TERRESTRIAL FAUNAL AND AVIFAUNAL SPECIES COMPLIANCE STATEMENT REPORT FOR THE PROPOSED FLOOD DAMAGE REPAIRS TO THE LANGENHOVEN SUBSTATION, REMAINDER OF ERF 464 AND ERF 20781, GEORGE, GEORGE MUNICIPALITY

October 2025

Prepared for:

Sharples Environmental Services cc (SES)

Prepared by:

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Table of contents

List of figures

List of tables

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Qualifications

- PhD (Zoology), University of Johannesburg (2015 - 2017)
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- 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
- 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.

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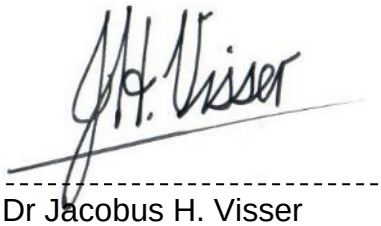
Declaration of independence by the independent person who compiled a specialist report or undertook a specialist process

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.



11 October 2025

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Date

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1. Introduction

The George Municipality is proposing flood damage repairs to the Langenhoven Substation located on Remainder of Erf 464 and Erf 20781, George, Western Cape (hereafter referred to as the "study area" or "site"). Two alternatives are proposed for the general extent of the scope of works which will include the following:

Alternative A

- Construct gabion retaining structure
- Construct earth v-drain along the southern edge of the substation
- Construct trapezoidal grass swale with an outlet as close to the river as possible with energy dissipators to protect against erosion.

Alternative B

- Construct gabion retaining structure
- Construct earth v-drain along the southern edge of the substation
- Construct trapezoidal grass swale with a flared swale to spread the water out on the edge of the bush near the river.

Blue Skies Research was appointed by Sharples Environmental Services cc (SES) on behalf of George Municipality to perform the required terrestrial faunal and

avifaunal assessment of the study area (see Sections 2 and 3). The current report represents a Compliance Statement for the site 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 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.
- *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 study area identifies the site as being of an overall “High” sensitivity under the “Relative Animal Species Sensitivity Theme” (**Figure 1**). This follows from the projected and possible occurrence of two mammal, one amphibian, one avifaunal and two invertebrate Species of Conservation Concern (SCC) (see **Table 1**). The current report therefore assesses the presence or likely presence of these SCC (as well as other possible SCC, see Section 9) within the study area in accordance with the protocols outlined in the Species Environmental Assessment Guideline (SANBI, 2020).

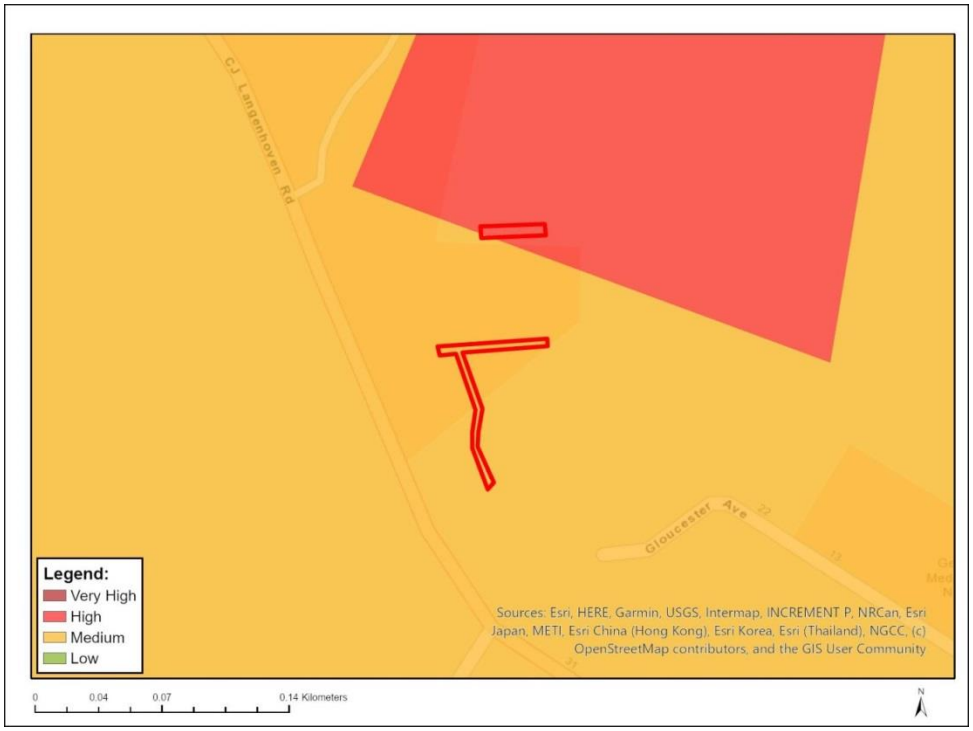

Figure 1 Relative Animal Species Sensitivity Map retrieved for the study area by the DFFE Screening Tool (https://screening.environment.gov.za/screeningtool/).

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 8" is deliberately obscured as the species is sensitive to illegal harvesting.

Sensitivity	Species	Common name	IUCN status
High	*Bradypterus sylvaticus*	Knysna Warbler	Vulnerable
Medium	*Afrixalus knysnae*	Knysna Leaf-folding Frog	Endangered
Medium	*Chlorotalpa duthieae*	Duthie's Golden Mole	Vulnerable
Medium	*Sensitive Species 8*	Sensitive Species 8	Least Concern
Medium	*Aneuryphymus montanus*	Yellow-winged Agile Grasshopper	Vulnerable
Medium	*Moggridea terricola*	Banded-legged Trapdoor Spider	Vulnerable

4. Overview of the study area

4.1 Geographic location

The study area is located on Remainder of Erf 464 and Erf 20781at the Langenhoven Substation in George, Western Cape (**Figures 2** and **3**). The site pertains to open space around the substation which is bordered by the Camfersdrift River to the south, C.J. Langehoven Road to the west, George Hospital to the north and an open space to the east.

For the proposed scope of works a gabion structure is proposed at the northern extent of the Langenhoven Substation. To allow for the drainage of flood water, a v-drain is proposed along the southern edge of the substation which will flow into the Camfersdrift River at the outlet via a trapezoidal grass swale. Overall, the proposed scope of works is of a limited spatial nature (likely limited to around 500m^2) and will pertain to already modified areas.

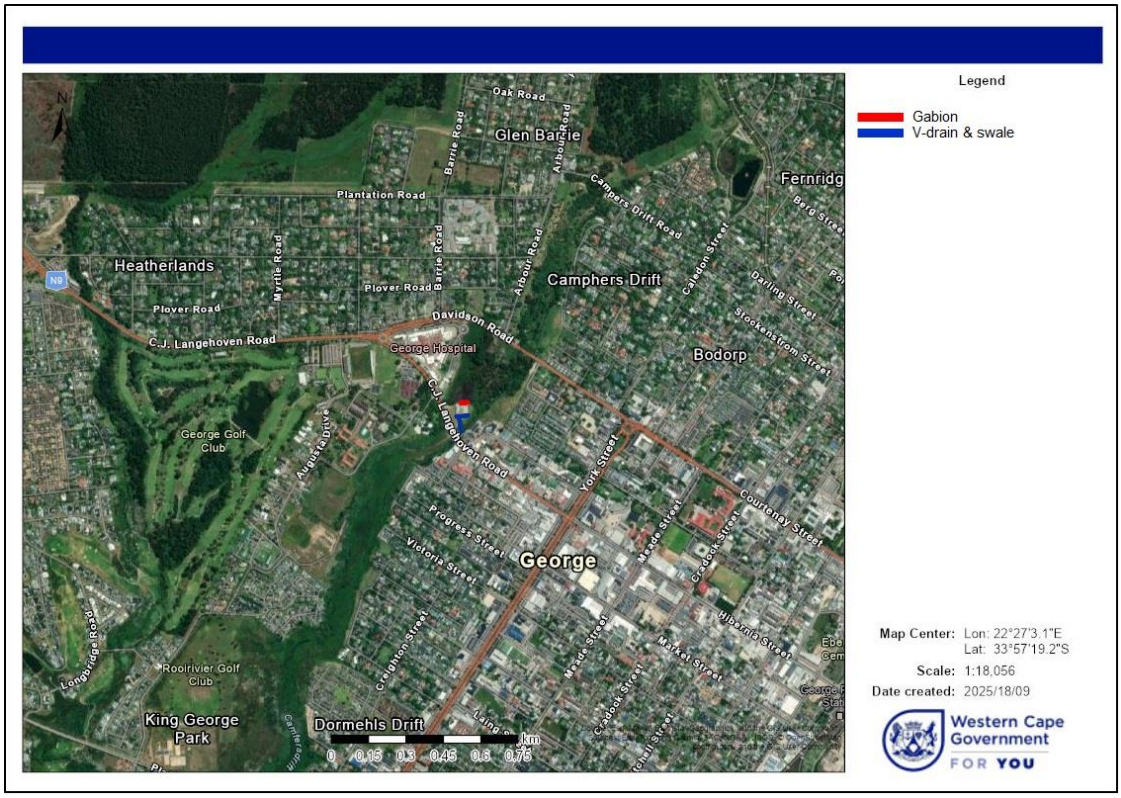

Figure 2 Spatial location of the study area on a broad scale (map generated in Cape Farm Mapper version 3.0, Western Cape Department of Agriculture).

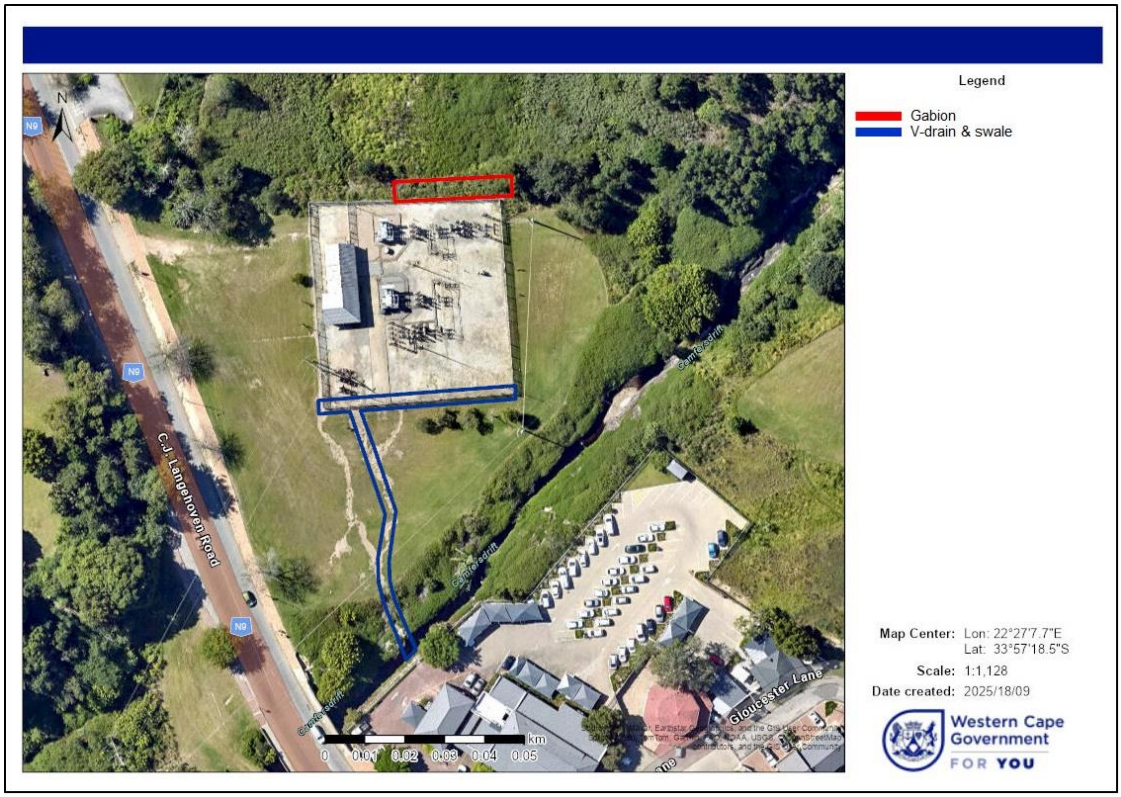

Figure 3 Spatial extent of the study area at a finer scale (map generated in Cape Farm Mapper version 3.0, Western Cape Department of Agriculture).

4.2 Vegetation

Vegetation across the study area is mapped as Garden Route Granite Fynbos (VEGMAP 2024 Beta; **Figure 4**) classified as an “Endangered“ ecosystem type according to *The Revised National List of Ecosystems that are Threatened and in Need of Protection* (Government Notice No. 2747 of 18 November 2022). Currently the entire site exists in an open and transformed state with no remaining natural vegetation and therefore does not harbour any of its historical vegetation type (also see Section 7).

Figure 4 Vegetation type across the study area (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 site currently overlaps terrestrial CBA1 over the north-western extent due to the historical presence of “Endangered” Garden Route Granite Fynbos (**Figure 5**). Notably, none of this vegetation type remains over this transformed area (Section 7). Sections to the north are also mapped as degraded terrestrial CBA 2 owing to the historical presence of the above vegetation type, but similarly exist in a degraded and modified state. Finally, the southern part of the site is mapped as aquatic CBA1 owing to the presence of the Camfersdrift River drainage channel. This river channel currently harbours poor water quality along with an incidence of alien and invasive vegetation (Section 7).

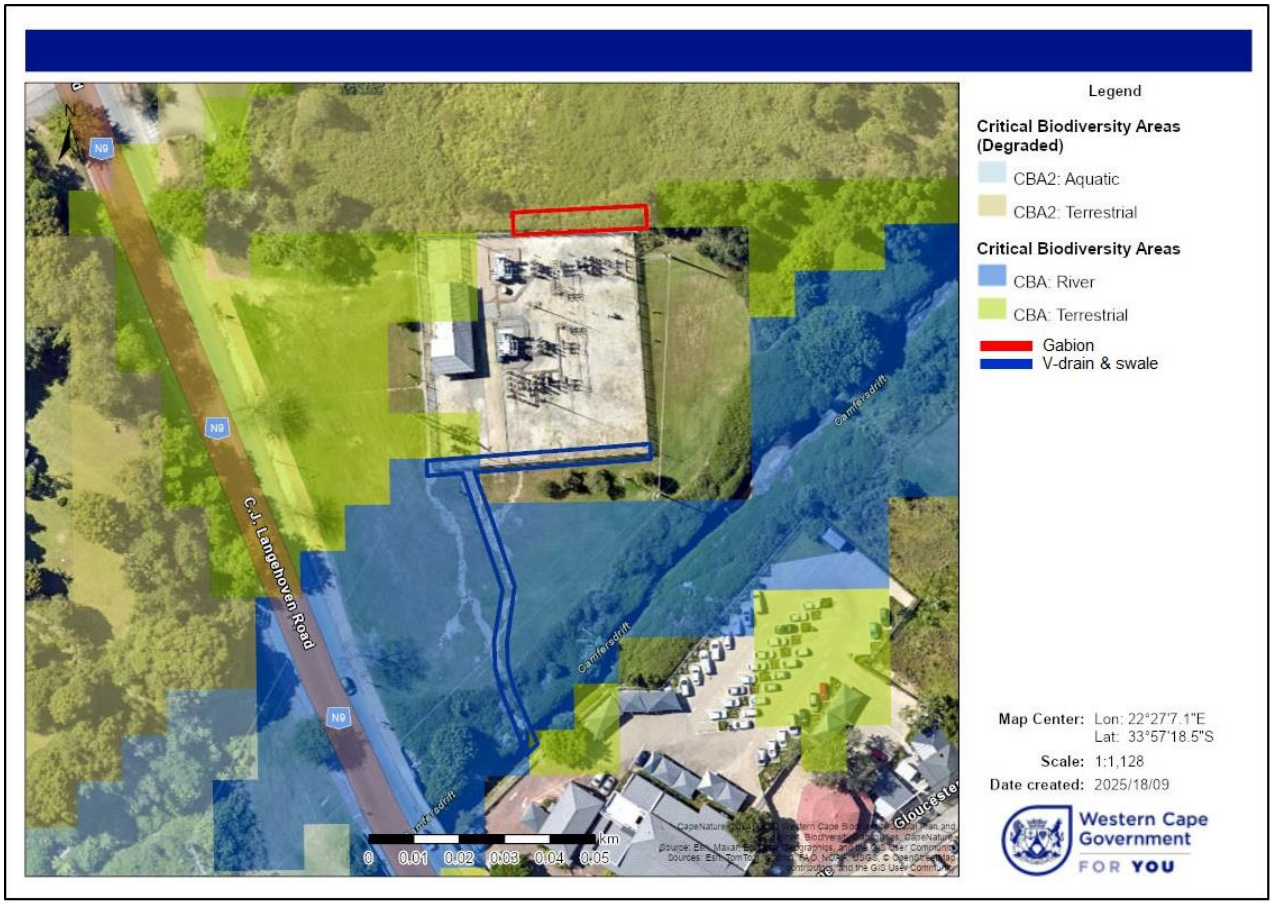

Figure 5 Spatial location of Critical Biodiversity Areas (CBAs) overlapping with the study area (information sourced from Cape Farm Mapper version 3.0, Western Cape Department of Agriculture).

4.4 Rivers and wetlands

The study area is located north of the drainage channel of the perennial Camfersdrift River (**Figure 6**). A channelled valley-bottom wetland is located to the south-west of the site (National Freshwater Ecosystem Priority Areas, NFEPA, CSIR et al. 2011). Only the southern part of the proposed grass swale is expected to feed into the Camfersdrift River and will serve to channel flood water into this channel.

Figure 6 Distribution of rivers and wetlands relative to the study area (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, amphibian, 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, amphibians and avifauna) for the study area landscape 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 this faunal group,

3.) compile a faunal species list (including mammals, amphibians and 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 possible SCC subpopulations 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, amphibian 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. Similarly, the presence or absence of the Banded-legged Trapdoor Spider was assessed based on on-site habitat conditions.

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 the iNaturalist (www.iNaturalist.org) platform for the study area (George) landscape.

5.2.2 Amphibians

The desktop species list for amphibians (**Appendix B**) was constructed with reference to the distributional data available in Du Preez and Carruthers (2009). This list was further bolstered by referring to the observational records available on the iNaturalist (www.iNaturalist.org) platform for the study area (George) landscape.

5.2.3 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 C**). The study area overlaps with one pentad (see below) which is well-represented in the atlassing cards:

Pentad: 3355_2225

Full protocol cards: 407
Ad-hoc protocol cards: 788

Total cards: 1 195

To create the avifaunal desktop species list for the study area, the species observed were noted, also 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 (**Appendix C**).

5.3 Field survey

The study area and surrounding parts was surveyed on foot over a single day on the 2nd of September 2025, during the Spring season. Weather conditions during the surveying period were characterised by relatively warm daily temperatures, low to no cloud cover and low to moderate wind conditions (**Figure 7**). Because the area had also been surveyed extensively by the author on the 9th of September 2023, the observations on mammals, amphibians and avifauna were included as data points in the current assessment.

Surveying included unconstrained point sampling through search meanders, as well 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 8**. Terrestrial faunal species (mammals) were identified by direct visual observation, or by their tracks, burrows, remains or scat. Amphibian species were identified by direct visual observation, or auditory means. Avifaunal species were identified by visual observation, using a 90x zoom lens, or by auditory means. Finally, butterfly species were identified and photographed from less than one meter away. 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 D**.

Given relatively optimal weather conditions, terrestrial faunal and avifaunal species' activity was observed to be high over the surveying period. In addition to these observations, the data points on the faunal profile from the site survey on 9

September 2023 yielded 58 recorded observations across the study area (**Figure 9**, **Appendix D**). 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).

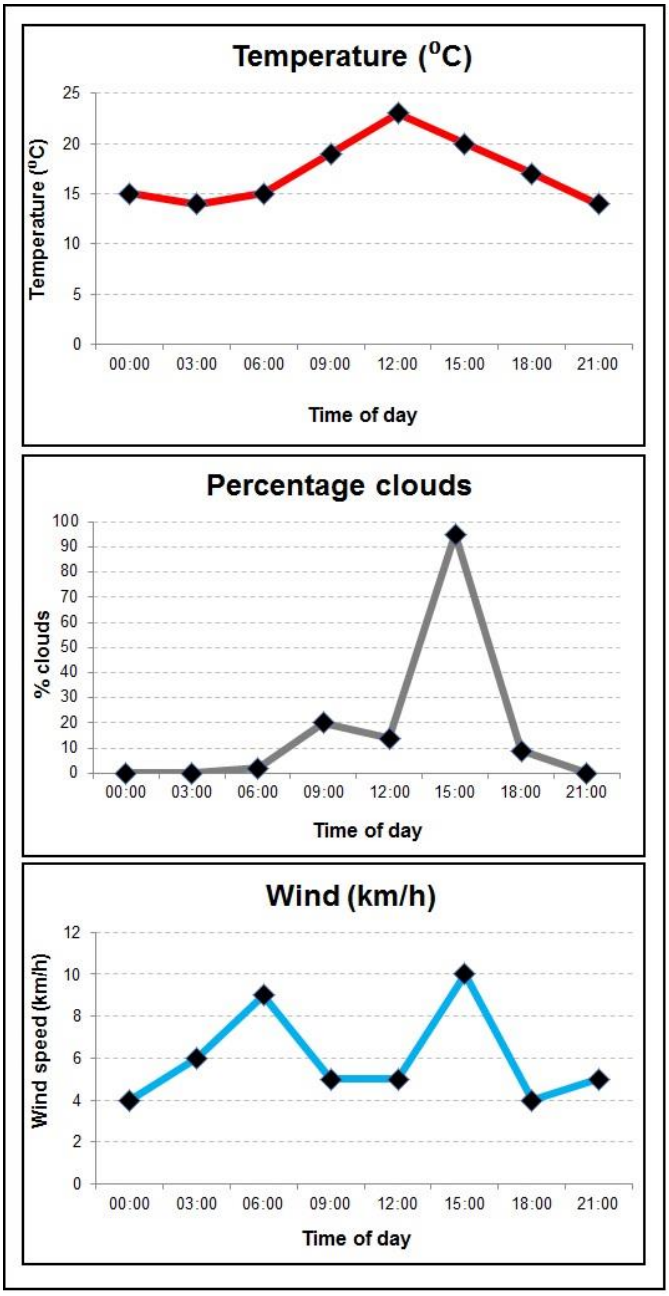

Figure 7 Weather conditions in the study area over the surveying period (02 September 2025). The time of day is indicated, along with the temperature (in °C), percentage cloud cover and wind speed (in km/h) (weather data sourced from https://www.worldweatheronline.com).

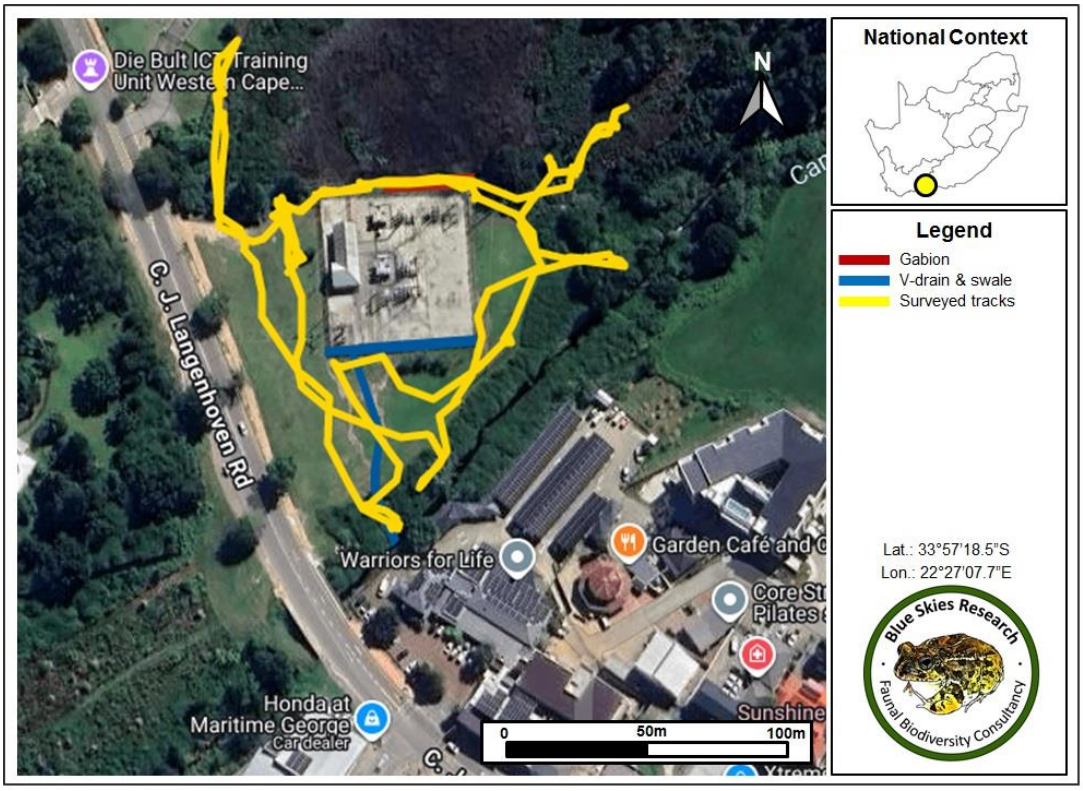

Figure 8 Spatial tracks recorded by GPS for all the search meanders across the study area over the surveying period.

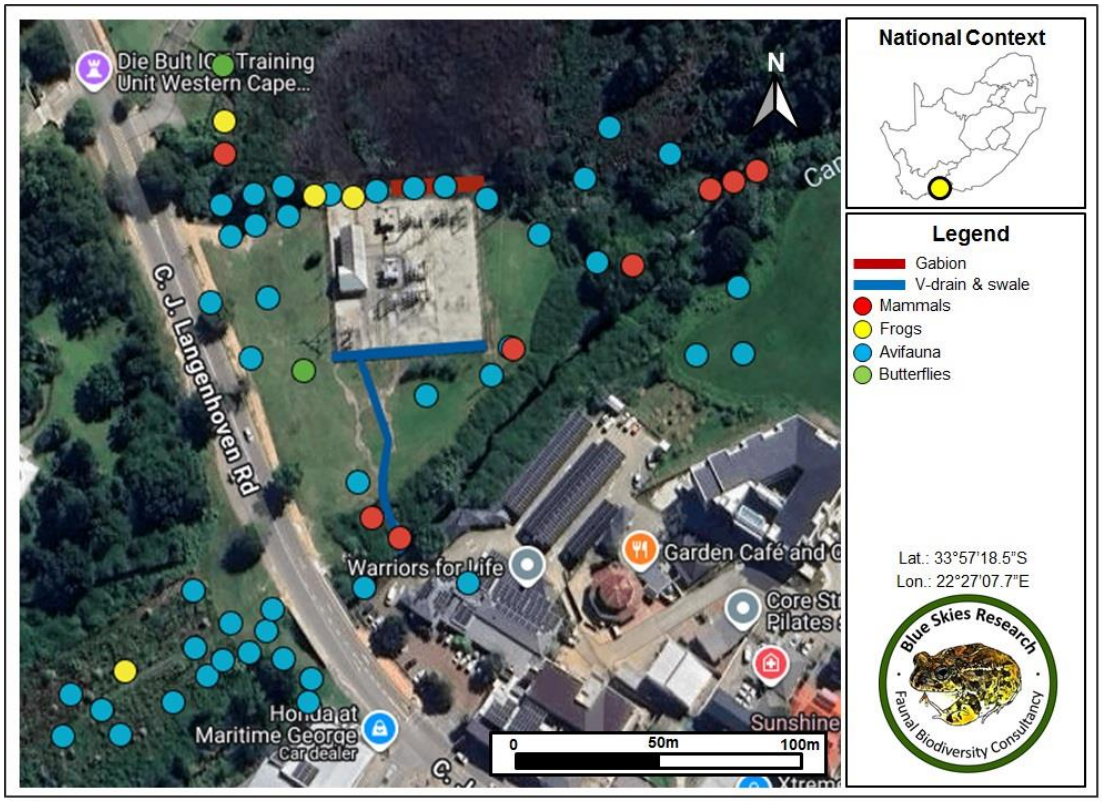

Figure 9 Spatial locations of all the faunal observations across the study area over the surveying periods.

6. Assumptions and limitations

Weather conditions during the surveying period combined with a relatively open habitat structure were optimal for detecting a representative sample of the terrestrial faunal and avifaunal species diversity across the study area. Even so, not all species could be observed (especially cryptic species), and it is further possible that the surveying period did not correspond to the activity period or activity season of some species. Although it is therefore possible that the observed faunal composition of the study area only partly reflects the species richness of, and faunal abundances within the study area (**Appendix D**), the inclusion and consideration of SCC was further based on a thorough desktop assessment and further takes account the habitat composition of the site meaning that the capacity of the site to support subpopulations of SCC were considered.

7. Faunal habitat types within the study area

The study area and surrounding landscape is comprised of five broadly identified habitat types based on habitat composition and habitat integrity (**Figure 10**, **Table 2**). The central part of the site harbours the fenced Langenhoven Substation infrastructure which is surrounded by an open and transformed area (park). The Camfersdrift River drainage channel is located along the southern extent where a significant incidence of alien and invasive plant species such as Brambles is evident. An apparent depression / artificial wetland is located in the north which is surrounded by remnant vegetation. Both these freshwater features bear significant signs of pollution with water quality appearing relatively poor as a result.

The proposed project footprints are all located in transformed areas with no remaining natural habitats. In addition, the few remaining habitats surrounding the site bear significant signs of pollution as a result of vagrancy and illegal waste dumping (see Section 11). Taken together therefore, the proposed project footprints and surrounding areas exist in a transformed degraded ecological state.

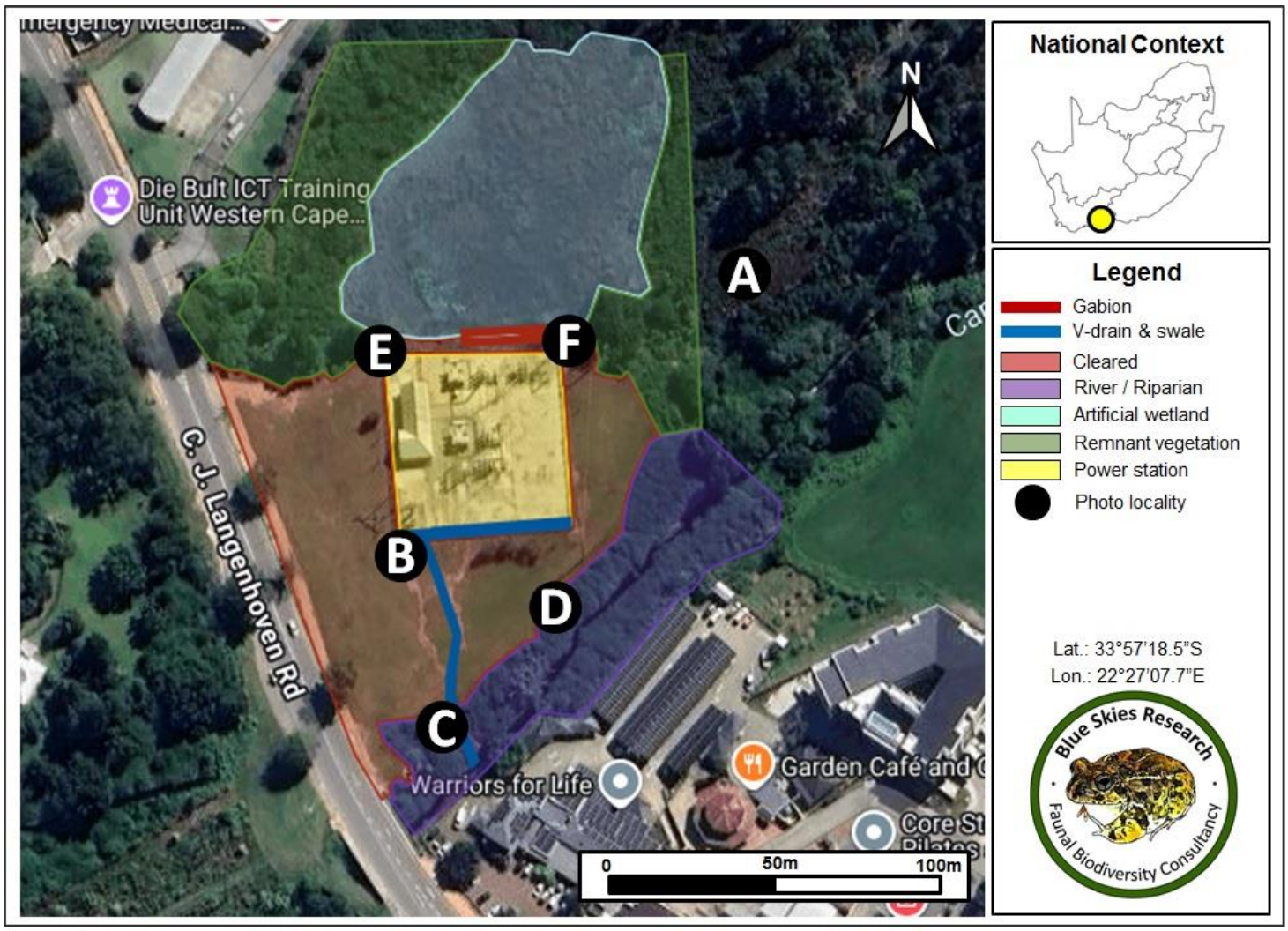

Figure 10 A broad indication of the spatial extent of habitat types in the study area and surrounding parts. Photo localities (A to F) correspond to the habitat photos in Table 2.

Table 2 Habitat locations, habitat descriptions and visual representations of the different habitat types within the study area and surrounding parts. Location designations (A to F) correspond to the photo locations in Figure 10.

Location	Habitat description	Photo 1	Photo 2
A -33.95446, 22.45284 **B** -33.95515, 22.45184	**Power Station / Cleared** The central part of the site harbours the fenced Langenhoven Substation infrastructure which is surrounded by an open area (park).		

	River / Riparian		
C -33.95556, 22.45196 **D** -33.95526, 22.45227	The Camfersdrift River drainage channel is located along the southern extent which indicates a significant incidence of alien and invasive plant species such as Brambles.		
E -33.95466, 22.45178 **F** -33.95463, 22.45233	**Artificial wetland** An apparent depression / artificial wetland is located in the north which is surrounded by remnant vegetation		

8. Faunal and avifaunal composition within the study area

8.1 Mammals

8.1.1 Desktop assessment

The distributions of 66 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 seven 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. Grey Rhebok (*Pelea capreolus*) classified as “Near-Threatened”,
6. Long-tailed Forest Shrew (*Myosorex longicaudatus*) classified as “Endangered”, and
7. White-tailed Rat (*Mystromys albicaudatus*) classified as “Vulnerable” by the IUCN.

From the observational records available on the iNaturalist (www.iNaturalist.org) platform, 28 mammal species have been confirmed in the study area (George) landscape (**Appendix A**) of which 25 are currently listed as “Least Concern” and with three species constituting mammal SCC. These three documented mammal SCC include the:

1. The Duthie's Golden Mole (*Chlorotalpa duthieae*) classified as “Vulnerable”,
2. Fynbos Golden Mole (*Amblysomus corriae*) classified as “Near-Threatened”, and
3. Long-tailed Forest Shrew (*Myosorex longicaudatus*) classified as “Endangered” by the IUCN.

8.1.2 Field survey

Evidence of six mammal species were recorded within and around the study area (**Figures 11** and **12**), five of which are currently classified as “Least concern” (**Appendix D**) and one, the Duthie's Golden Mole (*Chlorotalpa duthieae*) classified as “Vulnerable” by the IUCN, and therefore representing a mammal SCC. One individual of this species was observed in the Camfersdrift River drainage channel just upstream of the site during the 2023 study. The population size of this species is therefore highly restricted given the degraded nature of habitats on the site along with high levels of daily disturbance within this urban setting (Section 11).

Other mammal species on the site constitute the Hottentot Golden Mole (*Amblysomus hottentotus*) which also represents a burrowing species restricted to the lawns around the study area. Further evidence of the presence of single individuals of the Marsh Mongoose (*Atilax paludinosus*), Cape Grysbok (*Raphicerus melanotis*), Common Duiker (*Sylvicapra grimmia*) and Four-striped Grass Mouse (*Rhabdomys pumilio*) was also noted. Taken together, the site appears depauperate of mammal diversity given the urban setting, high levels of daily disturbance and degraded habitat structure.

Figure 11 Photographic evidence of the different mammal species recorded in the study area. A) Mounds of the Hottentot Golden Mole (*Amblysomus hottentotus*). B) Tunnel of the Duthie's Golden Mole (*Chlorotalpa duthieae*). C) Track of the Cape Grysbok (*Raphicerus melanotis*). D) Track of the Common Duiker (*Sylvicapra grimmia*). E) H) Run (arrowed) of the Four-striped Grass Mouse (*Rhabdomys pumilio*).

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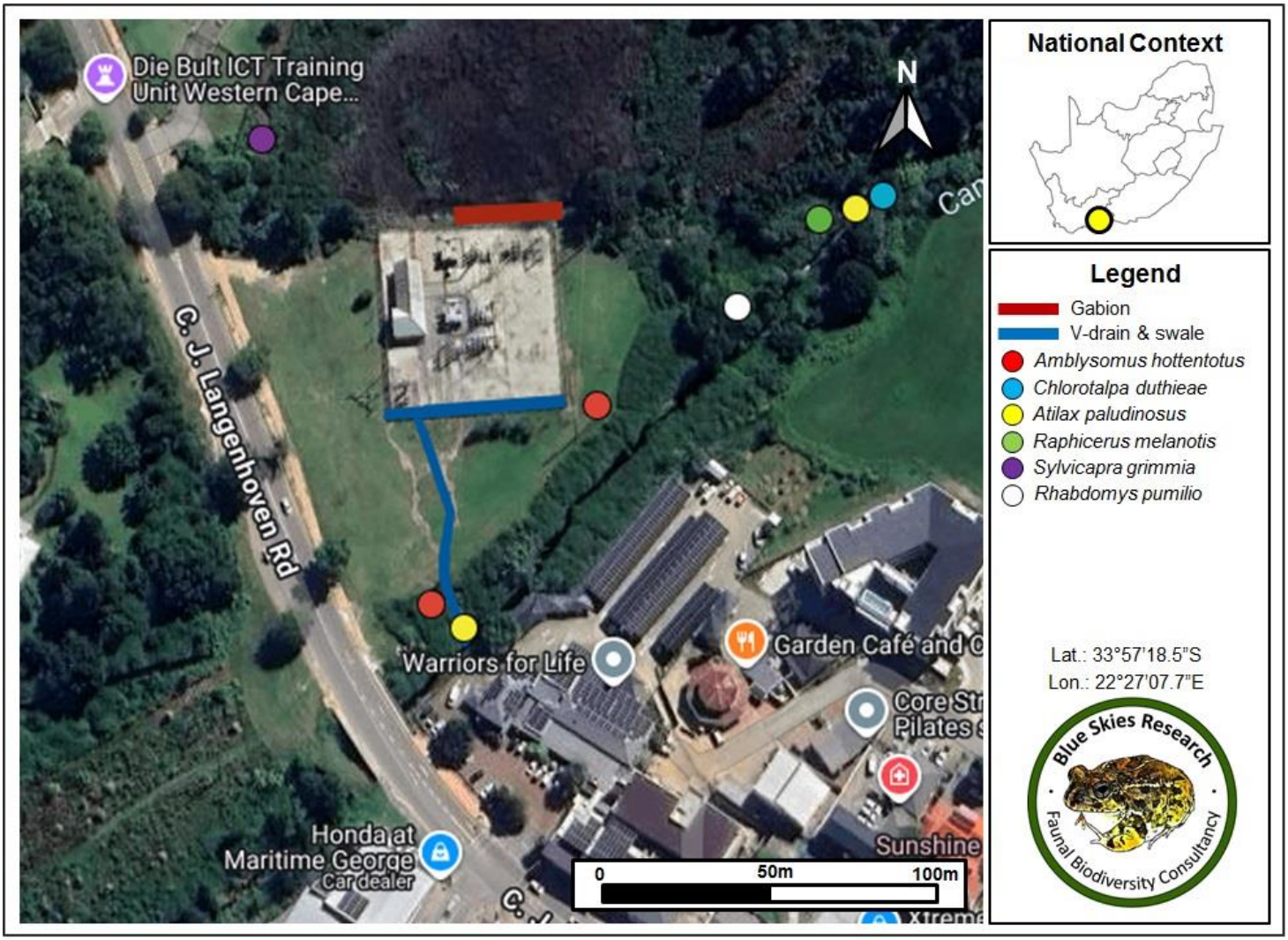

Figure 12 Spatial locations of the different mammal species recorded within the study area.

8.2 Amphibians

8.2.1 Desktop assessment

The distributions of 18 amphibian species overlap with the study area landscape (Appendix A). Among these, 17 species are currently listed as “Least Concern” (IUCN, 2021), with one the Knysna Leaf-folding Frog (*Afrixalus knysnae*), classified as “Endangered” by the IUCN and therefore representing an amphibian SCC.

From the observational records available on the iNaturalist (www.iNaturalist.org) platform, 11 amphibian species have been confirmed in the study area (George) landscape (**Appendix B**), with 10 species currently

listed as “Least Concern” and Knysna Leaf-folding Frog (*Afrixalus knysnae*) included as an amphibian SCC (Section 9).

8.2.2 Field survey

Two amphibian species were recorded within and around the study area, both of which are currently classified as “Least concern” (**Figure 13**, **Appendix D**). The Bronze Frog (*Cacosternum nanum*) and Clicking Stream Frog (*Strongylopus grayii*) are both present in the artificial wetland to the north of the site with the former species also noted previously along the Camfersdrift River drainage channel during a 2023 study. These two frog species are less sensitive to poor water quality and are therefore able to persist in the freshwater areas which are degraded due to significant pollution.

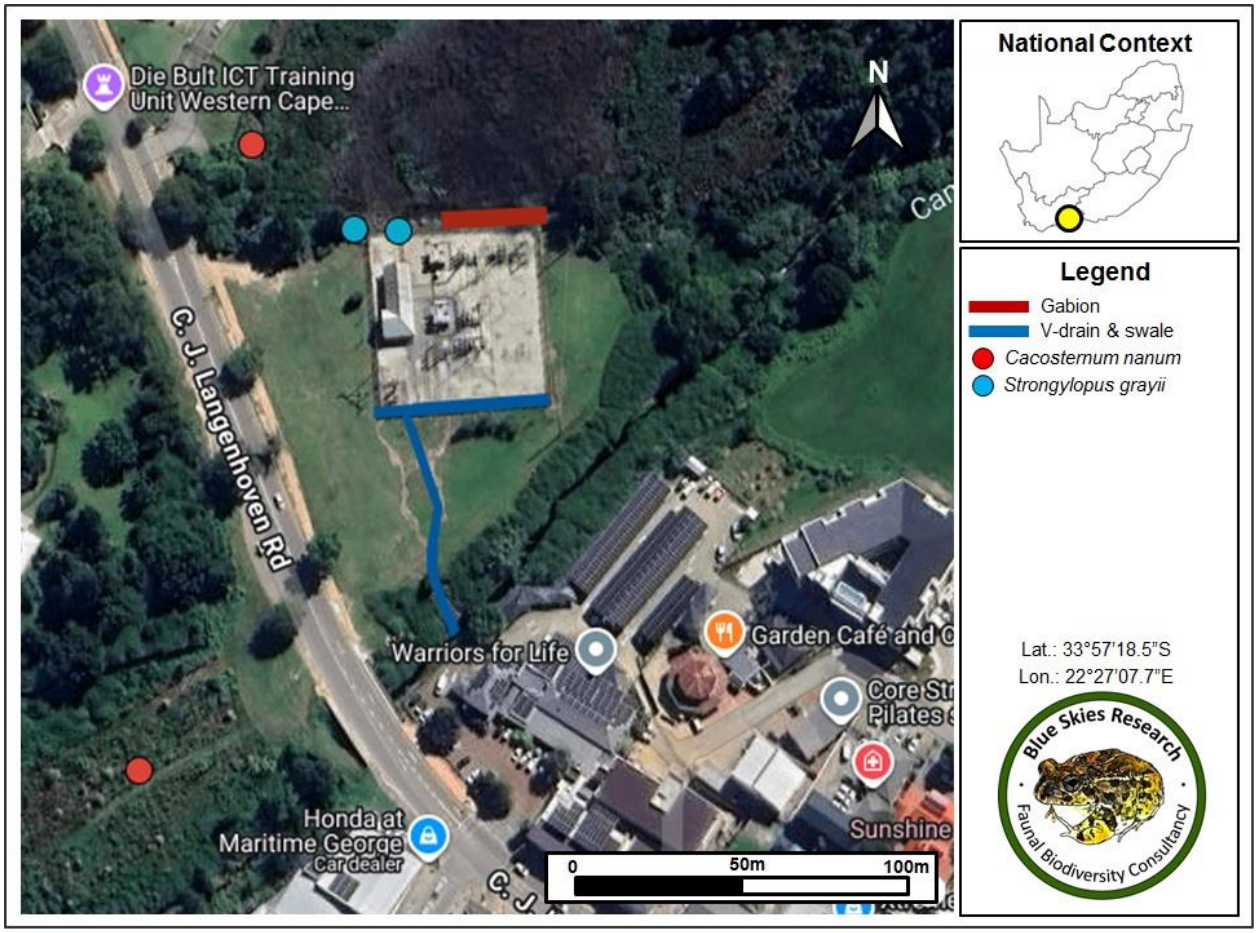

Figure 13 Spatial locations of the different amphibian species recorded within the study area.

8.3 Avifauna

8.3.1 Desktop assessment

According to the SABAP2 records, 247 bird species have been recorded from the pentad overlapping the study area with 235 species classified as “Least Concern” by the IUCN, and 12 species which constitute avifaunal SCC (**Appendix C**). These avifaunal SCC includes the:

1. Verreaux’s Eagle (*Aquila verreauxii*) classified as “Least Concern”,
2. Forest Buzzard (*Buteo trizonatus*) classified as “Near-Threatened”,
3. Black Harrier (*Circus maurus*) classified as “Endangered”,
4. African Marsh Harrier (*Circus ranivorus*) classified as “Least Concern”,
5. Martial Eagle (*Polemaetus bellicosus*) classified as “Endangered”,
6. Crowned Eagle (*Stephanoaetus coronatus*) classified as “Near-Threatened”,
7. Maccoa Duck (*Oxyura maccoa*) classified as “Endangered”,
8. Lanned Falcon (*Falco biarmicus*) classified as “Least Concern”,
9. Blue Crane (*Anthropoides paradiseus*) classified as “Vulnerable”,
10. Protea Canary (*Crithagra leucoptera*) classified as “Near-Threatened”,
11. Knysna Warbler (*Bradypterus sylvaticus*) classified as “Vulnerable”, and
12. Knysna Woodpecker (*Campethera notate*) classified as “Near-Threatened” by the IUCN.

8.3.2 Field survey

In total, 28 bird species were recorded within and around the study area, all of which are currently classified as “Least concern” by the IUCN (**Figures 14** and **15**, **Appendix D**). All avifauna on the site constitutes common species which are regularly encountered in urban landscapes and tolerant to regular disturbance. Notably, avifaunal diversity is clustered around larger trees in the area with few birds species located over the transformed open parts of the site.

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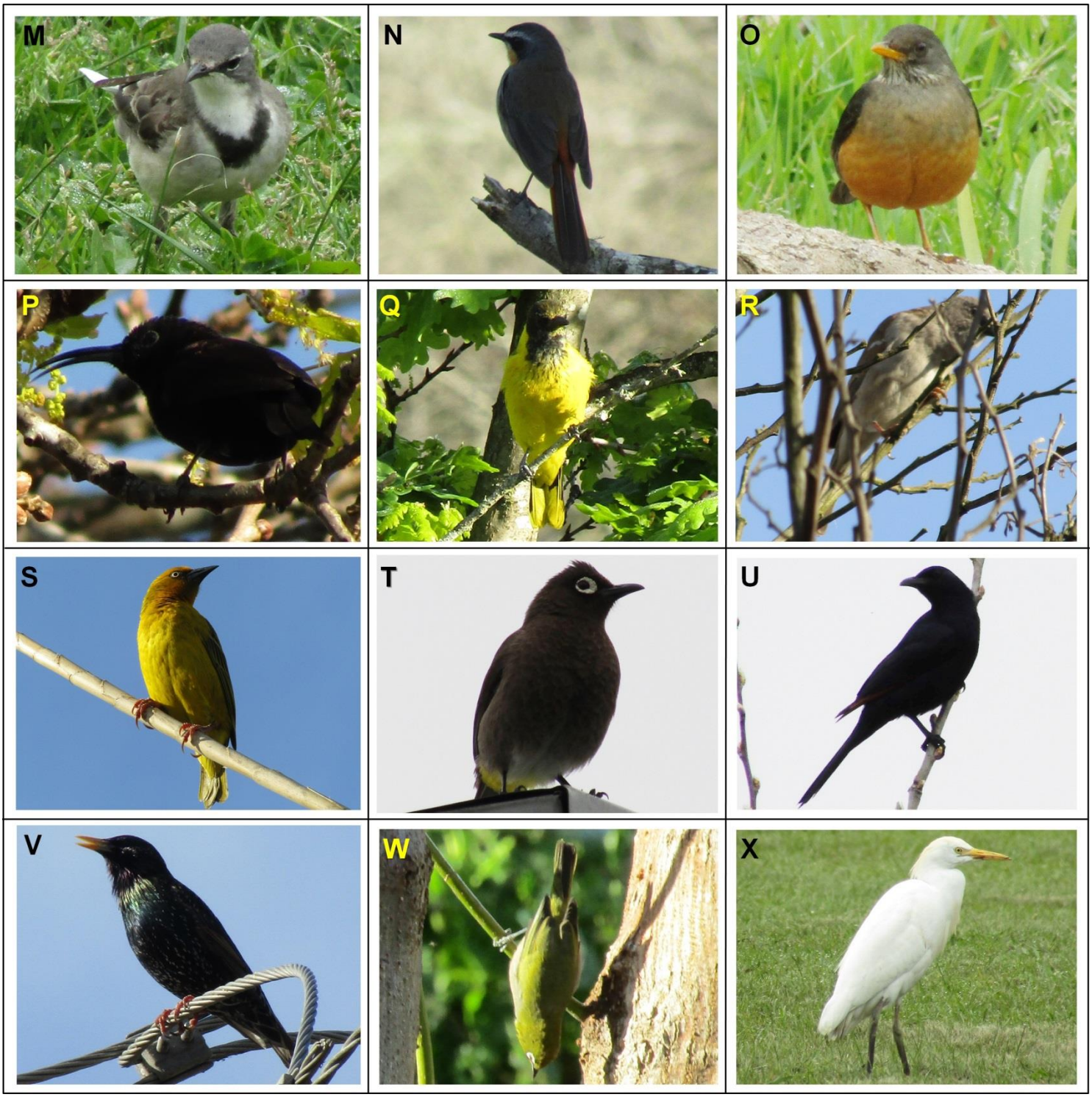

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Figure 14 Photographic evidence of different avifaunal species recorded in the study area landscape. A) Egyptian Goose (*Alopochen aegyptiaca*). B) African Hoopoe (*Upupa africana*). C) Speckled Mousebird (*Colius striatus*). D) Speckled Pigeon (*Columba guinea*). E) Red-eyed Dove (*Streptopelia semitorquata*). F) Brown-hooded Kingfisher (*Halcyon albiventris*). G) Helmeted Guineafowl (*Numida meleagris*). H) Levaillant's Cisticola (*Cisticola tinniens*). I) White-necked Raven (*Corvus albicollis*). J) Fork-tailed Drongo (*Dicrurus adsimilis*). K) Common Waxbill (*Estrilda astrild*). L) Southern Boubou (*Laniarius ferrugineus*).

M) Cape Wagtail (*Motacilla capensis*). N) Cape Robin-Chat (*Cossypha caffra*). O) Olive Thrush (*Turdus olivaceus*). P) Greater Double-collared Sunbird (*Cinnyris afer*). Q) Eastern Black-headed Oriole (*Oriolus larvatus*). R) Southern Grey-headed Sparrow (*Passer diffusus*). S) Cape Weaver (*Ploceus capensis*). T) Cape Bulbul (*Pycnonotus capensis*). U) Red-winged Starling (*Onychognathus morio*). V) Common Starling (*Sturnus vulgaris*). W) Cape White-eye (*Zosterops virens*). X) Intermediate Egret (*Ardea intermedia*).

Y) Black-headed Heron (*Ardea melanocephala*). Z) Hadada Ibis (*Bostrychia hagedash*).

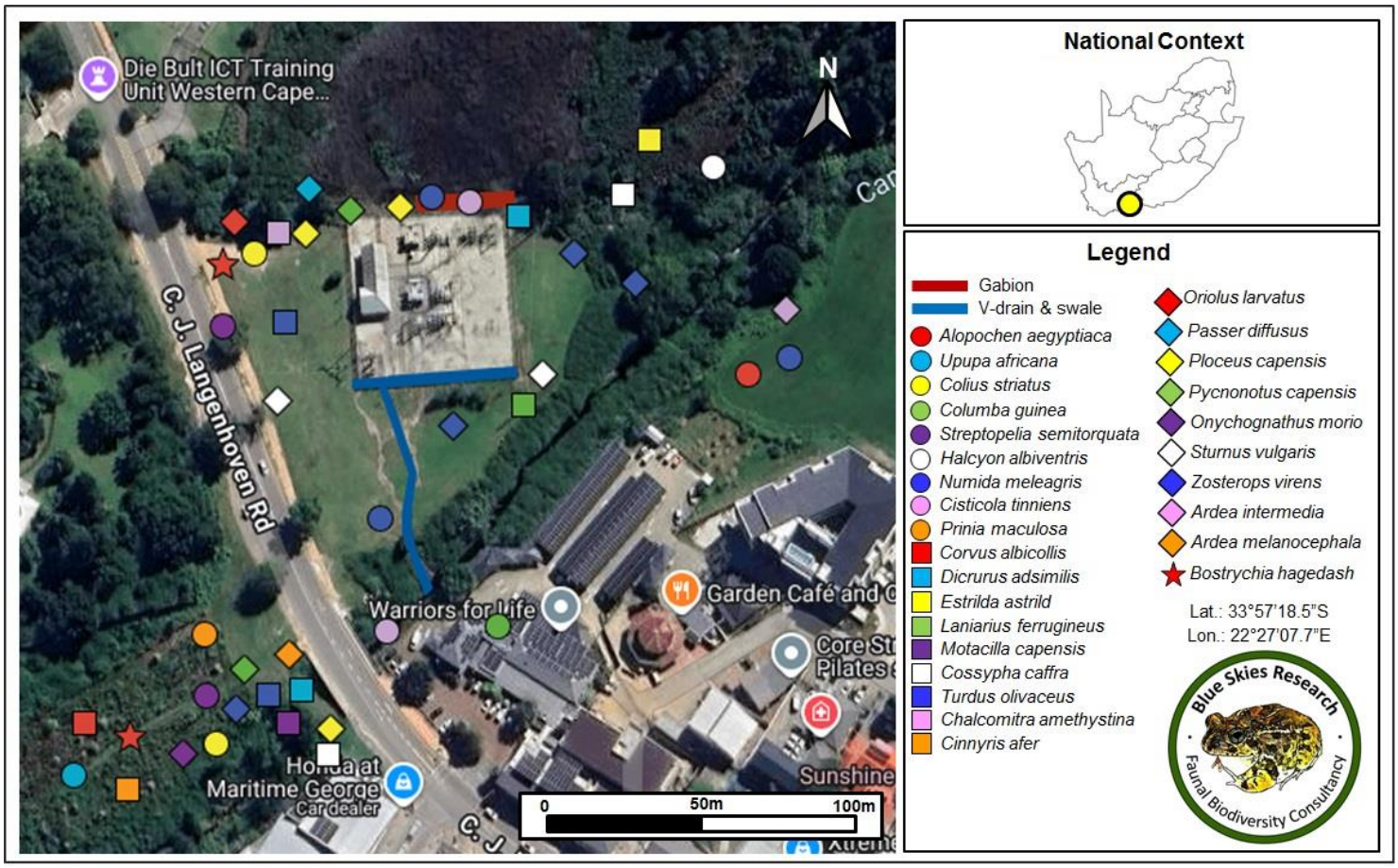


Figure 15 Spatial locations of the different avifaunal species recorded in the study area.

8.4 Butterflies

Only a single butterfly species, the Painted Lady (*Vanessa cardui*), was recorded in the study area (**Figures 16** and **17**) with this species currently classified as "Least concern" by the IUCN (**Appendix D**). The presence of only this common butterfly species (in low numbers) indicates the degraded ecological nature of the site where few flowering plants are evident.

Figure 16 Photographic evidence of the single butterfly species recorded in the study area. A) Painted Lady (*Vanessa cardui*).

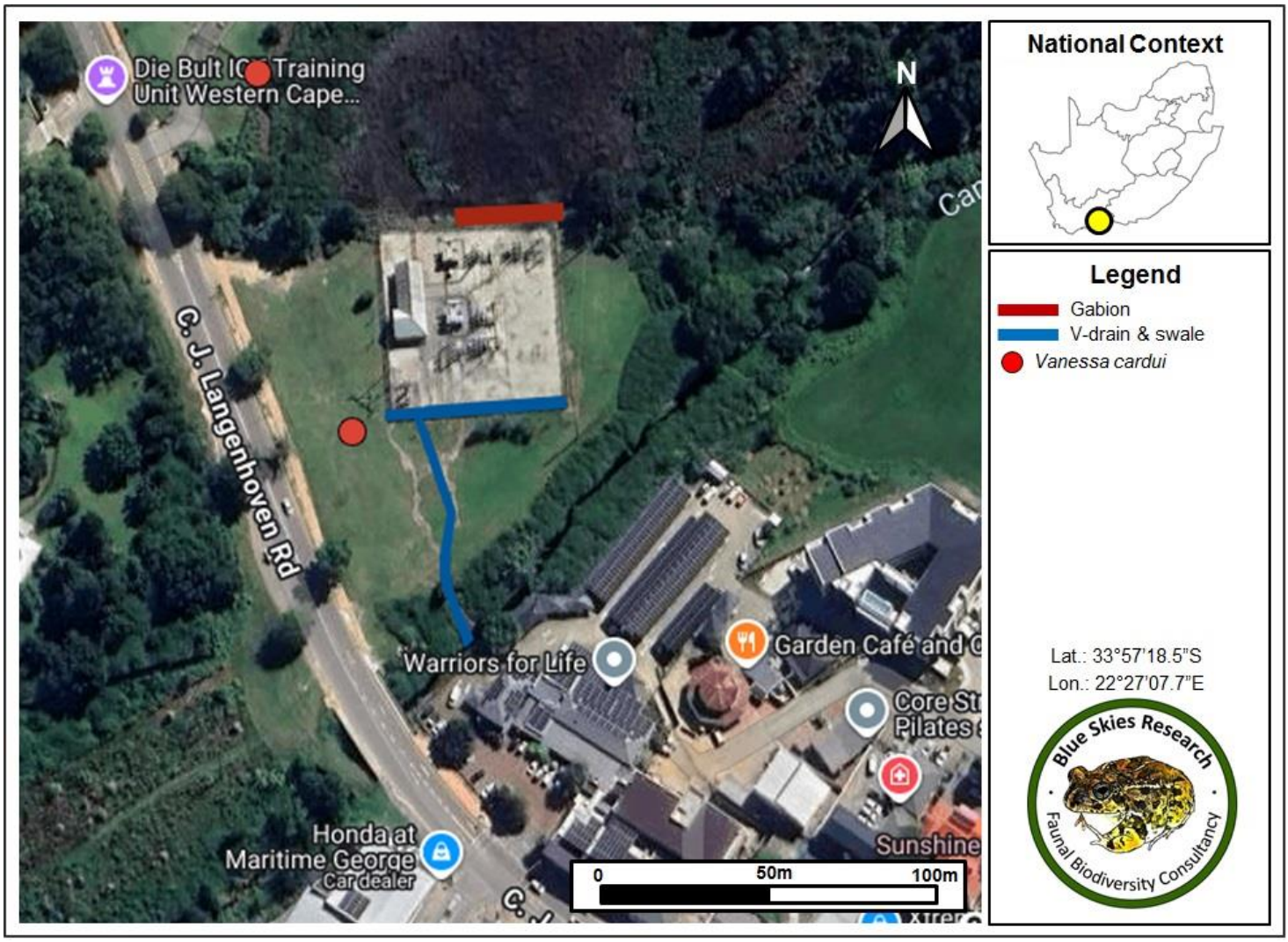


Figure 17 Spatial locations of the single butterfly species recorded within the study area.

8.5 Grasshoppers

The presence of the Yellow-winged Agile Grasshopper was evaluated based on suitable habitat (recently burnt Schlerophyll on south-facing slopes) for this species - a habitat type which is not present on this degraded and transformed site. To this end, suitable habitat for the Yellow-winged Agile Grasshopper is not present and it is highly unlikely that this species will occur either on the site or in the surrounding landscape.

8.6 Spiders

The Banded-legged Trapdoor Spider (*Moggridgea terricola*) inhabits the Fynbos biome at altitudes ranging from 7 to 243 m above sea level (Dippenaar-Schoeman et al. 2021). Given the open, transformed and degraded nature of the site, it is unlikely that this species will be present.

8.7 Faunal and avifaunal diversity within the study area

Faunal and avifaunal diversity in the study area and surrounding landscape is comprised of relatively common species of “Least Concern” (IUCN, 2021), with the exception of a single *C. duthieae* to the north-east, and outside of the site. Given the urban setting, high levels of daily disturbance (through vibration from vehicles and people) and degraded habitat structure (significant signs of pollution and a high incidence of alien and invasive vegetation), species on the site are disturbance-prone with a notable impairment of both diversity and subpopulation sizes. The site and surrounding areas therefore displays impaired ecosystem dynamics and is less sensitive from a faunal perspective. Furthermore, the proposed project footprints are small and all located in already transformed areas and the proposed development is highly unlikely to impact on any notable ecological processes or impinge on any faunal subpopulations.

9. Species of Conservation Concern

Along with the six (two mammal, one amphibian, one avifaunal and two invertebrate) SCC listed in the DFFE Screening Tool (Table 1), the potential occurrence of 16 other (five mammal and 11 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 the study area or surrounding landscape during the field survey.

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

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

Low - No suitable habitat for the species is present in the study area or surrounding landscape. Further, in the case of avifauna, the species has been recorded a low number of times (<2 times) or more than five years ago in the overlapped pentad.

Although the presence of a single individual of the Duthie's Golden Mole was confirmed in the immediate landscape in a 2023 study, with the Fynbos Golden Mole, Long-tailed Forest Shrew, Knysna Leaf-folding Frog, Forest Buzzard, Knysna

Warbler and Knysna Woodpecker also occurring in the broader area, the site itself exists in a highly degraded state with numerous daily disturbances, and with the individual project footprint being spatially limited to already transformed areas. To this end, the proposed development is highly unlikely to affect any terrestrial faunal or avifaunal SCC, either on the site or in a local context. All other SCC considered in the current assessment have a low probability of occurring on the site given a lack of suitable habitats and / or scarcity in the broader landscape with the proposed development having no impact on these species.

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
Mammals						
Sensitive Species 8	*Sensitive Species 8*	*Sensitive Species 8*	Least Concern	-	Low	The species was not confirmed during the field survey, and it has not been recorded in the study area landscape. It is unlikely that this species will occur on the site, given a degraded habitat structure along with high levels of daily disturbance on the site and in the surrounding urban landscape.
Chrysochloridae	*Chlorotalpa duthieae*	Duthie's Golden Mole	Vulnerable	The species occurs on alluvial sands and sandy loams in Southern Cape Afrotemperate 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.	Low	One individual of this species was observed in the Camfersdrift River drainage channel just upstream of the site during the 2023 study. The population size of this species is therefore highly restricted and does not overlap with any of the proposed project footprints.
Chrysochloridae	*Amblysomus corriae*	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, but it has been recorded in the study area landscape around 1.5km north-east of the site. Even so, the site harbours soils of a compact nature and does not contain the sandy soils and soft loams preferred by this species, while further being of a degraded and transformed habitat structure. The species is therefore unlikely to occur on the site.
Felidae	*Panthera pardus*	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.	Low	The species was not confirmed during the field survey, and it has not been recorded in the study area landscape. Furthermore, the high levels of daily disturbances, degraded nature and urban setting of the site makes it is highly unlikely that this species will be present on the site and in the surrounding urban landscape.

Mustelidae	*Aonyx capensis*	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).	Low	The species was not confirmed during the field survey, and it has not been recorded in the study area landscape. Furthermore, although aquatic habitats are available on the site, these appear highly degraded and with a high level of daily disturbances in an urban setting. It is therefore highly unlikely that this species will be present on the site.
Soricidae	*Myosorex longicaudatus*	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).	Low	The species was not confirmed during the field survey, but it has been recorded in the study area landscape around 5km south-west of the site. Given that none of the habitats on the site exist in a pristine primary state but rather in a highly degraded state with a high level of daily disturbances, it is highly unlikely that this species will be present
Nesomyidae	*Mystromys albicaudatus*	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 along with the high level of daily disturbances, degraded nature and urban setting of the site, it highly is highly unlikely that this species will be present.
Amphibians						
Hyperoliidae	*Afrixalus knysnae*	Knysna Leaf-folding Frog	Endangered	The species occurs in a coastal mosaic of vegetation types, including mountain fynbos heathland and forest. It breeds in small dams and shallow semi-permanent water with much emergent vegetation, and even in well vegetated ornamental garden ponds. It is suspected that this species requires high water quality for breeding.	Low	The species was not confirmed during the field survey, but has been recorded a number of times in a wetland area upstream in the Camfersdrift River, around 1.5km north-east of the site. Although the site does contain aquatic habitats, the water quality here appears poor owing to a high incidence of pollution and it is unlikely that this species will occur as it prefers high water quality. Furthermore, the proposed project footprints do not overlap any aquatic areas and the proposed development is unlikely to affect this species.
Avifauna						
Accipitridae	*Aquila verreauxii*	Verreaux's Eagle	Least Concern	The species occupies remote, mountainous, rocky areas, as well as savannah and semi-desert, anywhere that rock hyraxes occur in substantial numbers (Ferguson- Lees and Christie, 2001). More than 60% of its prey are rock hyraxes but it will occasionally also take other mammals, birds, tortoises and rarely, other reptiles.	Low	The presence of this species was not confirmed during the field survey, and it has been recorded only twice in the landscape more than 12 years ago (December 2013, Appendix C). The site is further devoid of the mountainous terrain and prey item (the Rock Hyrax) preferred by this species with a highly degraded nature along with a high level of daily disturbances and in an urban setting. It is therefore highly unlikely that this species will be present on the site or in the surrounding landscape.

Accipitridae	*Buteo trizonatus*	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).	Low	The species was not confirmed during the field survey, but has been recorded a high number of times (358 times) in the study area landscape, with the latest observation in September 2025 (Appendix C). Even so, the site does not support any native forests and is of a highly degraded nature with a high level of daily disturbances in an urban setting. It is therefore unlikely that this species will be associated to the site.
Accipitridae	*Circus maurus*	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 *Otomys* and *Rhabdomys* 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, *Rhabdomys pumilio* (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).	Low	The species was not confirmed during the field survey, and has been recorded only three times in the study area landscape more than seven years ago (March 2018, Appendix C). The site is also of a highly degraded nature with a high level of daily disturbances and in an urban setting. It is therefore highly unlikely that this species will be present on or near the site.
Accipitridae	*Circus ranivorus*	African Marsh Harrier	Least Concern	The species breeds in wetlands, foraging primarily over reeds and lake margins (Harrison *et al*. 1997). Its diet consists largely of small mammals, particularly striped mouse *Rhabdomys pumilio* (Kemp and Dean, 1988).	Low	The species was not confirmed during the field survey, but has been recorded a number of times (five times) in the study area landscape more than five years ago (October 2020, Appendix C). Even so, suitable wetland habitats for this species do not exist on the site, with habitats being of a highly degraded nature along with a high level of daily disturbances and in an urban setting. It is therefore highly unlikely that this species will be present on or near the site.
Accipitridae	*Polemaetus bellicosus*	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).	Low	The species was not confirmed during the field survey, and has been recorded only once in the study area landscape more than ten years ago (April 2015, Appendix C). In addition, the high level of daily disturbances, degraded nature and urban setting of the site makes it is highly unlikely that this species will be present on the site or the surrounding landscape
Accipitridae	*Stephanoaetus coronatus*	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 et al. 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	Low	The species was not confirmed during the field survey, and has been recorded only once in the study area landscape, with this observation in September 2025 (Appendix C). Given its scarcity in the landscape, along with the highly degraded nature of the site, a high level of daily disturbances and an urban setting, it is therefore highly unlikely that this species will occur on

				local declines in population density. The use of exotic invasive trees (especially *Eucalyptus* and *Pinus* spp.) for nesting permits persistence in degraded and mosaic landscapes (McPherson et al. 2016a). It shows dietary plasticity and can feed on a diversity of prey (although maybe almost entirely mammals, Swatridge et al. 2014) according to habitat type, which may allow it to persist in certain areas.		or near the site.
Anatidae	*Oxyura maccoa*	Maccoa Duck	Endangered	During the breeding season the species inhabits small temporary and permanent inland freshwater lakes (Berruti *et al*. 2005, 2007), preferring those that are shallow and nutrient-rich (Johnsgard,1978, Johnsgard and Carbonell, 1996) with extensive emergent vegetation such as reeds (*Phragmites* spp.) and cattails (*Typha* 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 *et al*. 1992, Berruti *et al*. 2005, 2007). It is thought to find refuge on the larger lakes while moulting (Berruti *et al*. 2005, 2007). The species tends to nest over deeper water among emergent vegetation (Berruti *et al*. 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 *Fulica cristata* may sometimes be used	Low	The species was not confirmed during the field survey, but has been recorded a number of times (six times) in the study area landscape more than ten years ago (November 2015, Appendix C). Furthermore, habitats on the site are not characteristic of the open water conditions required by this species, with constituent habitats of a highly degraded nature, a high level of daily disturbances and in an urban setting. It is therefore highly unlikely that the species will be present on or near the site.
Falconidae	*Falco biarmicus*	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).	Low	The species was not confirmed during the field survey, and has been recorded only three times in the study area landscape more than eight years ago (January 2017; Appendix C). The study area landscape does contain a number of the avifaunal species preyed upon by the Lanner Falcon, but its scarcity makes it unlikely that species may be present.
Gruidae	*Anthropoides paradiseus*	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).	Low	The species was not confirmed during the field survey, and has been recorded only three times in the study area landscape more than five years ago (January 2020, Appendix C). Given a lack of suitable habitat along with the high level of daily disturbances, degraded nature and urban setting of the site, it is highly unlikely that this species will be present on the site or within the immediate landscape.

Fringillidae	*Crithagra leucoptera*	Protea Canary	Near-Threatened	The species is predominantly found in mature Fynbos, but can be found in large numbers in areas of recent burning as a result of seed release by *Protea* species (Lee and Barnard, 2014). The species may also be found in other habitats such as tall shrubs, semi-arid scrub and woodland patches (Clement and Sharpe, 2017).	Low	The species was not confirmed during the field survey and has been recorded only three times in the study area landscape, albeit recently (August 2023, Appendix C). The site does further not harbour the required Fynbos vegetation or *Protea* species preferred by this species, and along with the high level of daily disturbances, degraded nature and urban setting, it is highly unlikely that this species will be present.
Locustellidae	*Bradypterus sylvaticus*	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 afromontane forest. It breeds in dense understorey vegetation (Pryke et al. 2010).	Low	The species was not confirmed during the field survey, but has been recorded a high number of times (210 times) in the study area landscape recently (October 2025, appendix C). Although habitats on the site are highly degraded, this species does sometimes occur in the invasive Brambles which is present along the Camfersdrift River. Even so, the presence of this species is likely to be ephemeral and the proposed development is of such a nature that it is highly unlikely to impact on this species.
Picidae	*Campethera notata*	Knysna Woodpecker	Near-Threatened	The species is confined to coastal areas of forest, woodland, dense bush, Euphorbia scrub, or open country with large trees.	Low	The species was not confirmed during the field survey, but has been recorded a number of times (48 times) in the study area landscape recently (September 2025, Appendix C). Some large trees are located in the immediate area of the site, and it is possible that this species may forage here. Even so, the proposed development is of such a nature that it is highly unlikely to impact on this species
Invertebrates						
Acrididae	*Aneuryphymus montanus*	Yellow-winged Agile Grasshopper	Vulnerable	The species is associated with fynbos vegetation, where it has been collected "amongst partly burnt stands of evergreen Sclerophyll in rocky foothills" (Brown 1960). It prefers south-facing cool slopes (Kinvig 2005).	Low	The site is devoid of any of the Fynbos vegetation required by this species, and it is highly unlikely to occur on or near the site.
Migidae	*Moggridgea terricola*	Banded-legged Trapdoor Spider	Vulnerable	The species inhabits the Fynbos biome at altitudes ranging from 7 to 243 m above sea level	Low	Given the open and transformed nature of the site, it is unlikely that this species will be present.

10. Evaluation of Site Ecological Importance (SEI)

10.1 Evaluating SEI for habitats in the study area

Evaluation of the Site Ecological Importance (SEI) for the habitats in the study area and surrounding landscape was performed following the methods and criteria outlined in the Species Environmental Assessment Guideline (SANBI, 2020). 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^2. 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^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. 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	Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing).
High	Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.
Medium	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.
Low	Small (> 1 ha but < 5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
Very low	Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts.

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 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%28 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.

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 of 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 18**. Although consisting of five broad habitat types, the overall footprints for the proposed development will be small and located in already transformed parts, unlikely to impact on surrounding areas. Furthermore, all habitats (including those surrounding the project footprints) exist in a poor ecological condition due to pollution and do not harbour any notable faunal subpopulations or faunal SCC. To this end, the entire site is retrieved as having a "Very low" SEI from a faunal SCC perspective, 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
Power Station / Cleared	**Very low** - No confirmed or likely subpopulations of terrestrial faunal or avifaunal SCC.	**Very low** - Very small (>1ha) area which is completely transformed with no natural habitats.	**Very high** - This habitat is completely transformed to an open state (park), also housing the substation, and it can only recover to this transformed state.	**Very low** - BI = Very low; RR = Very high
River / Riparian	**Very low** - No confirmed or likely subpopulations of terrestrial faunal or avifaunal SCC.	**Very low** - Proposed footprints intersecting this habitat will be very small and will be focussed in areas with several major current negative ecological impacts (a high incidence of pollution and alien invasive vegetation with poor water quality).	**Very high** - Although in a poor ecological state, this habitat represents an aquatic environment which is sensitive to disturbance. Even so, it may recover to this condition relatively quickly as the proposed development is unlikely to have any major impacts.	**Very low** - BI = Very low; RR = Very high
Artificial wetland	**Very low** - No confirmed or likely subpopulations of terrestrial faunal or avifaunal SCC.	**Very low** - Very small (>1ha) area which appears artificial in nature and is subjected to several major current negative ecological impacts (a high incidence of pollution and poor water quality).	**Very high** - This habitat exists in an artificial state and displays a poor ecological condition. It may therefore recover to a similar state relatively quickly. In addition, the proposed development is unlikely to have any major impacts.	**Very low** - BI = Very low; RR = Very high
Remnant vegetation	**Very low** - No confirmed or likely subpopulations of terrestrial faunal or avifaunal SCC.	**Very low** - Notably, none of the project footprints intersect this habitat, however it also represents very small area (<1 hectare) with several major current negative ecological impacts (a high incidence of pollution, and alien invasive vegetation with poor water quality).	**Very high** - This habitat appears remnant in nature and also exists in a poor ecological condition. As such, it may recover to a similar state relatively quickly. Notably, none of the proposed development footprints intersect this habitat an the proposed development is unlikely to have any major impacts.	**Very low** - BI = Very low; RR = Very high

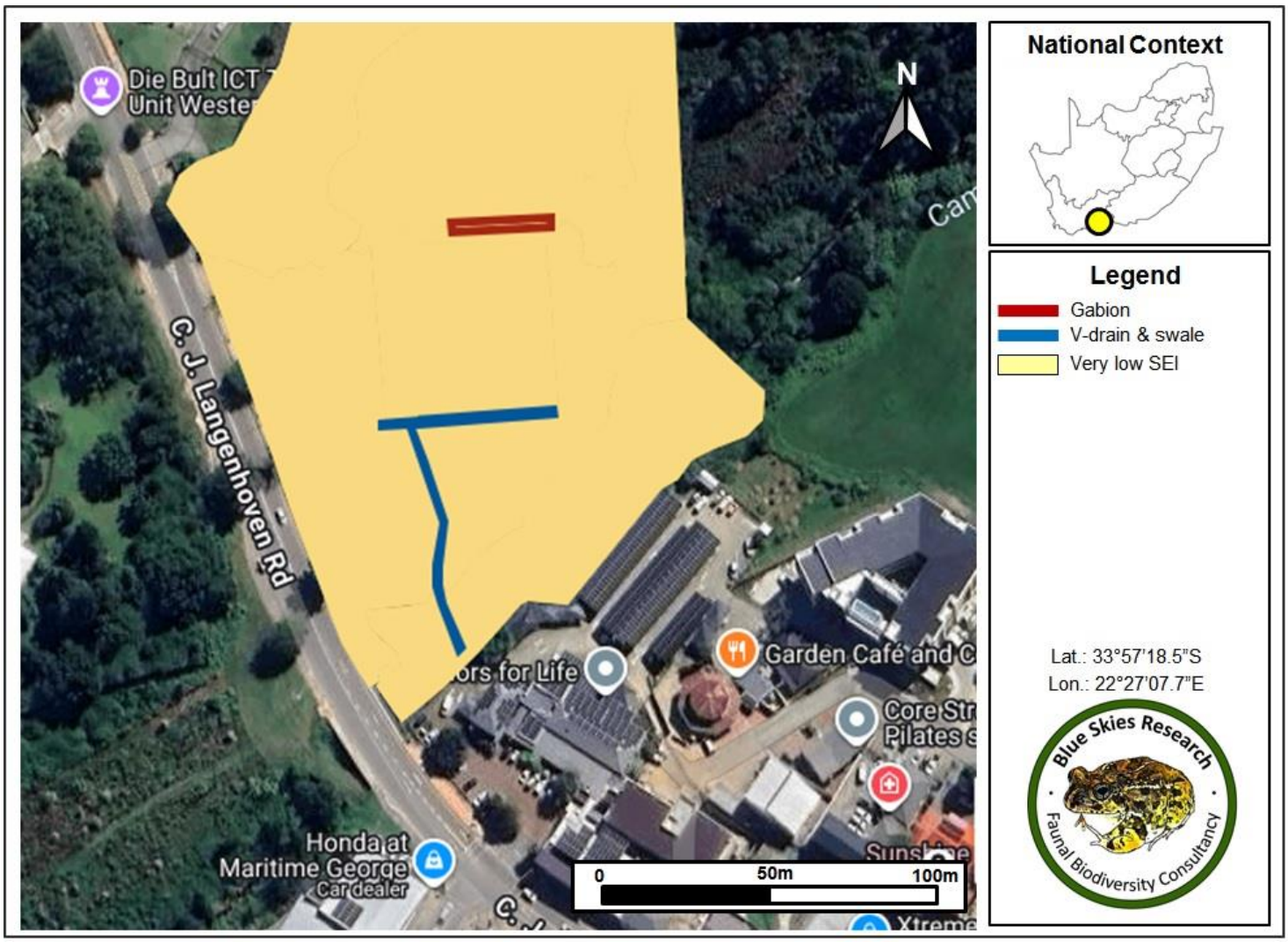


Figure 18 Spatial representation of the SEI of habitats within the study area.

11. Current impacts and project-related impacts

11.1 Current impacts

Current impacts within the study area include the following:

- The study area is located within an urban setting and is surrounded by residential areas, business parks, a hospital and busy roads, from where daily noise and vibration is evident (through vehicles and human foot traffic).
- The proposed project footprints exist in a completely transformed state with no natural habitat, while habitats in the surrounding area appear highly degraded with major signs of pollution (**Figures 19** and **20**), human foot traffic (vagrancy, as well as from people traversing the site), a high incidence of alien and invasive vegetation and poor water quality.
- The site harbours a common disturbance-prone terrestrial faunal and avifaunal profile.

These impacts are of a major extent, and appear to have heavily impinged on biodiversity patterns and processes within the study area landscape, adding to the degraded nature of ecosystem characteristics.

Figure 19 An indication of the high levels of pollution (illegal waste dumping) and vagrancy on the site (Waypoint: -33.95485, 22.45273).

Figure 19 An indication of the high levels of pollution (illegal waste dumping) and vagrancy on the site (Waypoint: -33.95468, 22.45155).

11.2 Proposed development and associated impacts

The George Municipality is proposing flood damage repairs to the Langenhoven Substation with two alternative (albeit spatially similar) scopes of works proposed which will include the following:

Alternative A

- Construct gabion retaining structure
- Construct earth v-drain along the southern edge of the substation
- Construct trapezoidal grass swale with an outlet as close to the river as possible with energy dissipators to protect against erosion.

Alternative B

- Construct gabion retaining structure
- Construct earth v-drain along the southern edge of the substation
- Construct trapezoidal grass swale with a flared swale to spread the water out on the edge of the bush near the river.

Because the spatial extent of these works will be spatially restricted (less than 500m^2) to already transformed areas with no remaining natural habitat, no notable terrestrial or avifaunal subpopulations a “Very low” SEI, the project is expected to lead to **minimal to no negative impacts on the receiving environment**. Along with this, the scope of works is expected to be of a very short term (less than one year) and **impacts on remaining areas outside of the proposed footprints are also expected to be of no significance**. To this end, any of the two development alternative will be able to proceed without affecting ecosystem processes and biodiversity patterns either on the site or in the local landscape.

Because the site does deliver ecosystem services in the form of aquatic zones which feed the Camfersdrift River and associated wetlands downstream, while also representing a green space, it is however suggested that the Municipality organise a clean-up of waste in the area and address illegal waste dumping as this is currently degrading natural areas, not only on the site, but also in the broader

landscape of the Camfersdrift River. Indeed, this river system is sensitive to disturbance, given the presence of the Knysna Leaf-folding Frog in the upper reaches not far from the site. If not addressed, current impacts will continue to degrade ecosystem dynamics in the area and may possibly lead to the local extirpation of sensitive aquatic fauna.

12. Conclusion

12.1 Listed sensitivity in the DFFE Screening Tool Report

The results from this report represent a more site-specific and finer-grained rendering of the site sensitivity than is represented in the DFFE Screening Tool Report. Because the proposed project footprints are relatively small, harbour transformed areas with no remaining natural habitats with a low faunal diversity and limited habitat for any fauna SCC, this confirms the area to be of a “Low” sensitivity from a faunal perspective, rather than a “High” sensitivity as listed in the DFFE Screening Tool Report (Figure 1, Section 3). To this end, this confirms the need for a Compliance Statement report following the ground-truthed site sensitivity.

12.2 Conclusion

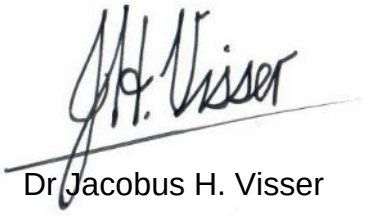
Taken together therefore, the proposed development is unlikely to have any notable negative impacts on terrestrial fauna or avifauna over the proposed project footprints, remaining natural areas around the site, or in the local landscape. Also considering the limited scope of works proposed to restore and upgrade infrastructure, there is no reason why the proposed development should not proceed from a terrestrial faunal and avifaunal biodiversity perspective.

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 (George) landscape (Naturalist, 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	***Chrysochloris asiatica***	**Cape Golden Mole**	**Least Concern**
		Chlorotalpa duthieae	**Duthie's Golden Mole**	**Vulnerable**
		Amblysomus corriae	**Fynbos Golden Mole**	**Near-Threatened**
		Amblysomus hottentotus	Hottentot Golden Mole	Least Concern
Carnivora	Canidae	*Canis mesomelas*	Black-backed Jackal	Least Concern
		Otocyon megalotis	**Bat-eared Fox**	**Least Concern**
		Vulpes chama	Cape Fox	Least Concern
	Felidae	***Caracal caracal***	**Caracal**	**Least Concern**
		Felis silvestris	African Wild Cat	Least Concern
		Leptailurus serval	Serval	Least Concern
		Panthera pardus	Leopard	Vulnerable
	Hyaenidae	*Proteles cristata*	Aardwolf	Least Concern
	Herpestidae	***Atilax paludinosus***	**Marsh Mongoose**	**Least Concern**
		Cynictis penicillata	Yellow Mongoose	Least Concern
		Herpestes ichneumon	**Egyptian Mongoose**	**Least Concern**
		Herpestes pulverulentus	**Cape Grey Mongoose**	**Least Concern**
	Mustelidae	*Aonyx capensis*	African Clawless Otter	Near-Threatened
		Ictonyx striatus	Zorilla	Least Concern

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

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

Appendix B

Appendix B Desktop species list of the amphibian species which have a distribution overlapping with the study area (constructed with reference to Preez and Carruthers, 2009). Species in bold have been previously recorded within the study area (George) 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.

Amphibians Desktop Species List				
Order	**Family**	**Species**	**Common name**	**Status**
Anura	Brevicipitidae	***Breviceps fuscus***	**Plain Rain Frog**	**Least Concern**
	Bufonidae	***Sclerophrys capensis***	**Raucous Toad**	**Least Concern**
		Sclerophrys pardalis	Eastern Leopard Toad	Least Concern
		Vandijkophrynus angusticeps	Cape Sand Toad	Least Concern
	Heleophrynidae	***Heleophryne regis***	**Royal Ghost Frog**	**Least Concern**
	Hyperoliidae	***Afrixalus knysnae***	**Knysna Leaf-folding Frog**	**Endangered**
		Hyperolius horstockii	Horstock's Reed Frog	**Least Concern**
		Hyperolius marmoratus	**Painted Reed Frog**	**Least Concern**
		Semnodactylus wealii	Rattling Frog	Least Concern
	Pipidae	***Xenopus laevis***	**African Clawed Frog**	**Least Concern**
	Pyxicephalidae	*Amietia delalandii*	Delalande's River Frog	**Least Concern**
		Amietia fuscigula	**Dark-throated River Frog**	**Least Concern**
		Cacosternum boettgeri	Boettger's Dainty Frog	Least Concern
		Cacosternum nanum	**Bronze Caco**	**Least Concern**
		Strongylopus bonaespei	**Banded Stream Frog**	**Least Concern**
		Strongylopus fasciatus	**Striped Stream Frog**	**Least Concern**
		Strongylopus grayii	**Clicking Stream Frog**	**Least Concern**
		Tomopterna delalandii	Cape Sand Frog	Least Concern

Appendix C

Appendix C Desktop species list of the avifaunal species which have been recorded in the pentad (3355_2225) 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). Furthermore, 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. Species in bold represent avifaunal species of conservation concern (SCC).

Avifauna Desktop Species List						
Order	**Family**	**Species**	**Common name**	**IUCN status**	**Number of observations**	**Latest record**
Accipitriformes	Accipitridae	*Accipiter melanoleucus*	Black Sparrowhawk	Least Concern	140	2025/08/16
		Accipiter minullus	Little Sparrowhawk	Least Concern	23	2025/06/25
		Accipiter rufiventris	Rufous-breasted Sparrowhawk	Least Concern	5	2021/10/24
		Accipiter tachiro	African Goshawk	Least Concern	138	2025/10/01
		Aviceda cuculoides	African Cuckoo-hawk	Least Concern	11	2023/12/25
		Aquila verreauxii	**Verreaux's Eagle**	**Least Concern**	**2**	**2013/12/07**
		Buteo buteo	Common Buzzard	Least Concern	33	2025/09/26
		Buteo rufofuscus	Jackal Buzzard	Least Concern	165	2025/08/16
		Buteo trizonatus	**Forest Buzzard**	**Near-Threatened**	**358**	**2025/09/14**
		Circaetus cinereus	Brown Snake-eagle	Least Concern	1	2022/02/26
		Circus maurus	**Black Harrier**	**Endangered**	**3**	**2018/03/30**
		Circus ranivorus	**African Marsh Harrier**	**Least Concern**	**5**	**2020/10/06**
		Elanus caeruleus	Black-winged Kite	Least Concern	80	2025/05/24
		Haliaeetus vocifer	African Fish Eagle	Least Concern	44	2025/08/18
		Hieraaetus pennatus	Booted Eagle	Least Concern	5	2017/03/25
		Lophaetus occipitalis	Long-crested Eagle	Least Concern	36	2025/09/14

		Melierax canorus	Pale Chanting-goshawk	Least Concern	1	2019/03/01
		Milvus aegyptius	Yellow-billed Kite	Least Concern	38	2025/10/04
		Pernis apivorus	European Honey-buzzard	Least Concern	7	2022/03/04
		Polemaetus bellicosus	**Martial Eagle**	**Endangered**	**1**	**2015/04/23**
		Polyboroides typus	African Harrier-Hawk	Least Concern	76	2025/08/16
		Stephanoaetus coronatus	**Crowned Eagle**	**Near-Threatened**	**1**	**2025/09/11**
Anseriformes	Anatidae	*Alopochen aegyptiaca*	Egyptian Goose	Least Concern	402	2025/10/01
		Anas capensis	Cape Teal	Least Concern	42	2022/07/01
		Anas erythrorhyncha	Red-billed Teal	Least Concern	48	2022/07/01
		Anas platyrhynchos	Mallard	Least Concern	14	2024/12/04
		Anas sparsa	African Black Duck	Least Concern	27	2025/03/05
		Anas undulata	Yellow-billed Duck	Least Concern	124	2025/10/04
		Anser anser	Greylag Goose	Least Concern	1	2012/12/21
		Cairina moschata	Muscovy Duck	Least Concern	1	2022/05/12
		Dendrocygna viduata	White-faced Whistling Duck	Least Concern	52	2025/10/01
		Netta erythrophthalma	Southern Pochard	Least Concern	3	2018/01/01
		Oxyura maccoa	**Maccoa Duck**	**Endangered**	**6**	**2015/11/28**
		Plectropterus gambensis	Spur-winged Goose	Least Concern	34	2025/03/16
		Spatula smithii	Cape Shoveler	Least Concern	42	2022/07/01
		Tadorna cana	South African Shelduck	Least Concern	2	2021/09/04
		Thalassornis leuconotus	White-backed Duck	Least Concern	5	2025/05/01
Bucerotiformes	Phoeniculidae	*Phoeniculus purpureus*	Green Woodhoopoe	Least Concern	170	2025/10/01
	Upupidae	*Upupa africana*	African Hoopoe	Least Concern	69	2025/09/04
Caprimulgiformes	Apodidae	*Apus affinis*	Little Swift	Least Concern	58	2025/05/11
		Apus apus	Common Swift	Least Concern	9	2021/01/16
		Apus barbatus	African Black Swift	Least Concern	32	2025/03/16
		Apus caffer	White-rumped Swift	Least Concern	119	2025/10/01
		Apus horus	Horus Swift	Least Concern	8	2015/11/12
		Cypsiurus parvus	African Palm Swift	Least Concern	57	2025/10/01

		Tachymarptis melba	Alpine Swift	Least Concern	36	2025/03/09
	Caprimulgidae	*Caprimulgus pectoralis*	Fiery-necked Nightjar	Least Concern	192	2025/10/01
Charadriiformes	Burhinidae	*Burhinus capensis*	Spotted Thick-knee	Least Concern	196	2025/09/09
		Burhinus vermiculatus	Water Thick-knee	Least Concern	5	2023/10/18
		Charadrius hiaticula	Common Ringed Plover	Least Concern	2	2015/11/05
		Charadrius pecuarius	Kittlitz's Plover	Least Concern	18	2020/11/24
		Charadrius tricollaris	Three-banded Plover	Least Concern	44	2022/07/01
		Vanellus armatus	Blacksmith Lapwing	Least Concern	238	2025/08/16
		Vanellus coronatus	Crowned Lapwing	Least Concern	194	2025/09/04
	Charadriidae	*Vanellus melanopterus*	Black-winged Lapwing	Least Concern	38	2023/06/16
	Haematopodidae	*Haematopus moquini*	African Oystercatcher	Least Concern	1	2020/05/01
	Jacanidae	*Actophilornis africanus*	African Jacana	Least Concern	5	2021/09/04
	Laridae	*Larus cirrocephalus*	Grey-headed Gull	Least Concern	9	2021/12/23
		Larus dominicanus	Kelp Gull	Least Concern	73	2025/08/16
	Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt	Least Concern	7	2014/11/13
	Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	Least Concern	3	2015/11/28
		Calidris minuta	Little Stint	Least Concern	1	2013/12/07
		Calidris pugnax	Ruff	Least Concern	2	2015/02/22
		Gallinago nigripennis	African Snipe	Least Concern	25	2022/07/01
		Tringa glareola	Wood Sandpiper	Least Concern	3	2013/12/07
	Stercorariidae	*Ciconia ciconia*	White Stork	Least Concern	15	2021/04/23
Ciconiiformes	Ciconiidae	*Leptoptilos crumenifer*	Marabou	Least Concern	1	2012/06/23
Coliiformes	Coliidae	*Colius striatus*	Speckled Mousebird	Least Concern	415	2025/10/01
		Urocolius indicus	Red-faced Mousebird	Least Concern	20	2025/01/09
Columbiformes	Columbidae	*Columba arquatrix*	African Olive Pigeon	Least Concern	271	2025/10/04
		Columba guinea	Speckled Pigeon	Least Concern	405	2025/09/04
		Columba larvata	Lemon Dove	Least Concern	54	2025/08/12
		Columba livia	Rock Dove	Least Concern	169	2025/09/14
		Spilopelia senegalensis	Laughing Dove	Least Concern	479	2025/10/01

		Streptopelia capicola	Cape Turtle Dove	Least Concern	262	2025/09/04
		Streptopelia semitorquata	Red-eyed Dove	Least Concern	621	2025/10/04
		Turtur tympanistria	Tambourine Dove	Least Concern	57	2025/09/26
Coraciiformes	Alcedinidae	*Alcedo semitorquata*	Half-collared Kingfisher	Least Concern	7	2024/01/06
		Ceryle rudis	Pied Kingfisher	Least Concern	8	2025/03/12
		Corythornis cristatus	Malachite Kingfisher	Least Concern	35	2025/05/01
		Halcyon albiventris	Brown-hooded Kingfisher	Least Concern	222	2025/10/01
		Megaceryle maxima	Giant Kingfisher	Least Concern	14	2025/05/24
	Meropidae	*Merops persicus*	Blue-cheeked Bee-eater	Least Concern	1	2024/01/01
Cuculiformes	Cuculidae	*Centropus burchellii*	Burchell's Coucal	Least Concern	218	2025/10/04
		Chrysococcyx caprius	Diederik Cuckoo	Least Concern	97	2025/09/29
		Chrysococcyx cupreus	African Emerald Cuckoo	Least Concern	61	2024/11/28
		Chrysococcyx klaas	Klaas's Cuckoo	Least Concern	149	2025/09/20
		Cuculus clamosus	Black Cuckoo	Least Concern	89	2025/01/03
		Cuculus solitarius	Red-chested Cuckoo	Least Concern	212	2025/10/04
Falconiformes	Falconidae	***Falco biarmicus***	**Lanner Falcon**	**Least Concern**	**3**	**2017/01/07**
		Falco peregrinus	Peregrine Falcon	Least Concern	54	2025/05/31
		Falco rupicolus	Rock Kestrel	Least Concern	33	2025/01/03
Galliformes	Gruidae	***Anthropoides paradiseus***	**Blue Crane**	**Vulnerable**	**3**	**2020/01/28**
	Numididae	*Numida meleagris*	Helmeted Guineafowl	Least Concern	315	2025/09/26
	Phasianidae	*Coturnix coturnix*	Common Quail	Least Concern	13	2021/07/04
		Pavo cristatus	Indian Peafowl	Least Concern	93	2025/05/31
		Pternistis afer	Red-necked Spurfowl	Least Concern	79	2025/05/24
		Pternistis capensis	Cape Spurfowl	Least Concern	19	2025/08/12
		Scleroptila levaillantii	Red-winged Francolin	Least Concern	4	2022/07/01
	Rallidae	*Fulica cristata*	Red-knobbed Coot	Least Concern	100	2025/08/16
		Gallinula chloropus	Common Moorhen	Least Concern	172	2025/10/04
		Rallus caerulescens	African Rail	Least Concern	27	2025/05/01
		Zapornia flavirostra	Black Crake	Least Concern	193	2025/10/04

Gruiformes	Rallidae	*Porphyrio madagascariensis*	African swamphen	Least Concern	1	2024/01/06
		Sarothrura affinis	Striped Flufftail	Least Concern	4	2024/01/08
		Sarothrura elegans	Buff-spotted Flufftail	Least Concern	58	2025/05/30
		Sarothrura rufa	Red-chested Flufftail	Least Concern	78	2025/05/01
Musophagiformes	Musophagidae	*Tauraco corythaix*	Knysna Turaco	Least Concern	318	2025/10/04
Passeriformes	Acrocephalidae	*Acrocephalus baeticatus*	African Reed Warbler	Least Concern	14	2021/12/12
		Acrocephalus gracilirostris	Lesser Swamp Warbler	Least Concern	64	2025/10/04
		Acrocephalus palustris	Marsh Warbler	Least Concern	8	2023/01/22
		Acrocephalus scirpaceus	Common Reed-warbler	Least Concern	2	2024/01/06
	Alaudidae	*Calandrella cinerea*	Red-capped Lark	Least Concern	3	2022/07/01
	Campephagidae	*Campephaga flava*	Black Cuckooshrike	Least Concern	19	2025/01/07
		Ceblepyris caesius	Grey Cuckooshrike	Least Concern	132	2025/05/31
	Cisticolidae	*Apalis thoracica*	Bar-throated Apalis	Least Concern	371	2025/08/13
		Camaroptera brachyura	Bleating Camaroptera	Least Concern	166	2025/09/26
		Cisticola fulvicapilla	Neddicky	Least Concern	96	2025/05/01
		Cisticola juncidis	Zitting Cisticola	Least Concern	49	2025/03/09
		Cisticola subruficapilla	Grey-backed Cisticola	Least Concern	3	2021/04/22
		Cisticola tinniens	Levaillant's Cisticola	Least Concern	208	2025/10/04
		Prinia maculosa	Karoo Prinia	Least Concern	261	2025/08/12
	Corvidae	*Corvus albicollis*	White-necked Raven	Least Concern	144	2025/09/20
		Corvus albus	Pied Crow	Least Concern	401	2025/09/14
		Corvus capensis	Cape Crow	Least Concern	25	2025/05/24
	Dicruridae	*Dicrurus adsimilis*	Fork-tailed Drongo	Least Concern	442	2025/10/04
	Emberizidae	*Emberiza capensis*	Cape Bunting	Least Concern	2	2016/12/02
		Emberiza flaviventris	Golden-breasted Bunting	Least Concern	10	2025/08/12
	Estrildidae	*Coccopygia melanotis*	Swee Waxbill	Least Concern	331	2025/10/01
		Estrilda astrild	Common Waxbill	Least Concern	271	2025/08/16
		Lagonosticta rubricata	African Firefinch	Least Concern	29	2025/08/12
		Ortygospiza atricollis	African Quailfinch	Least Concern	3	2022/04/10

	Spermestes bicolor	Black-and-white Mannikin	Least Concern	11	2023/05/24
Fringillidae	*Crithagra albogularis*	White-throated Canary	Least Concern	2	2022/01/21
	Crithagra flaviventris	Yellow Canary	Least Concern	15	2024/07/21
	Crithagra gularis	Streaky-headed Seedeater	Least Concern	238	2025/09/26
	Crithagra leucoptera	**Protea Canary**	**Near-Threatened**	**3**	**2023/08/15**
	Crithagra scotops	Forest Canary	Least Concern	338	2025/10/01
	Crithagra sulphurata	Brimstone Canary	Least Concern	170	2025/10/01
	Crithagra totta	Cape Siskin	Least Concern	17	2024/08/03
	Serinus canicollis	Cape Canary	Least Concern	178	2025/10/01
Hirundinidae	*Cecropis abyssinica*	Lesser Striped Swallow	Least Concern	1	2023/12/11
	Cecropis cucullata	Greater Striped Swallow	Least Concern	122	2025/03/16
	Delichon urbicum	Common House Martin	Least Concern	2	2018/11/22
	Hirundo albigularis	White-throated Swallow	Least Concern	94	2025/10/04
	Hirundo dimidiata	Pearl-breasted Swallow	Least Concern	3	2024/01/06
	Hirundo rustica	Barn Swallow	Least Concern	116	2025/03/27
	Psalidoprocne pristoptera	Black Saw-wing	Least Concern	269	2025/10/04
	Ptyonoprogne fuligula	Rock Martin	Least Concern	60	2025/05/31
	Riparia cincta	Banded Martin	Least Concern	2	2015/02/22
	Riparia paludicola	Brown-throated Martin	Least Concern	21	2025/05/24
Laniidae	*Lanius collaris*	Southern Fiscal	Least Concern	543	2025/10/04
	Lanius collurio	Red-backed Shrike	Least Concern	1	2021/12/05
Locustellidae	*Bradypterus baboecala*	Little Rush Warbler	Least Concern	259	2025/10/04
	Bradypterus sylvaticus	**Knysna Warbler**	**Vulnerable**	**210**	**2025/10/04**
Macrosphenidae	*Cryptillas victorini*	Victorin's Warbler	Least Concern	172	2025/05/01
	Sphenoeacus afer	Cape Grassbird	Least Concern	137	2025/08/12
Malaconotidae	*Chlorophoneus olivaceus*	Olive Bushshrike	Least Concern	114	2025/10/04
	Dryoscopus cubla	Black-backed Puffback	Least Concern	193	2025/10/01
	Laniarius ferrugineus	Southern Boubou	Least Concern	308	2025/10/01
	Tchagra tchagra	Southern Tchagra	Least Concern	3	2018/11/11

	Telophorus zeylonus	Bokmakierie	Least Concern	21	2022/04/10
Monarchidae	*Terpsiphone viridis*	African Paradise Flycatcher	Least Concern	180	2025/10/04
	Trochocercus cyanomelas	Southern Crested-flycatcher	Least Concern	190	2025/10/04
Motacillidae	*Anthus cinnamomeus*	African Pipit	Least Concern	33	2022/07/01
	Anthus leucophrys	Plain-backed Pipit	Least Concern	14	2022/07/01
	Macronyx capensis	Cape Longclaw	Least Concern	57	2025/05/01
	Motacilla aguimp	African Pied Wagtail	Least Concern	1	2009/11/08
	Motacilla capensis	Cape Wagtail	Least Concern	305	2025/08/18
Muscicapidae	*Cossypha caffra*	Cape Robin-Chat	Least Concern	473	2025/10/01
	Cossypha dichroa	Chorister Robin-chat	Least Concern	249	2025/10/04
	Melaenornis silens	Fiscal Flycatcher	Least Concern	102	2025/08/16
	Monticola rupestris	Cape Rock Thrush	Least Concern	1	2012/02/21
	Muscicapa adusta	African Dusky Flycatcher	Least Concern	260	2025/10/04
	Muscicapa striata	Spotted Flycatcher	Least Concern	2	2016/02/08
	Oenanthe familiaris	Familiar Chat	Least Concern	1	2025/01/07
	Oenanthe pileata	Capped Wheatear	Least Concern	2	2021/12/12
	Pogonocichla stellata	White-starred Robin	Least Concern	86	2025/10/04
	Saxicola torquatus	African Stonechat	Least Concern	153	2025/05/24
	Turdus olivaceus	Olive Thrush	Least Concern	456	2025/10/04
	Tychaedon coryphoeus	Karoo Scrub Robin	Least Concern	2	2023/09/26
Nectariniidae	*Anthobaphes violacea*	Orange-breasted Sunbird	Least Concern	50	2025/10/01
	Chalcomitra amethystina	Amethyst Sunbird	Least Concern	405	2025/09/04
	Cinnyris afer	Greater Double-collared Sunbird	Least Concern	466	2025/10/04
	Cinnyris chalybeus	Southern Double-collared Sunbird	Least Concern	413	2025/10/01
	Cyanomitra verreauxii	Mouse-coloured Sunbird	Least Concern	164	2025/10/04
	Hedydipna collaris	Collared Sunbird	Least Concern	60	2025/09/26
	Nectarinia famosa	Malachite Sunbird	Least Concern	78	2025/03/16
Oriolidae	*Oriolus larvatus*	Eastern Black-headed Oriole	Least Concern	512	2025/10/04
	Oriolus oriolus	Eurasian Golden Oriole	Least Concern	4	2021/12/30

	Passeridae	*Passer diffusus*	Southern Grey-headed Sparrow	Least Concern	236	2025/08/16
		Passer domesticus	House Sparrow	Least Concern	188	2025/10/01
		Passer melanurus	Cape Sparrow	Least Concern	35	2025/03/12
	Phylloscopidae	*Phylloscopus ruficapilla*	Yellow-throated Woodland-warbler	Least Concern	150	2025/07/02
		Phylloscopus trochilus	Willow Warbler	Least Concern	9	2024/12/15
	Platysteiridae	*Batis capensis*	Cape Batis	Least Concern	267	2025/10/01
	Ploceidae	*Euplectes capensis*	Yellow Bishop	Least Concern	112	2025/04/12
		Euplectes orix	Southern Red Bishop	Least Concern	101	2025/06/25
		Ploceus capensis	Cape Weaver	Least Concern	494	2025/10/04
		Ploceus velatus	Southern Masked Weaver	Least Concern	29	2024/01/06
		Quelea quelea	Red-billed Quelea	Least Concern	1	2016/07/14
	Promeropidae	*Promerops cafer*	Cape Sugarbird	Least Concern	91	2025/01/07
	Pycnonotidae	*Andropadus importunus*	Sombre Greenbul	Least Concern	518	2025/10/04
		Phyllastrephus terrestris	Terrestrial Brownbul	Least Concern	200	2025/10/01
		Pycnonotus capensis	Cape Bulbul	Least Concern	513	2025/10/04
	Sturnidae	*Creatophora cinerea*	Wattled Starling	Least Concern	3	2018/01/13
		Notopholia corusca	Black-bellied Starling	Least Concern	179	2025/10/04
		Onychognathus morio	Red-winged Starling	Least Concern	357	2025/10/01
		Sturnus vulgaris	Common Starling	Least Concern	525	2025/10/04
	Sylviidae	*Curruca subcoerulea*	Chestnut-vented Warbler	Least Concern	1	2017/04/07
	Viduidae	*Vidua macroura*	Pin-tailed Whydah	Least Concern	243	2025/10/04
	Zosteropidae	*Zosterops virens*	Cape White-eye	Least Concern	653	2025/10/04
Pelecaniformes	Ardeidae	*Ardea cinerea*	Grey Heron	Least Concern	57	2025/03/16
		Ardea intermedia	Intermediate Egret	Least Concern	1	2016/04/27
		Ardea melanocephala	Black-headed Heron	Least Concern	187	2025/06/25
		Ardea purpurea	Purple Heron	Least Concern	9	2023/10/13
		Ardeola ralloides	Squacco Heron	Least Concern	1	2021/05/24
		Bubulcus ibis	Western Cattle Egret	Least Concern	298	2025/09/04
		Egretta garzetta	Little Egret	Least Concern	14	2020/01/03

		Ixobrychus minutus	Little Bittern	Least Concern	8	2023/04/01
		Nycticorax nycticorax	Black-crowned Night Heron	Least Concern	14	2021/08/02
	Scopidae	*Scopus umbretta*	Hamerkop	Least Concern	12	2025/03/12
	Threskiornithidae	*Bostrychia hagedash*	Hadada Ibis	Least Concern	653	2025/10/04
		Platalea alba	African Spoonbill	Least Concern	10	2022/07/01
		Plegadis falcinellus	Glossy Ibis	Least Concern	5	2015/01/14
		Threskiornis aethiopicus	African Sacred Ibis	Least Concern	144	2025/07/18
Piciformes	Indicatoridae	*Indicator indicator*	Greater Honeyguide	Least Concern	1	2017/07/01
		Indicator minor	Lesser Honeyguide	Least Concern	28	2024/10/24
		Indicator variegatus	Scaly-throated Honeyguide	Least Concern	52	2025/01/02
		Prodotiscus regulus	Brown-backed Honeybird	Least Concern	1	2025/03/16
	Lybiidae	*Lybius torquatus*	Black-collared Barbet	Least Concern	55	2025/10/01
		Tricholaema leucomelas	Acacia Pied Barbet	Least Concern	3	2022/04/04
	Picidae	***Campethera notata***	**Knysna Woodpecker**	**Near-Threatened**	**48**	**2025/09/01**
		Dendropicos fuscescens	Cardinal Woodpecker	Least Concern	5	2025/03/12
		Dendropicos griseocephalus	Olive Woodpecker	Least Concern	236	2025/10/01
Podicipediformes	Podicipedidae	*Podiceps nigricollis*	Black-necked Grebe	Least Concern	2	2016/11/26
		Tachybaptus ruficollis	Little Grebe	Least Concern	119	2025/10/04
Sphenisciformes	Spheniscidae	*Bubo africanus*	Spotted Eagle-Owl	Least Concern	106	2025/10/04
Strigiformes	Strigidae	*Bubo capensis*	Cape Eagle-owl	Least Concern	4	2012/01/17
		Bubo lacteus	Verreaux's Eagle-owl	Least Concern	4	2024/03/03
		Strix woodfordii	African Wood-owl	Least Concern	13	2025/04/05
	Tytonidae	*Tyto alba*	Common Barn-owl	Least Concern	45	2025/05/31
Struthioniformes	Struthionidae	*Struthio camelus*	Common Ostrich	Least Concern	1	2021/08/02
Suliformes	Anhingidae	*Anhinga rufa*	African Darter	Least Concern	81	2024/06/16
	Phalacrocoracidae	*Microcarbo africanus*	Reed Cormorant	Least Concern	105	2025/05/31
		Phalacrocorax lucidus	White-breasted Cormorant	Least Concern	23	2025/02/21
Trogoniformes	Trogonidae	*Apaloderma narina*	Narina Trogon	Least Concern	50	2025/01/04

Appendix D

Appendix D Species list of the faunal species recovered within the study area during the field survey and during a 2023 study. 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	*Amblysomus hottentotus*	Hottentot Golden Mole	Least Concern	2
		Chlorotalpa duthieae	**Duthie's Golden Mole**	**Vulnerable**	**1**
Carnivora	Herpestidae	*Atilax paludinosus*	Marsh Mongoose	Least Concern	2
Cetartiodactyla	Bovidae	*Raphicerus melanotis*	Cape Grysbok	Least Concern	1
		Sylvicapra grimmia	Common Duiker	Least Concern	1
Rodentia	Muridae	*Rhabdomys pumilio*	Four-striped Grass Mouse	Least Concern	1
Amphibians					
Order	**Family**	**Species**	**Common name**	**IUCN status**	**Number of observations**
Anura	Pyxicephalidae	*Cacosternum nanum*	Bronze Frog	Least Concern	2
		Strongylopus grayii	Clicking Stream Frog	Least Concern	2
Avifauna					
Order	**Family**	**Species**	**Common name**	**IUCN status**	**Number of observations**
Anseriformes	Anatidae	*Alopochen aegyptiaca*	Egyptian Goose	Least Concern	1
Bucerotiformes	Upupidae	*Upupa africana*	African Hoopoe	Least Concern	1
Coliiformes	Coliidae	*Colius striatus*	Speckled Mousebird	Least Concern	2
Columbiformes	Columbidae	*Columba guinea*	Speckled Pigeon	Least Concern	1
		Streptopelia semitorquata	Red-eyed Dove	Least Concern	2
Coraciiformes	Alcedinidae	*Halcyon albiventris*	Brown-hooded Kingfisher	Least Concern	1

Galliformes	Numididae	*Numida meleagris*	Helmeted Guineafowl	Least Concern	3
Passeriformes	Cisticolidae	*Cisticola tinniens*	Levaillant's Cisticola	Least Concern	2
		Prinia maculosa	Karoo Prinia	Least Concern	1
	Corvidae	*Corvus albicollis*	White-necked Raven	Least Concern	1
	Dicruridae	*Dicrurus adsimilis*	Fork-tailed Drongo	Least Concern	2
	Estrildidae	*Estrilda astrild*	Common Waxbill	Least Concern	1
	Malaconotidae	*Laniarius ferrugineus*	Southern Boubou	Least Concern	1
	Motacillidae	*Motacilla capensis*	Cape Wagtail	Least Concern	1
	Muscicapidae	*Cossypha caffra*	Cape Robin-Chat	Least Concern	2
		Turdus olivaceus	Olive Thrush	Least Concern	2
	Nectariniidae	*Chalcomitra amethystina*	Amethyst Sunbird	Least Concern	1
		Cinnyris afer	Greater Double-collared Sunbird	Least Concern	1
	Oriolidae	*Oriolus larvatus*	Eastern Black-headed Oriole	Least Concern	1
	Passeridae	*Passer diffusus*	Southern Grey-headed Sparrow	Least Concern	1
	Ploceidae	*Ploceus capensis*	Cape Weaver	Least Concern	3
	Pycnonotidae	*Pycnonotus capensis*	Cape Bulbul	Least Concern	2
	Sturnidae	*Onychognathus morio*	Red-winged Starling	Least Concern	1
		Sturnus vulgaris	Common Starling	Least Concern	2
	Zosteropidae	*Zosterops virens*	Cape White-eye	Least Concern	4
Pelecaniformes	Ardeidae	*Ardea intermedia*	Intermediate Egret	Least Concern	1
		Ardea melanocephala	Black-headed Heron	Least Concern	1
	Threskiornithidae	*Bostrychia hagedash*	Hadada Ibis	Least Concern	2
Butterflies					
Order	**Family**	**Species**	**Common name**	**IUCN status**	**No. observations**
Lepidoptera	Nymphalidae	*Vanessa cardui*	Painted Lady	Least Concern	2

Appendix E

Jacobus Hendrik Visser - Curriculum Vitae

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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)

Accreditation

- Registered Professional Natural Scientist (Zoological Science) with the South African Council for Natural Scientific Practitioners (SACNASP). Registration number: 128018

Scientific publications

- **Visser J.H.** (2013). Gene-flow in the rock hyrax (*Procavia capensis*) at different spatial scales. MSc thesis, Stellenbosch University, Stellenbosch, South Africa. https://core.ac.uk/download/pdf/37420485.pdf
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