

**TERRESTRIAL BIODIVERSITY, TERRESTRIAL FAUNAL AND  
AVIFAUNAL SPECIES COMPLIANCE STATEMENT REPORT FOR  
THE UPGRADE OF THE RAW WATER ABSTRACTION WORKS  
AND PUMP STATION ON PORTION 15, 24 AND 25 OF THE FARM  
KLIPHEUVEL, MOSSEL BAY LOCAL MUNICIPALITY**

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**September 2025**



**Prepared for:**

Sharples Environmental Services cc (SES)

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## Specialist details and expertise

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### Qualifications

- PhD (Zoology), University of Johannesburg (2015 - 2017)
- MSc (Zoology), Stellenbosch University (2011 - 2013)
- BSc Honours (Zoology) cum laude, Stellenbosch University (2010)
- BSc (Biodiversity and Ecology) cum laude, Stellenbosch University (2007 - 2009)

### Expertise

- 28 years of in-the-field naturalist experience involving all faunal groups
- Zoologist with 17 years of professional experience
- 14 Peer-reviewed publications in high impact national and international scientific journals on the patterns and processes which drive and maintain faunal biodiversity, as well as on aspects of faunal biology and ecology
- Five IUCN Red List assessments

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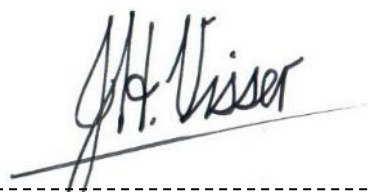
- Over 50 faunal specialist assessments
- Involved in the Southern African Bird Atlas Project 2 (SABAP2)
- Contributor on the National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria.

## **Declaration of independence by the independent person who compiled a specialist report or undertook a specialist process**

I, Dr Jacobus Hendrik Visser, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations and any specific environmental management Act;
- have no and will not have any vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence.



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## **TERRESTRIAL BIODIVERSITY, TERRESTRIAL FAUNAL AND AVIFAUNAL SPECIES COMPLIANCE STATEMENT REPORT FOR THE UPGRADE OF THE RAW WATER ABSTRACTION WORKS AND PUMP STATION ON PORTION 15, 24 AND 25 OF THE FARM KLIPHEUVEL, MOSSEL BAY LOCAL MUNICIPALITY**

### **1. Introduction**

The Mossel Bay Local Municipality is proposing the upgrading of the raw water abstraction works and pump station on Portion 15, 24 and 25 of the Farm Klipheuwel, Mossel Bay (hereafter referred to as the “study area” or “site”). The proposed development site is at the existing raw water abstraction works and pump station (in operation since 1980), on the Moordkuil River bank located near Mossel Bay.

The existing raw water abstraction works was designed to abstract 800 litres per second of water from the Moordkuil River and to pump the water to the nearby Klipheuwel Dam for storage. The Klipheuwel Dam is one of four reservoirs from which Mossel Bay residents receive their water. Only one of the existing two axial pumps is currently operational, which means that the facility is operating at half its original intended design capacity. The existing axial pump station design is outdated and it is not able to be maintained / repaired due to the unavailability of parts and other maintenance restrictions (unable to remove parts easily, axial pumps are not protected from silt and are subject to repeated wear and tear). It is therefore required to upgrade the existing raw water abstraction works and pump station with more modern technology that will be low maintenance, cost effective and efficient (able to abstract water at the full original intended design capacity of 800 litres per second and low maintenance).

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The proposed development therefore requires the upgrade of the existing raw water abstraction works and pump station. In summary, the following is scope of works is proposed:

- The construction of a new reinforced concrete inlet hopper structure for the pump station;
- The construction of pipe protection ramp structure for the pipes into the existing pump station building.
- The reinstatement of the existing gravel access road from Blesbok Road to the site (180m long and 3.6m wide) by reinstating the existing gravel road, within the same development footprint, which has become almost impassable due to water ingress into the existing layerworks (farmers leaking irrigation channel). The final road is proposed to be 3m wide. 300mm is proposed on each side for the bottom layerworks that have to be wider than the top layerworks to transfer vehicle loads to the soil. The proposed affected area will be 3.6m but the final road will be 3m wide.
- A new concrete road (in an already disturbed area mostly). The new concrete road proposed is approximately 500m<sup>2</sup> and ranges in width from 3m to 7.4m (in order for a 5 ton truck to turn around);
- Construction of an access ramp to the hopper;
- The construction of a new water meter chamber next to the pump station. The development footprint of the water meter chamber is approximately 20m<sup>2</sup>;
- Replacing of three air-valves and construction of new chambers around the air-valves;
- Installation of new pipework, pumps and motor control centers;
- Installation of other mechanical items such as cover, trash-racks, etc.
- Upgrading of the electrical supply and breakers within the existing pump station building;
- Installation of a sediment barrier downstream of the crossing to curb sediment generation in the river;
- Final reinstatement of the river bed to the requirements of the CEMP.

The concrete inlet hopper structure is proposed to be anchored to the bedrock by means of piling foundations. In order to install the piles, a pile rig needs to obtain access in the correct position. It is for this reason that a temporary platform structure is required to be constructed within the Moordkuil River. The area where the inlet hopper (and the associated pile foundations) is proposed to be constructed is below the 1:10 year floodline, within the river. It is therefore required to construct a coffer dam with soil infill material behind the sheet piling around the area where the inlet hopper structure is proposed to be built in order to have a dry area for construction and concrete setting. In order to install the inlet hopper structure within the river, a temporary 75m<sup>2</sup> platform must be constructed for a piling rig to be able to install the piles into the bedrock. The piles are required to anchor the new inlet hopper structure and will likely be 450mm in diameter drilled in places up to 10m deep into bedrock.

All of the above, except for the proposed temporary platform, cement access road, new water meter chamber and sediment barrier, are proposed within the existing development footprint. It is also proposed to demolish the existing underwater cement bag wall, existing above water concrete steps and the existing underwater concrete plinths for the existing pipes. Two development alternatives have been provided for the proposed layout of the above scope of works with the originally provided Alternative layout B represented throughout this report and the subsequently updated Preferred Alternative layout A considered in Sections 11 and 12. While largely similar in the spatial context of the installation of infrastructure, the two alternatives considers different placements of three potential site camp locations.

Blue Skies Research was appointed by Sharples Environmental Services cc (SES) on behalf of the Mossel Bay Local Municipality to perform the required terrestrial biodiversity, terrestrial faunal and avifaunal assessment of the study area (see Sections 2 and 3). The current report represents a Compliance Statement for the site and proposed development in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment (EIA) Regulations 2014 (Government Notice (GN) 984), as amended.

## 2. Terms of Reference

### 2.1. General legislature pertaining to this report

This terrestrial biodiversity, terrestrial faunal and avifaunal assessment report is compiled in accordance with the following guidelines:

- *Department of Environmental Affairs and Development Planning (DEA&DP) Guidelines for Involving Biodiversity Specialists in the EIA Process* (Brownlie, 2005).
- *Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes, Government Notice No. 320* (Gazetted 20 March 2020).
- *Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species, Government Notice No. 1150* (Gazetted 30 October 2020).
- South African National Biodiversity Institute (SANBI). 2020. *Species Environmental Assessment Guideline. Guidelines for the implementation of the terrestrial fauna and terrestrial flora species protocols for environmental impact assessments in South Africa*. South African National Biodiversity Institute, Pretoria. Version 2.1 2021.

### 2.2 Other sources consulted

Other sources pertaining to this report are as follows:

- IUCN. 2021. The IUCN Red List of Threatened Species. Version 2021-3. <https://www.iucnlist.org>. Accessed on 15 May 2025.
- *National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Publication of lists of critically endangered, endangered, vulnerable and protected species, Government Notice No. 2007* (Gazetted 14 December 2007).

### 3. Reporting protocol

The DFFE Screening Tool Report generated for the project footprint (dated 09/06/2026) identifies the site as being of an overall “High” sensitivity under the “Relative Animal Species Sensitivity Theme”. This follows from the projected and possible occurrence of one mammal, eight avifaunal and one invertebrate Species of Conservation Concern (SCC) (see **Table 1**). The current report therefore assesses the presence or likely presence of these mammal, avifaunal and invertebrate SCC (as well as other possible SCC within these faunal groups, see Section 9) within the study area in accordance with the protocols outlined in the Species Environmental Assessment Guideline (SANBI, 2020).

In addition, the DFFE Screening Tool Report identifies the site as being of an overall “Very High” sensitivity under the “Relative Animal Terrestrial Biodiversity Theme” due to the overlap of footprints with terrestrial CBA1 and CBA2 (also see Subsection 4.3). These biodiversity features correspond to the mapped presence of “Critically Endangered” Garden Route Granite Fynbos and Groot Brak Dune Strandveld vegetation units. The presence and integrity of these biodiversity features is discussed in Section 12.

**Table 1** List of Species of Conservation Concern (SCC) identified in the DFFE Screening Tool Report (<https://screening.environment.gov.za/screeningtool/>). For each, the listed sensitivity (possibility of occurrence within the study area), scientific name and common name is shown, along with its current IUCN status. The name of “Sensitive Species 13” is purposefully omitted, given the sensitivity of this species.

Sensitivity	Species	Common name	IUCN status
High	<i>Hydroprogne caspia</i>	Caspian Tern	Least Concern
High	<i>Bradypterus sylvaticus</i>	Knysna Warbler	Vulnerable
High	<i>Polemaetus bellicosus</i>	Martial Eagle	Endangered
High	<i>Circus ranivorus</i>	African Marsh-harrier	Least Concern
High	<i>Neotis denhami</i>	Denham's Bustard	Near-Threatened
High	<i>Pelecanus onocrotalus</i>	Great White Pelican	Least Concern
High	<i>Stephanoaetus coronatus</i>	Crowned Eagle	Near-Threatened
Medium	<i>Afrotis afra</i>	Southern Black Bustard	Vulnerable
Medium	<i>Sensitive Species 13</i>	Sensitive Species 13	Least Concern

Medium

*Aneuryphymus montanus*

Yellow-winged Agile Grasshopper

Vulnerable

## 4. Overview of the study area

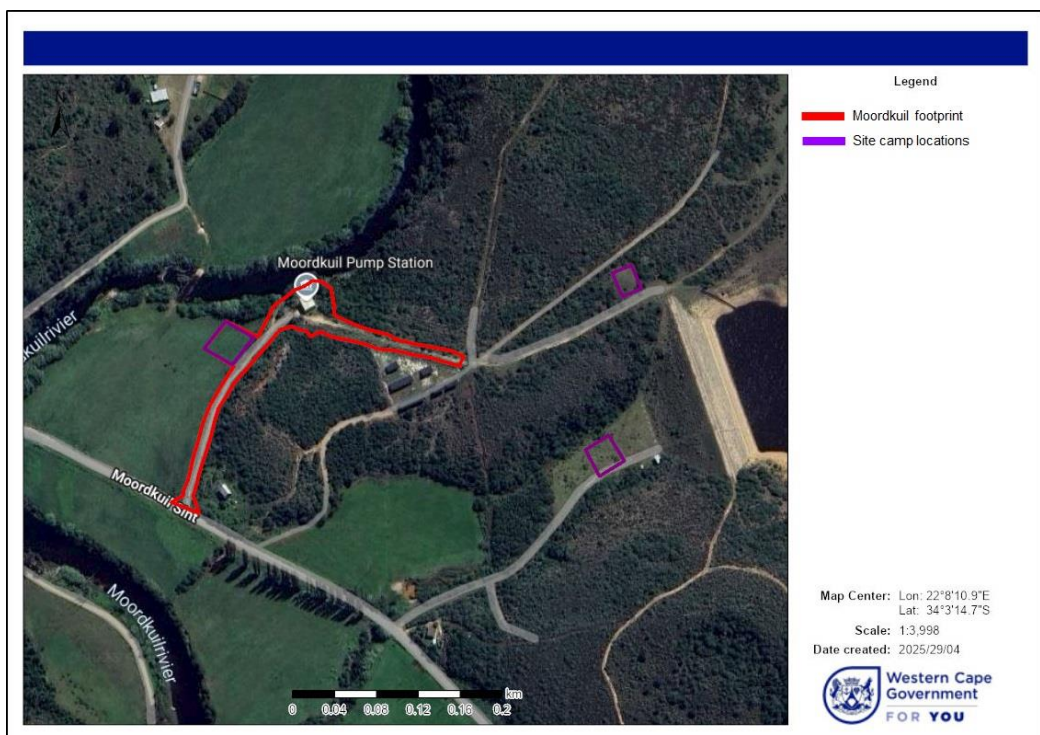
### 4.1 Geographic location

The project footprint encompasses the roads, buildings and infrastructure of the raw water abstraction works and pump station on the southern bank of the Moordkuil River on Portions 15, 24 and 25 of the farm Klipheuvel, Mossel Bay (**Figures 1**). The site is located around 3 kilometres north-west of Kleinbrak, and is bordered by the Moordkuil Sint Road to the south-west.

Because the original site camp location identified for the project is located on the floodplain of the Moordkuil River and therefore fall under freshwater constraints, two other alternative site camp locations have been identified under Alternative layout B (**Figure 2**). Under Preferred Alternative layout A, all three alternative site camp locations are located away from the floodplain in terrestrial areas (Section 11 and 12). Importantly, the project footprint and alternative site camp locations follow already cleared or modified areas which are located extra-limitally to remaining natural habitats in the broader landscape.



**Figure 1** Spatial location of the project footprints relative to surrounding built up areas and main roads on a broad scale (map generated in Cape Farm Mapper version 3.0, Western Cape Department of Agriculture).



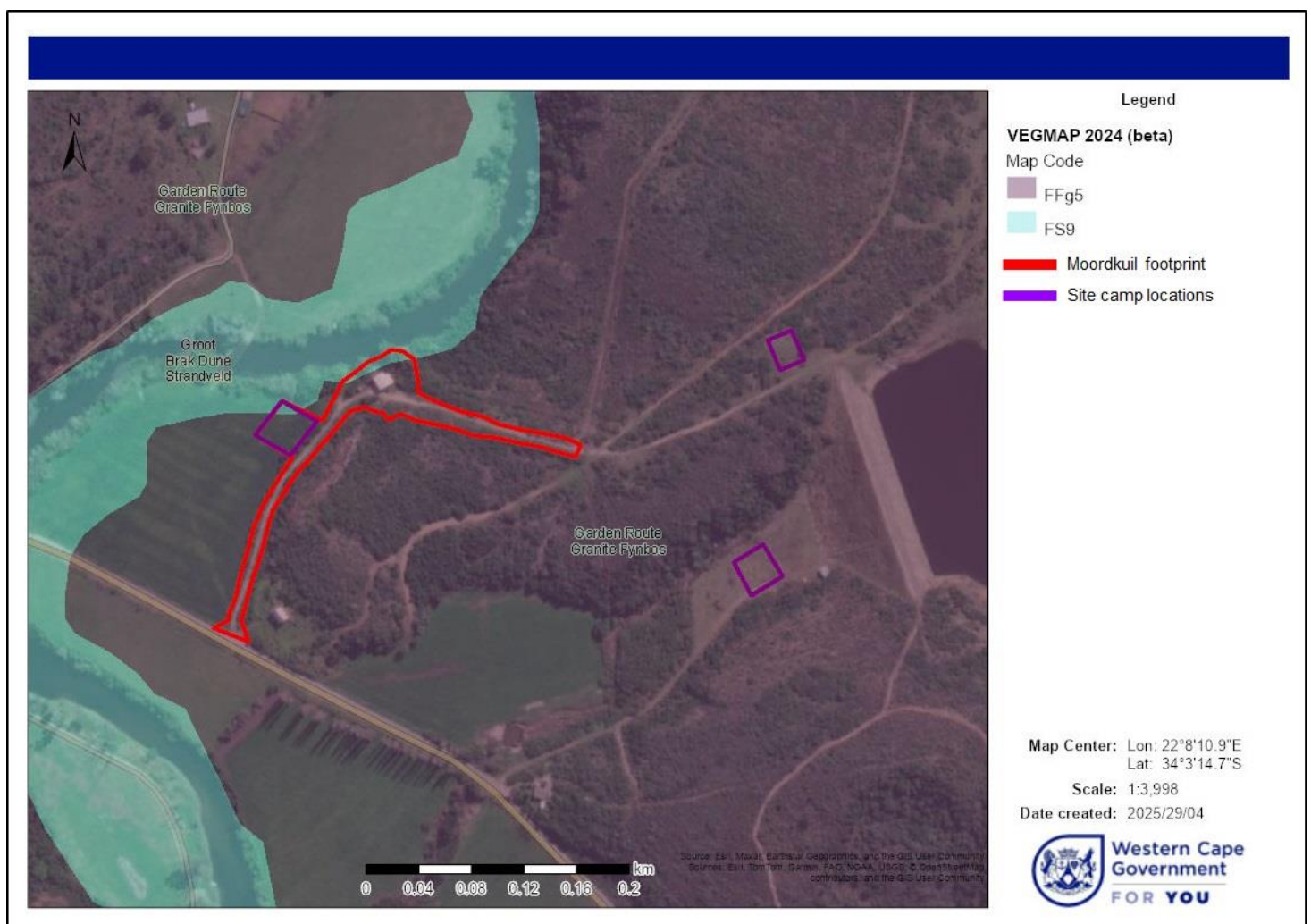
**Figure 2** Spatial location of the project footprints relative to surrounding built up areas and main roads at a finer scale (map generated in Cape Farm Mapper version 3.0, Western Cape Department of Agriculture).

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## 4.2 Vegetation

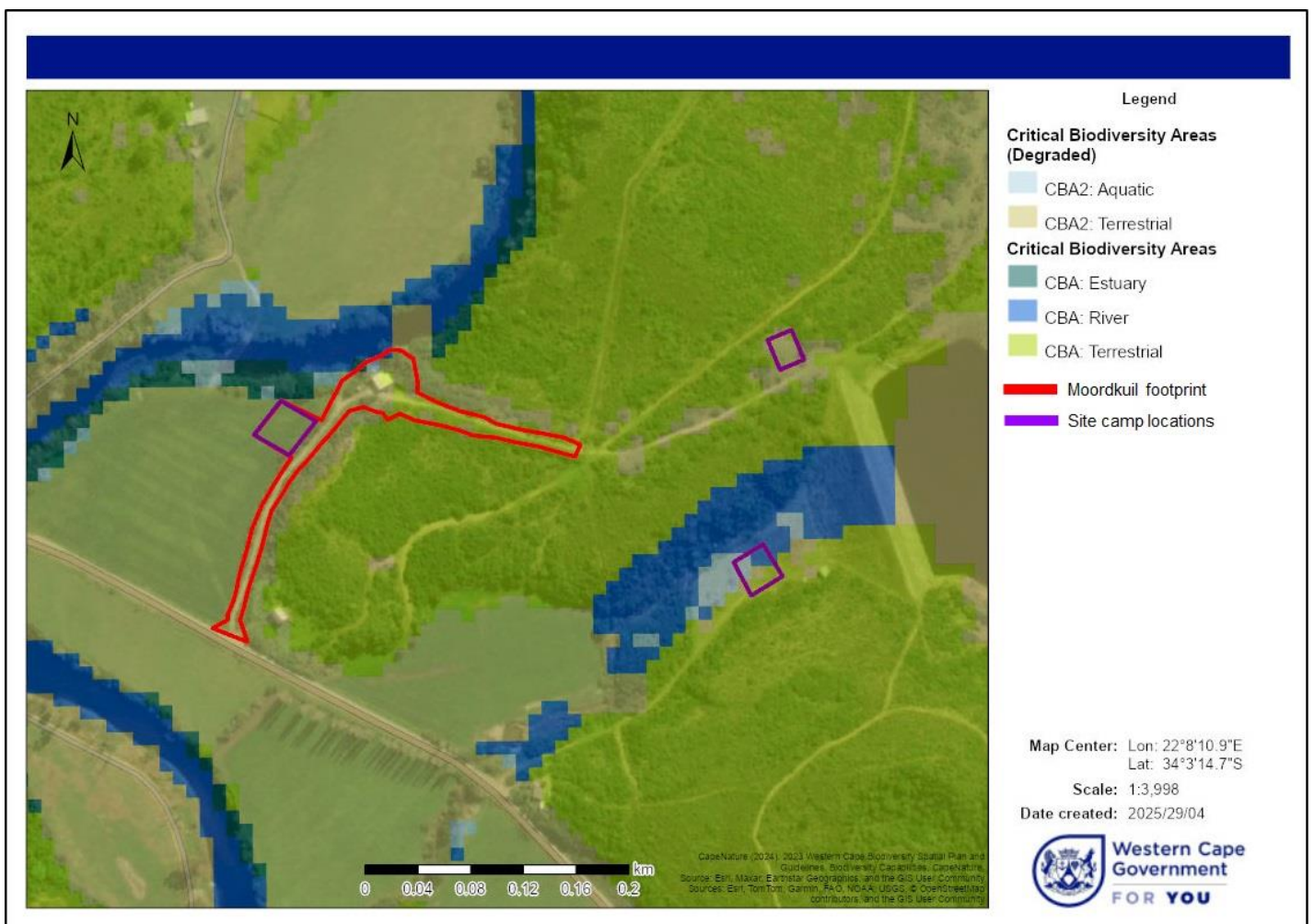
Vegetation across study area landscape is mapped as Garden Route Granite Fynbos which is currently classified as “Critically Endangered” (VEGMAP 2024 Beta; **Figure 3**). Part of the project footprint also overlaps the Moordkuil River Channel which is mapped as harbouring Groot Brak Dune Strandveld vegetation. Importantly, the project footprint (including the alternative site camp locations) currently overlap existing cleared or modified areas with no remaining natural vegetation (see Section 7).



**Figure 3** Vegetation types across the project footprints (VEGMAP 2024 Beta; map generated in Cape Farm Mapper version 3.0, Western Cape Department of Agriculture).

### 4.3 Critical Biodiversity Areas (CBAs)

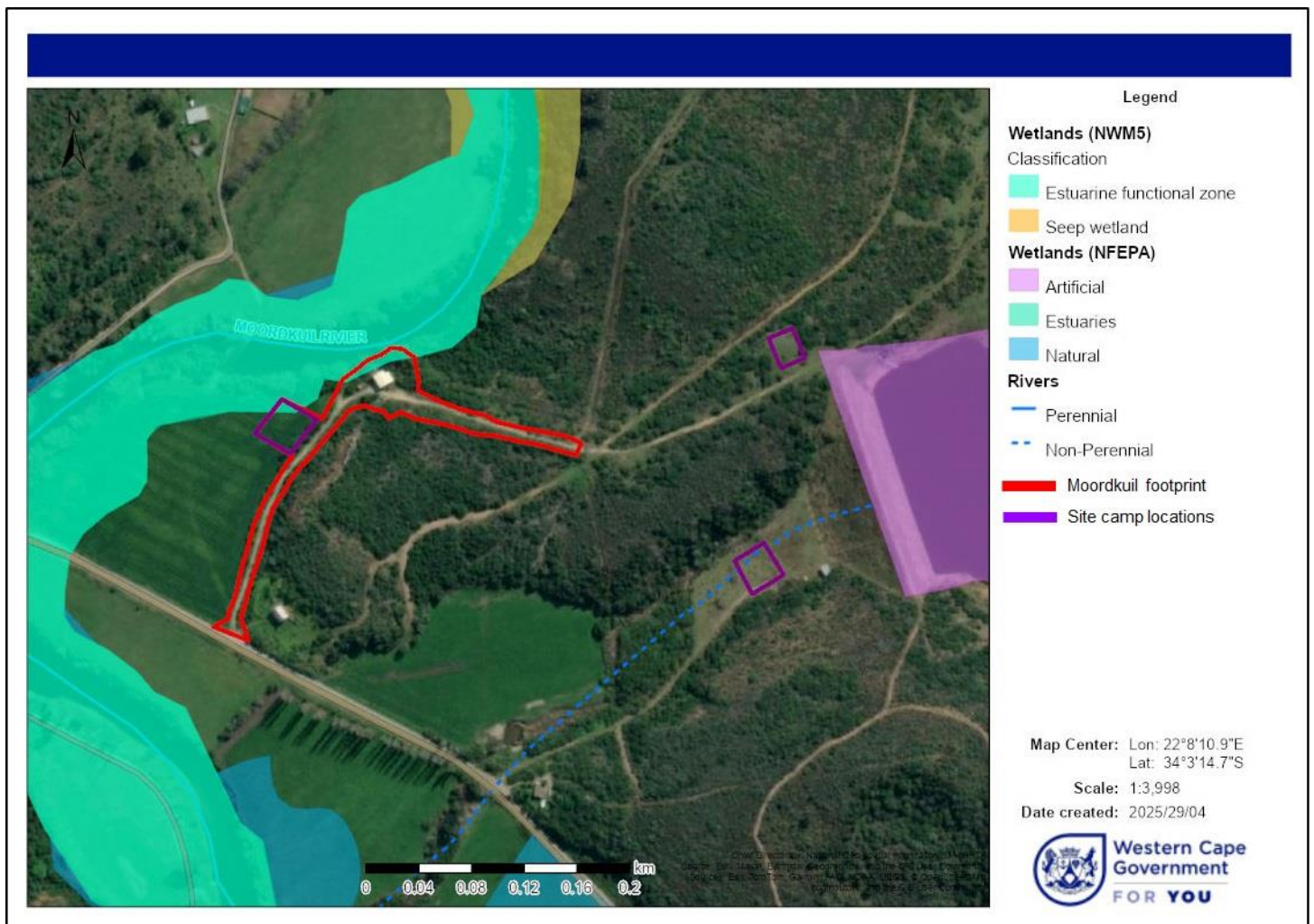
Critical Biodiversity Areas (CBAs) are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan (Purves and Holmes, 2015). The larger part of the project footprint currently overlaps with areas regarded as degraded terrestrial and aquatic CBA2 owing to the open and transformed nature of these parts (**Figure 4**). Only a small section of the northern access road is mapped as a terrestrial CBA1, owing to the previous presence of Garden Route Granite Fynbos which has subsequently been cleared to form a fire break.



**Figure 4** Spatial locations of Critical Biodiversity Areas (CBAs) overlapping with the project footprints (information sourced from Cape Farm Mapper version 3.0, Western Cape Department of Agriculture).

#### 4.4 Wetlands and rivers

Only a small part of the project footprint and western site camp location (under alternative layout B) overlap with the estuarine functional zone of the perennial Moordkuil River (**Figure 5**). Furthermore, the south-western site camp location intersects a non-perennial river centreline of the drainage below the artificial Klipheuwel Dam (**Figure 5**).



**Figure 5** Distribution of wetland areas relative to the project footprints (map generated in Cape Farm Mapper version 3.0, Western Cape Department of Agriculture).

## 5. Study methodology

### 5.1 Study aims

This study represents an assessment of the terrestrial faunal and avifaunal diversity and abundances, -habitat composition, ecosystem dynamics and potential occurrence of mammal, avifaunal and invertebrate (and other) SCC within the study area. As such, the aims of this investigation were to:

- 1.) Assess, define and create a spatial rendering of available faunal habitats across the study area based on information gathered during the field survey as well as through a desktop assessment using the latest satellite imagery,
- 2.) compile a complete faunal desktop species list (including mammals and avifauna) for the study area based on a thorough desktop assessment so as to assess the presence of any of the listed SCC (**Table 1**) as well as any additional SCC within these faunal groups,
- 3.) compile a faunal species list (including mammals, avifauna and butterflies) within the study area through field surveying so as to assess the possibility of occurrence of the SCC retrieved in the desktop assessment (based on appropriate sampling methods, as well as the presence of suitable habitat for these species), or any additional SCC which are present on the site, and
- 4.) generate spatial occurrence maps for the recovered faunal species within the study area to assess the spatial extent of areas supporting higher levels of diversity, and SCC sub-populations and habitats which may be of conservation concern.

### 5.2 Desktop assessment

To assess the possible occurrence of the listed (**Table 1**) as well as any additional mammal and avifaunal SCC, a desktop assessment was performed to create a representative desktop species list for these faunal groups. Given

the low number of records for grasshopper species, the presence or absence of the Yellow-winged Agile Grasshopper could only be evaluated during the field survey.

### 5.2.1 Mammals

The desktop species list for mammals (**Appendix A**) was constructed with reference to the distributional data available in Skinner and Chimimba (2005). This list was further bolstered by referring to the observational records available on iNaturalist ([www.iNaturalist.org](http://www.iNaturalist.org)) platforms for the study area landscape.

### 5.2.2 Avifauna

The desktop avifaunal species list for the study area was generated by referring to the species records of the South African Bird Atlas Project 2 (SABAP2, <https://sabap2.birdmap.africa/>) (**Appendix B**). The study area overlaps with one pentad (see below) which is well-represented in the atlassing cards:

#### **Pentad: 3400\_2205**

Full protocol cards: 224

Ad-hoc protocol cards: 234

Total cards: 458

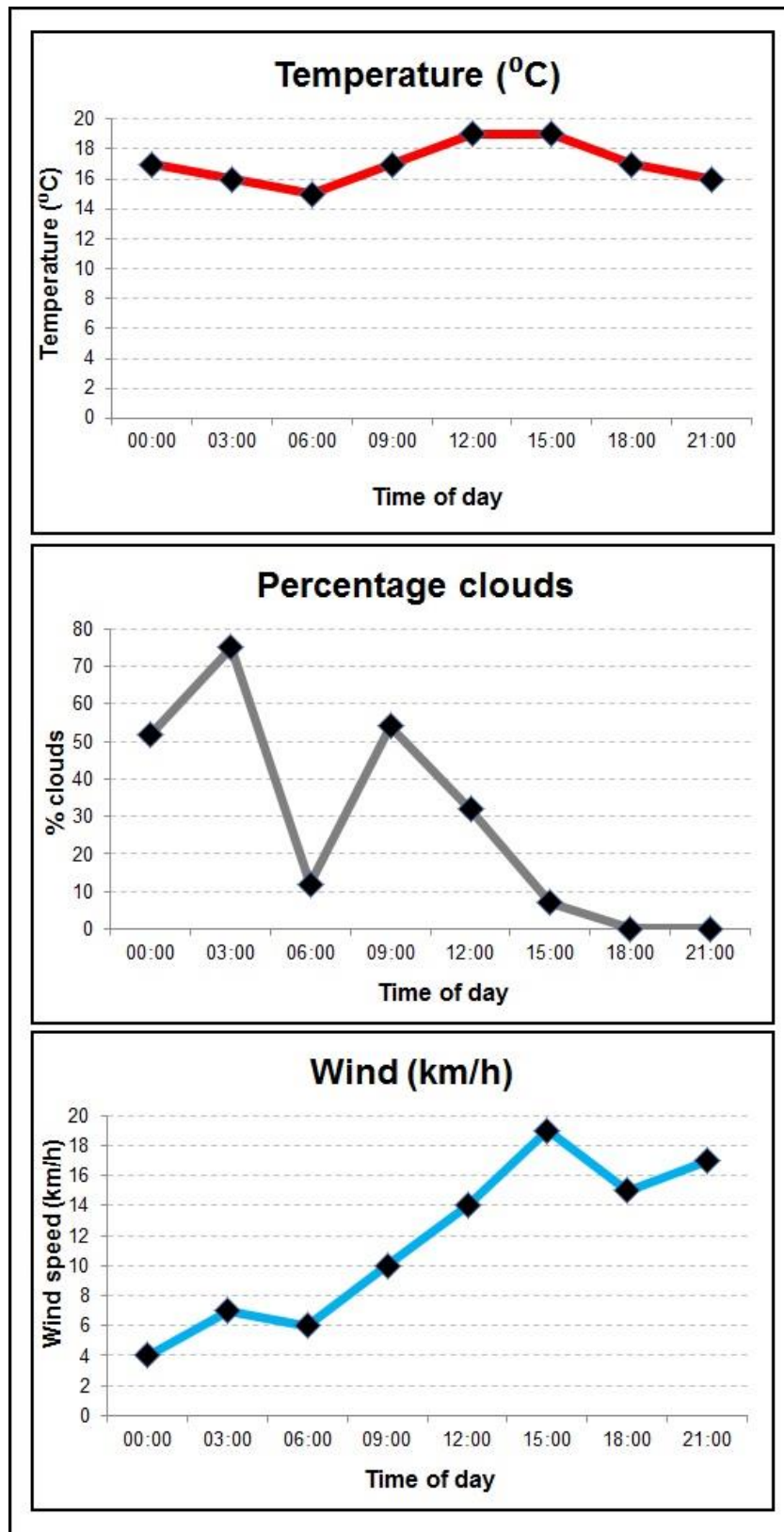
To create the avifaunal species list for the study area, the species observed in the pentad was included (see **Appendix B**), noting the total number of observations (including both full and ad-hoc protocols) and the latest date that the species was recorded within this pentad.

### 5.3 Field survey

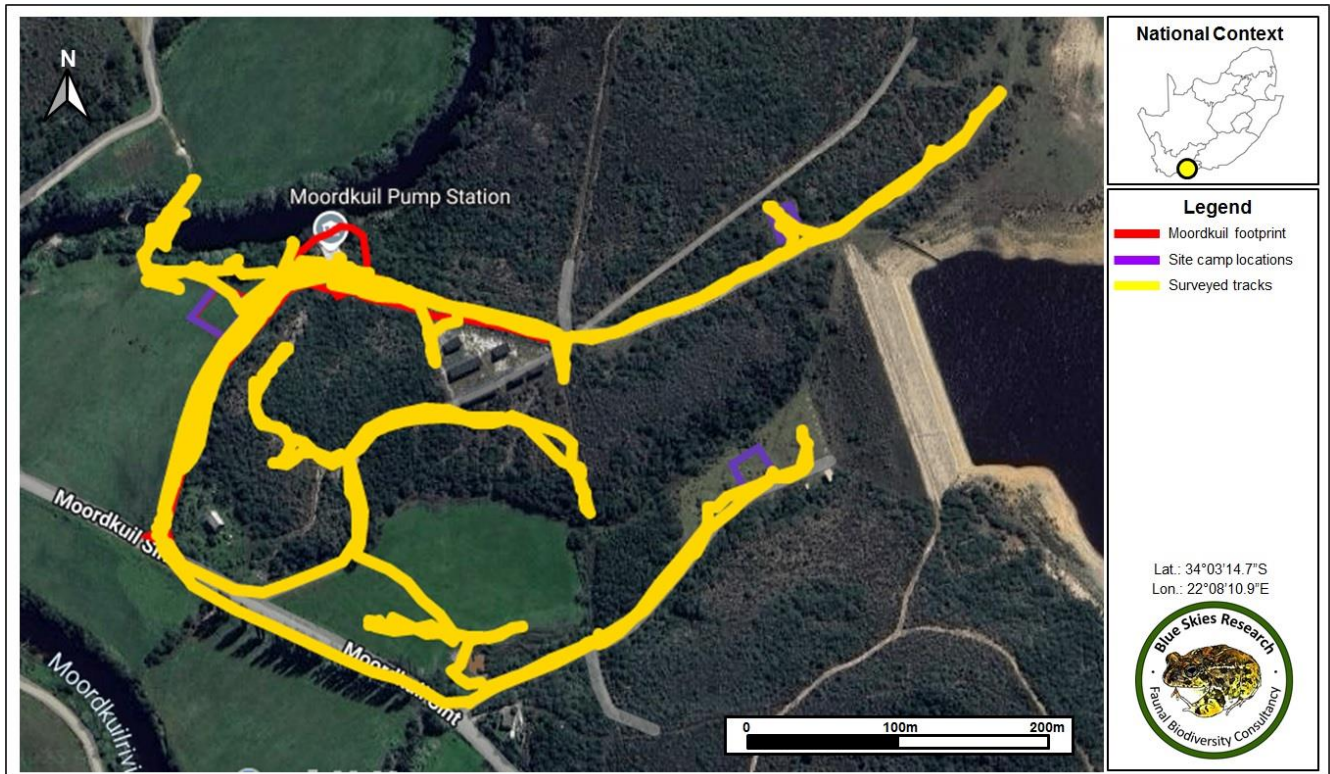
The study area was surveyed on foot over a single day on the 2<sup>nd</sup> of April 2025, during the Autumn season. Weather conditions during the surveying period were characterised by relatively warm daily temperatures, moderate to low cloud cover and low wind conditions in the morning (**Figure 6**).

Surveying included unconstrained point sampling through search meanders, as well as active searching under rocks and debris. All tracks surveyed were recorded by GPS (Garmin eTrex® 10, Garmin International Inc, USA) and are represented in **Figure 7**. Terrestrial faunal species (mammals) were identified by direct visual observation, or by their tracks, burrows, remains or scat. Avifaunal species were identified by visual observation, using a 90x zoom lens, or by auditory means. Butterfly species were identified and photographed from less than one meter away. Finally, the presence or absence of the Yellow-winged Agile Grasshopper was evaluated based on suitable habitat (recently burnt Schlerophyll on south-facing slopes) for this species. All observations were recorded by GPS and the species or evidence of species' presence or activity were photographed using a digital camera (Canon PowerShot SX430 IS, Canon Inc, USA). A species list for all fauna recorded within the study area is given in **Appendix C**.

Given relatively optimal weather conditions, faunal and avifaunal species' activity was observed to be high over the surveying period, thereby resulting in 109 recorded observations across the study area (**Figure 8, Appendix C**), relating to one observation per every 0.008 hectares of study area (the project footprint is 0.844 hectares in extent). During surveying, faunal habitats were broadly identified in the field, and thereafter delineated through a desktop assessment of the study area using satellite imagery (CapeFarmMapper Version 3.0, Western Cape Department of Agriculture).



**Figure 6** Weather conditions in the study area over the surveying period (02 April 2025). The time of day is indicated, along with the temperature (in °C), percentage cloud cover and wind speed (in km/h) (weather data sourced from <https://www.worldweatheronline.com>).



**Figure 7** Spatial tracks recorded by GPS for all the search meanders across the study area over the surveying period.



**Figure 8** Spatial locations of all the faunal observations across the study area over the surveying period.

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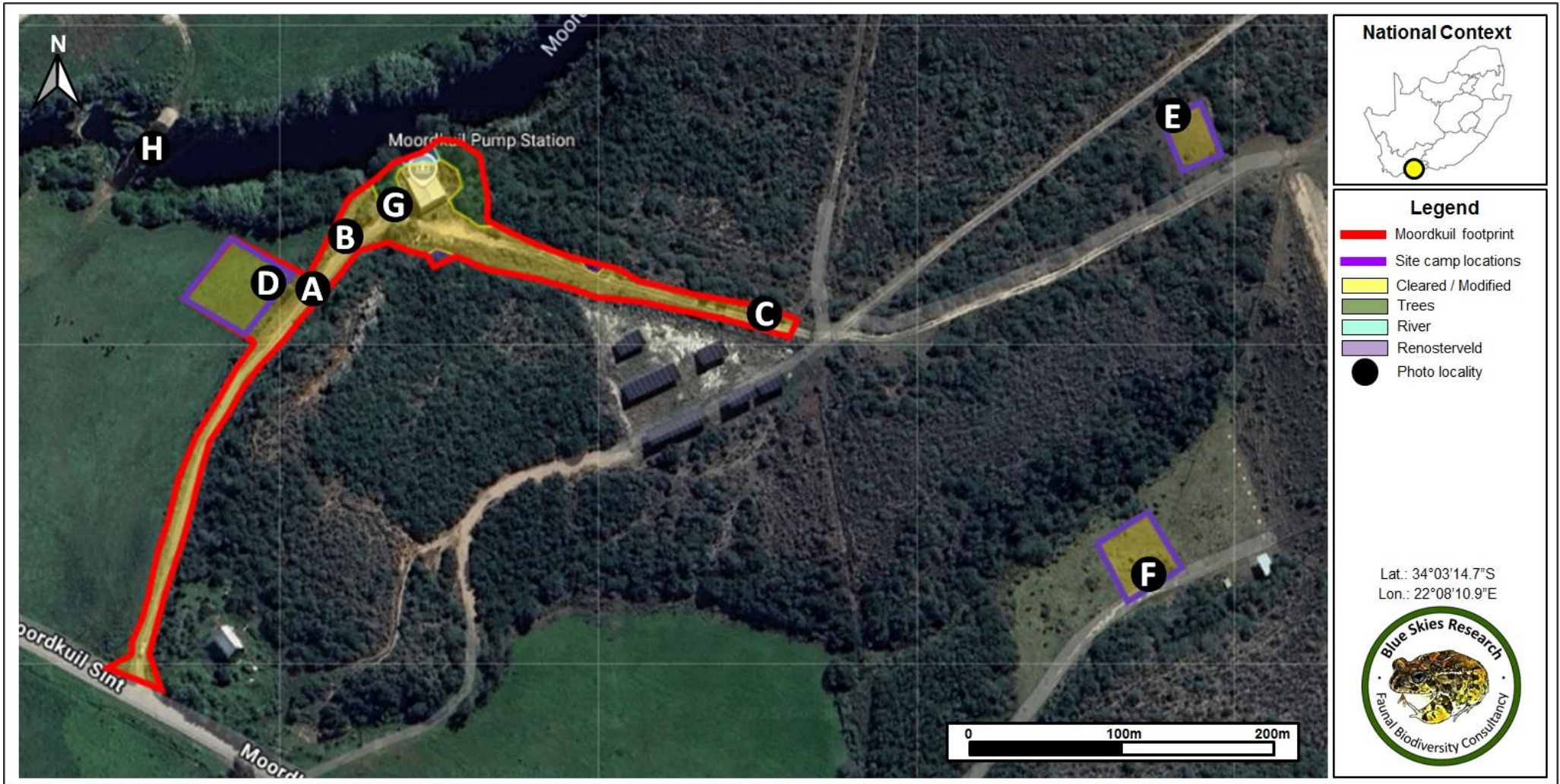
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## 6. Assumptions and limitations

Optimal weather conditions during the surveying period along with an open and modified habitat structure were ideal for detecting a representative sample of the resident terrestrial faunal and avifaunal species diversity over the project footprint and alternative site camp locations. Even so, it is possible that not all species could be observed (especially cryptic species), and that the surveying period did not correspond to the activity period or activity season of some species. To allow for this, the thorough desktop assessment for the included faunal groups (mammals and avifauna; **Appendices A and B**) meant that all possibly occurring SCC were considered (Section 9) in the current assessment.

## 7. Faunal habitat types within the study area

The study area is largely comprised of open and modified habitats with no remaining natural vegetation (**Figure 9, Table 2**). These parts correspond to existing roads, firebreaks, buildings and infrastructure of the existing Moordkuil Pump Station. Similarly, the three alternative site camp locations are located in open areas with no remaining natural vegetation. The part of the project footprint closest to the Moordkuil River harbours a small number of large (mostly invasive) trees, also intersecting the part of the river where the existing axial pump is located. Overall, the project footprint (including the alternative site camp locations) are spatially limited (>1 hectare) with an extra-limital placement with regards to surrounding natural areas. Taken together therefore, these small and modified areas offer little in the way of ecological functionality in the surrounding landscape.



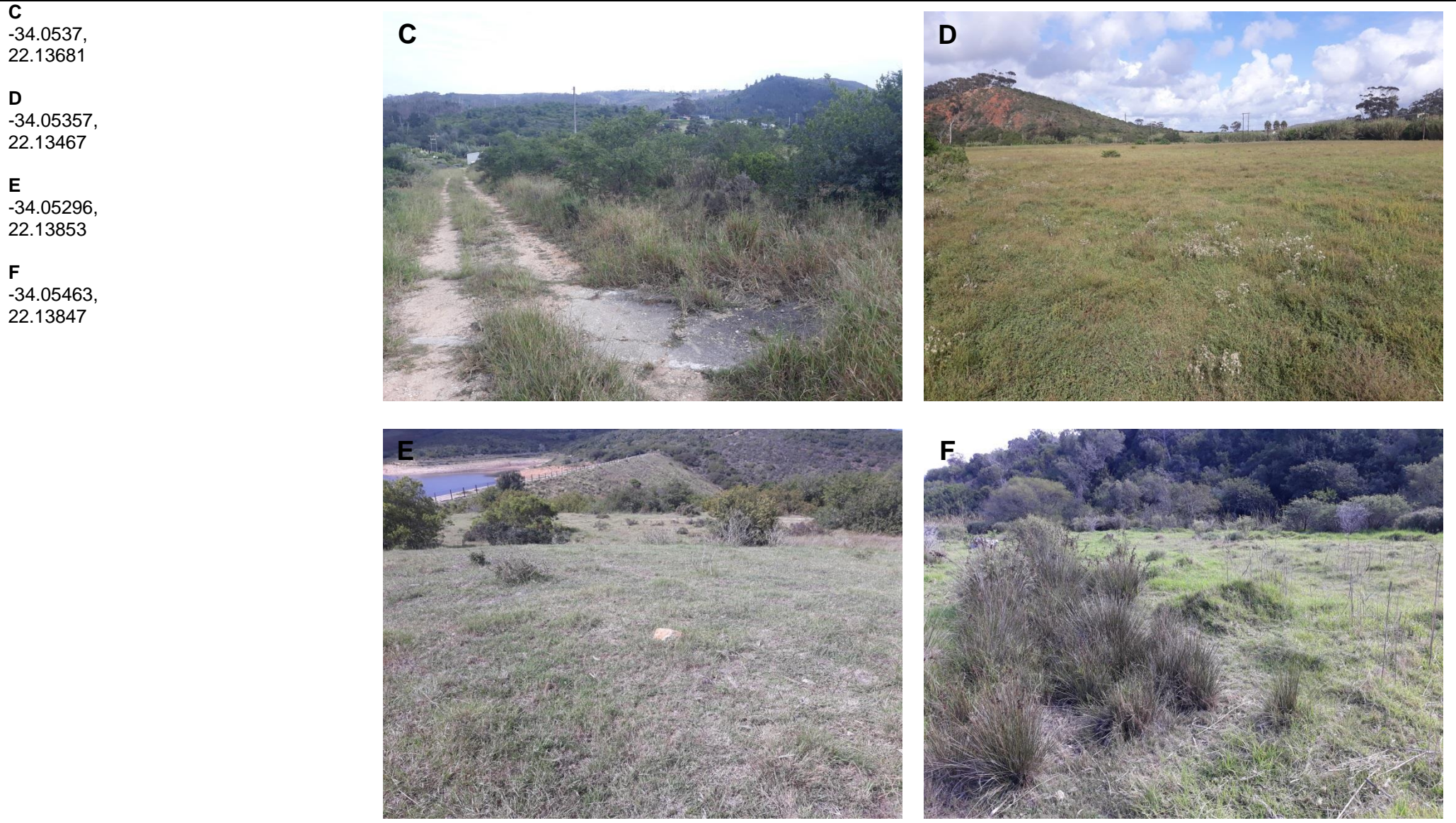
**Figure 9** A broad indication of the spatial extent of habitat types within the study area. Photo localities (A to H) correspond to the habitat photos in Table 2.

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**Table 2** Habitat locations, habitat descriptions and visual representations of the different habitat types within the study area. Location designations (A to H) correspond to the photo locations in Figure 9.

Location	Habitat description	Photo 1	Photo 2
<b>A</b> -34.05359, 22.13485	<b>Cleared / Modified</b>  The larger part of the site is comprised of open and modified habitats with no remaining natural vegetation. These parts correspond to existing roads, firebreaks, buildings and infrastructure of the existing Moordkuil Pump Station (A to C). Similarly, the three alternative site camp locations are located in open areas with no remaining natural vegetation (D to F).		
<b>B</b> -34.05343, 22.13499			



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**G**  
-34.05331,  
22.1352

**H**  
-34.05309,  
22.13414

### River

The part of the project footprint closest to the Moordkuil River harbours a small number of large (mostly invasive) trees, also intersecting the part of the river where the existing axial pump is located (G).



## 8. Faunal and avifaunal composition within the study area

### 8.1 Mammals

#### 8.1.1 Desktop assessment

The distributions of 65 mammal species overlap with the study area landscape (**Appendix A**). Among these, 59 species are currently listed as “Least Concern” by the IUCN (IUCN, 2021), with the remaining six species representing mammal SCC. These mammal SCC include the following:

1. The Duthie's Golden Mole (*Chlorotalpa duthieae*) classified as “Vulnerable”,
2. Fynbos Golden Mole (*Amblysomus corriae*) classified as “Near-Threatened”,
3. Leopard (*Panthera pardus*) classified as “Vulnerable”,
4. African Clawless Otter (*Aonyx capensis*) classified as “Near-Threatened”,
5. Long-tailed Forest Shrew (*Myosorex longicaudatus*) classified as “Endangered”, and
6. White-tailed Rat (*Mystromys albicaudatus*) classified as “Vulnerable” by the IUCN.

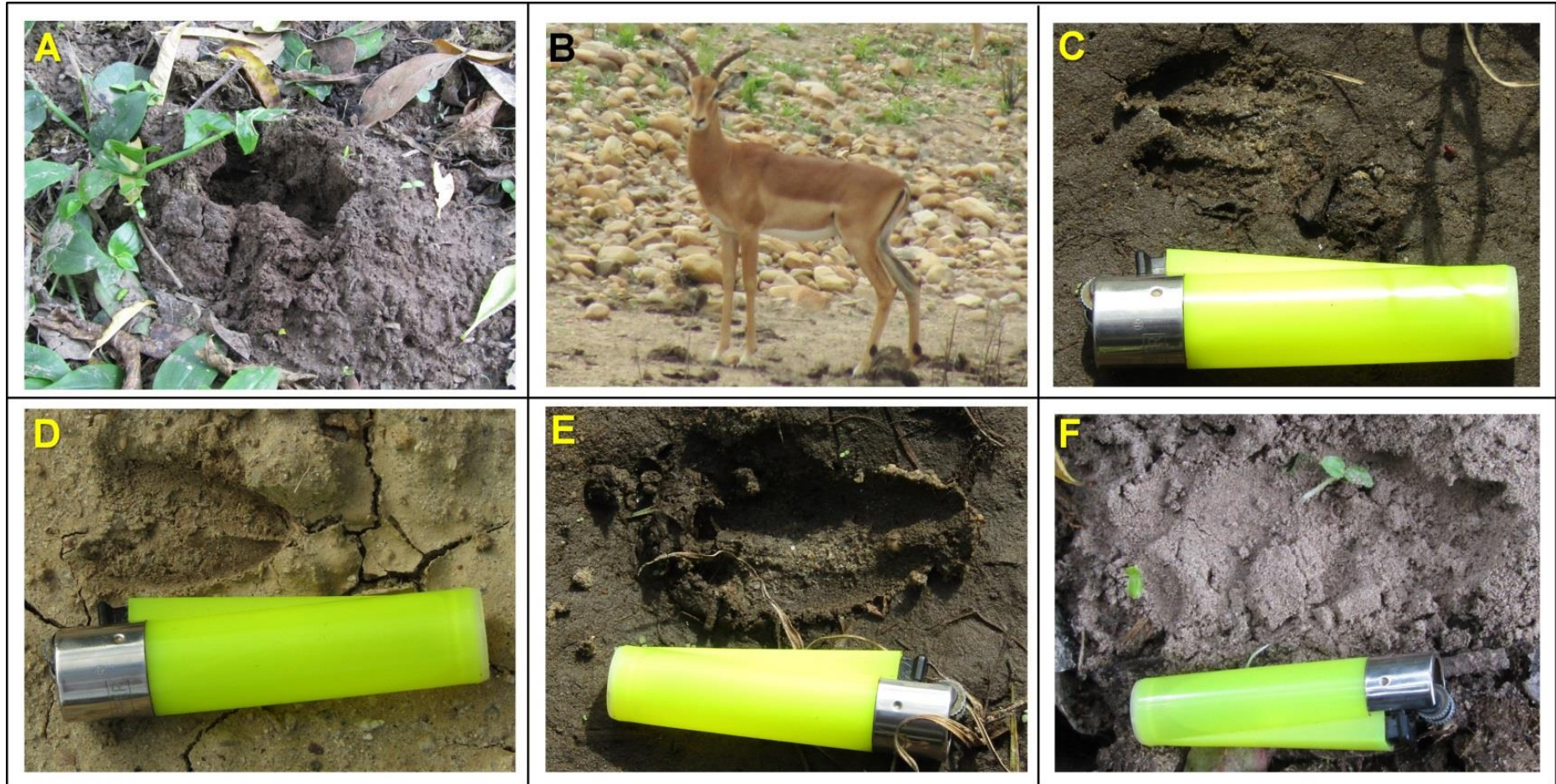
From the observational records available on the iNaturalist ([www.iNaturalist.org](http://www.iNaturalist.org)) platform, 14 mammal species have been confirmed in the study area landscape (Appendix A), with 12 of these species currently listed as “Least Concern” by the IUCN, and with two mammal SCC confirmed within the study area landscape. These SCC pertain to the:

1. Leopard (*Panthera pardus*) observed to the north-west of the site on September 2024, and the
2. African Clawless Otter (*Aonyx capensis*) observed to the north-east of the site on May 2020.

### 8.1.2 Field survey

Evidence of eight mammal species were recovered within the study area (**Figures 10 and 11**), seven of which are currently classified as “Least concern” and one, the Duthie's Golden Mole (*Chlorotalpa duthieae*) classified as “Vulnerable” by the IUCN (Appendix C). A single individual of this species was recorded just outside the western part of the project footprint underneath the trees adjacent to the Moordkuil River. Population sizes in this part of the landscape are likely limited, and will follow trees adjacent to the river channel, or within small adjacent “kloof” areas where thicket vegetation is located.

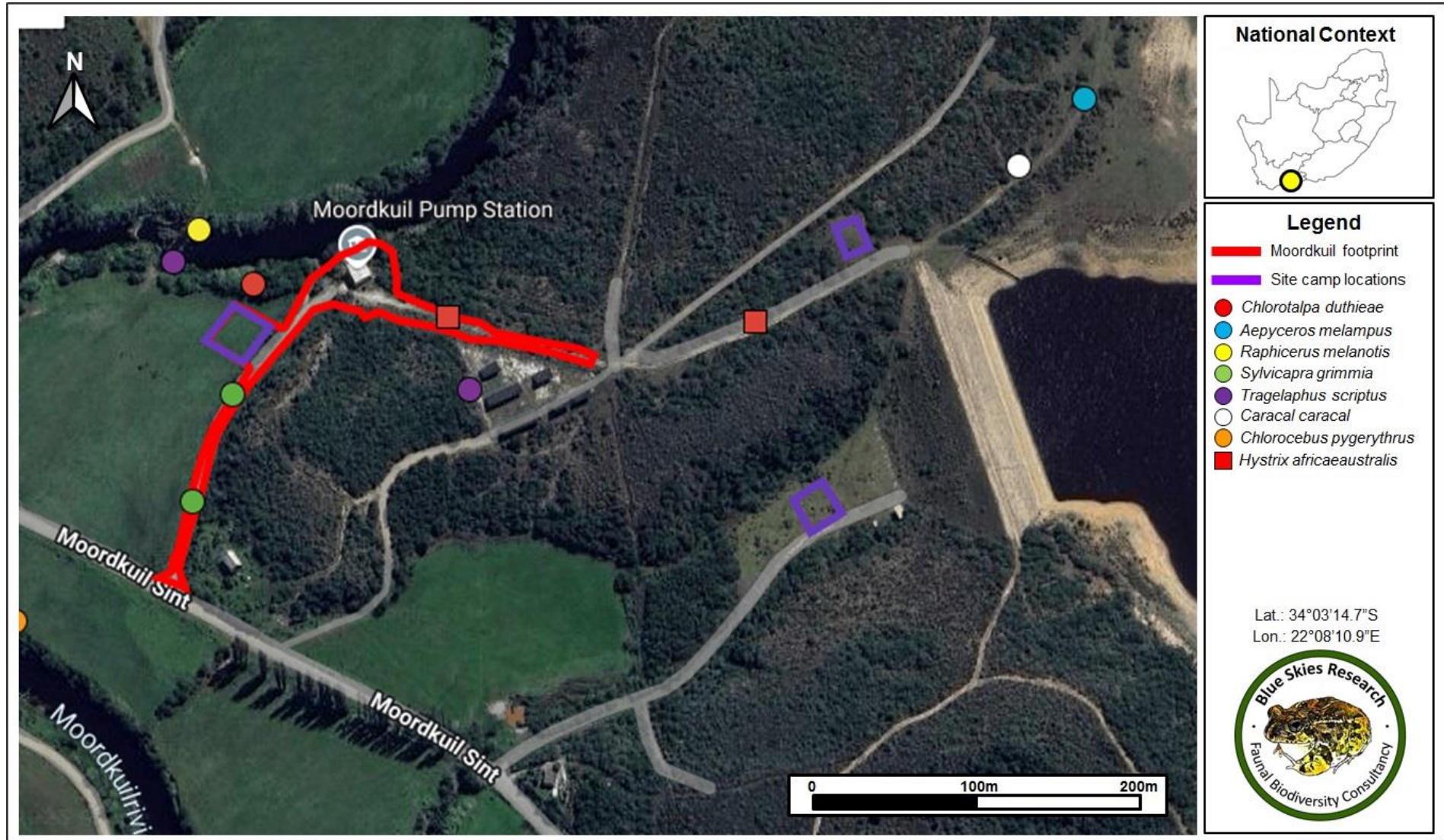
Other mammal species recorded include antelope such as the introduced Impala (*Aepyceros melampus*) in the game farm to the east of the site, as well as the naturally occurring Cape Gysbok (*Raphicerus melanotis*), Common Duiker (*Sylvicapra grimmia*) and Southern Bushbuck (*Tragelaphus scriptus*) which traverse the site from the adjacent natural areas. Tracks of the Cape Porcupine (*Hystrix africae australis*) and a physical observation of one Vervet Monkey (*Chlorocebus pygerythrus*) were also noted. Finally, given an abundance of avifaunal prey species, one mammal predator, the Caracal (*Caracal caracal*), was also observed hunting Cape Spurfowl (*Pternistis capensis*) in the natural parts adjacent to the site. Taken together, mammal diversity in the natural areas adjacent to the study area appears relatively high, but with these species only ephemerally traversing the site.



**Figure 10** Photographic evidence of the different mammal species recorded in the study area landscape. A) Tunnel system of the Duthie's Golden Mole (*Chlorotalpa duthieae*). B) Impala (*Aepyceros melampus*). C) Tracks of the Cape Gysbok (*Raphicerus melanotis*). D) Track of the Common Duiker (*Sylvicapra grimmia*). E) Track of the Southern Bushbuck (*Tragelaphus scriptus*). F) Track of the Cape Porcupine (*Hystrix africaeaustralis*).

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**Figure 11** Spatial locations of the different mammal species recorded within the study area landscape.

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## 8.2 Avifauna

### 8.2.1 Desktop assessment

According to the SABAP2 records, 258 bird species have been recorded from the pentad overlapping the study area with 240 species classified as “Least Concern” by the IUCN, and 18 species which constitute avifaunal SCC (**Appendix B**). These avifaunal SCC includes the:

1. Forest Buzzard (*Buteo trizonatus*) classified as “Near-Threatened”,
2. Black Harrier (*Circus maurus*) classified as “Endangered”,
3. African Marsh Harrier (*Circus ranivorus*) classified as “Least Concern”,
4. Martial Eagle (*Polemaetus bellicosus*) classified as “Endangered”,
5. Crowned Eagle (*Stephanoaetus coronatus*) classified as “Near-Threatened”,
6. Bateleur (*Terathopius ecaudatus*) classified as “Endangered”,
7. Secretarybird (*Sagittarius serpentarius*) classified as “Endangered”,
8. Maccoa Duck (*Oxyura maccoa*) classified as “Endangered”,
9. Curlew Sandpiper (*Calidris ferruginea*) classified as “Near-Threatened”,
10. Caspian Tern (*Hydroprogne caspia*) classified as “Least Concern”,
11. Lanner Falcon (*Falco biarmicus*) classified as “Least Concern”,
12. Blue Crane (*Anthropoides paradiseus*) classified as “Vulnerable”,
13. Denham's Bustard (*Neotis denhami*) classified as “Near-Threatened”,
14. Knysna Warbler (*Bradypterus sylvaticus*) classified as “Vulnerable”,
15. Lesser Flamingo (*Phoeniconaias minor*) classified as “Near-Threatened”,
16. Knysna Woodpecker (*Campethera notata*) classified as “Near-Threatened”,
17. Cape Cormorant (*Phalacrocorax capensis*) classified as “Endangered”, and
18. Cape Gannet (*Morus capensis*) classified as “Endangered” by the IUCN.

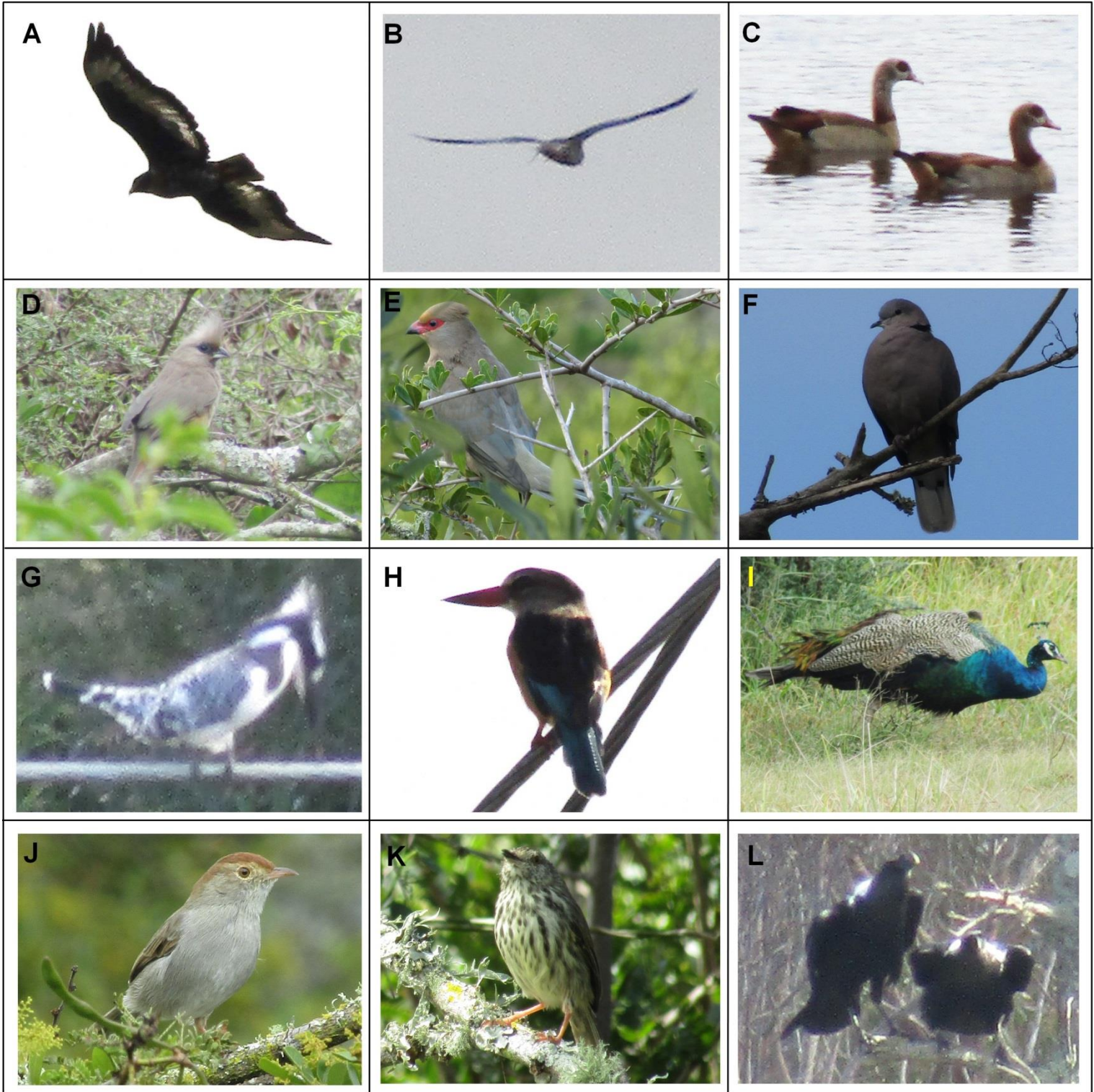
### 8.2.2 Field survey

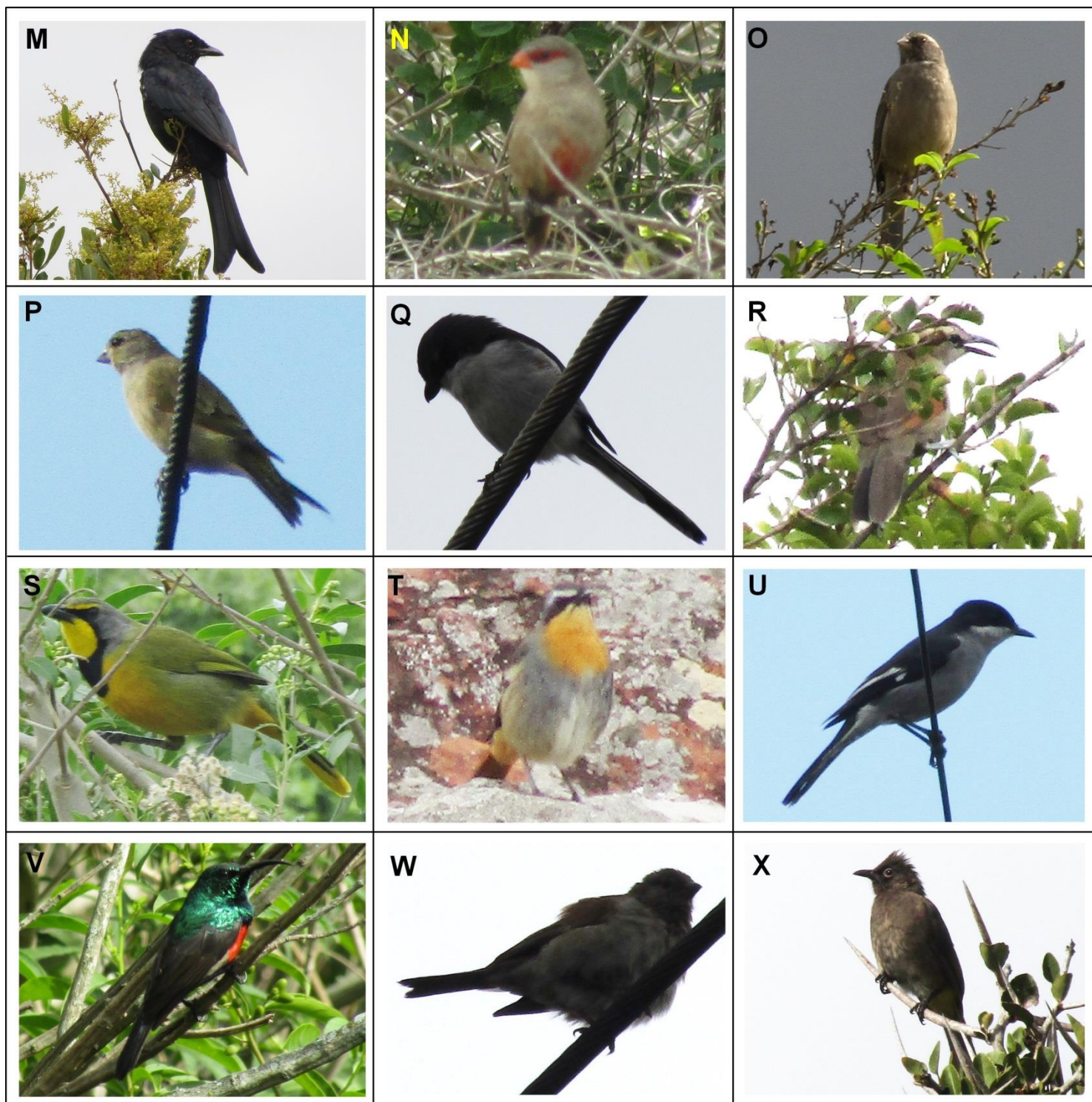
In total, 43 bird species were recorded within the study area landscape with 42 species currently classified as “Least concern” (**Figures 12 and 13, Appendix C**) and one, the Knysna Woodpecker (*Campethera notata*), classified as “Near-

Threatened” by the IUCN. A single individual of this species was observed vocalising in the thicket vegetation in the "kloof" to the north of the site. To this end, the natural vegetation in the surrounding landscape along with the trees along the Moordkuil River drainage channel offer suitable habitat for this species.

Also notable is the presence of two raptor species, the Jackal Buzzard (*Buteo rufofuscus*) and Black-winged Kite (*Elanus caeruleus*), indicating the presence of a suitable terrestrial prey base over the natural parts of the landscape. In addition, the presence of the Pied Kingfisher (*Ceryle rudis*) and Brown-hooded Kingfisher (*Halcyon albiventris*) is linked to the abundance of fish species in the Moordkuil River drainage channel.

Other avifauna comprise vegetation-associated species which are common in the surrounding landscape. Even so, the avifaunal species assemblage appears relatively species diverse, indicating the ecological intactness of natural habitats adjacent to the site.



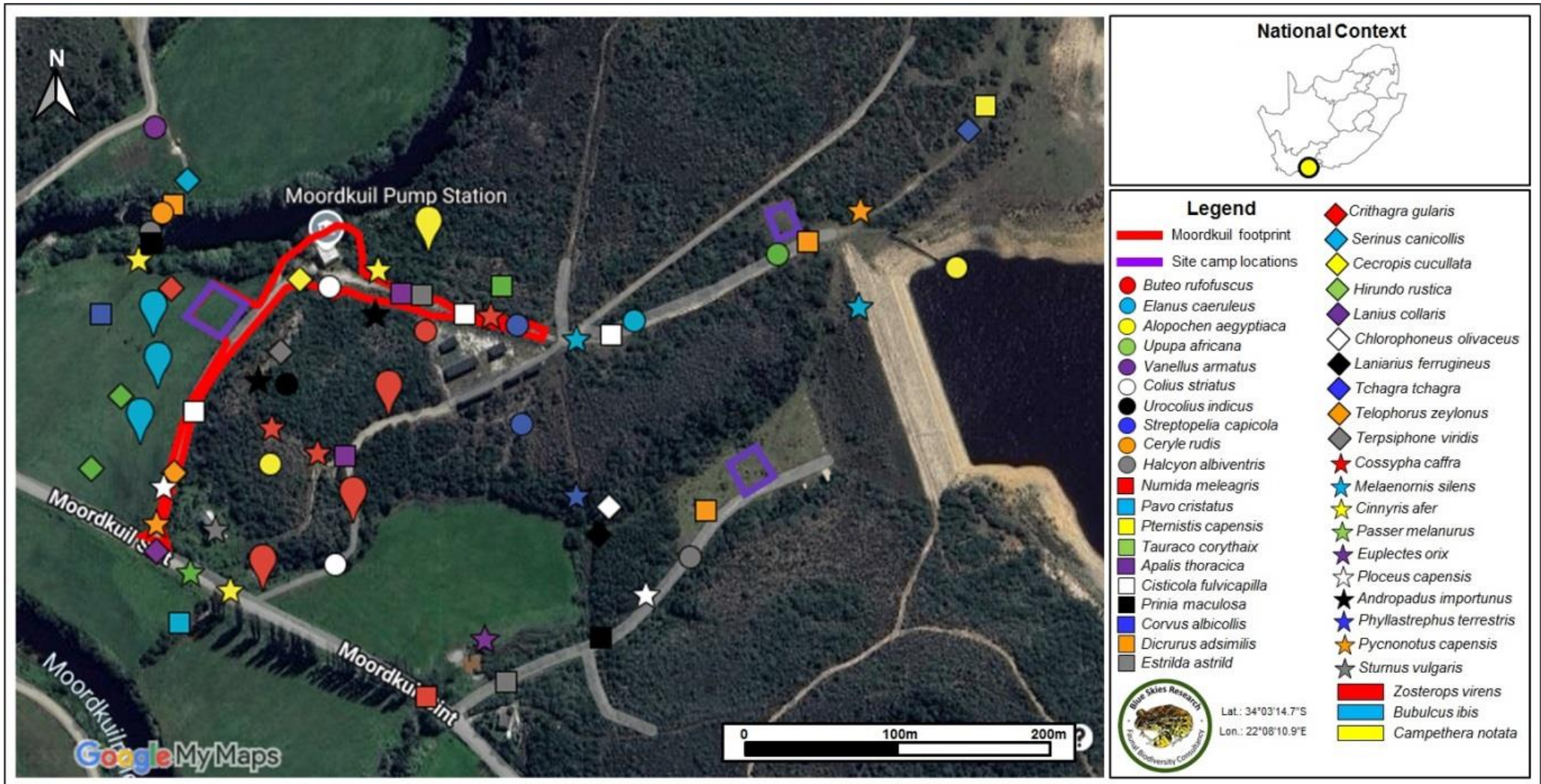




**Figure 12** Photographic evidence of different avifaunal species recorded in the study area landscape. A) Jackal Buzzard (*Buteo rufofuscus*). B) Black-winged Kite (*Elanus caeruleus*). C) Egyptian Goose (*Alopochen aegyptiaca*). D) Speckled Mousebird (*Colius striatus*). E) Red-faced Mousebird (*Urocolius indicus*). F) Cape Turtle Dove (*Streptopelia capicola*). G) Pied Kingfisher (*Ceryle rudis*). H) Brown-hooded Kingfisher (*Halcyon albiventris*). I) Indian Peafowl (*Pavo cristatus*). J) Neddicky (*Cisticola fulvicapilla*). K) Karoo Prinia (*Prinia maculosa*). L) White-necked Raven (*Corvus albicollis*).

M) Fork-tailed Drongo (*Dicrurus adsimilis*). N) Common Waxbill (*Estrilda astrild*). O) Streaky-headed Seedeater (*Crithagra gularis*). P) Cape Canary (*Serinus canicollis*). Q) Southern Fiscal (*Lanius collaris*). R) Southern Tchagra (*Tchagra tchagra*). S) Bokmakierie (*Telophorus zeylonus*). T) Cape Robin-Chat (*Cossypha caffra*). U) Fiscal Flycatcher (*Melaenornis silens*). V) Greater Double-collared Sunbird (*Cinnyris afer*). W) Cape Sparrow (*Passer melanurus*). X) Cape Bulbul (*Pycnonotus capensis*).

Y) Common Starling (*Sturnus vulgaris*). Z) Cape White-eye (*Zosterops virens*). 1) Western Cattle Egret (*Bubulcus ibis*).



**Figure 13** Spatial locations of the different avifaunal species recorded within the study area landscape.

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#### 8.4 Butterflies

Twelve butterfly species were recorded in the study area landscape (**Figures 14 and 15**), all of which are currently classified as “Least Concern” by the IUCN (**Appendix C**). The landscape harbours high butterfly species richness, albeit comprising species which are common for the area. This high butterfly diversity indicates the ecological intactness of the natural areas surrounding the site which harbours an abundance of flowering plants.

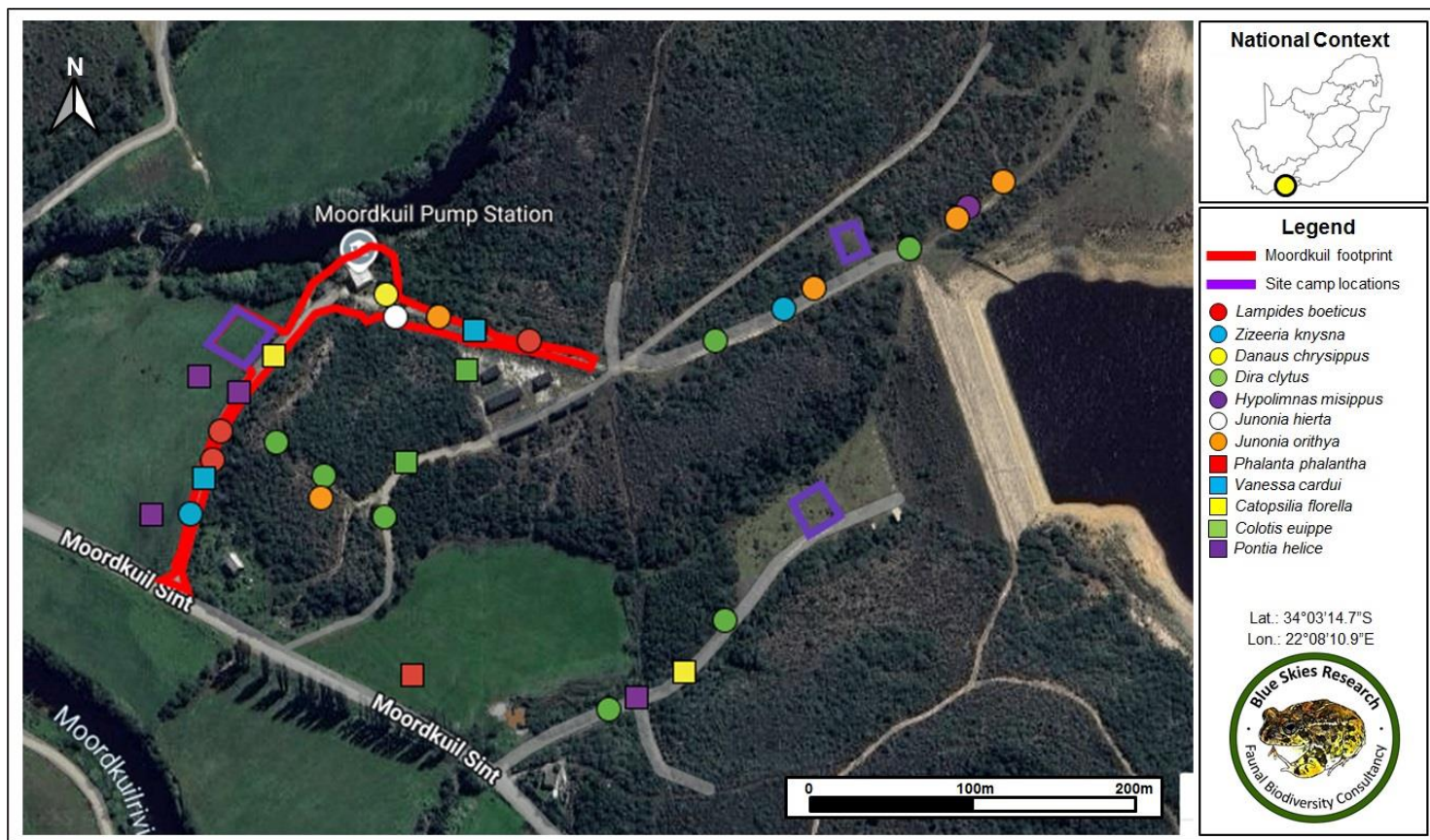


**Figure 14** Photographic evidence of the different butterfly species recorded in the study area landscape. A) Pea Blue (*Lampides boeticus*). B African Grass Blue (*Zizeeria knysna*). C) Plain Tiger (*Danaus chrysippus*). D) Cape Autumn Widow (*Dira clytus*). E) Blue Pansy (*Junonia orithya*). F) Painted Lady (*Vanessa cardui*) G) African Migrant (*Catopsilia florella*).

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H) Round-winged Orange Tip (*Colotis euipe*). I) Southern Meadow White (*Pontia helice*).



**Figure 15** Spatial locations of the different butterfly species recorded within the study area landscape.

#### *8.4 Faunal and avifaunal diversity within the study area*

Faunal habitats in the study area landscape harbour a diverse mammal, avifaunal and butterfly species profile with both rare (SCC) and common species of “Least Concern” (IUCN, 2021) being present. In addition, predator-prey dynamics (as is evidenced by the presence of mammal and avifaunal predators) appear intact over the natural part of the landscape, also indicating intact and functional ecosystem dynamics.

In contrast, the project footprint and alternative site camp locations are limited to small and already cleared and modified areas with an extra-limital placement relative to the surrounding natural landscape. To this end, faunal and avifaunal movement over these parts is highly ephemeral with these parts supporting no permanent faunal subpopulations. From a terrestrial faunal and avifaunal perspective therefore, the project footprint and alternative site camp locations is of a “Low” sensitivity.

## 9. Species of Conservation Concern

Along with the 10 (one mammal, eight avifaunal and one invertebrate) SCC listed in the DFFE Screening Tool (**Table 1**), the potential occurrence of 18 other (six mammal and 12 avifaunal) SCC within the study area was assessed (**Table 3**), given their recovery in the desktop assessment (see Section 8). The probability of occurrence of each specific SCC within the study area landscape was assessed based on the following criteria:

**Confirmed** - The species was confirmed as present within or near the study area during the field survey.

**High** - The species was not confirmed as present within or near the study area during the field survey but has been recorded study area landscape in the case of mammals. In the case of avifauna, the species has been recorded in the overlapped SABAP2 pentad recently (less than 2 years ago) and in high number (>10 times) and is also likely to occur in the study area, given suitable habitat characteristics.

**Medium** - The species was not confirmed as present within or near the study area during the field survey and has not been recorded in the study area landscape in the case of mammals. In the case of avifauna, the species has been recorded a number of times (<10 times) in the overlapped SABAP2 pentad recently (less than 2 years ago). Suitable habitat for the species is also present in the study area landscape.

**Low** - No suitable habitat for the species is present in the study area. Furthermore, in the case of avifauna, the species has been recorded a low number of times (<3 times) or more than five years ago in the overlapped SABAP2 pentad.

Among the SCC considered, the presence of the Duthie's Golden Mole (*Chlorotalpa duthieae*) and Knysna Woodpecker (*Campethera notata*) was confirmed within the study area landscape during the field survey, with the Leopard (*Panthera pardus*) African Clawless Otter (*Aonyx capensis*), Forest Buzzard (*Buteo trizonatus*), Martial Eagle (*Polemaetus bellicosus*), Lanner Falcon (*Falco biarmicus*), Blue Crane

(*Anthropoides paradiseus*), Denham's Bustard (*Neotis denhami*) and Knysna Warbler (*Bradypterus sylvaticus*) also likely to occur within the surrounding landscape given suitable habitat characteristics and previous observations of these species.

The study area landscape therefore harbours confirmed or likely subpopulations of at least three mammal and seven avifaunal SCC. Importantly, the project footprint and alternative site camp locations are spatially limited (<1 hectare) and extra-limital to the natural habitats where these species occur. To this end, the presence of these SCC over the receiving environment is likely to be highly ephemeral, with the proposed project unlikely to impact on their subpopulations (Section 11)

All other SCC considered have either a "Low" or "Medium" likelihood of occurring in the study area landscape, either given their scarcity in confirmed sightings or a lack of suitable habitat for these species. These SCC are not further considered during this assessment.

**Table 3** Probability of occurrence of specific SCC in the study area. For each species, the taxonomic Family, scientific name and common name is shown, along with its current classification under the IUCN Red List of Threatened Species (IUCN, 2021). In addition, the species' preferred habitat and the probability that the species occurs within the study area is given, along with a justification for listing this probability.

Family	Species	Common name	Status	Habitat	Probability of occurrence in the study area	Justification of probability
<b>Mammals</b>						
Sensitive Species 13	<i>Sensitive Species 13</i>	<i>Sensitive Species 13</i>	-	-	Low	The presence of the species was not confirmed during the field survey and it has not been recorded in the study area landscape. Forested habitats are also relatively scarce in the study area landscape, and it is therefore unlikely that this species will be present on or near the site given a lack of suitable habitat.
Chrysochloridae	<i>Chlorotalpa duthieae</i>	Duthie's Golden Mole	Vulnerable	The species occurs on alluvial sands and sandy loams in Southern Cape Afrotropical forests (especially coastal platform and scarp forest patches) in the Fynbos and Moist Savanna biomes (Bronner, 2015). The species also thrives in cultivated areas and gardens.	Confirmed	The presence of the species was confirmed just outside the western part of the project footprint underneath the trees adjacent to the river, with only a single individual noted. Population sizes in this part of the landscape are likely limited, and will follow trees adjacent to the river channel, or within small adjacent "kloof" areas.
Chrysochloridae	<i>Amblysomus corriae</i>	Fynbos Golden Mole	Near-Threatened	The species prefers sandy soils and soft loams in Mountain Fynbos, Grassy Fynbos and Renosterveld of South West Cape (Bronner and Mynhardt, 2015). Also in Afromontane forest and southern African moist savanna along the southern Cape coast. The species furthermore thrives in gardens, cultivated lands, golf courses and livestock paddocks, and is also present in exotic plantations, but apparently at lower densities (Bronner, 2013).	Low	The species was not confirmed during the field survey, and it has not been recorded in the study area landscape. The study area landscape is also largely devoid of the sandy soils and soft loams preferred by this species and it is therefore unlikely to occur on or near the site.
Felidae	<i>Panthera pardus</i>	Leopard	Vulnerable	The species occurs in the widest range of habitats among any of the Old World Cats, including the larger part of Africa and Asia (Nowell and Jackson 1996). Generally, Leopards prefer medium-sized ungulate prey (10- 40 kgs) where available (Hayward et al. 2006). They have a highly varied diet, however, feeding on insects, reptiles, birds and small mammals up to large ungulates.	High	The species was not confirmed during the field survey, but it has been observed to the north-west of the site on September 2024. Given the presence of suitable cover in the natural areas adjacent to the site, as well as the abundance of antelope prey species, it is likely that this species may ephemerally traverse habitats adjacent to the study area.
Mustelidae	<i>Aonyx capensis</i>	African Clawless Otter	Near-Threatened	The species occupies aquatic freshwater areas and is seldom found far from water. It may occur in many seasonal or episodic rivers provided suitable-sized pools persist (Nel and Somers, 2007, Somers and Nel, 2013).	High	The species was not confirmed during the field survey, but has been observed to the north-east of the site on May 2020. Given the presence of aquatic habitats along the Moordkuil River channel along with a suitable prey base of

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							fish, it is likely that this species may traverse areas adjacent to the site.
Soricidae	<i>Myosorex longicaudatus</i>	Long-tailed Forest Shrew	Endangered	The species is found in forests, forests edges, fynbos and boggy grassland, and depends on moist microhabitats (typically above the 800 mm isohyet). It is restricted to pristine primary habitat that has not been degraded (Baxter et al. 2020).	Medium		The species was not confirmed during the field survey and it has not been confirmed in the study area landscape, but suitable fynbos and moist habitat in pristine condition exist in the surrounding area. It is therefore possible that this species may occur in these habitats in the surrounding landscape.
Nesomyidae	<i>Mystromys albicaudatus</i>	White-tailed Rat	Vulnerable	The species' habitat requirements are not well known, but it appears associated with calcrete soils within grasslands. The species can occur in disturbed areas (heavily grazed, D. MacFadyen pers. obs.) and in sparse grasslands (Kuyler, 2000; Kaiser, 2006; Avenant and Cavallini, 2007; Avenant and Schulze, 2012; Morwe 2013), but does not occur in transformed habitat (croplands, fallow fields, or old fields). In the Blaauwberg Conservation Area (BCA), Western Cape Province it may occur in Dune Thicket on sloped clay soils.	Low		The species was not confirmed during the field survey, and it has not been recorded in the study area landscape. Furthermore, suitable calcrete soils or sloped clay soils in Dune Thicket are not present on the site, and it is highly unlikely that this species will be present within or near the study area.
<b>Avifauna</b>							
Accipitridae	<i>Buteo trizonatus</i>	Forest Buzzard	Near-Threatened	This species inhabits native temperate forests from sea level up to 1,000 m, and rarely to 1,500 m (Ferguson-Lees and Christie 2001). It can also be found in plantations, though usually near to areas of native forest (Ferguson-Lees and Christie 2001).	High		The species was not confirmed during the field survey, but has been recorded a high number of times (20 times) in the study area landscape, with the latest observation in February 2025 (Appendix B). Although forested environments are not present in the study area landscape, there are a number of large trees along the Moordkuil River drainage channel which this species may utilise. It is therefore possible that the Forest Buzzard may traverse the study area landscape.
Accipitridae	<i>Circus maurus</i>	Black Harrier	Endangered	The species occurs in coastal and montane Fynbos, highland grasslands, Karoo subdesert scrub, open plains with low shrubs and croplands (Curtis et al. 2004). In the Western Cape of South Africa it is most abundant in coastal and montane fynbos (Curtis et al. 2004), and loose colonies may aggregate around wetland areas. The Black Harrier prefers open ground with low vegetation for hunting, where it feeds mainly on small mammals, especially <i>Otomys</i> and <i>Rhabdomys</i> species, although its diet may also include birds and reptiles (Garcia-Heras et al. 2017). The main diet of the Black Harrier however constitutes the Four-striped Grass Mouse, <i>Rhabdomys pumilio</i> (Garcia-Heras et al. 2017). The species breeds close to coastal and upland marshes (damp sites, near vleis, marshes or streams are preferred for breeding), but may also nest in montane habitats, preferring south-facing slopes (Brown et al. 1982; Curtis et al. 2004). Nests are built on the ground in tall vegetation such as shrubs or reeds (Brown et al. 1982, Curtis et al. 2004). The species does not breed in transformed and cultivated lands, although it may forage in these environments (Curtis et al. 2004).	Medium		The species was not confirmed during the field survey, and has been recorded only five times in the study area landscape, with the latest observation in March 2025 (Appendix B). Although relatively rare in this landscape, it is likely that this species will ephemerally hunt over the natural habitats of the area.

Accipitridae	<i>Circus ranivorus</i>	African Marsh Harrier	Least Concern	The species breeds in wetlands, foraging primarily over reeds and lake margins (Harrison <i>et al.</i> 1997). Its diet consists largely of small mammals, particularly striped mouse <i>Rhabdomys pumilio</i> (Kemp and Dean, 1988).	Low	The species was not confirmed during the field survey, but has been recorded a high number of times (24 times) in the study area landscape, with the latest observation in March 2025 (Appendix B). Even so, the study area landscape is devoid of the large reedbeds preferred by this species for hunting and breeding, and it is therefore unlikely to occur on or near the site.
Accipitridae	<i>Polemaetus bellicosus</i>	Martial Eagle	Endangered	The species inhabits open woodland, wooded savanna, bushy grassland, thornbush and, in southern Africa, more open country and even subdesert, from sea level to 3,000 m but mainly below 1,500 m (Ferguson-Lees and Christie, 2001). The main prey is sizeable mammals, birds and reptiles (Ferguson-Lees and Christie, 2001).	High	The species was not confirmed during the field survey, but has been recorded a high number of times (20 times) in the study area landscape, with the latest observation in March 2025 (Appendix B). Given suitable hunting opportunities in the natural parts of the landscape along with adequate perching within the large trees along the Moordkuil River drainage channel, it is possible that this species may traverse the study area landscape.
Accipitridae	<i>Stephanoaetus coronatus</i>	Crowned Eagle	Near-Threatened	The species inhabits forest, woodland, savanna and shrubland, as well as some modified habitats, such as plantations and secondary growth (Ferguson-Lees and Christie, 2001), and can persist in small forest fragments including urban greenspace forests (Dowsett-Lemaire and Dowsett, 2006, McPherson <i>et al.</i> 2016a). It shows high resilience to heavy deforestation and degradation in some areas (F. Dowsett-Lemaire in litt. 2012), although such changes are assumed to cause local declines in population density. The use of exotic invasive trees (especially <i>Eucalyptus</i> and <i>Pinus</i> spp.) for nesting permits persistence in degraded and mosaic landscapes (McPherson <i>et al.</i> 2016a). It shows dietary plasticity and can feed on a diversity of prey (although maybe almost entirely mammals, Swatridge <i>et al.</i> 2014) according to habitat type, which may allow it to persist in certain areas.	Low	The species was not confirmed during the field survey, and has been recorded only once in the study area landscape, with the latest observation in March 2023 (Appendix B). Given its scarcity in the landscape, it is therefore highly unlikely that this species will occur on or near the site.
Accipitridae	<i>Terathopius ecaudatus</i>	Bateleur	Endangered	The species inhabits open country, including grasslands, savanna and subdesert thornbush from sea level to 4,500 m but generally below 3,000 m (Ferguson-Lees and Christie 2001). It takes both live and dead food, mostly mammals and birds but also some reptiles, carrion, insects and occasionally birds' eggs and crabs, foraging over a huge range (55-200 km <sup>2</sup> ) (Ferguson-Lees and Christie 2001). The nest is built in the canopy of a large tree.	Low	The species was not confirmed during the field survey, and has been recorded only once in the study area landscape, with the latest observation in May 2024 (Appendix B). Given its scarcity in the landscape, it is therefore highly unlikely that this species will occur on or near the site.
Anatidae	<i>Oxyura maccoa</i>	Maccoa Duck	Endangered	During the breeding season the species inhabits small temporary and permanent inland freshwater lakes (Berruti <i>et al.</i> 2005, 2007), preferring those that are shallow and nutrient-rich (Johnsgard, 1978, Johnsgard and Carbonell, 1996) with extensive emergent vegetation such as reeds ( <i>Phragmites</i> spp.) and cattails ( <i>Typha</i> spp.) (Johnsgard and Carbonell, 1996) on which it relies for nesting. It prefers areas with a bottom of mud or silt and minimal amounts of floating vegetation, since this provides the best foraging conditions (Johnsgard and Carbonell, 1996). It also breeds on man-made habitats, such as small farm wetlands, and sewage-farm basins (Johnsgard, 1978, Johnsgard and Carbonell, 1996). Outside the breeding season it will wander over larger, deeper lakes and brackish lagoons (del Hoyo <i>et al.</i> 1992, Berruti <i>et al.</i> 2005, 2007). It is thought to find refuge on the larger lakes while moulting (Berruti <i>et al.</i> 2005, 2007). The species	Low	The species was not confirmed during the field survey, and has been recorded only once in the study area landscape, with the latest observation in February 2023 (Appendix B). Given its scarcity in the landscape, it is therefore highly unlikely that this species will occur on or near the site.

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				tends to nest over deeper water among emergent vegetation (Berruti <i>et al.</i> 2005, 2007). The nest is usually constructed from reeds and cattails that have been bent down to form a basin (Johnsgard and Carbonell, 1996), although old nests of Red-knobbed Coots <i>Fulica cristata</i> may sometimes be used		
Sagittariidae	<i>Sagittarius serpentarius</i>	Secretarybird	Endangered	The species inhabits open landscapes, ranging from open plains and grasslands, to lightly wooded savanna, but is also found in agricultural areas and sub-desert (Ferguson-Lees and Christie, 2001), with up to 50% of recorded individuals in the Fynbos biome in winter being found in transformed environments (Hofmeyr <i>et al.</i> 2014). The species avoids areas of >20% wood cover (Loftie-Eaton, 2017). Although the species is nomadic, individuals which inhabit moist grassland tend to be less nomadic but may travel 20-30 km per day while foraging (Kemp and Kemp, 1977; Whitecross <i>et al.</i> 2019). The species preys on a variety of invertebrates (insects form 86% of the diet, Whitecross <i>et al.</i> 2019) and vertebrates (rodents, other mammals, lizards, snakes, eggs, young birds and amphibians, Kemp and Kemp, 1977; Ferguson-Lees and Christie, 2001). Breeding occurs throughout the year and the species typically nests in a flat-topped Acacia or other thorny tree (Ferguson-Lees and Christie, 2001).	Medium	The species was not recorded in the study area landscape during the field survey and has been recorded only four times in the study area landscape, with the latest observation in September 2024 (Appendix B). Although areas surrounding the site have a densely vegetated profile, some parts exist in an open state which are preferred by this species for hunting. It is therefore possible that this species may be ephemerally present in areas adjacent to the site.
Laridae	<i>Hydroprogne caspia</i>	Caspian Tern	Least Concern	The breeding, passage and wintering habitats of this species are similar, although during the winter it is largely confined to the coast (Shuford and Craig 2002). It frequents sheltered sea coasts, estuaries, inlets, bays, harbours, coastal lagoons, saltmarshes and salt pans, also occurring inland on fresh or saline wetlands including large lakes, inland seas, large rivers, creeks, floodlands, reservoirs and sewage ponds (Flint <i>et al.</i> 1984, Martin and Randall 1987, Richards 1990, Higgins and Davies 1996, del Hoyo <i>et al.</i> 1996, Snow and Perrins 1998).	Low	The species was not confirmed during the field survey, but has been recorded a high number of times (36 times) in the study area landscape, with the latest observation in December 2024 (Appendix B). Even so, this species has marine habits and records likely pertain to the coastal part of the overlapped pentad. The site itself is devoid of the saline conditions preferred by this species, and it is unlikely to occur within or near the study area.
Scolopacidae	<i>Calidris ferruginea</i>	Curlew Sandpiper	Vulnerable	This species breeds on slightly elevated areas in the lowlands of the high Arctic especially on southward-facing slopes, as well as along the coast and islands of the Arctic Ocean (Johnsgard 1981, del Hoyo <i>et al.</i> 1996). In the winter the species chiefly occurs on coastal brackish lagoons, tidal mud- and sand-flats, estuaries, saltmarshes (del Hoyo <i>et al.</i> 1996, Snow and Perrins 1998), exposed coral, rocky shores and tidewrack on sandy beaches (Urban <i>et al.</i> 1986), and also inland on the muddy edges of marshes, large rivers and lakes (both saline and freshwater), irrigated land, flooded areas (del Hoyo <i>et al.</i> 1996), dams (Urban <i>et al.</i> 1986) and salt pans (Khomenko 2006). Abnormal rainfall in inland sites may additionally create temporary wetlands that provide additional suitable habitat (Geering <i>et al.</i> 2007, Dhanjal-Adams <i>et al.</i> 2018). On the breeding grounds the diet of this species consists mainly of insects, such as the adults, pupae and larva of Diptera (e.g. midges, crane flies (Johnsgard 1981)) and beetles, as well as bugs and leeches (del Hoyo <i>et al.</i> 1996). In the winter its diet consists of polychaete worms, molluscs, crustaceans (such as amphipods, brine shrimps and copepods), and occasionally insects and seeds (del Hoyo <i>et al.</i> 1996). It is a full migrant, moving long distances by well-travelled routes (del Hoyo <i>et al.</i> 1996, Snow and Perrins 1998).	Low	The species was not confirmed during the field survey, and has been recorded only five times in the study area landscape, with the latest observation in January 2019 (Appendix B). Although a small amount of mudflat habitat is present along certain parts of the Moordkuil River drainage channel, these are suboptimal for the occurrence of the species. In addition, the species is relatively rare in the study area landscape and it is therefore unlikely to occur on or near the site.

Falconidae	<i>Falco biarmicus</i>	Lanner Falcon	Least Concern	The species inhabits a wide variety of habitats, from lowland deserts to forested mountains, and is recorded up to 5,000 m (del Hoyo et al. 1994). Small birds make up most of its diet, particularly quails, pigeons and doves (del Hoyo et al. 1994). Birds usually breed in the abandoned nests of other raptors, corvids or herons on trees and pylons (del Hoyo et al. 1994).	High	The species was not confirmed during the field survey, and has been recorded nine times in the study area landscape, with the latest observation in December 2024 (Appendix B). The study area landscape does contain a number of the avifaunal species preyed upon by the Lanner Falcon, while also allowing for adequate perching opportunity in the large trees adjacent to the Moordkuil River channel. It is therefore possible that this species may ephemerally traverse the study area landscape.
Gruidae	<i>Anthropoides paradiseus</i>	Blue Crane	Vulnerable	This species breeds in natural grass- and sedge-dominated habitats, preferring secluded grasslands at high elevations where the vegetation is thick and short (Barnes, 2000). Occasionally it will breed in or near wetland areas (Barnes, 2000), in pans or on islands in dams (Hockey et al. 2005). Particularly in the Western Cape of South Africa, it also uses lowland agricultural areas, particularly pasture, fallow fields and cereal crop fields as stubble becomes available after harvest (Barnes, 2000, Hockey et al. 2005). During the non-breeding season the species inhabits short, dry, natural grasslands, as well as the Karoo and fynbos biomes (Barnes, 2000). In fynbos it occurs almost exclusively in cultivated habitats, largely avoiding the natural vegetation (Barnes, 2000), although this habitat may provide important cover for juveniles (Bidwell et al. 2006). The agricultural habitats that it uses include pastures, croplands, particularly where cereal crops are grown (Barnes, 2000), and fallow fields. It is intolerant of intensively grazed and burnt grassland (Hockey et al. 2005). It roosts in shallow wetlands (Barnes, 2000, Hockey et al. 2005).	High	The species was not confirmed during the field survey, but has been recorded a high number of times (169 times) in the study area landscape, with the latest observation in April 2025 (Appendix B). Although areas surrounding the site have a densely vegetated profile, some parts have exist in an open state which are preferred by this species for foraging. It is therefore possible that this species may be ephemerally present in areas adjacent to the site.
Otididae	<i>Neotis denhami</i>	Denham's Bustard	Near-Threatened	The species inhabits grasslands, grassy <i>Acacia</i> -studded dunes, fairly dense shrubland, light woodland, farmland, crops, dried marsh and arid scrub plains, also grass-covered ironstone pans and burnt savanna woodland in Sierra Leone and high rainfall sour grassveld, planted pastures and cereal croplands in fynbos in South Africa (del Hoyo et al. 1996). It feeds on insects, small vertebrates and plant material (Collar, 1996).	High	The species was not confirmed during the field survey, and has been recorded 12 times in the study area landscape, with the latest observation in March 2025 (Appendix B). Although areas surrounding the site have a densely vegetated profile, some parts have exist in an open state which are preferred by this species for foraging. It is therefore possible that this species may be ephemerally present in areas adjacent to the site.
Locustellidae	<i>Bradypterus sylvaticus</i>	Knysna Warbler	Vulnerable	The species occurs in thick, tangled vegetation along the banks of watercourses, or covering drainage lines in fynbos forest patches, or on the edges of afro-montane forest. It breeds in dense understorey vegetation (Pryke et al. 2010).	High	The species was not confirmed during the field survey, but has been recorded a high number of times (53 times) in the study area landscape, with the latest observation in March 2025 (Appendix B). Natural areas adjacent to the site also harbour a significant incidence of thicket vegetation and it is therefore highly likely that this species will be present within the landscape adjacent to the study area.
Picidae	<i>Campethera notata</i>	Knysna Woodpecker	Near-Threatened	The species is confined to coastal areas of forest, woodland, dense bush, Euphorbia scrub, or open country with large trees.	Confirmed	The species was confirmed during the field survey, and has been recorded a number of times (12 times) in the study area landscape, with the latest observation in March 2025 (Appendix B). A single individual of this species was observed vocalising in the thicket vegetation in the "kloof" to the north of the site. To this end, the natural vegetation in the surrounding landscape along with the trees along the Moordkuil River drainage channel offer suitable habitat for

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## 10. Evaluation of Site Ecological Importance (SEI)

### 10.1 Evaluating SEI for habitats in the study area

The evaluation of the Site Ecological Importance (SEI) was performed following the methods and criteria outlined in the Species Environmental Assessment Guideline (SANBI, 2020). Given that the project footprint and alternative site camp locations are spatially limited (<1 hectare) and extra-limital to the natural habitats where SCC may occur, calculation of SEI was performed for both mammals and avifauna combined. In short, SEI is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/faunal community or habitat type present on the site) and its resilience to impacts (Receptor Resilience, RR) as follows:  $SEI = BI + RR$ . Biodiversity Importance (BI) is in turn a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows:  $BI = CI + FI$ .

To calculate the Conservation Importance (CI) and Functional Integrity (FI) of each habitat within the study area, the criteria outlined in **Table 4** and **Table 5** were respectively used.

According to the Species Environmental Assessment Guideline, Conservation Importance (CI) may defined as follows:

*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."*

**Table 4** Conservation importance (CI) criteria (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

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

According to the guideline, Functional Integrity (FI) is defined as:

Functional integrity (FI): *“The receptors’ current ability to maintain the structure and functions that define it, compared to its known or predicted state under ideal conditions. Simply stated, FI is: ‘A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.’”*

**Table 5** Functional integrity (FI) criteria (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

Functional Integrity (FI)	Fulfilling Criteria
Very high	<p>Very large (&gt; 100 ha) intact area for any conservation status of ecosystem type or &gt; 5 ha for CR ecosystem types.</p> <p>High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches.</p> <p>No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing).</p>
High	<p>Large (&gt; 20 ha but &lt; 100 ha) intact area for any conservation status of ecosystem type or &gt; 10 ha for EN ecosystem types.</p> <p>Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches.</p> <p>Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.</p>
Medium	<p>Medium (&gt; 5 ha but &lt; 20 ha) semi-intact area for any conservation status of ecosystem type or &gt; 20 ha for VU ecosystem types.</p> <p>Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.</p> <p>Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.</p>
Low	<p>Small (&gt; 1 ha but &lt; 5 ha) area.</p> <p>Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential.</p> <p>Several minor and major current negative ecological impacts.</p>
Very low	<p>Very small (&lt; 1 ha) area.</p> <p>No habitat connectivity except for flying species or flora with wind-dispersed seeds.</p> <p>Several major current negative ecological impacts.</p>

Based on assessments of CI and FI for habitats within the study area, the Biodiversity Importance (BI) of each habitat was calculated using the matrix in **Table 6** (based on the formula:  $BI = CI + FI$ ). As Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor, BI can be derived from a simple matrix of CI and FI as follows:

**Table 6** Matrix for calculating Biodiversity Importance (BI) (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

Biodiversity Importance (BI)		Conservation Importance (CI)				
		Very high	High	Medium	Low	Very low
Functional Integrity (FI)	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

Finally, the Receptor Resilience for each habitat was evaluated following the criteria listed in **Table 7**. According to the Species Assessment Guidelines, Receptor resilience (RR) may be defined as follows:

Receptor resilience (RR): “*The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.*”

**Table 7** Receptor Resilience (RR) criteria (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

Receptor Resilience (RR)	Fulfilling Criteria
Very high	Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
Very low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

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Taken together, the Site Ecological Importance (SEI) was calculated for each habitat within the study area using the formula:  $SEI = BI + RR$ , and following the matrix outlined in **Table 8**. The interpretation of the development actions allowed for each SEI category are outlined in **Table 9**.

**Table 8** Matrix for calculating Site Ecological Importance (SEI) (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

Site Ecological Importance (SEI)		Biodiversity Importance (BI)				
		Very high	High	Medium	Low	Very low
Receptor Resilience (RR)	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

**Table 9** Guidelines for interpreting SEI in the context of the proposed development activities (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

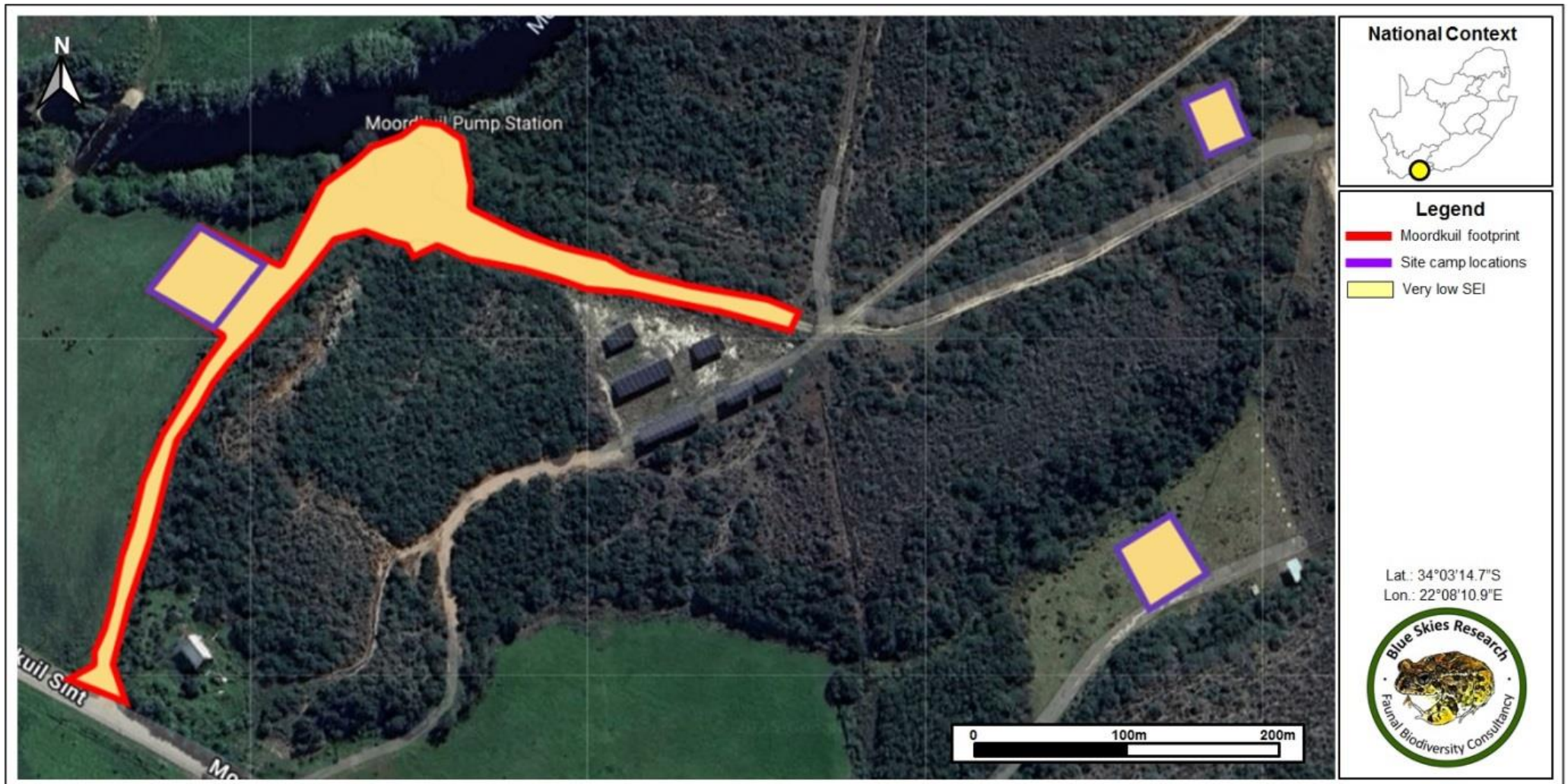
Site Ecological Importance (SEI)	Interpretation in relation to proposed development activities
Very high	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition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

## 10.2 SEI for habitats in the study area

The SEI results for habitats within the study area are given in **Table 10** with the spatial representation for each habitat and its concomitant SEI category portrayed in **Figure 16**. The project footprint and alternative site camp locations harbour almost no remaining natural habitats, are spatially limited (<1 hectare) and extra-limital to the natural habitats where SCC may occur and do not support any permanent subpopulations of terrestrial faunal or avifaunal species. As such, all habitats overlapping the project footprint are retrieved as having a “Very low” SEI. Minimisation mitigation is therefore acceptable (the project footprint is already minimised to existing modified areas), allowing for development activities of medium to high impact without restoration activities being required (**Table 9**).

**Table 10** Evaluation of SEI for habitats within the study area. BI = Biodiversity Importance, RR = Receptor Resilience.

Habitat type	Conservation Importance	Functional Integrity	Receptor Resilience	Site Ecological Importance
Cleared / Modified	<b>Very low</b> - Unlikely populations of terrestrial faunal or avifaunal SCC.	<b>Very low</b> - Very small area (<1ha) with several major current negative ecological impacts (no remaining natural habitats and no permanent subpopulations of terrestrial faunal or avifaunal species).	<b>Very high</b> - Because this habitat exists in an already open and modified state with significant daily impacts, it can only recover to this state.	Very low - BI = Very low; RR = Very high
Trees	<b>Very low</b> - Unlikely populations of terrestrial faunal or avifaunal SCC.	<b>Very low</b> - Very small area (<1ha) with several major current negative ecological impacts (alien and invasive vegetation).	<b>Very high</b> - Because this habitat comprises mostly alien and invasive trees, it can only recover to this state.	Very low - BI = Very low; RR = Very high



**Figure 16** Spatial representation of the SEI of habitats within the study area.

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## **11. Current impacts, project-related impacts and mitigation measures**

### *11.1 Current impacts*

The project footprint and alternative site camp locations are limited to already cleared and modified areas with a spatially limited and extra-limital placement relative to the surrounding natural landscape. To this end, faunal and avifaunal movement over these parts is highly ephemeral with the site supporting no notable permanent faunal subpopulations. From a terrestrial faunal and avifaunal perspective therefore, the project footprint and alternative site camp locations is of a “Low” sensitivity.

### *11.2 Proposed scope of works and development alternatives*

The project will entail the upgrade of the raw water abstraction works and pump station (in operation since 1980) at the Moordkuil River on Portion 15, 24 and 25 of the farm Klipheuwel. The existing raw water abstraction works was designed to abstract 800 litres per second of water from the Moordkuil River and to pump the water to the Klipheuwel Dam for storage. Only one of the existing two axial pumps is currently operational, which means that the facility is operating at half its original intended design capacity. The existing axial pump station design is outdated and it is not able to be maintained / repaired due to the unavailability of parts and other maintenance restrictions. It is therefore required to upgrade the existing raw water abstraction works and pump station with more modern technology that will be low maintenance, cost effective and efficient (able to abstract water at the full original intended design capacity of 800 litres per second and low maintenance). In summary, the following is proposed to be constructed:

- The construction of a new reinforced concrete inlet hopper structure for the pump station;
- The construction of pipe protection ramp structure for the pipes into the existing pump station building.

- The reinstatement of the existing gravel access road from Blesbok Road to the site (180m long and 3.6m wide) by reinstating the existing gravel road, within the same development footprint, which has become almost impassable due to water ingress into the existing layerworks (farmers leaking irrigation channel). The final road is proposed to be 3m wide. 300mm is proposed on each side for the bottom layerworks that have to be wider than the top layerworks to transfer vehicle loads to the soil. The proposed affected area will be 3.6m but the final road will be 3m wide.
- A new concrete road (in an already disturbed area). The new concrete road proposed is approximately 500m<sup>2</sup> and ranges in width from 3m to 7.4m (in order for a 5 ton truck to turn around);
- Construction of an access ramp to the hopper;
- The construction of a new water meter chamber next to the pump station. The development footprint of the water meter chamber is approximately 20m<sup>2</sup>;
- Replacing of three air-valves and construction of new chambers around the air-valves;
- Installation of new pipework, pumps and motor control centers;
- Installation of other mechanical items such as cover, trash-racks, etc.
- Upgrading of the electrical supply and breakers within the existing pump station building;
- Installation of a sediment barrier downstream of the crossing to curb sediment generation in the river;
- Final reinstatement of the river bed to the requirements of the CEMP.

The concrete inlet hopper structure is proposed to be anchored to the bedrock by means of piling foundations. In order to install the piles, a pile rig needs to obtain access in the correct position. It is for this reason that a temporary platform structure is required to be constructed within the Moordkuil River. The area where the inlet hopper (and the associated pile foundations) is proposed to be constructed is below the 1:10 year floodline, within the river. It is therefore required to construct a coffer dam with soil infill material behind the sheet piling around the area where the inlet hopper structure is proposed to be built in order to have a dry area for construction and concrete setting. In order to install the inlet hopper structure within the river, a

temporary 75m<sup>2</sup> platform must be constructed for a piling rig to be able to install the piles into the bedrock. The piles are required to anchor the new inlet hopper structure and will likely be 450mm in diameter drilled in places up to 10m deep into bedrock.

All of the above, except for the proposed temporary platform, cement access road, new water meter chamber and sediment barrier, are proposed within the existing development footprint. It is also proposed to demolish the existing underwater cement bag wall, existing above water concrete steps and the existing underwater concrete plinths for the existing pipes.

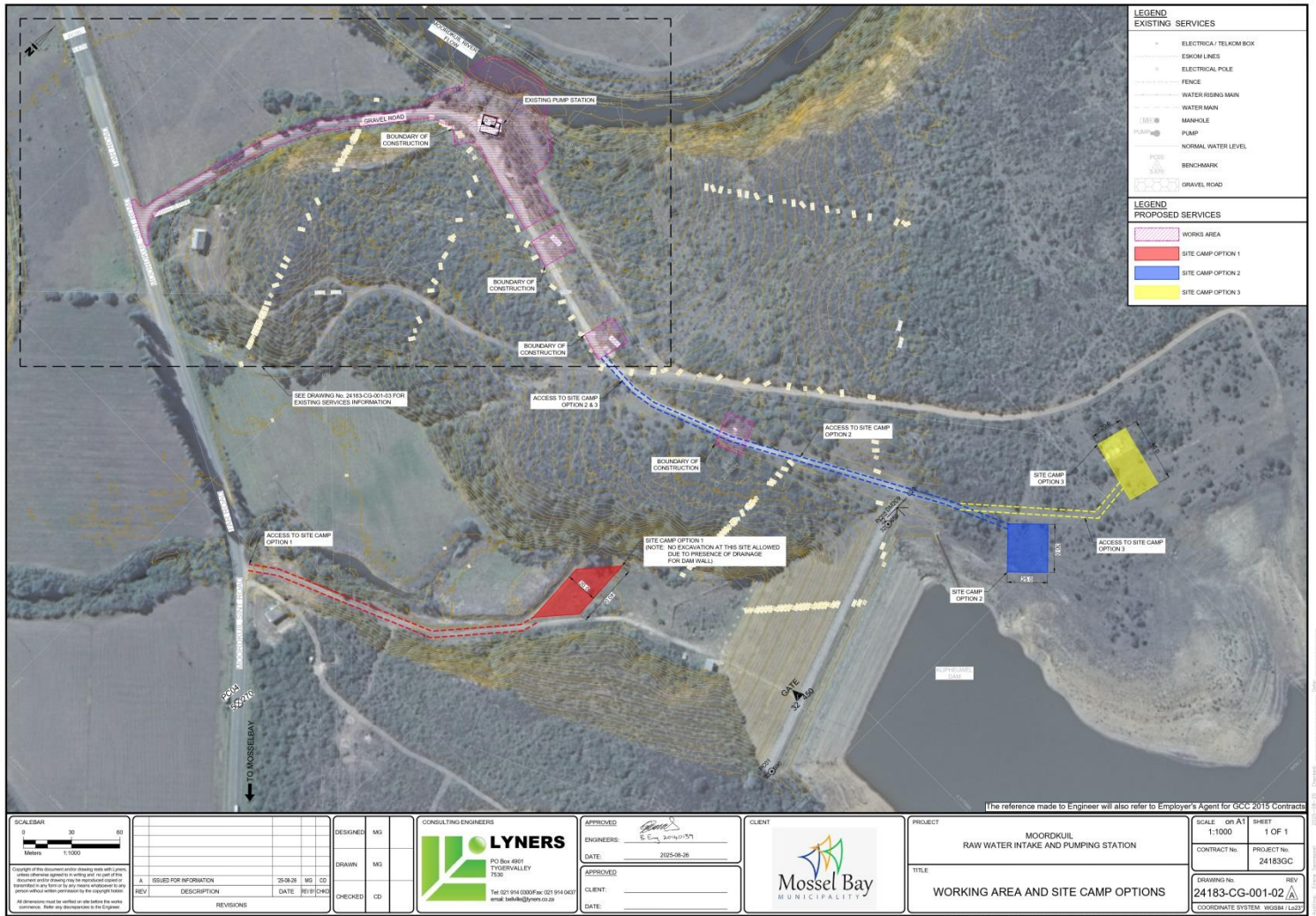
**Two development alternatives** have been provided for the proposed layout of the scope of works with the originally provided **Alternative layout B represented throughout this report** and the subsequently updated **Preferred Alternative layout A considered here**. While largely similar in the spatial context of the installation of infrastructure, the two alternatives considers different placements of three potential site camp locations.

#### 11.2.1 Preferred Alternative layout A

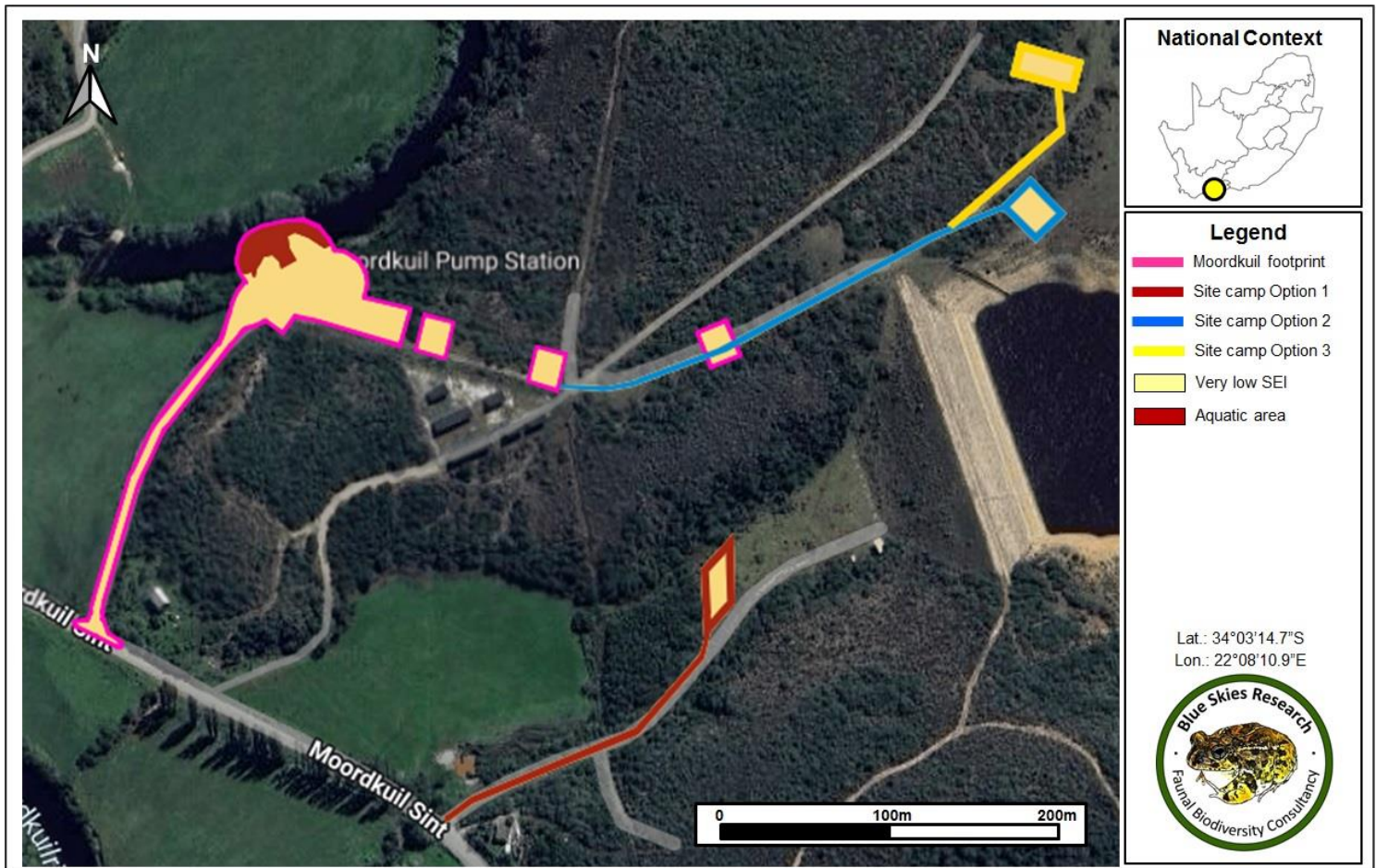
This refined layout is spatially similar for the proposed scope of works under both alternatives, but does include the footprint of an extra air valve chamber to the east which will also be located in a previously modified area (**Figure 17**). In addition, this alternative considers the placement of the three alternative site camp locations that are spatially different to that of Alternative layout B. Notably, the one site camp location will no longer be near the Moorkuil River floodplain, but will rather pertain to a small south-western “kloof” below the Kipheuvel Dam, with two other site camp locations located in cleared areas to the immediate north-west of the Dam. All three alternative site camp locations are also located within previously modified areas with no remaining natural vegetation.

This refined alternative also takes into account the temporary 75m<sup>2</sup> platform for the piling rig within the Moorkuil River which will be constructed through soil infill material behind the sheet piling. From a terrestrial faunal and avifaunal perspective,

all of the proposed footprints are located in areas of "Very low" SEI, but with the temporary 75m<sup>2</sup> platform intersecting the Moorkuil River which may be of a higher sensitivity from an aquatic perspective (**Figure 18**, see Subsection 11.3.4)



**Figure 17** Site development plan (SDP) for the proposed scope of works and alternative site camp locations under Alternative layout A.



**Figure 18** Spatial representation of the SEI of habitats intersecting the proposed scope of works and alternative site camp locations under Alternative layout A.

### 11.2.2 Alternative layout B

This alternative considers the originally provided layout represented throughout this report. This alternative does not provide for the temporary platform for the piling rig within the Moordkuil River, and also includes three different alternative site camp locations with one located on the river floodplain. From a terrestrial faunal and avifaunal perspective, all of the proposed footprints are located in areas of “Very low” SEI (**Figure 16**).

### *11.3 Associated impacts, impact management actions and mitigation measures*

Impacts from the proposed development are expected to be restricted to the construction phase, with no additional impacts expected during the operational phase. Major impacts are expected to pertain to the:

- The destruction and loss of habitats;
- Direct mortality of, or displacement of fauna;
- Noise and vibration through machinery and people; and
- Contamination of ground water through chemical spills or leaching of chemicals.

#### 11.3.1 The destruction and loss of habitats

##### **Impact description**

The project footprint and alternative site camp locations under both Preferred Alternative layout A and Alternative layout B are limited to already cleared and modified areas of “Very low” SEI, cover less than 1 hectare in extent and have an extra-limital placement relative to the surrounding natural landscape. Currently, these parts harbour no permanent subpopulations of terrestrial faunal or avifaunal species, with faunal and avifaunal movement being highly ephemeral. From a terrestrial faunal and avifaunal perspective therefore, the project footprint and alternative site camp locations under both Preferred Alternative layout A and Alternative layout B do not intersect any notable habitats of concern.

##### **Mitigation measures and / or impact management actions**

Because the project footprint and alternative site camp locations under both Preferred Alternative layout A and Alternative layout B do not intersect any notable habitats of concern and are located in areas of “Very low” SEI, the proposed development is expected to lead to **no loss of habitat**. To this end, this impact is expected to be **“Insignificant”** to the receiving environment.

### 11.3.2 Direct mortality of, or displacement of fauna

#### **Impact description**

Currently, the project footprint and alternative site camp locations under both Preferred Alternative layout A and Alternative layout B harbour no permanent subpopulations of terrestrial faunal or avifaunal species with the faunal and avifaunal profile of the surrounding landscape comprising mostly highly mobile species. It is expected that these species will vacate the area of their own accord at the onset of any disturbance. It is expected that displaced fauna will move into the large natural areas to the east of the site and therefore the impact of faunal displacement is expected to be reduced.

#### **Mitigation measures and / or impact management actions**

The direct mortality of, or displacement of fauna is expected to be “**Insignificant**” to the receiving environment under both Preferred Alternative layout A and Alternative layout B. It is however advocated that every effort should be made to save and relocate any mammal, reptile, amphibian, bird, or invertebrate that cannot flee of its own accord, encountered during site preparation (i.e., to avoid and minimise the direct mortality of faunal species). These animals should be relocated to an area immediately outside of the project footprint, but under no circumstances any further away.

### 11.3.3 Noise and vibration through machinery and people

#### **Impact description**

Noise and vibration through machinery and people are an unavoidable impact during both the construction phase of the project under both Preferred Alternative layout A and Alternative layout B. This impact may also lead to the displacement of fauna. As noted, the faunal and avifaunal profile of the site comprises highly mobile species which will be able to vacate the area of their own accord at the onset of disturbance.

Noise and vibration through machinery and people are therefore expected to be an “**Insignificant**” consequence to the receiving environment during both the construction and operational phases.

### **Mitigation measures and / or impact management actions**

Impacts from noise and vibration are expected to be limited and no mitigation measures or impact management actions are proposed under both Preferred Alternative layout A and Alternative layout B.

#### 11.3.4 Contamination of ground water through chemical spills or leaching of chemicals

### **Impact description**

During the construction phase of the project it is possible that chemicals (such as oil, fuel and cement) may spill or leach into the surrounding environment, thereby causing contamination and the potential mortality of fauna. This may especially be the case when constructing the temporary platform structure within the Moordkuil River under Preferred Alternative layout A which will be used to support the piling rig when constructing piling foundations. Furthermore, this process will entail construction of a coffer dam around the area where the inlet hopper structure is proposed to be built in order to have a dry area for construction and concrete setting. Because impacts from contamination to the freshwater environment of the Moordkuil River are a distinct possibility, mitigation measures and impact management actions should follow the recommendations by the freshwater specialist.

### **Mitigation measures and / or impact management actions**

- Storage of fuel, chemicals and other hazardous substances should be done in suitable secure weatherproof containers with impermeable and bunded floors to limit pilferage or spillage into the environment.

- Clean-up of any spillages (e.g. oil, fuel hazardous chemicals and cement) should proceed immediately and the contaminated soil should be removed and disposed of appropriately.

## 12. Conclusion

### *12.1 Listed sensitivity in the DFFE Screening Tool Report*

The results from this report confirm the site sensitivity (terrestrial biodiversity and terrestrial faunal and avifaunal species) of the project footprint and alternative site camp locations under both Preferred Alternative layout A and Alternative layout B to be “Low” in contrast to the respective “High” and “Very High” site sensitivities retrieved in the DFFE Screening Tool Report (Section 3). The project footprint and alternative site camp locations are limited to already cleared and modified areas of “Very low” SEI, cover less than 1 hectare in extent and have an extra-limital placement relative to the surrounding natural landscape. These parts also harbour no permanent subpopulations of terrestrial faunal or avifaunal species. Taken together, these factors confirm the sensitivity of the proposed project footprints under both Preferred Alternative layout A and Alternative layout B to be “Low” from terrestrial biodiversity and terrestrial faunal and avifaunal perspectives, thereby confirming the requirement for this Compliance Statement Report.

### *12.2 Terrestrial and aquatic biodiversity features*

The larger part of the project footprint currently overlaps with areas regarded as degraded terrestrial and aquatic CBA2 owing to the open and transformed nature of these parts. Only a small section of the northern access road is mapped as a terrestrial CBA1, owing to the previous presence of Garden Route Granite Fynbos which has subsequently been cleared to form a fire break.

As noted from the ground-truthing phase, the project footprint and alternative site camp locations fail to meet the criteria of degraded terrestrial and aquatic CBA2 defined as “*Areas in a degraded or secondary condition that are required to meet*

*biodiversity targets, for species, ecosystems or ecological processes and infrastructure.*” This follows from their already cleared and modified nature, retrieval as “Very low” SEI, small spatial extent of less than 1 hectare and an extra-limital placement relative to the surrounding natural landscape. Furthermore, these parts also harbour no permanent subpopulations of terrestrial faunal or avifaunal species, with only a highly ephemeral movement of species. In combination therefore, the project footprint and alternative site camp rather exist in an “Irreversibly modified” condition and offer little in the way of supporting biodiversity features, ecosystems or ecological processes in the local landscape. The loss of these parts to development is unlikely to impact on ecosystem integrity at either local or regional scales.

### *12.3 Conclusion*

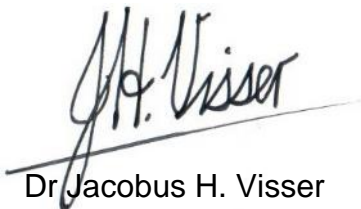
While the proposed project is unlikely to have any major impacts on terrestrial biodiversity and terrestrial faunal and avifaunal species, the a temporary platform will be constructed through soil infill material behind the sheet piling accommodate a temporary platform for the piling rig in order to construct the concrete inlet hopper within the Moordkuil River. Because this temporary platform will intersect a sensitive freshwater environment, any such scope of works should follow recommendations from the freshwater specialist.

Aside from overlap with the freshwater ecosystem of the Moordkuil River, all other project footprints and site camp locations under both Preferred Alternative layout A and Alternative layout B are located in less sensitive areas from terrestrial biodiversity and terrestrial faunal and avifaunal perspectives and are unlikely to impact on ecological processes or biodiversity patterns at either local or regional scales. Both these development layouts and associated activities are therefore supported from terrestrial biodiversity and terrestrial faunal and avifaunal biodiversity perspectives.

### 13. Conditions to which this statement is subjected

The content of this report is based on the author's best scientific and professional knowledge as well as available information. Since environmental impact studies deal with dynamic natural systems, additional information may come to light at a later stage which is not listed in this report. As such, the conclusions and recommendations made in this report are done in good faith based on information gathered at the time of the investigation.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of the report, which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.



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## Appendix A

**Appendix A** Desktop species list of the mammal species which have a distribution overlapping with the study area (constructed with reference to Skinner and Chimimba, 2005). Species in bold have been previously recorded within the study area landscape (iNaturalist, www.iNaturalist.org). For each species, the taxonomic Order, Family, species binomial name and common name is shown, along with the current IUCN Red List classification of the species.

Mammals Desktop Species List					
Order	Family	Species	Common name	Status	
Afrosoricida	Chrysochloridae	<i>Chlorotalpa duthieae</i>	Duthie's Golden Mole	Vulnerable	
		<i>Amblysomus corriae</i>	Fynbos Golden Mole	Near-Threatened	
		<i>Amblysomus hottentotus</i>	Hottentot Golden Mole	Least Concern	
Carnivora	Canidae	<i>Canis mesomelas</i>	Black-backed Jackal	Least Concern	
		<i>Vulpes chama</i>	Cape Fox	Least Concern	
	Felidae	<i>Caracal caracal</i>	Caracal	Least Concern	
		<i>Felis silvestris</i>	African Wild Cat	Least Concern	
		<i>Leptailurus serval</i>	Serval	Least Concern	
		<b><i>Otocyon megalotis</i></b>	<b>Bat-eared Fox</b>	<b>Least Concern</b>	
		<b><i>Panthera pardus</i></b>	<b>Leopard</b>	<b>Vulnerable</b>	
		Hyaenidae	<i>Proteles cristata</i>	Aardwolf	Least Concern
		Herpestidae	<i>Atilax paludinosus</i>	Marsh Mongoose	Least Concern
	<i>Cynictis penicillata</i>		Yellow Mongoose	Least Concern	
	<i>Herpestes ichneumon</i>		Egyptian Mongoose	Least Concern	
	<b><i>Herpestes pulverulentus</i></b>		<b>Cape Grey Mongoose</b>	<b>Least Concern</b>	
	<b><i>Suricata suricatta</i></b>		<b>Meerkat</b>	<b>Least Concern</b>	
Mustelidae	<b><i>Aonyx capensis</i></b>	<b>African Clawless Otter</b>	<b>Near-Threatened</b>		
	<b><i>Ictonyx striatus</i></b>	<b>Zorilla</b>	<b>Least Concern</b>		

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		<i>Mellivora capensis</i>	Honey Badger	Least Concern
		<i>Poecilogale albinucha</i>	African Striped Weasel	Least Concern
	Viverridae	<i>Genetta genetta</i>	Common Genet	Least Concern
		<b><i>Genetta tigrina</i></b>	<b>Cape Genet</b>	<b>Least Concern</b>
Cetartiodactyla	Bovidae	<i>Oreotragus oreotragus</i>	Klipspringer	Least Concern
		<i>Philantomba monticola</i>	Blue Duiker	Least Concern
		<i>Raphicerus campestris</i>	Steenbok	Least Concern
		<b><i>Raphicerus melanotis</i></b>	<b>Cape Grysbok</b>	<b>Least Concern</b>
		<i>Sylvicapra grimmia</i>	Common Duiker	Least Concern
		<b><i>Tragelaphus scriptus</i></b>	<b>Southern Bushbuck</b>	<b>Least Concern</b>
	Suidae	<i>Potamochoerus larvatus</i>	Bushpig	Least Concern
Chiroptera	Molossidae	<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	Least Concern
	Nycteridae	<i>Nycteris thebaica</i>	Cape Long-eared Bat	Least Concern
	Pteropodidae	<i>Epomophorus wahlbergi</i>	Wahlberg's Epauletted Fruit Bat	Least Concern
		<i>Rousettus aegyptiacus</i>	Egyptian Fruit Bat	Least Concern
	Rhinolophidae	<i>Rhinolophus capensis</i>	Cape Horseshoe Bat	Least Concern
		<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	Least Concern
	Vespertilionidae	<i>Myotis tricolor</i>	Temminck's Hairy Bat	Least Concern
		<i>Neoromicia capensis</i>	Cape Bat	Least Concern
Eulipotyphla	Soricidae	<i>Crocidura cyanea</i>	Reddish-grey Musk Shrew	Least Concern
		<i>Crocidura flavescens</i>	Greater Red Musk Shrew	Least Concern
		<i>Myosorex longicaudatus</i>	Long-tailed Forest Shrew	Endangered
		<i>Myosorex varius</i>	Forest Shrew	Least Concern
		<i>Suncus infinitesimus</i>	Least Dwarf Shrew	Least Concern
		<i>Suncus varilla</i>	Lesser Dwarf Shrew	Least Concern
Hyracoidea	Procaviidae	<b><i>Procavia capensis</i></b>	<b>Rock Hyrax</b>	<b>Least Concern</b>
Lagomorpha	Leporidae	<i>Lepus saxatilis</i>	Cape Scrub Hare	Least Concern
		<i>Pronolagus saundersiae</i>	Hewitt's Red Rock Hare	Least Concern
Primates	Cercopithecidae	<b><i>Chlorocebus pygerythrus</i></b>	<b>Vervet Monkey</b>	<b>Least Concern</b>

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Rodentia	Bathyergidae	<i>Papio ursinus</i>	Chacma Baboon	Least Concern
		<b><i>Bathyergus suillus</i></b>	<b>Cape Dune Mole-rat</b>	<b>Least Concern</b>
		<i>Cryptomys hottentotus</i>	African Mole-rat	Least Concern
		<i>Georchus capensis</i>	Cape Mole-rat	Least Concern
	Gliridae	<i>Graphiurus murinus</i>	Woodland Dormouse	Least Concern
	Hystriidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern
	Muridae	<i>Acomys subspinosus</i>	Cape Spiny Mouse	Least Concern
		<i>Gerbillurus paeba</i>	Hairy-footed Gerbil	Least Concern
		<i>Micaelamys namaquensis</i>	Namaqua Rock Rat	Least Concern
		<i>Mus minutoides</i>	Pygmy Mouse	Least Concern
		<i>Myomyscus verreauxii</i>	Verreaux's Mouse	Least Concern
		<b><i>Otomys irroratus</i></b>	<b>Southern African Vlei Rat</b>	<b>Least Concern</b>
		<b><i>Rhabdomys pumilio</i></b>	<b>Four-striped Grass Mouse</b>	<b>Least Concern</b>
	Nesomyidae	<i>Dendromus melanotis</i>	Grey Climbing Mouse	Least Concern
		<i>Dendromus mesomelas</i>	Brant's Climbing Mouse	Least Concern
		<i>Mystromys albicaudatus</i>	White-tailed Rat	Vulnerable
		<i>Saccostomus campestris</i>	Pouched Mouse	Least Concern
<i>Steatomys krebsii</i>		Krebs' Fat Mouse	Least Concern	

## Appendix B

**Appendix B** Desktop species list of the avifaunal species which have been recorded in the pentad (3400\_2205) which overlaps the study area (the South African Bird Atlas Project 2, <https://sabap2.birdmap.africa/>). To create this species list, the species observed in this pentad was included, noting the total number of observations and the latest date the species was recorded (both shown). Species in bold represent avifaunal species of conservation concern (SCC).

Avifauna Desktop Species List (SABAP2 records)					
Common group	Common species	Genus	Species	No. observations	Latest observation
	<b>Bateleur</b>	<b>Terathopius</b>	<b>ecaudatus</b>	<b>1</b>	<b>2024/05/25</b>
	Bokmakierie	Telophorus	zeylonus	151	2025/04/02
	Hamerkop	Scopus	umbretta	34	2025/03/22
	Mallard	Anas	platyrhynchos	14	2024/12/07
	Neddicky	Cisticola	fulvicapilla	163	2025/03/29
	Quailfinch	Ortygospiza	atricollis	7	2024/12/05
	Ruff	Calidris	pugnax	14	2024/12/05
	<b>Secretarybird</b>	<b>Sagittarius</b>	<b>serpentarius</b>	<b>4</b>	<b>2024/09/04</b>
Apalis	Bar-throated	Apalis	thoracica	182	2025/03/29
Avocet	Pied	Recurvirostra	avosetta	10	2023/07/26
Barbet	Black-collared	Lybius	torquatus	1	2022/03/12
Batis	Cape	Batis	capensis	30	2025/03/22
Bee-eater	Blue-cheeked	Merops	persicus	2	2020/12/03
Bishop	Yellow	Euplectes	capensis	90	2025/03/29
Bittern	Little	Ixobrychus	minutus	4	2025/01/02
Boubou	Southern	Laniarius	ferrugineus	165	2025/04/02
Brownbul	Terrestrial	Phyllastrephus	terrestris	28	2025/03/09

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Bulbul	Cape	Pycnonotus	capensis	189	2025/03/29
Bunting	Cape	Emberiza	capensis	5	2024/12/28
Bushshrike	Olive	Chlorophoneus	olivaceus	66	2025/03/22
<b>Bustard</b>	<b>Denham's</b>	<b>Neotis</b>	<b>denhami</b>	<b>12</b>	<b>2025/03/22</b>
Buttonquail	Fynbos	Turnix	hottentottus	2	2019/06/11
Buzzard	Common	Buteo	buteo	70	2025/02/28
<b>Buzzard</b>	<b>Forest</b>	<b>Buteo</b>	<b>trizonatus</b>	<b>20</b>	<b>2025/02/26</b>
Buzzard	Jackal	Buteo	rufofuscus	163	2025/03/25
Camaroptera	Green-backed	Camaroptera	brachyura	1	2025/03/09
Canary	Brimstone	Crithagra	sulphurata	35	2025/03/01
Canary	Cape	Serinus	canicollis	93	2025/04/02
Canary	Forest	Crithagra	scotops	31	2025/03/22
Canary	White-throated	Crithagra	albogularis	10	2022/11/10
Canary	Yellow	Crithagra	flaviventris	53	2025/03/29
Chat	Familiar	Oenanthe	familiaris	7	2025/03/09
Cisticola	Grey-backed	Cisticola	subruficapilla	31	2025/03/25
Cisticola	Levaillant's	Cisticola	tinniens	102	2025/03/01
Cisticola	Zitting	Cisticola	juncidis	67	2025/03/22
Coot	Red-knobbed	Fulica	cristata	164	2025/03/29
<b>Cormorant</b>	<b>Cape</b>	<b>Phalacrocorax</b>	<b>capensis</b>	<b>27</b>	<b>2025/03/22</b>
Cormorant	Reed	Microcarbo	africanus	197	2025/04/02
Cormorant	White-breasted	Phalacrocorax	lucidus	153	2025/03/22
Coucal	Burchell's	Centropus	burchellii	71	2025/03/09
Crake	Black	Zaporina	flavirostra	34	2025/03/22
<b>Crane</b>	<b>Blue</b>	<b>Grus</b>	<b>paradisea</b>	<b>169</b>	<b>2025/04/02</b>
Crombec	Long-billed	Sylvietta	rufescens	8	2025/03/09
Crow	Cape	Corvus	capensis	126	2025/04/02
Crow	Pied	Corvus	albus	77	2025/03/25
Cuckoo	Black	Cuculus	clamosus	4	2022/11/04

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Cuckoo	Common	Cuculus	canorus	1	2022/11/04
Cuckoo	Diederik	Chrysococcyx	caprius	32	2025/01/10
Cuckoo	Jacobin	Clamator	jacobinus	3	2023/04/26
Cuckoo	Klaas's	Chrysococcyx	klaas	45	2025/03/09
Cuckoo	Red-chested	Cuculus	solitarius	9	2024/12/11
Cuckooshrike	Black	Campephaga	flava	32	2025/03/22
Darter	African	Anhinga	rufa	174	2025/03/22
Dove	Laughing	Spilopelia	senegalensis	159	2025/03/29
Dove	Namaqua	Oena	capensis	10	2024/12/04
Dove	Red-eyed	Streptopelia	semitorquata	193	2025/04/02
Dove	Ring-necked	Streptopelia	capicola	200	2025/04/02
Dove	Rock	Columba	livia	31	2025/03/29
Dove	Tambourine	Turtur	tympanistria	15	2025/03/04
Drongo	Fork-tailed	Dicrurus	adsimilis	182	2025/04/02
Duck	African Black	Anas	sparsa	16	2025/03/22
Duck	Fulvous Whistling	Dendrocygna	bicolor	8	2019/07/15
Duck	Knob-billed	Sarkidiornis	melanotos	13	2017/07/15
<b>Duck</b>	<b>Maccoa</b>	<b>Oxyura</b>	<b>maccoa</b>	<b>1</b>	<b>2023/02/03</b>
Duck	White-backed	Thalassornis	leuconotus	14	2025/01/02
Duck	White-faced Whistling	Dendrocygna	viduata	92	2025/03/25
Duck	Yellow-billed	Anas	undulata	187	2025/03/25
Eagle	Booted	Hieraaetus	pennatus	17	2024/12/11
<b>Eagle</b>	<b>Crowned</b>	<b>Stephanoaetus</b>	<b>coronatus</b>	<b>1</b>	<b>2023/03/16</b>
Eagle	Long-crested	Lophaetus	occipitalis	20	2025/03/09
<b>Eagle</b>	<b>Martial</b>	<b>Polemaetus</b>	<b>bellicosus</b>	<b>20</b>	<b>2025/03/29</b>
Eagle-Owl	Spotted	Bubo	africanus	32	2024/11/17
Egret	Intermediate	Ardea	intermedia	2	2025/01/02
Egret	Little	Egretta	garzetta	158	2025/03/29
Egret	Western Cattle	Bubulcus	ibis	248	2025/04/02

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<b>Falcon</b>	<b>Lanner</b>	<b>Falco</b>	<b>biarmicus</b>	<b>9</b>	<b>2024/12/18</b>
Falcon	Peregrine	Falco	peregrinus	21	2025/02/08
Firefinch	African	Lagonosticta	rubricata	2	2025/03/09
Fiscal	Southern	Lanius	collaris	239	2025/04/02
Fish Eagle	African	Haliaeetus	vocifer	88	2025/03/29
Flamingo	Greater	Phoenicopterus	roseus	9	2024/12/05
<b>Flamingo</b>	<b>Lesser</b>	<b>Phoeniconaias</b>	<b>minor</b>	<b>3</b>	<b>2021/06/12</b>
Flufftail	Red-chested	Sarothrura	rufa	2	2025/03/01
Flycatcher	African Dusky	Muscicapa	adusta	80	2025/03/29
Flycatcher	African Paradise	Terpsiphone	viridis	61	2025/03/29
Flycatcher	Blue-mantled Crested	Trochocercus	cyanomelas	9	2024/09/04
Flycatcher	Fairy	Stenostira	scita	1	2017/06/16
Flycatcher	Fiscal	Melaenornis	silens	141	2025/03/29
Flycatcher	Spotted	Muscicapa	striata	1	2015/12/17
<b>Gannet</b>	<b>Cape</b>	<b>Morus</b>	<b>capensis</b>	<b>12</b>	<b>2025/03/29</b>
Goose	Domestic	Anser	anser domesticus	1	2017/01/12
Goose	Egyptian	Alopochen	aegyptiaca	236	2025/04/02
Goose	Spur-winged	Plectropterus	gambensis	106	2025/03/22
Goshawk	African	Accipiter	tachiro	6	2024/05/25
Grassbird	Cape	Sphenoeacus	afer	27	2025/03/25
Grebe	Great Crested	Podiceps	cristatus	4	2022/08/16
Grebe	Little	Tachybaptus	ruficollis	125	2025/03/25
Greenbul	Sombre	Andropadus	importunus	210	2025/04/02
Greenshank	Common	Tringa	nebularia	71	2025/03/04
Guineafowl	Helmeted	Numida	meleagris	243	2025/04/02
Gull	Grey-headed	Chroicocephalus	cirrocephalus	87	2025/03/25
Gull	Hartlaub's	Chroicocephalus	hartlaubii	2	2025/02/28
Gull	Kelp	Larus	dominicanus	132	2025/03/29
<b>Harrier</b>	<b>African Marsh</b>	<b>Circus</b>	<b>ranivorus</b>	<b>24</b>	<b>2025/03/29</b>

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<b>Harrier</b>	<b>Black</b>	<b>Circus</b>	<b>maurus</b>	<b>5</b>	<b>2025/03/29</b>
Harrier-Hawk	African	Polyboroides	typus	18	2025/03/09
Heron	Black-headed	Ardea	melanocephala	125	2025/04/02
Heron	Goliath	Ardea	goliath	3	2020/06/13
Heron	Grey	Ardea	cinerea	178	2025/04/02
Heron	Purple	Ardea	purpurea	18	2025/03/04
Honeybird	Brown-backed	Prodotiscus	regulus	1	2024/01/24
Honeyguide	Greater	Indicator	indicator	59	2024/12/04
Honeyguide	Lesser	Indicator	minor	33	2025/03/29
Honeyguide	Scaly-throated	Indicator	variegatus	2	2020/11/28
Hoopoe	African	Upupa	africana	89	2025/03/25
House Martin	Common	Delichon	urbicum	4	2020/12/03
Ibis	African Sacred	Threskiornis	aethiopicus	227	2025/04/02
Ibis	Glossy	Plegadis	falcinellus	12	2024/12/04
Ibis	Hadada	Bostrychia	hagedash	240	2025/04/02
Jacana	African	Actophilornis	africanus	1	2024/05/26
Kestrel	Rock	Falco	rupicolus	33	2025/03/22
Kingfisher	Brown-hooded	Halcyon	albiventris	158	2025/04/02
Kingfisher	Giant	Megaceryle	maxima	77	2025/02/08
Kingfisher	Half-collared	Alcedo	semitorquata	3	2021/07/02
Kingfisher	Malachite	Corythornis	cristatus	72	2025/03/22
Kingfisher	Pied	Ceryle	rudis	177	2025/03/29
Kite	Black-winged	Elanus	caeruleus	88	2025/03/29
Kite	Yellow-billed	Milvus	aegyptius	31	2025/03/04
Lapwing	Black-winged	Vanellus	melanopterus	46	2025/03/25
Lapwing	Blacksmith	Vanellus	armatus	226	2025/04/02
Lapwing	Crowned	Vanellus	coronatus	124	2025/03/25
Lark	Agulhas Long-billed	Certhilauda	brevirostris	2	2019/06/11
Lark	Cape Clapper	Mirafraga	apiata	1	2022/11/04

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Lark	Large-billed	Galerida	magnirostris	5	2024/10/11
Lark	Red-capped	Calandrella	cinerea	16	2025/02/28
Longclaw	Cape	Macronyx	capensis	69	2025/03/22
Mallard	Hybrid	Anas	hybrid	1	2024/09/04
Martin	Banded	Neophedina	cincta	3	2020/12/03
Martin	Brown-throated	Riparia	paludicola	112	2025/03/29
Martin	Rock	Ptyonoprogne	fuligula	79	2025/03/09
Moorhen	Common	Gallinula	chloropus	99	2025/04/02
Mousebird	Red-faced	Urocolius	indicus	80	2025/03/22
Mousebird	Speckled	Colius	striatus	179	2025/04/02
Mousebird	White-backed	Colius	colius	2	2022/01/04
Night Heron	Black-crowned	Nycticorax	nycticorax	10	2025/02/28
Nightjar	Fiery-necked	Caprimulgus	pectoralis	8	2025/03/04
Openbill	African	Anastomus	lamelligerus	1	2010/08/14
Oriole	Black-headed	Oriolus	larvatus	108	2025/04/02
Osprey	Western	Pandion	haliaetus	52	2025/03/29
Ostrich	Common	Struthio	camelus	16	2024/12/11
Oystercatcher	African	Haematopus	moquini	28	2025/03/29
Painted-snipe	Greater	Rostratula	benghalensis	6	2017/07/11
Peafowl	Indian	Pavo	cristatus	108	2025/03/25
Pelican	Great White	Pelecanus	onocrotalus	4	2017/09/30
Pigeon	African Olive	Columba	arquatrix	55	2025/03/09
Pigeon	Speckled	Columba	guinea	145	2025/04/02
Pipit	African	Anthus	cinnamomeus	98	2025/01/18
Pipit	Nicholson's	Anthus	nicholsoni	4	2022/07/20
Pipit	Plain-backed	Anthus	leucophrys	13	2024/08/21
Plover	Common Ringed	Charadrius	hiaticula	23	2024/12/05
Plover	Grey	Pluvialis	squatarola	3	2020/12/18
Plover	Kittlitz's	Charadrius	pecuarius	34	2025/01/22

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Plover	Three-banded	Charadrius	tricoloris	120	2025/03/22
Plover	White-fronted	Charadrius	marginatus	14	2025/03/22
Pochard	Southern	Netta	erythrophthalma	3	2020/11/28
Prinia	Karoo	Prinia	maculosa	157	2025/03/29
Puffback	Black-backed	Dryoscopus	cubla	14	2025/03/22
Quail	Common	Coturnix	coturnix	15	2025/02/28
Quelea	Red-billed	Quelea	quelea	24	2025/03/25
Rail	African	Rallus	caerulescens	7	2017/10/31
Raven	White-necked	Corvus	albicollis	69	2025/03/29
Red Bishop	Southern	Euplectes	orix	136	2025/03/25
Robin-Chat	Cape	Cossypha	caffra	165	2025/04/02
Robin-Chat	Chorister	Cossypha	dichroa	4	2022/11/04
Rock-Thrush	Cape	Monticola	rupestris	3	2019/06/12
Roller	European	Coracias	garrulus	1	2022/01/04
Sandpiper	Common	Actitis	hypoleucos	73	2025/03/04
<b>Sandpiper</b>	<b>Curlew</b>	<b>Calidris</b>	<b>ferruginea</b>	<b>5</b>	<b>2019/01/05</b>
Sandpiper	Marsh	Tringa	stagnatilis	7	2021/11/14
Sandpiper	Terek	Xenus	cinereus	1	2018/10/03
Sandpiper	Wood	Tringa	glareola	14	2023/09/27
Saw-wing	Black	Psalidoprocne	pristoptera	111	2025/04/02
Scrub Robin	Karoo	Cercotrichas	coryphoeus	6	2024/09/04
Seedeater	Streaky-headed	Crithagra	gularis	93	2025/03/29
Shelduck	South African	Tadorna	cana	2	2010/11/04
Shoveler	Cape	Anas	smithii	78	2025/03/22
Snipe	African	Gallinago	nigripennis	26	2025/03/22
Sparrow	Cape	Passer	melanurus	116	2025/03/29
Sparrow	House	Passer	domesticus	74	2025/03/22
Sparrow	Southern Grey-headed	Passer	diffusus	77	2025/03/29
Sparrowhawk	Black	Accipiter	melanoleucus	7	2025/01/02

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Sparrowhawk	Rufous-breasted	Accipiter	rufiventris	4	2023/04/25
Spoonbill	African	Platalea	alba	75	2025/03/04
Spurfowl	Cape	Pternistis	capensis	156	2025/03/29
Spurfowl	Red-necked	Pternistis	afer	4	2024/03/20
Starling	Black-bellied	Notopholia	corrusca	8	2025/03/29
Starling	Common	Sturnus	vulgaris	243	2025/04/02
Starling	Pied	Lamprotornis	bicolor	1	2018/12/15
Starling	Red-winged	Onychognathus	morio	47	2025/03/09
Stilt	Black-winged	Himantopus	himantopus	118	2025/03/29
Stint	Little	Calidris	minuta	16	2025/03/29
Stonechat	African	Saxicola	torquatus	160	2025/03/29
Stork	White	Ciconia	ciconia	8	2024/02/24
Sugarbird	Cape	Promerops	cafer	24	2025/03/22
Sunbird	Amethyst	Chalcomitra	amethystina	98	2025/03/29
Sunbird	Collared	Hedydipna	collaris	3	2024/12/04
Sunbird	Greater Double-collared	Cinnyris	afer	104	2025/04/02
Sunbird	Malachite	Nectarinia	famosa	38	2025/03/22
Sunbird	Orange-breasted	Anthobaphes	violacea	6	2023/08/09
Sunbird	Southern Double-collared	Cinnyris	chalybeus	79	2025/03/22
Swallow	Barn	Hirundo	rustica	120	2025/04/02
Swallow	Greater Striped	Cecropis	cucullata	116	2025/04/02
Swallow	Pearl-breasted	Hirundo	dimidiata	36	2025/01/10
Swallow	White-throated	Hirundo	albigularis	87	2025/03/22
Swamphen	African	Porphyrio	madagascariensis	28	2025/03/29
Swift	African Black	Apus	barbatus	22	2025/03/09
Swift	African Palm	Cypsiurus	parvus	8	2025/01/10
Swift	Alpine	Tachymarptis	melba	12	2024/05/25
Swift	Common	Apus	apus	3	2025/01/10
Swift	Little	Apus	affinis	43	2025/03/09

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Swift	White-rumped	Apus	caffer	56	2025/03/22
Tchagra	Southern	Tchagra	tchagra	48	2025/03/22
Teal	Blue-billed	Anas	hottentota	1	2021/05/28
Teal	Cape	Anas	capensis	97	2025/03/09
Teal	Red-billed	Anas	erythrorhyncha	103	2025/03/22
<b>Tern</b>	<b>Caspian</b>	<b>Hydroprogne</b>	<b>caspia</b>	<b>36</b>	<b>2024/12/04</b>
Tern	Common	Sterna	hirundo	3	2025/03/22
Tern	Greater Crested	Thalasseus	bergii	16	2025/03/29
Tern	Sandwich	Thalasseus	sandvicensis	2	2022/11/04
Tern	Whiskered	Chlidonias	hybrida	6	2024/12/26
Tern	White-winged	Chlidonias	leucopterus	1	2010/10/17
Thick-knee	Spotted	Burhinus	capensis	57	2025/03/29
Thick-knee	Water	Burhinus	vermiculatus	100	2025/04/02
Thrush	Olive	Turdus	olivaceus	27	2025/03/22
Tit	Cape Penduline	Anthoscopus	minutus	1	2023/12/28
Turaco	Knysna	Tauraco	corythaix	64	2025/04/02
Turnstone	Ruddy	Arenaria	interpres	2	2018/10/03
Wagtail	Cape	Motacilla	capensis	217	2025/04/02
Warbler	African Reed	Acrocephalus	baeticatus	9	2022/11/04
Warbler	Common Reed	Acrocephalus	scirpaceus	2	2024/12/05
Warbler	Great Reed	Acrocephalus	arundinaceus	1	2020/12/30
<b>Warbler</b>	<b>Knysna</b>	<b>Bradypterus</b>	<b>sylvaticus</b>	<b>53</b>	<b>2025/03/22</b>
Warbler	Lesser Swamp	Acrocephalus	gracilirostris	35	2025/03/29
Warbler	Little Rush	Bradypterus	baboecala	57	2025/03/22
Warbler	Marsh	Acrocephalus	palustris	2	2022/02/03
Warbler	Victorin's	Cryptillas	victorini	1	2020/12/30
Warbler	Willow	Phylloscopus	trochilus	7	2024/12/26
Waxbill	Common	Estrilda	astrild	129	2025/04/02
Waxbill	Swee	Coccygia	melanotis	53	2025/03/09

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Weaver	Cape	Ploceus	capensis	205	2025/04/02
Weaver	Southern Masked	Ploceus	velatus	66	2025/03/09
Wheatear	Capped	Oenanthe	pileata	13	2024/10/11
Whimbrel	Eurasian	Numenius	phaeopus	31	2025/03/25
White-eye	Cape	Zosterops	virens	177	2025/03/29
Whydah	Pin-tailed	Vidua	macroura	78	2025/03/29
Woodpecker	Cardinal	Dendropicos	fuscescens	31	2025/03/09
<b>Woodpecker</b>	<b>Knysna</b>	<b>Campethera</b>	<b>notata</b>	<b>12</b>	<b>2025/03/29</b>
Woodpecker	Olive	Dendropicos	griseocephalus	33	2025/03/22

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## Appendix C

**Appendix C** Species list of the faunal species recovered within the study area during the field survey. For each, the taxonomic Order, Family, species binomial name and species common name are shown, along with the current IUCN Red List classification of the species, and the number of records of the species during the surveying period. Species in bold represent Species of Conservation Concern (SCC).

Mammals					
Order	Family	Species	Common name	IUCN status	Number of observations
Afrosoricida	Chrysochloridae	<b><i>Chlorotalpa duthieae</i></b>	<b>Duthie's Golden Mole</b>	<b>Vulnerable</b>	<b>1</b>
Artiodactyla	Bovidae	<i>Aepyceros melampus</i>	Impala	Least Concern	1
		<i>Raphicerus melanotis</i>	Cape Grysbok	Least Concern	1
		<i>Sylvicapra grimmia</i>	Common Duiker	Least Concern	2
		<i>Tragelaphus scriptus</i>	Southern Bushbuck	Least Concern	2
		<i>Caracal caracal</i>	Caracal	Least Concern	1
Carnivora	Felidae	<i>Caracal caracal</i>	Caracal	Least Concern	1
Primates	Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet Monkey	Least Concern	1
Rodentia	Hystricidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern	2
Avifauna					
Order	Family	Species	Common name	IUCN status	Number of observations
Accipitriformes	Accipitridae	<i>Buteo rufofuscus</i>	Jackal Buzzard	Least Concern	1
		<i>Elanus caeruleus</i>	Black-winged Kite	Least Concern	1
Anseriformes	Anatidae	<i>Alopochen aegyptiaca</i>	Egyptian Goose	Least Concern	2
Bucerotiformes	Upupidae	<i>Upupa africana</i>	African Hoopoe	Least Concern	1
Charadriiformes	Burhinidae	<i>Vanellus armatus</i>	Blacksmith Lapwing	Least Concern	1
Coliiformes	Coliidae	<i>Colius striatus</i>	Speckled Mousebird	Least Concern	2
		<i>Urocolius indicus</i>	Red-faced Mousebird	Least Concern	1
Columbiformes	Columbidae	<i>Streptopelia capicola</i>	Cape Turtle Dove	Least Concern	2

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Coraciiformes	Alcedinidae	<i>Ceryle rudis</i>	Pied Kingfisher	Least Concern	1
		<i>Halcyon albiventris</i>	Brown-hooded Kingfisher	Least Concern	2
Galliformes	Numididae	<i>Numida meleagris</i>	Helmeted Guineafowl	Least Concern	1
	Phasianidae	<i>Pavo cristatus</i>	Indian Peafowl	Least Concern	1
		<i>Pternistis capensis</i>	Cape Spurfowl	Least Concern	1
Musophagiformes	Musophagidae	<i>Tauraco corythaix</i>	Knysna Turaco	Least Concern	1
Passeriformes	Cisticolidae	<i>Apalis thoracica</i>	Bar-throated Apalis	Least Concern	2
		<i>Cisticola fulvicapilla</i>	Neddicky	Least Concern	3
		<i>Prinia maculosa</i>	Karoo Prinia	Least Concern	2
	Corvidae	<i>Corvus albicollis</i>	White-necked Raven	Least Concern	1
	Dicruridae	<i>Dicrurus adsimilis</i>	Fork-tailed Drongo	Least Concern	3
	Estrildidae	<i>Estrilda astrild</i>	Common Waxbill	Least Concern	2
	Fringillidae	<i>Crithagra gularis</i>	Streaky-headed Seedeater	Least Concern	1
		<i>Serinus canicollis</i>	Cape Canary	Least Concern	1
	Hirundinidae	<i>Cecropis cucullata</i>	Greater Striped Swallow	Least Concern	1
		<i>Hirundo rustica</i>	Barn Swallow	Least Concern	2
	Laniidae	<i>Lanius collaris</i>	Southern Fiscal	Least Concern	1
	Malaconotidae	<i>Chlorophoneus olivaceus</i>	Olive Bushshrike	Least Concern	1
		<i>Laniarius ferrugineus</i>	Southern Boubou	Least Concern	1
		<i>Tchagra tchagra</i>	Southern Tchagra	Least Concern	1
		<i>Telophorus zeylonus</i>	Bokmakierie	Least Concern	1
	Monarchidae	<i>Terpsiphone viridis</i>	African Paradise Flycatcher	Least Concern	1
	Muscicapidae	<i>Cossypha caffra</i>	Cape Robin-Chat	Least Concern	3
		<i>Melaenornis silens</i>	Fiscal Flycatcher	Least Concern	2
	Nectariniidae	<i>Cinnyris afer</i>	Greater Double-collared Sunbird	Least Concern	3
	Passeridae	<i>Passer melanurus</i>	Cape Sparrow	Least Concern	1
	Ploceidae	<i>Euplectes orix</i>	Southern Red Bishop	Least Concern	1
		<i>Ploceus capensis</i>	Cape Weaver	Least Concern	2
	Pycnonotidae	<i>Andropadus importunus</i>	Sombre Greenbul	Least Concern	2

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		<i>Phyllastrephus terrestris</i>	Terrestrial Brownbul	Least Concern	1	
		<i>Pycnonotus capensis</i>	Cape Bulbul	Least Concern	2	
	Sturnidae	<i>Sturnus vulgaris</i>	Common Starling	Least Concern	1	
	Zosteropidae	<i>Zosterops virens</i>	Cape White-eye	Least Concern	3	
Pelecaniformes	Ardeidae	<i>Bubulcus ibis</i>	Western Cattle Egret	Least Concern	3	
Piciformes	Picidae	<b><i>Campethera notata</i></b>	<b>Knysna Woodpecker</b>	<b>Near-Threatened</b>	<b>1</b>	
<b>Butterflies</b>						
Order	Family	Species	Common name	IUCN status	No. observations	
Lepidoptera	Lycaenidae	<i>Lampides boeticus</i>	Pea Blue	Least Concern	3	
		<i>Zizeeria knysna</i>	African Grass Blue	Least Concern	2	
	Nymphalidae	<i>Danaus chrysippus</i>	Plain Tiger	Least Concern	1	
		<i>Dira clytus</i>	Cape Autumn Widow	Least Concern	7	
		<i>Hypolimnas misippus</i>	Common Diadem	Least Concern	1	
		<i>Junonia hierta</i>	Yellow Pansy	Least Concern	1	
		<i>Junonia orithya</i>	Blue Pansy	Least Concern	5	
		<i>Phalanta phalantha</i>	Common Leopard	Least Concern	1	
		<i>Vanessa cardui</i>	Painted Lady	Least Concern	2	
		Pieridae	<i>Catopsilia florella</i>	African Migrant	Least Concern	2
			<i>Colotis euipe</i>	Round-winged Orange Tip	Least Concern	2
			<i>Pontia helice</i>	Southern Meadow White	Least Concern	4

## Appendix D

### Curriculum Vitae of Jacobus Hendrik Visser

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#### Qualifications

- PhD (Zoology), University of Johannesburg (2015 - 2017)
- MSc (Zoology), Stellenbosch University (2011 - 2013)
- BSc Honours (Zoology) cum laude, Stellenbosch University (2010)
- BSc (Biodiversity and Ecology) cum laude, Stellenbosch University (2007 - 2009)

#### Scientific publications

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