always possible that a species assessed as having a low probability of occurrence can still occur on the site and therefore this table should only be used as a guideline.

*Table 5. Likelihood of occurrence for terrestrial fauna SCC on Erf 301 Hoekwil. Bold text indicates SCC highlighted by DFFE Online Screening Tool.*

| Red list status | Species | Observed on site | Suitable habitat | Likelihood of occurrence |
|---|---|---|---|---|
| **AVIFAUNA** | | | | |
| Endangered A2c+3c+4c;C1 | ***Circus ranivorus*** **Marsh Harrier** | No | No | **LOW** SCC likely to use the greater Wilderness Lakes system to the south of the property but unlikely to be attracted to site given unsuitable thicket vegetation/habitat. |
| Vulnerable A3c; B2b(ii,iii,v); C1+2a(i) | ***Bradypterus sylvaticus*** **Knysna warbler** | No | Possible | **MEDIUM** SCC possibly occurs along the small non-perennial streams. Given non-perennial and temporary nature of the stream on site the SCC is given a medium likelihood of occurrence. |
| Vulnerable A2a;C1; D1, D2 | ***Hydroprogne caspia*** **Caspian Tern** | No | No | **LOW** SCC likely to use the greater Wilderness Lakes system and coastal areas to the south of the property but unlikely to be attracted to site given unsuitable thicket vegetation/habitat. |
| Vulnerable C1; D1 | ***Stephanoaetus coronatus*** **Crowned eagle** | No | Possible | **LOW-MEDIUM** Thicket habitat property site does not have many large trees preferred by SCC that occurs mostly in forest, but the site could possibly be utilised by SCC transiently. No nearby reports of SCC indicated on public platforms, but given possible suitable habitat and high connectivity of thicket throughout the broader landscape the precautionary approach is applied. |
| Near Threatened C1 | *Campethera notata* Knysna Woodpecker | No | Yes | **HIGH** Suitable thicket and tree habitat on site to support and attract SCC. |
| Near Threatened | *Crithagra leucoptera* Protea Canary | No | No | **LOW** Very small fragments of fynbos were seen on site and are unlikely to be significantly attractive for SCC to be occur. |

| Red list status | Species | Observed on site | Suitable habitat | Likelihood of occurrence |
|---|---|---|---|---|
| Least Concern (Regional), Near Threatened (Global) | *Buteo trizonatus* Forest Buzzard | No | Yes | **HIGH** Suitable thicket/forest habitat is present on site. |
| **MAMMALS** | | | | |
| Vulnerable B1ab(iii)+2ab(iii) | ***Chlorotalpa duthieae* Duthie's Golden Mole** | Suspected, characteristic tunnels observed | Yes | **HIGH** Suitable thicket/forest habitat is present on site and DFFE Online Screening Tool predicted suitable habitat. Ample evidence of subsurface tunnelling seen on site indicative of golden mole activity. Not possible to differentiate between the two golden mole SCC, so precautionary principle is applied. |
| Vulnerable C1 | *Panthera pardus* Leopard | No | Yes | **MEDIUM-HIGH** Ample thick vegetation on site for SCC, although SCC is rare in its range and has not been seen on the camera trap surveys of site. However, public platforms indicate the presence of the SCC in the vicinity and given high connectivity to thickets in greater landscape and the precautionary principle is applied. |
| Vulnerable B2ab(ii,iii,v)+C2a(i) | **Sensitive species 8** | No | Yes | **MEDIUM-HIGH** Ample thick vegetation on site for SCC, although SCC has not been seen on the camera trap surveys of site. However, public platforms and personal observations confirm the presence of the SCC in the vicinity and given the high connectivity of the thicket habitat in the broader landscape and the presence of small antelope footprints on site, the precautionary principle is applied. |
| Near Threatened B2b(iii) | *Amblysomus corriae* Fynbos Golden Mole | Suspected, characteristic tunnels observed | Yes | **HIGH** Suitable thicket/forest habitat is present on site. Ample evidence of sub-surface tunnelling seen on site indicative of Golden Mole activity. Not possible to differentiate between the two golden mole SCC, so precautionary principle is applied. |

| Red list status | Species | Observed on site | Suitable habitat | Likelihood of occurrence |
|---|---|---|---|---|
| Near Threatened C2a(i) | *Aonyx capensis* Cape Clawless Otter | No | Possible | **MEDIUM** Non-perennial streams are possibly suitable habitat for SCC although unlikely to sustain them given low and temporary food availability. SCC possibly uses the streams transiently and SCC is known to occur in the surrounding areas. The precautionary approach is applied. |
| **INVERTEBRATES** | | | | |
| Endangered Criterion B | ***Aloeides thyra orientis* Red Copper Butterfly** | No | No | **LOW** No suitable flat sandy habitat, limited fynbos habitat containing no host plants. |
| Vulnerable B2ab(iii,v) | **Aneuryphymus montanus *Yellow-winged Agile Grasshopper*** | No | No | **LOW** No suitable sclerophyllous fynbos vegetation. |
| Vulnerable B2ab(i,ii,iii); D2 | *Syncordulia gracilis* Yellow Presba | No | No | **LOW** No suitable streams with Fynbos or tree-less margins |
| Vulnerable B2ab(i,ii,iii) | *Syncordulia venator* Mahogany Presba | No | Possible | **MEDIUM** Suitable tree-lined streams on property but non-perennial nature might be too short-lived to support SCC. |
| Near Threatened Criterion B | *Aloeides pallida littoralis* Knysna Pale Copper Butterfly | No | No | **LOW** Little to no flat terrain on site and no host plants observed**.** |
| Near Threatened B1ab(i,iii) | *Ceratogomphus triceraticus* Cape Thorntail Dragonfly | No | No | **LOW** Non-perennial nature of streams reduce habitat suitability and habitat within thicket is not typical for SCC. |

| Red list status | Species | Observed on site | Suitable habitat | Likelihood of occurrence |
|---|---|---|---|---|
| Near Threatened | *Ecchlorolestes nylephtha* Queen Malachite Damselfly | No | Possible | **MEDIUM** Non-perennial nature of streams reduces habitat suitability for SCC but possibly suitable forest/densely vegetated habitat. |
| | | | **AMPHIBIANS** | |
| Endangered B1ab(i,ii,iii,v)+ 2ab(i,ii,iii,v) | ***Afrixalus knysnae*** **Knysna Leaf-folding Frog** | No | No | **LOW** No suitable wetland habitat on property. |

## 5. SITE SENSITIVITY VERIFICATION

Following the desktop assessment and field visit, it is determined that the site sensitivity for the terrestrial animal theme of Erf 301, Hoekwil property is **VERY HIGH/HIGH** in accordance with the sensitivity highlighted by the DFFE Screening tool. The following reasons support this finding:

- The discovery of sub-terranean tunnels on the property, indicative of golden mole activity. Two golden mole SCC are potentially occurring on site, and while it is not possible. to identify the species responsible for the tunnels, the thicket habitat is more indicative of *C. duthieae* (Vulnerable) which was also predicted by the DFFE Screening Tool. It is however also possible that *A. corriae* (Near Threatened) is present on site given the elements of fynbos vegetation and therefore the precautionary principle is applied with both species presumed present.
- The thicket habitat with high levels of connectivity to other similar habitats across the broader landscape is highly likely to support multiple SCC: Sensitive Species 8, *Campethera notata* (NT), *Buteo trizonatus* (Globally NT), *Panthera pardus* (VU).
- One non-perennial stream on the property and another in close proximity to the western boundary that have possibly suitable habitat for various SCC which are given a medium likelihood of occurrence: *Bradypterus sylvaticus* (VU), *Aonyx capensis* (NT), *Syncordulia venator* (NT), *Ecchlorolestes nylephtha* (NT).

As per the Published Government Notice No. 1150, Government Gazette 43855 (30 October 2020), the **VERY HIGH/HIGH** sensitivity of the site requires a Terrestrial Animal Species Specialist Assessment including an Impact assessment to be conducted for development on this site.

## 6. SITE ECOLOGICAL IMPORTANCE

The Site Ecological Importance (SEI) is determined for habitats within the property, taking associated fauna SCC scored with a medium or high likelihood of occurrence into account (see Table 5). Table 6 provides the SEI calculations for each habitat type and Figure 13 illustrates the SEI results for the site (see Appendix 6 for SEI methods). Guidelines for interpreting SEI ratings are given in Table 7.

It is important to note that the SEI reported here is specific to the proposed development and associated activities of this report and can only be used to compare multiple layouts and/or locations for the development.

The entire property of Erf 301 has a High SEI rating for fauna due to the importance of the thicket/forest habitat. While the non-perennial streams have been scored with a Low SEI rating, these are encompassed within the forest/thicket habitat and therefore also mapped as a High SEI rating in Figure 13. The guidelines for SEI rating indicate that the development in High SEI areas should follow the avoidance and minimization measures wherever possible to reduce impacts. The current SDP makes good provisions for this guideline given the use of stilts that will minimize the development footprint on the property soils and thereby allowing space for SCC and natural vegetation to recolonize and exist beneath the dwellings/pods.

*Table 6. Site Ecological Importance assessment for Erf 301. Conservation status for SCC is abbreviated to indicate Critically Rare/Endangered (CR), Endangered (EN), Vulnerable (VU) or Near Threatened (NT). When relevant, the extent of occurrence (EOO) is indicated as part of the justification for the conservation importance (CI) metric.*

| Habitat and associated SCC | Conservation Importance (CI) | Functional Integrity (FI) | Biodiversity Importance | Receptor Resilience (RR) | Site Ecological Importance (SEI) |
|---|---|---|---|---|---|
| **Thicket and Fynbos patch habitat**<br><br>SCC:<br>*S. coronatus (VU)*<br>*C. duthieae (VU)*<br>*P. pardus (VU)*<br>*Sensitive species 8 (VU)*<br>*C. notata (NT)*<br>*B. trizonatus (NT)*<br>*A. corriae (NT)* | **HIGH**<br>Likely occurrence of Vulnerable SCC (EOO > 10km$^2$)<br><br>**MEDIUM**<br>Likely occurrence of NT SCC. | **HIGH**<br>Good habitat connectivity with likely functional ecological corridors and no signs of past disturbance on site. Regularly used road networks between habitats | **HIGH** | **MEDIUM**<br>Habitat likely to recover within approx. 10 years after disturbance. Most SCC are highly likely to remain on site during disturbance (golden moles, avifauna) but some are likely to be deterred by human presence (*P. pardus* and *Sensitive species 8*) and are given a moderate likelihood of remaining on site. | **HIGH**<br>BI = High<br>RR = Medium |
| **Non-perennial stream**<br><br>SCC:<br>*B. sylvaticus (VU)*<br>*A. capensis (NT)*<br>*S. venator (NT)* | **HIGH**<br>Possible occurrence of Vulnerable SCC (EOO > 10km$^2$)<br><br>**MEDIUM**<br>Likely occurrence of NT SCC. | **MEDIUM**<br>Narrow corridor of habitat available with road networks to north and south of each stream. | **MEDIUM** | **HIGH**<br>Habitat will be able to recover quickly <10 years and given good connectivity SCC are expected to return soon after disturbance. SCC highly likely to remain on site during disturbance. | **LOW**<br>BI = Medium<br>RR = High |

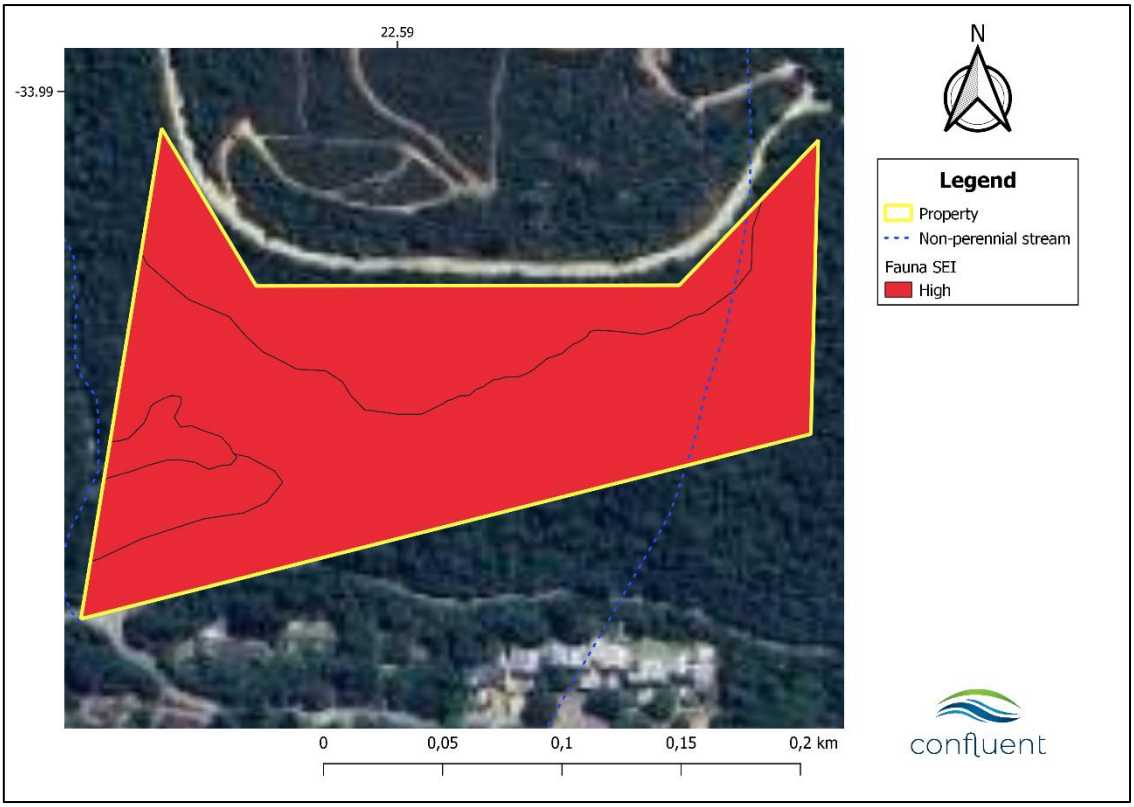


*Figure 13. Site Ecological Importance for Erf 301. Non-perennial river habitat is given a Low SEI rating for fauna, but this falls within the thicket/forest habitat and therefore the High SEI is mapped.*

*Table 7. Guidelines for interpreting Site Ecological Importance for proposed developments (SANBI, 2020).*

| Site ecological importance | Interpretation in relation to proposed development activities |
|---|---|
| Very high | Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/ unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains. |
| High | Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities. |
| Medium | Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities. |
| Low | Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities. |
| Very low | Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required. |

# 7. IMPACT ASSESSMENT

This impact assessment is based on the SDP provided at the time of writing this report and will need to be reassessed if these change in the future.

The impact assessment considers the construction of a driveway, one dwelling and six pods on the property.

- The driveway to access the primary dwelling is estimated to cover 416 $m^2$.
- The primary dwelling will cover a total of 446 $m^2$ with the front half raised off the ground (on pylons/stilts) effectively reducing the permanent footprint to ca. 200 $m^2$.
- The six pods (38 $m^2$ each) will also make use of a raised footprint on stilts/pylons, ultimately resulting in a total permanent footprint of 9.5 $m^2$ x 6 pods = 57 $m^2$.

The total footprint of development (without the use of stilts/pylons) is estimated to be 1090 $m^2$, which has effectively been reduced by raising some sections off the ground with the use of stilts/pylons to 673 $m^2$. This reduces the habitat transformation from approx. 3% to 2% of the property size.

The impacts and associated mitigation measures for each development phase are discussed in the following sections. Impacts (pre- and post-mitigation) are evaluated and presented in Table 8 with the methods explained in Appendix 7.

## 7.1 Mitigation Hierarchy

The principles of the mitigation hierarchy (Ekstrom *et al.*, 2015) are applied during an impact assessment. Potential impacts on biodiversity are preferentially managed through preventative, rather than remediative, measures (Figure 14). This is achieved by suggesting avoidance or minimization methods wherever possible. Alternatively, if the impacts of a development cannot be adequately managed through the preventative measures of avoidance and minimization, then restoration and, as a last resort, offsets are considered.

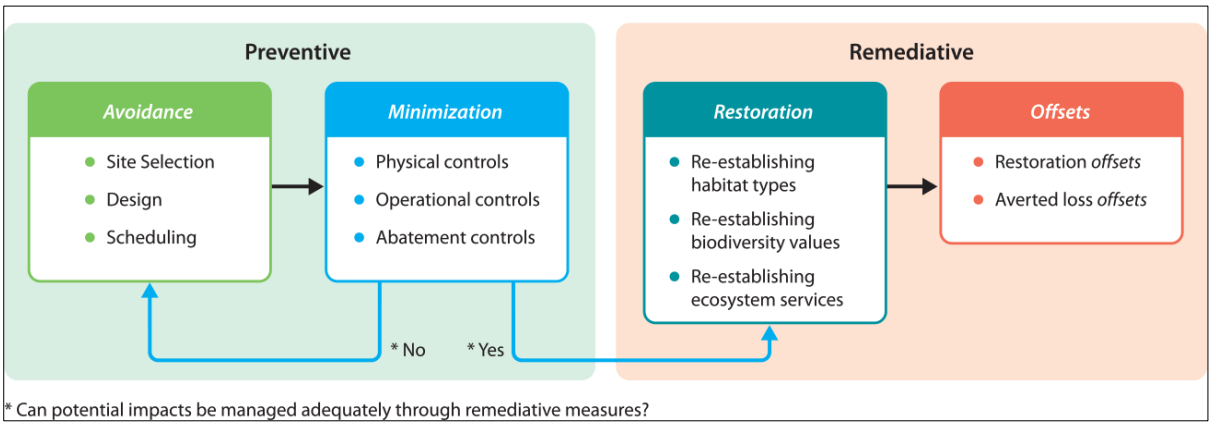


*Figure 14. The iterative process of minimising predicted impacts on biodiversity and ecosystem services, as described in the mitigation hierarchy (Ekstrom et al., 2015).*

## 7.2 Reference to be made to Botanical and Aquatic Reports

Many impacts to fauna can be mitigated through minimizing impacts to the natural environment within which they occur. As such, many mitigation measures throughout this section address this aspect of 'habitat protection'. In addition to the measures highlighted throughout the next sections, it is imperative that the Botanical Specialist Report (B. Fouche, Confluent Environmental, 2024) and the Aquatic Compliance Statement (F. de Ridder & J. Dabrowski, Confluent Environmental, 2024) also be consulted for suggestions and any mitigation measures adhered to in order to reduce the impact of the development on vegetation and aquatic environments since fauna rely heavily on these habitats.

## 7.3 Current Impacts

Erf 301 has remained undeveloped and largely unmodified from its natural state. Minimal to no current impacts were observed pertaining to fauna on the property.

## 7.4 Layout and Design Phase

Some considerations within the layout and design phase of a project can reduce the impact of the development on fauna and their habitat within the property. Some suggestions include:

1. Keep artificial lighting along roads and around infrastructure to a minimum and consider lighting colour, brightness and design options with minimal impact on biodiversity. This is particularly relevant to development within this largely natural area, where the potential for impacts on the native faunal diversity can be large. Light pollution is of global concern given that our night skies are getting lighter due to urban development and that many animals are specifically adapted to dark night skies for navigation, foraging and behavioural aspects (i.e. sleep, hunting). A common impact is that many insects are attracted to or disorientated by artificial lights, leading to aggregations at such point sources. This interferes with their natural behaviour (i.e. feeding), associated ecosystem services they provide (e.g. pollination) and often has fatal consequences for individuals unable to escape the 'light trap'. There is also the cumulative impact of attracting predators to light sources (e.g. birds, frogs, small mammals) and exposing them to risks in these areas as well.
    a. Wherever possible in the designing phase consider 'no lighting' options to encourage dark areas and reduce light pollution.
    b. Where this is not possible, the impacts of lighting can be reduced through the selection of the colour/brightness (select yellow, dim lights which are less attractive to insects than bright white or blue lights) and design elements (lights facing down towards the ground rather than facing up towards the sky).
2. Access roads and parking spaces for non-heavy machinery could make use of open pavers that are planted with non-invasive grasses, like *Cynodon dactylon* (the Cape Royal variety), or *Stenotaphrum secundatum* (Buffalo grass). Open pavers should also be considered around any areas where water might be channelled and cause erosion around the houses (i.e. at the base of gutter outlets or overflow zones around water tanks). Open pavers reduce surface water runoff intensity through improved infiltration and can reduce erosion often associated with infrastructure (Figure 15).

*Figure 15. Examples of open pavers to use for parking areas, access roads or underneath gutters/water tank overflow areas to improve water infiltration and prevent soil erosion.*

3. Considerations should be given to limited fencing around the property and allowing for animal movement across the property as well as within the greater landscape. No fencing is always preferable, but this may not always be possible from a security perspective. Consideration should at least be given to limiting fencing in areas where security is not a concern. Some other fencing design suggestions include:
    a. Leaving some gaps in fence lines in order to animals to access and exit the property. Gaps can be permanent (camera traps that send images to a cell phone when triggered or security cameras can be placed here for monitoring purposes if security is a concern) or temporary (open for a few hours during certain times, preferably during day and nighttime to accommodate for diurnal and nocturnal animals).
    b. Crawl spaces (30 cm diameter, can use PVC pipes) at regular intervals along fence line to allow small animals to enter/exit property. These should be regularly checked for blockages.
    c. If electric fencing is to be utilised, the lowest strand should be placed minimum of 30cm off the ground to minimize the risk of small animals getting caught and electrocuted (Pieterson, 2022).

## 7.5 Construction Phase Impacts

The construction phase will have the highest impacts on fauna species due to increased moving vehicles, noise and habitat destruction associated with these activities. It is imperative that an Environmental Control Officer (ECO) be appointed for the duration of the construction phase and ensure compliance with mitigation measures that aim to minimize impacts on fauna. It is imperative that an ECO is present on site at the onset of a new construction phase and at the start of any earthworks. These impacts are discussed below and assessed in Table 8.

### *7.5.1 Loss of habitat for fauna within the footprint of the proposed houses, pods and roads due to construction related activities.*

**Description:** The proposed development of a residential dwelling, pods and associated access roads will result in the permanent loss of habitat space on the property. The primary development footprint where permanent infrastructure is placed and permanent loss of habitat occurs, translates to approx. 2% of the property size. Efforts to reduce this impact have already been made by means of using stilts/pylons to raise sections of the development off the ground, thereby increasing habitat availability for many SCC.

**Consequences of impact:**

1. Loss of suitable habitat for fauna SCC to live, forage and breed.

**Mitigation measures:**

1. Prior to construction, the disturbance footprint of proposed roads and houses should be clearly defined and demarcated to prevent unnecessary additional damage to the surrounding environment – see also Botanical Specialist Report:
    a. Construction netting or fencing must be used to clearly indicate construction areas (see example in Figure 16). Access roads must be clearly marked so there is no confusion as to where the tracks are or how wide the road is.
    b. Clear signs for “no-go” areas for vehicles and personnel should be placed strategically on the site and along access roads. No-go areas are anywhere outside of the direct area of influence of the construction phase.
    c. All vehicles, construction or inspection, must only access the sites via a planned, single track access road with no additional roads, tracks to be made in the environment. Roads are to be clearly marked to prevent additional tracks or unnecessarily widening the access road. A turning area for construction vehicles should be demarcated within the existing footprint of the house.

*Figure 16. Example of construction fencing to be used to demarcate construction areas*.

2. Where vegetation will be cleared to make way for construction, filled sandbags, silt socks or a silt fence must be used to reduce the intensity of water runoff and flow over the site and thereby reduce erosion potential (Figure 17). This should be placed around

the perimeter of the downslope disturbance footprint and needs regular inspection and adaptive management to ensure the integrity of the system for reducing erosion. This is pertinent given the slope of the property. Refer also to the Botanica Assessment/Aquatic Compliance Statement for any other erosion control measures.

*Figure 17. Examples of silt socks (left) and a silt fence (right) placed perpendicular to the flow of water. These methods reduce the force of water flow, erosion and can prevent unwanted sedimentation a site*.

3. Protection and reuse of topsoil can be critical for the successful rehabilitation of vegetation following construction processes as it contains valuable seedbank of indigenous plants that regenerate after the soil is replaced.

### *7.5.2 Fauna and habitat negatively affected by the management of the construction site (i.e., staff, stockpiles, and equipment).*

**Description:** The management of materials and staff on the site is also an important impact of development. If managed properly, many accidents and unanticipated negative impacts on fauna and the surrounding environment can be avoided.

**Consequences:**

1. Loss of habitat or harm to fauna outside of designated construction areas.
2. Litter and pollution of natural environment.
3. Potential health and safety hazards (for staff and fauna) on the site and in the surrounding environment.

**Mitigation measures:**

1. All new staff must be briefed about the layout of the construction site, made aware of the no-go areas and informed of the sensitive surrounding environment that is not to be disturbed. Regular site meetings should be held, during which the ECO should remind all staff of these requirements and any questions/concerns can be raised and addressed.
2. Construction vehicles should be checked daily, prior to construction at the start of each day for leaks and other faults.

a. Sandbags or sawdust should be available and accessible on the site to ensure that any accidental oil spills are contained and stopped quickly.

b. Any contaminated soil on the site must be removed by a registered hazardous waste service provider (e.g. Spill Tech, Interwaste, EnviroServ., etc.).

c. Vehicles with leaks and other problems are not allowed to operate on the site until they have been repaired.

3. No littering, waste dumping or burning is allowed on the site or in the surrounding environment. All waste is to be collected in designated bins with lids that can be secured or stored in a secure area when construction is not taking place (evenings, weekends, holidays, etc.) to prevent interference by animals (i.e. baboons). All waste is to be transported to a registered waste disposal facility off site.
4. Adequate ablution facilities must be provided for every construction project.
    a. Portable toilets will need to be used in remote areas like this site, and these must be placed on a level platform before construction starts within the footprint of the access roads or housing sites.
    b. Ablution facilities must be regularly maintained and cleaned.
    c. Refer to SHEQ guidelines for minimum toilet facilities to be provided for number of staff on site.
5. Concrete, cement, plastering, and painting:
    a. Mixing areas be clearly defined on the site and must be surrounded by an impermeable material (i.e. create a temporary coffer dam with sandbags and thick plastic sheeting) to prevent any runoff and absorption into the surrounding soils.
    b. The designated mixing areas should be limited to areas that will become future hard surfaces on the site, or that are already transformed and likely to remain transformed.
    c. No concrete and cement mixing is allowed in areas outside the site development plans (SDPs).
    d. Cleaning of cement, plastering & paint equipment must be done into a designated, bunded & lined slurry sump or container to avoid contaminating the environment.
6. All stockpiles of fine textured building materials and soils must be covered by a geotextile or plastic covering, which must also be bunded (e.g. with sandbags) when not in use (Figure 18). This will prevent material being lost to the environment and fauna from accessing stockpiles and possibly subjecting them to harm during construction.

*Figure 18. Stockpiles of fine textured building materials and soils covered with geotextile/plastic covering and bunded with sandbags when not in use.*

7. Any small items or building materials which can be carried away by medium-large animals (i.e. baboons) should be safely stored in containers or locked away in a designated area to prevent interference from animals, causing possible harm to them and preventing them from removing such items from site.
8. All food waste (leftovers, bones, pips, apple cores) to be disposed of in designated bins and NOT to be disposed of in the surrounding environment within or outside the designated construction areas. Food sources serve as a major attractant for fauna and will expose them to unnecessary harm in the vicinity of the construction site. All food waste should be removed from site on a daily basis and disposed of appropriately.
9. Construction should take place during daylight hours so that the site can be adequately monitored for fauna during work hours, and also to prevent the use of artificial lighting at night which attracts many animal species (predominantly insects and associated predators) and subjects them to the risks of construction.

### *7.5.3 Harm/Death of fauna, particularly invertebrates and soil dwelling mammal SCC, due to earthworks and construction related activities.*

**Description:** Fauna may occur on site and be killed or seriously harmed during construction related activities. Cryptic and ground-dwelling species, like the golden mole SCC, are difficult to detect and are limited in their mobility rendering them vulnerable to earthmoving and construction activities.

**Consequences of impact:**

1. Loss of threatened species and a shift towards a negative change in the conservation status of the SCC and other indigenous species affected by the development.
2. Loss of genetic diversity from remaining fauna populations.
3. General loss of biodiversity.

**Mitigation measures:**

1. Construction should happen in phases, such that construction related activities are confined to one area at a time on the property and can be monitored for faunal impacts appropriately.
2. <u>During construction:</u>
    a. Before construction commences for any new earthworks at the start of new phase, an ECO should do a walk-through of the demarcated area and access roads to look fauna with limited mobility. These animals should be removed from the demarcated area to an adjacent location, and where appropriate a Fauna Specialist contacted for assistance or guidance. Construction/Earthworks for this new phase can commence thereafter.
    b. At any point during the day (during construction), if an animal with limited mobility is observed on site, this should be reported to the ECO and construction temporarily halted. Construction can commence once the ECO is satisfied that all such fauna are removed from the construction area.
    c. Speed limits should be imposed and monitored during construction phase, as collisions with vehicles (roadkill) pose a significant threat to many fauna species. The development site falls within a largely natural area, increasing connectivity and ultimately the diversity of fauna that may be encountered and threatened by moving vehicles. Given the narrow access roads recommended for this development, speed limits should be restricted at the discretion of the ECO to appropriate speeds to allow for driver alertness and ability to avoid collisions with fauna. Recommended speeds include 40 km/hour on main access roads with good visibility into the road verges, and 20 km/hour on smaller access roads with narrow or overgrown verges where visibility is reduced. Signs should be put up along the roads to remind people of speed limits, as well as warnings to look out for small animals on the roads (see examples in Figure 19).


*Figure 19. Road sign reminding drivers to look out for dung beetles (left) and tortoises (tight). Can be applied to all sensitive fauna*.

## 7.6 Conclusion of Construction Phase

The conclusion of any project is an essential, but often overlooked aspect of projects. This relates primarily to the cleaning up of the site once construction has concluded.

1. Construction sites must be cleared of all waste material, rubble, and debris associated with the construction phase at regular intervals during, and at the conclusion of the construction phase.
2. Revegetation of bare soil following construction is an essential part of concluding the construction phase of the project. This should be done with indigenous plant species that occur naturally in the surrounding environment. Refer to Botanical Specialist Report.
3. All drainage structures must be checked to ensure that there are no blockages or pollution that is blocking the free flow of water over the site; these checks will prevent erosion during and after the construction phase that could have potentially far-reaching implications beyond the footprint for the proposed development.

## 7.7 Operational Phase Impacts

Some operational phase impacts associated with residential dwellings are discussed below and assessed for Erf 301 in Table 8.

### *7.7.1 Loss of habitat for fauna during maintenance activities for roads and housing infrastructure.*

**Description:** The development on the site could alter the natural area on the property through changes in vegetation clearing associated with the maintenance and operation of housing and road infrastructure or possibly the introduction of alien plants. For the most part habitat alterations will be restricted to the immediate surroundings of the roads (i.e. road verge clearing) and houses (i.e. clearing/trimming vegetation around houses) but any impacts associated with alien plant invasions can have landscape level impacts. See also Botanical Specialist Report.

**Consequences of impact:**

1. A general loss of habitat for plants and fauna by excessive vegetation clearing around houses and roads.
2. The mismanagement of materials during routine maintenance of infrastructure can cause habitat loss (i.e. stockpiling/long term storage of materials on site rather than removing from site).
3. Uncontrolled alien plants can completely invade and transform natural habitats leading to a loss in associated biodiversity.

**Mitigation measures:**

1. Vegetation clearing along road verges should be kept to a minimum, and avoided in areas where it poses no risk to vehicles.
2. During routine maintenance of infrastructure on the property, adequate management of materials should be implemented to reduce any unnecessary habitat loss. For

example, all new building materials should be stored in areas within the disturbance footprint of the developments as far as possible to reduce additional damage to the natural (undisturbed) surroundings. Any old/removed building materials or rubble should be removed from site as soon as possible during maintenance activities and disposed of appropriately off-site. This will reduce the amount of additional space (natural surrounding habitat) lost or damaged for unnecessary storage of materials (Figure 20).

*Figure 20. Inappropriate disposal or storage of pavers used during road maintenance activities.*

3. It is a requirement by law than an alien and invasive plant management plan be developed and implemented on the property – see Botanical Specialist Report by B. Fouche (Confluent Environmental) and refer to the National Environmental Management: Biodiversity Act (NEMBA, Act No. 10 of 2004) and the Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1983).
4. No insect zappers should be allowed on site, nor the general application of insecticides around infrastructure. Ecofriendly repellents are readily available (i.e. citronella oil/lotions) and should be used instead.
5. Emergency & cleaning supplies for waste spillage or fires should be accessible at each development proposed development on the property (e.g., keep lime, spades, first aid, fire extinguishers, etc. handy). Rainwater tanks can also be a useful source of water to aid in extinguishing fires, provided the water is readily accessible.
6. All staff and guests to the property must be properly trained and made aware of activities that are not allowed on the property.
7. Limited additional vegetation clearing should take place on the property for activities, even if these are low impact, as the cumulative effects can be substantial (i.e. camping grounds, mountain biking/hiking trails, picnic areas).
8. The establishment of indigenous gardens or the complete absence of gardens (i.e. fully rehabilitating any disturbed areas) within the footprints of the development will promote natural biodiversity.

### *7.7.2 Disturbance of fauna due to noise and lighting associated with residential units.*

**Description:** The development on the site will alter the disturbance regime of the largely natural area on the property through changes in noise and artificial lighting levels. For the most part, these disturbances will be restricted to the immediate surroundings of the roads (i.e. traffic noise) and houses (i.e. people talking/shouting, music). However, this can have a significant impact on biodiversity and alter the way fauna use the landscape (i.e. the creation of a landscape of fear resulting in animals avoiding certain habitats/areas around human disturbances; insects attracted to lights decreases their survival, negatively impacts on the ecosystem services they provide and has negative knock-on consequences for their associate predators).

**Consequences of impact:**

1. The creation of a landscape of fear for fauna where areas of the property are avoided due to excessive anthropogenic activity, predominantly noise.
2. Light pollution, as discussed in Layout and Design Phase 7.4 above, acts as an attractant to many insects and associated predators, putting all at risk.

**Mitigation measures:**

1. Light pollution must be reduced and avoided wherever possible during the operational phase of the project. White LED lights have the worst negative effects for the environment, therefore dimmer lights with more natural warm light colours must be used, and no bright torches used outside the house at night unnecessarily.
2. Permanent lighting along roads must be avoided. Given the low traffic volumes expected for this development, road-side lighting along the access roads is unnecessary and will cause avoidable impacts on biodiversity, particularly increasing the risk of roadkill.
3. Noise should be minimised on the site and loud sirens/alarms should not be permitted unless there is an emergency. If security is a concern, then a silent alarm system should be implemented i.e. motion detection cameras.

### *7.7.3* Human-wildlife conflict

**Description:** Some wild animals are attracted to human developments, usually due to the presence of a resource that has become available within the footprint of the development (i.e. food attracting baboons, leftover scraps attracting wild animals if disposed in the surrounding environment). If any animal becomes habituated or loses their fear of humans, they risk becoming pests and problem animals (sometimes even posing a risk to humans) and often require control, in severe cases resulting in their harm or death. Keeping pets on the premises can also increase the potential for human-wildlife conflict as pets can fight or kill animals (i.e. cats are known to be devastating for indigenous wildlife, especially birds, small mammals and reptiles), or be attractive to some animals as prey (i.e. leopard are known to take domestic cats and dogs occasionally). Pets also run the risk of being harmed by wildlife (i.e. snake bites) which can lead to owners wanting to control or harm the natural fauna of the area.

**Consequences of impact:**

1. Intentional harm or death of problem or pest animals due to their negative effects on people (or pets) living on the property.
2. Unintentional harm or death of animals due to them consuming waste/food products which are bad for their health.
3. Pets causing death/harm to indigenous wildlife.
4. Changes in natural foraging and movement patterns of fauna across habitats within the landscape due to the presence of a favourable resource (usually food) near the development. This can have knock-on effects for the ecosystem services they provide and their associated predators.

**Mitigation measures:**

1. No feeding of wildlife is permitted, and no disposal/discarding of any food waste (bones, scraps, fruit pips/cores) within the surrounding environment is allowed.
2. All food waste or general waste should be kept in a secure location (i.e. a lockup cage or sealed outside room) which is not accessible to any wildlife.
3. All waste should be stored in a double-container fashion, in such a way that it does not serve as an attractant to wildlife attempting to access the secure location (i.e. all waste products put into closed/sealed rubbish bags/containers and then placed within larger sealed containers/bins).
4. Given that the waste area is secured against wildlife accessing it, allowances should still be made for the unlikely event that an animal does access the waste storage area, so that the waste is not easily accessed (i.e. use wildlife-proof dustbins/containers or lock the lids of larger containers). The double-container storage of waste (mentioned above) also prevents easy access of waste products to fauna, with all rubbish bags to be stored inside more solid containers. Examples of wildlife-proof bins are suggested in Figure 21.
5. All waste, particularly food waste, should be regularly removed from the property and disposed of appropriately to prevent the scent of old products increasing the attractiveness to the disposal area and surrounding development for wildlife.
6. Residents on the property should be limited in their ability to keep pets (i.e. how many pets and what types of pets). It is highly recommended that no cats be allowed on the property as they are known to actively hunt small animals and can have detrimental effects on the wildlife of an area (see Figure 22). If dogs are kept on the property, they should be contained within the vicinity of the residence areas and not be allowed to wander the entire property unsupervised as they may hunt and kill fauna species or be exposed to risks from wildlife fauna.

*Figure 21. Wildlife-proof garbage disposal container options. Large containers with a one-way shoot to dispose of garbage (left): the top lid is connected to a smaller container which swivels up when the lid is opened to block access to the larger bin and its contents below, but when the lid is closed this bin swivels down to drop the garbage into the larger container. Locking mechanisms and handles on bins (middle and right) can also be used to successfully keep wildlife out*.

*Figure 22. Animals killed by one house cat in one year. Article published in National Geographic (https://www.nationalgeographic.co.uk/animals/2020/09/the-232-animals-in-this-photo-were-killed-by-house-cats-in-just-one-year).*

*Table 8. Impact assessment results for the Construction and Operational Phase impacts of the proposed development on Erf 301. The description, consequences and mitigation measures for each impact can be found in text under Sections 7.5 and 7.7 above.*

| Impact | Nature | Duration | Extent | Intensity | Probability | Significance | Nature | Duration | Extent | Intensity | Probability | Significance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Without Mitigation | | | | | | With Mitigation | | | | | |
| 7.5.1 Loss of habitat within development footprint | Negative | On-going | Limited | High | Certain / definite | Moderate - negative | Negative | On-going | Very limited | Low | Certain / definite | Minor - negative |
| 7.5.2 Fauna and habitat negatively affected by construction management | Negative | Medium term | Limited | High | Likely | Minor - negative | Negative | Immediate | Very limited | Negligible | Rare / improbable | Negligible - negative |
| 7.5.3 Harm to fauna from earthworks and construction | Negative | Short term | Limited | Moderate | Probable | Minor - negative | Negative | Immediate | Very limited | Negligible | Rare / improbable | Negligible - negative |
| 7.7.1 Loss of habitat for fauna during maintenance activities | Negative | Permanent | Limited | Moderate | Likely | Minor - negative | Negative | Immediate | Very limited | Negligible | Unlikely | Negligible - negative |
| 7.7.2 Disturbance of fauna due to noise and lighting | Negative | Permanent | Limited | Moderate | Probable | Minor - negative | Negative | Immediate | Very limited | Negligible | Rare / improbable | Negligible - negative |
| 7.7.3 Human-wildlife conflict | Negative | Permanent | Limited | High | Almost certain / Highly probable | Moderate - negative | Negative | Immediate | Very limited | Negligible | Rare / improbable | Negligible - negative |

# 8. DISCUSSION AND CONCLUSION

Erf 301 has largely been undisturbed by anthropogenic activity and despite urban development in the surrounding areas it remains connected to other natural areas in the landscape. The property has suitable habitat for a range of fauna SCC and has been scored a High SEI rating.

While two non-perennial rivers are present on site, the development footprint falls outside the aquatic buffer areas (as determined by the Aquatic Compliance Statement) and therefore the development is expected to have no effect on the aquatic habitat on site. A few fauna SCC possibly occur and utilise this stream habitat, and following the aquatic compliance statement, the development is expected to have little to no impact on these fauna.

The forest/thicket vegetation is suitable habitat for most of the highlighted SCC on Erf 301. The development will impact these SCC most notably through habitat loss in the housing/road footprints. However, the SDP already makes use of stilts/pylons to raise sections of the development, thereby reducing the permanent footprint on the property and minimizing habitat loss for many of the SCC (i.e. golden moles). Ultimately the area lost to this development equated to 2% of the property size.

Provided the mitigation measures are adhered to in this report, the development of a residential dwelling and pods adheres to the guidelines for the high SEI rating of the property and is unlikely to affect fauna of the area significantly. It is the specialist's opinion that this development (as specified in the SDP) is a suitable land use for Erf 301 given the low levels of habitat loss, the low impact expected from a residential dwelling of this nature and the resilience of many SCC to adapt and remain on site given this development type – provided all mitigation measures are adhered to.

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## APPENDIX 1: SCC IDENTIFIED FROM PUBLIC PLATFORMS.

SCC were included or excluded from further analysis in this report based on expert interpretation for the presence/absence of key landscape and habitat features on site. See Section 4.2 Assumptions and Limitations for more information.

| Taxa | Species | Common name | Regional, Global Assessment status | Source | Assessed in report Y/N |
|---|---|---|---|---|---|
| **Avifauna** | *Alcedo semitorquata* | Half-collared Kingfisher | NT, LC | SABAP2 | N |
| | *Aquila verreauxii* | Verreaux's Eagle | VU, LC | SABAP2 | N |
| | *Ardenna grisea* | Sooty Shearwater | NT, NT | SABAP2 | N |
| | *Bradypterus sylvaticus* | Knysna Warbler | VU, VU | SABAP2 | Y |
| | *Buteo trizonatus* | Forest Buzzard | LC, NT | SABAP2 | Y |
| | *Campethera notata* | Knysna Woodpecker | NT, NT | SABAP2 | Y |
| | *Circus maurus* | Black Harrier | EN, EN | SABAP2 | N |
| | *Circus ranivorus* | African Marsh Harrier | EN, LC | SABAP2 | Y |
| | *Crithagra leucoptera* | Protea Canary | NT, NT | SABAP2 | Y |
| | *Falco biarmicus* | Lanner Falcon | VU, LC | SABAP2 | N |
| | *Geocolaptes olivaceus* | Ground Woodpecker | LC, NT | SABAP2 | N |
| | *Grus paradisea* | Blue Crane | NT, VU | SABAP2 | N |
| | *Hydroprogne caspia* | Caspian Tern | VU, LC | SABAP2 | Y |
| | *Morus capensis* | Cape Gannet | VU, EN | SABAP2 | N |
| | *Neotis denhami* | Denham's Bustard | VU, NT | SABAP2 | N |
| | *Oxyura maccoa* | Maccoa Duck | NT, EN | SABAP2 | N |
| | *Pelecanus onocrotalus* | Great White Pelican | VU, LC | SABAP2 | N |
| | *Phalacrocorax capensis* | Cape Cormorant | EN, EN | SABAP2 | N |
| | *Phoenicopterus roseus* | Greater Flamingo | NT, LC | SABAP2 | N |
| | *Polemaetus bellicosus* | Martial Eagle | EN, EN | SABAP2 | N |
| | *Stephanoaetus coronatus* | Crowned Eagle | VU, NT | SABAP2 | Y |
| **Mammal** | *Amblysomus corriae* | Fynbos Golden Mole | NT | Virtual Museum | Y |
| | *Aonyx capensis* | African Clawless Otter | NT | Virtual Museum | Y |
| | *Chlorotalpa duthieae* | Duthie's Golden Mole | VU | Virtual Museum | Y |
| | *Cistugo seabrae* | Angolan Wing-gland Bat | NT | Virtual Museum | N |
| | *Damaliscus pygargus pygargus* | Bontebok | VU | Virtual Museum | N |
| | *Panthera pardus* | Leopard | VU | Virtual Museum | Y |
| | *Pelea capreolus* | Vaal Rhebok | NT | Virtual Museum | N |
| | *Poecilogale albinucha* | African Striped Weasel | NT | Virtual Museum | N |

| | | | | | |
|---|---|---|---|---|---|
| | *Sensitive species 8* | - | VU | Virtual Museum | Y |
| **Invertebrate** | *Aloeides pallida littoralis* | Giant russet | NT | Virtual Museum | Y |
| | *Ceratogomphus triceraticus* | Cape Thorntail | NT | Virtual Museum | Y |
| | *Ecchlorolestes nylephtha* | Queen Malachite | NT | Virtual Museum | Y |
| | *Syncordulia gracilis* | Yellow Presba | VU | Virtual Museum | Y |
| | *Syncordulia venator* | Mahogany Presba | VU | Virtual Museum | Y |
| **Amphibian** | *Afrixalus knysnae* | Knysna Leaf-folding Frog | EN | Virtual Museum | Y |

## APPENDIX 2: AVIFAUNA SPECIES OBSERVED ON ERF 301

| Common name | Scientific name |
|---|---|
| Cape Robin-Chat | *Cossypha caffra* |
| Cape White-eye | *Zosterops virens* |
| Forest Canary | *Crithagra scotops* |
| Fork-tailed Drongo | *Dicrurus adsimilis* |
| Jackal Buzzard | *Buteo rufofuscus* |
| Knysna Turaco | *Tauraco corythaix* |
| Sombre Greenbul | *Andropadus importunus* |
| Southern Double-collared Sunbird | *Cinnyris chalybeus* |

## APPENDIX 3: MAMMAL SPECIES OBSERVED ON ERF 301

| Order | Family | Common name | Scientific name | Notes |
|---|---|---|---|---|
| - | - | Sensitive Species 8 | - | Suspected from small spoor seen on site |
| rtiodactyla | Bovidae | Bushbuck | *Tragelaphus sylvaticus* | Seen on site, Camera trap images from owner |
| Afrosoricida | Chrysochloridae | Golden Mole | *Chlorotalpa duthieae* OR *Amblysomus corriae* | Sub surface tunnels typical of SCC seen |
| Artiodactyla | Suidae | Southern Bushpig | *Potamochoerus larvatus* | Camera trap images from owner |
| Carnivora | Canidae | Domestic dog | Canis familiaris | Camera trap images from owner |
| Carnivora | Viverridae | Cape/Large spotted Genet | *Genetta tigrina* | Camera trap images from owner |
| Rodentia | Hystricidae | Cape Porcupine | Hystrix africaeaustralis | Camera trap images from owner |

## APPENDIX 4: INVERTEBRATE SPECIES OBSERVED ON ERF 301

| Order | Family | Common name | Scientific name |
|---|---|---|---|
| Araneae | Nephilidae | Blackleg Orbweaver | *Trichonephila fenestrata* |
| Araneae | Salticidae | Jumping Spider | - |
| Hemiptera | Apidae | Honey Bee | *Apis mellifera* |
| Lepidoptera | Nymphalidae | Cape Autumn Widow | *Dira clytus* |
| Lepidoptera | Nymphalidae | Common Bush Brown | *Bicyclus safitza* |
| Odonata | Lestidae | Smoky Spreadwing | *Lestes virgatus* |
| Odonata | Synlestidae | True Malachites | *Chlorolestes sp.* |

## APPENDIX 5: AMPHIBIAN SPECIES OBSERVED ON ERF 301

| Family | Common name | Scientific name |
|---|---|---|
| Pyxicephalidae | Clicking Stream Frog | *Strongylopus grayii* |

## APPENDIX 6: SITE ECOLOGICAL IMPORTANCE METHODS

The site ecological importance (SEI) is defined and calculated as highlighted as per the Species Environmental Assessment Guideline (SANBI, 2020), where SEI is a function of biodiversity importance (BI) and receptor resilience (RR) such that: SEI = BI + RR.

BI is further defined as a function of conservation importance (CI) and habitat functional integrity (FI), with BI = CI + FI, and is determined by means of a matrix (Table 9).

SEI can therefore be fully understood as SEI = (CI + FI) + RR, where:

**Conservation Importance (CI):** 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. *Most features included in CI are provided by the screening tool but are evaluated at a finer scale following field work at the site.

**Functional Integrity (FI):** A measure of the ecological condition of the impact receptor (i.e., habitat type) as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.

**Receptor Resilience (RR):** The intrinsic capacity of the receptor (i.e., habitat type or SCC) to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.

Table 9. Matrix to calculate the biodiversity importance (BI) of a given habitat type identified from desktop and field assessments.

| **Biodiversity Importance** | | **Conservation Importance** | | | | |
|---|---|---|---|---|---|---|
| | | Very High | High | Medium | Low | Very Low |
| **Functional Integrity** | 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 |

The SEI is derived for each habitat type or SCC within a project site by making use of two matrixes: first to calculate the BI (using Table 9) and then the SEI (Table 10).

SEI is therefore specific to the proposed development and can only be compared between alternative layouts for the same proposed development, but not between different developments.

*Table 10. Matrix to calculate site ecological importance (SEI) of a given habitat type identified from desktop and field assessments.*

| **Site Ecological Importance** | | **Biodiversity Importance** | | | | |
|---|---|---|---|---|---|---|
| | | Very High | High | Medium | Low | Very Low |
| **Receptor Resilience** | 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 |



confluent

## APPENDIX 7: IMPACT ASSESSMENT METHODS

Criteria are ascribed for each predicted impact. These include the intensity (size or degree scale), which also includes the type of impact, being either a positive or negative impact; the duration (temporal scale); and the extent (spatial scale), as well as the probability (likelihood). The methodology is quantitative, whereby professional judgement is used to identify a rating for each criterion based on a seven-point scale (Table 11) and the significance is auto-generated using a spreadsheet through application of the calculations.

For each predicted impact, certain criteria are applied to establish the likely **significance** of the impact, firstly in the case of no mitigation being applied and then with the most effective mitigation measure(s) in place.

These criteria include the **intensity** (size or degree scale), which also includes the **nature** of impact, being either a positive or negative impact; the **duration** (temporal scale); and the **extent** (spatial scale). These numerical ratings are used in an equation whereby the **consequence** of the impact can be calculated. Consequence is calculated as follows:

**Consequence = type x (intensity + duration + extent)**

To calculate the significance of an impact, the **probability** (or likelihood) of that impact occurring is applied to the consequence.

**Significance = consequence x probability**

Depending on the numerical result, the impact would fall into a significance category as negligible, minor, moderate or major, and the type would be either positive or negative.

When assessing impacts, broader considerations are also considered. These include the level of confidence in the assessment rating; the reversibility of the impact; and the irreplaceability of the resource as set out in (Table 12, Table 13, and Table 14), respectively.

*Table 11. Assessment criteria for the evaluation of impacts*

| Criteria | Numeric Rating | Category | Description |
|---|---|---|---|
| Duration | 1 | Immediate | Impact will self-remedy immediately |
| | 2 | Brief | Impact will not last longer than 1 year |
| | 3 | Short term | Impact will last between 1 and 5 years |
| | 4 | Medium term | Impact will last between 5 and 10 years |
| | 5 | Long term | Impact will last between 10 and 15 years |
| | 6 | On-going | Impact will last between 15 and 20 years |
| | 7 | Permanent | Impact may be permanent, or in excess of 20 years |
| Extent | 1 | Very limited | Limited to specific isolated parts of the site |
| | 2 | Limited | Limited to the site and its immediate surroundings |
| | 3 | Local | Extending across the site and to nearby settlements |
| | 4 | Municipal area | Impacts felt at a municipal level |
| | 5 | Regional | Impacts felt at a regional level |
| | 6 | National | Impacts felt at a national level |
| | 7 | International | Impacts felt at an international level |
| Intensity | 1 | Negligible | Natural and/ or social functions and/ or processes are negligibly altered |
| | 2 | Very low | Natural and/ or social functions and/ or processes are slightly altered |

| Criteria | Numeric Rating | Category | Description |
|---|---|---|---|
| | **3** | **Low** | Natural and/ or social functions and/ or processes are somewhat altered |
| | **4** | **Moderate** | Natural and/ or social functions and/ or processes are moderately altered |
| | **5** | **High** | Natural and/ or social functions and/ or processes are notably altered |
| | **6** | **Very high** | Natural and/ or social functions and/ or processes are majorly altered |
| | **7** | **Extremely high** | Natural and/ or social functions and/ or processes are severely altered |
| **Probability** | **1** | **Highly unlikely / None** | Expected never to happen |
| | **2** | **Rare / improbable** | Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere |
| | **3** | **Unlikely** | Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur |
| | **4** | **Probable** | Has occurred here or elsewhere and could therefore occur |
| | **5** | **Likely** | The impact may occur |
| | **6** | **Almost certain / Highly probable** | It is most likely that the impact will occur |
| | **7** | **Certain / Definite** | There are sound scientific reasons to expect that the impact will definitely occur |

*Table 12. Definition of confidence ratings*.

| Category | Description |
|---|---|
| **Low** | Judgement is based on intuition |
| **Medium** | Determination is based on common sense and general knowledge |
| **High** | Substantive supportive data exists to verify the assessment |

*Table 13. Definition of reversibility ratings.*

| Category | Description |
|---|---|
| **Low** | The affected environment will not be able to recover from the impact - permanently modified |
| **Medium** | The affected environment will only recover from the impact with significant intervention |
| **High** | The affected environmental will be able to recover from the impact |

*Table 14. Definition of irreplaceability ratings*.

| Category | Description |
|---|---|
| **Low** | The resource is not damaged irreparably or is not scarce |
| **Medium** | The resource is damaged irreparably but is represented elsewhere |
| **High** | The resource is damaged irreparably and is not represented elsewhere |