SCIENTIFIC TERRESTRIAL SERVICES

Terrestrial Biodiversity Assessment

FOR THE PROPOSED SOLAR PLANT FACILITY FOR BLACK ROCK MINE, NEAR HOTAZEL, NORTHERN CAPE PROVINCE.

Part C: Faunal Assessment

Prepared for: Environmental Science Associated (Pty) Ltd
Author: C. Hooton (Pr. Sci. Nat)
Reviewers: S. van Staden (Pr.Sci.Nat)
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

ADU	The Animal Demography Unit online database: http://vmus.adu.org.za/.
AIP	Alien Invasive Plant
BGIS	Biodiversity Geographic Information Systems
CR	Critically Endangered
DENC	Department of Environment and Nature Conservation
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIS	Ecological Importance and Sensitivity
EN	Endangered
EW	Extinct in the Wild
GIS	Geographic Information System
GPS	Global Positioning System
H	High
IBA	Important Bird Area
IEA	Integrated Environmental Authorisation
IEM	Integrated Environmental Management
EMPrs	Environmental Management Programmes
IUCN	International Union for Conservation of Nature and Natural Resources
Km	Kilometers
LC	Least Concern
NA	Not Applicable
NCNCA	Northern Cape Nature Conservation Act, 2009 (Act No.9 of 2009)
NL	Not Listed
NT	Near Threatened
NEMBA	National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)
NYBA	Not yet been assessed
m	Meters
M	Medium
MAMSL	Meters Above Mean Sea Level
P	Protected, according to the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004): Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List. December 2007
PES	Present Ecological State
POC	Probability of Occurrence
PRECIS	Pretoria Computerised Information System
QDS	Quarter Degree Square
RDL	Red Data Listed
RE	Regionally Extinct
SABAP	Southern African Bird Atlas Project
SANBI	South Africa National Biodiversity Institute
SP	Specially Protected
STS	Scientific Terrestrial Services CC
SCC	Species of Conservation Concern
TOPS	Threatened Or Protected Species (list of 2007) according to the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004):
VU	Vulnerable

GLOSSARY OF TERMS

Most definitions are based on terms and concepts elaborated by Richardson et al. (2011), Hui and Richardson (2017), Wilson et al. (2017), Skowno et al. (2019), and SANBI (2016), with consideration to their applicability in the South African context, especially South African legislation [notably the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), and the associated Alien and Invasive Species Regulations, 2020].

Alien species (syn. exotic species; non-native species)	A species that is present in a region outside its natural range due to human actions (intentional or accidental) that have enabled it to overcome biogeographic barriers.
Biological diversity or Biodiversity (as per the definition in NEMBA)	The variability among living organisms from all sources including, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part and includes diversity within species, between species, and of ecosystems.
Carrying Capacity	The maximum population size of a biological species that can be sustained by that specific environment, given the food, habitat, water, and other resources available.
Corridor	A dispersal route or a physical connection of suitable habitats linking previously unconnected regions.
Critical Biodiversity Area (CBA)	A CBA is an area considered important for the survival of threatened species and includes valuable ecosystems such as wetlands, untransformed vegetation, and ridges.
Critically Endangered (CR) (IUCN[1] Red List category)	**Applied to both species/taxa and ecosystems**: A species is CR when the best available eviNorthern Cape DAEARDLRe indicates that it meets at least one of the five IUCN criteria for CR, indicating that the species is facing an extremely high risk of extinction. CR ecosystem types are at an extremely high risk of collapse. Most of the ecosystem type has been severely or moderately modified from its natural state. The ecosystem type is likely to have lost much of its natural structure and functioning, and species associated with the ecosystem may have been lost. CR species are those considered to be at extremely high risk of extinction.
Development footprint (as per the NEMA definition)	"in respect of land, means any area of its physical transformation as a result of the undertaking of any activity"
Degradation	The many human-caused processes that drive the decline or loss in biodiversity, ecosystem functions or ecosystem services in any terrestrial and associated aquatic ecosystems.
Disturbance	A temporal change, either regular or irregular (uncertain), in the environmental conditions that can trigger population fluctuations and secondary succession. Disturbance is an important driver of biological invasions.
Driver (ecological)	A driver is any natural or human-induced factor that directly or indirectly causes a change in ecosystem. A direct driver clearly influences ecosystem processes, where indirect driver influences ecosystem processes through altering one or more direct drivers.
Ecological processes	The functions and processes that operate to maintain and generate biodiversity. In order to include ecological processes in a biodiversity plan, their spatial components need to be identified and mapped.
Endangered (EN) (IUCN Red List category)	**Applied to both species/taxa and ecosystems**: A species is EN when the best available area indicates that it meets at least one of the five IUCN criteria for EN, indicating that the species is facing a very high risk of extinction. EN ecosystem types are at a very high risk of collapse. EN species are those considered to be at very high risk of extinction.
Endemic species	Species that are only found within a pre-defined area. There can therefore be sub-continental (e.g., southern Africa), national (South Africa), provincial, regional, or even within a particular mountain range.

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[1] International Union for Conservation of Nature (IUCN)

Faunal Class	In biological classification, class (Latin: classis) is a taxonomic rank, as well as a taxonomic unit. Class specifically refers to major groups, namely: mammals, avifauna (birds), reptiles and invertebrates.
Ground-truth	Ground truth is a term used in various fields to refer to information provided by direct observation (i.e., empirical area) as opposed to information provided by inference.
Habitat (As per the definition in NEMBA)	A place where a species or ecological community naturally occurs.
Habitat loss	Conversion of natural habitat in an ecosystem to a land use or land cover class that results in irreversible change in the composition, structure and functional characteristics of the ecosystem concerned.
Impact (IEM Series, draft Offset policy, and NEMA)	The positive or negative effects on human well-being and/or on the environment. Impact-related terminology: - Cumulative impact: Past, current and reasonably foreseeable future impacts of an activity, considered together with the impact of the proposed activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities. - Impact Significant/significance: Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e., intensity, duration, and likelihood). Impact significance is the value placed on the change by different affected parties (i.e., level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e., biophysical, social and economic). Such judgement reflects the political reality of impact assessment in which significance is translated into public acceptability of impacts. - Residual negative impacts: Negative impacts that remain after the proponent has made all reasonable and practicable changes to the location, siting, scale, layout, technology and design of the proposed development, in consultation with the environmental assessment practitioner and specialists (including a biodiversity specialist), in order to avoid and minimise negative impacts, and/or rehabilitate and/or restore impacted areas within 30 years (*It is acknowledged that the time it takes for full restoration differs from ecosystem type to ecosystem type, as well as the local conditions. Given that there is no readily accessible information on the recovery times of the different ecosystem types in South Africa, a general timeframe had to be used. The 30-year general timeframe in the definition of "residual impact" reflects that the difficulty in restoring South African ecosystems once they have been disturbed. It is based on the risk-averse and cautious approach.*). - Significant impact: An impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds, or targets.
Important Bird and Biodiversity Area (IBA)	The IBA Programme identifies and works to conserve a network of sites critical for the long-term survival of bird species that: are globally threatened, have a restricted range, are restricted to specific biomes/vegetation types or sites that have significant populations.
Indigenous vegetation (As per the definition in NEMA)	Vegetation occurring naturally within a defined area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Integrity (ecological)	The integrity of an ecosystem refers to its functional completeness, including its components (species) its patterns (distribution) and its processes.
Invasive species	Alien species that sustain self-replacing populations over several life cycles, produce reproductive offspring, often in very large numbers at considerable distances from the parent and/or site of introduction, and have the potential to spread over long distances.
Listed invasive species	All alien species that are regulated in South Africa under the NEMBA, Alien and Invasive Species Regulations, 2020.

Least Threatened	Least threatened ecosystems are still largely intact.
Native species **(syn. indigenous species)**	Species that are found within their natural range where they have evolved without human intervention (intentional or accidental). Also includes species that have expanded their range as a result of human modification of the environment that does not directly impact dispersal (e.g., species are still native if they increase their range as a result of watered gardens but are alien if they increase their range as a result of spread along human-created corridors linking previously separate biogeographic regions).
Near Threatened (according to IUCN)	Close to being at high risk of extinction in the near future.
Niche (ecological)	The role and position a species have in its environment; how it meets its needs for food and shelter, how it survives, and how it reproduces. A species' niche includes all of its interactions with the biotic and abiotic factors of its environment.
Protected	Species of high conservation value or national importance that require protection, according to TOPS 2007 and NEMBA.
Red Data Listed (RDL) species	According to the Red List of South African plants (http://redlist.sanbi.org/) and the International Union for Conservation of Nature (IUCN), organisms that fall into the Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU) categories of ecological status.
Refugia (ecological)	Refugium (plural: refugia) is a location which supports an isolated or relict population of a once more widespread species. This isolation can be caused by climatic changes, geography, or human activities such as deforestation and overhunting.
Resource (ecological)	A resource is a substance or object in the environment required by an organism for normal growth, maintenance, and reproduction. Resources can be consumed by one organism and, as a result, become unavailable to another organism.
Species of Conservation Concern (SCC)	The term SCC in the context of this report refers to all RDL and IUCN listed threatened species as well as provincially and nationally protected species of relevance to the project.
Termitaria	Colonies of termites, typically within a tall mound of cemented earth.
Threatened ecosystem	An ecosystem that has been classified as CR, EN or VU, based on an analysis of ecosystem threat status. A threatened ecosystem has lost or is losing vital aspects of its structure, function, or composition. The NEMBA allows the Minister of Environmental Affairs or a provincial MEC for Environmental Affairs to publish a list of threatened ecosystems. To date, threatened ecosystems have been listed only in the terrestrial environment. In cases where no list has yet been published by the Minister, such as for all aquatic ecosystems, the ecosystem threat status assessment in the National Biodiversity Assessment (NBA) can be used as an interim list in planning and decision making.
Threatened species	A species that has been classified as CR, EN or VU, based on a conservation assessment (Red List), using a standard set of criteria developed by the IUCN for determining the likelihood of a species becoming extinct. A threatened species faces a high risk of extinction in the near future.
Trophic (ecological)	Refers to feeding and nutrition.
Vulnerable (VU) (Red List category)	**Applied to both species/taxa and ecosystems**: A species is VU when the best available eviNorthern Cape DAEARDLRe indicates that it meets at least one of the five IUCN criteria for VU, indicating that the species is facing a high risk of extinction. An ecosystem type is VU when the best available eviNorthern Cape DAEARDLRe indicates that it meets any of the criteria A to E for VU and is then considered to be at a high risk of collapse.

1   INTRODUCTION

Scientific Terrestrial Services (Pty) Ltd (STS) was appointed to conduct a terrestrial biodiversity assessment as part of the environmental authorisation process for the proposed Black Rock Solar Plant Facility, near Hotazel, Northern Cape Province. The Black Rock Solar Project consists of the Overhead Powerline (OHPL), Access Road, Proposed Substation and two solar project areas (e.g., western and eastern) collectively the layout will be referred to as the "study area".

The study area is situated at Santoy, within the Gloria Mine Complex located approximately 6.25 km north of the town of Hotazel and 57 km north of Kathu. The R380 is situated approximately 1.2 km south of the study area which intersects with the R31 which is located 1.4 km to the south of the study area. The study area is located within the John Taolo Gaetsewe District Municipality, and the Joe Morolong Local Municipality. The land use of the area surrounding the Black Rock Solar Project Area includes other mining operations and livestock farming. The extent and layout of the study area is illustrated in Figure 1.

Please refer to Part A for more detailed desktop and background information as well as a project description. Figure 1 depicts the proposed layout of the solar facility and OHPL.

This report, after consideration and the description of the ecological integrity of the proposed activities, must guide the Environmental Assessment Practitioner (EAP), the regulatory authorities and the developing proponent, by means of the presentation of the faunal results and recommendations as to the ecological viability of the proposed solar facility and OHPL.
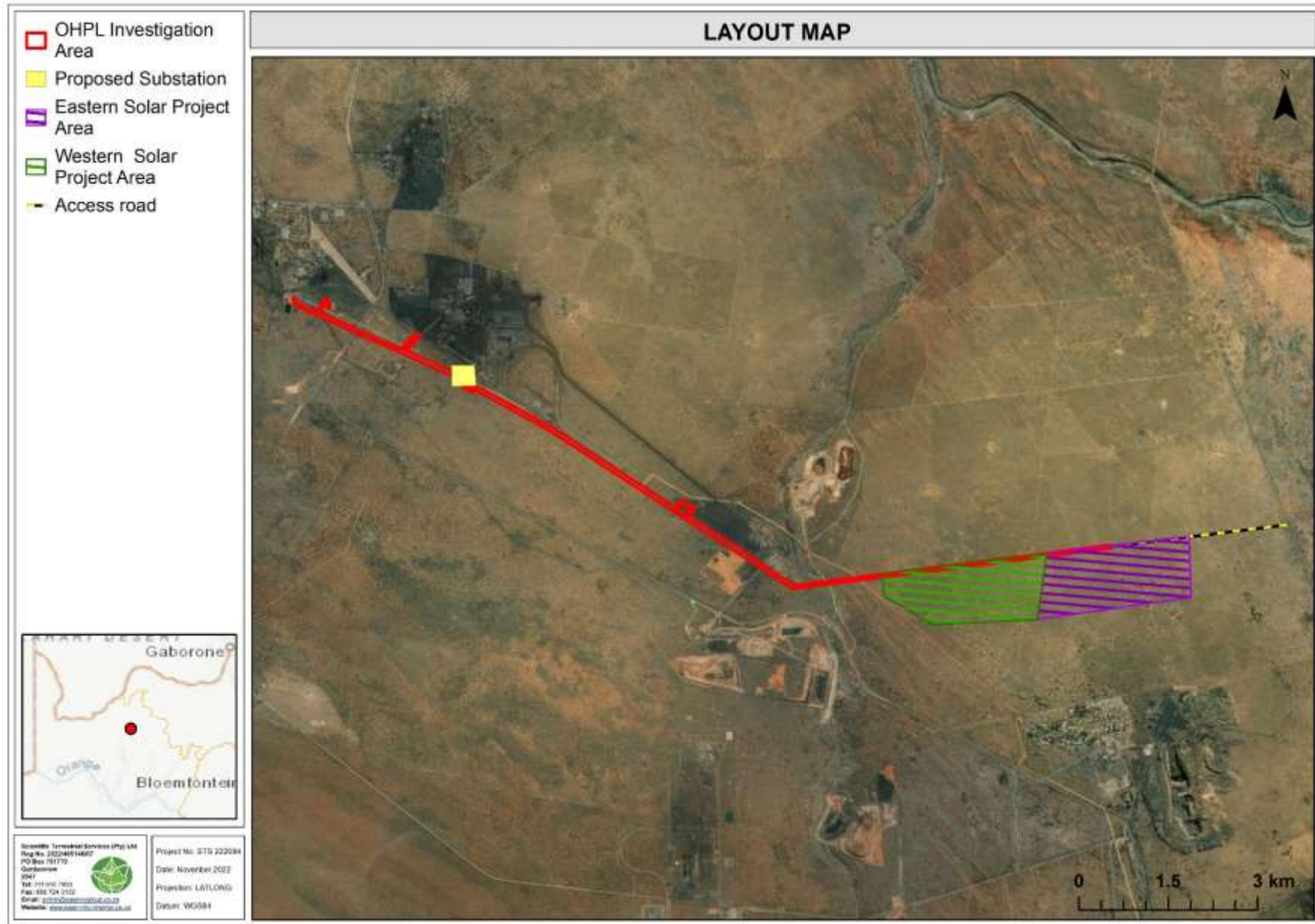
Figure 1: Proposed layout in relation to the surrounding area.

1.1 Scope of Work

The purpose of this report is to define the faunal ecology of the study area as well as mapping and defining areas of increased Ecological Importance and Sensitivity (EIS) and to define the Present Ecological State (PES) of the study area. The scope of work for this study is:

➢ To provide inventories of faunal species as encountered within the study area;

➢ To determine and describe habitat types, faunal communities and the ecological state of the sites associated with the proposed study area and to rank each habitat type based on conservation importance and ecological sensitivity;

➢ To identify and consider all sensitive landscapes and/ or any other special habitat features;

➢ To conduct a Red Data Listed (RDL) and Species of Conservation Concern (SCC) assessment, including species as listed in the National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEMBA) Threatened or Protected Species (TOPS) list (Government Notice R152 in Government Gazette 29657, dated 23 February 2007, as amended), and the overall potential for such species to occur within the areas associated with the proposed study area;

➢ To provide detailed information as well as relevant mitigation measures that must be implemented to guide the proposed development activities associated with the proposed study area; and

➢ To ensure the ongoing functioning of the ecosystem in such a way as to support local and regional conservation requirements and the provision of ecological services in the local area.

1.2 Assumptions and Limitations

The following assumptions and limitations are applicable to this report:

➢ The faunal assessment is confined to the study area as well as the areas immediately adjacent (approx. 100m) the study area which may be impacted upon from the proposed solar facility. Additional data for the surrounding areas was supplemented through a desktop assessment;

➢ With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most faunal communities have been accurately assessed and as such the information provided herein is considered sufficient to allow informed decision making to take place and facilitate integrated environmental management;

➤ As part of the assessment, a field investigation was undertaken during summer (31st October – 4th of November 2022) to determine the ecological status of the study area and to "ground-truth" the results of the desktop assessment (as presented in Part A). A more accurate assessment would require that assessments take place in all seasons of the year, however the season in which the study was taken is considered optimal for the region. On-site data was further augmented with all available desktop data, previous specialist studies undertaken in the region and specialist experience in the area. The findings of this assessment are considered to be an accurate reflection of the ecological characteristics associated with the locality of the study area; and

➤ Due to the nature of sampling and the secretive habits of some faunal taxa, it is unlikely that all species would have been observed during a field assessment of limited duration. Some species and taxa within the study area may therefore have been missed during the assessment.

2   ASSESSMENT APPROACH

The field assessment was undertaken during summer (31st October – 4th of November 2022), to determine the faunal ecological status of the study area. A reconnaissance 'walkabout' was initially undertaken to determine the general habitat types found throughout the sites where the study area will occur. Following this, specific study sites were selected that were considered to be representative of the habitats found within the sites, with special emphasis being placed on areas that may potentially support faunal SCC. Sites were investigated on foot in order to identify the occurrence of fauna within the sites. Sherman and camera traps were used to increase the likelihood of capturing and observing mammal species, notably nocturnal and reclusive mammals.

A detailed explanation of the method of assessment is provided in Appendix A of this report. The faunal categories covered in this assessment are mammals, avifauna, reptiles, amphibians, general invertebrates and arachnids. For the methodologies relating to the impact assessment and development of the mitigation measures, please refer to Appendix C of Part A of the study.

2.1 General approach

In order to accurately determine the PES of the habitat and associated faunal assemblages within the sites and capture comprehensive data with respect to faunal taxa, the following methodology was applied:

- ➢ Maps and digital satellite images were consulted prior to the field assessment in order to determine broad habitats, vegetation types and potentially sensitive sites. An initial visual on-site assessment of the sites was made in order to confirm the assumptions made during consultation of the digital satellite imagery;

- ➢ A literature review with respect to habitats, vegetation types and species distribution was conducted. For a detailed description of the vegetation types and habitats associated with the site, please refer to Part B report;

- ➢ Relevant past studies of the Kudumane Mine area, such as that of Birch (2009), Birch (2012), Birch (2014), Bell and Altern (2019), Birch *et al* (2019) and Todd (2018) were consulted to acquire additional information and data pertaining to the sites in which the Proposed BRMO activities are situated. The findings of these past studies have been incorporated in this report, together with information obtained from the STS July 2021 field assessment;

- ➢ Relevant databases considered during the assessment of the proposed BRMO activities included online atlases on the University of Cape Town (UCT) Animal Demography Unit (ADU) Virtual Museum website; the Important Bird and Biodiversity Areas (IBA, 2015); South African Bird Atlas Project 2 (SABAP2), International Union for Conservation of Nature (IUCN); iNaturalist website; South African National Biodiversity Institute (SANBI) Red List of South African Species; the Northern Cape Biodiversity Areas Database (2016) and the National Biodiversity Assessment (NBA, 2018) (refer to report provided in Part A);

- ➢ Specific methodologies for the assessment, in terms of field work and data analysis of faunal ecological assemblages are presented in Appendix A of this report; and

- ➢ For the methodologies relating to the impact assessment and development of the mitigation measures, please refer to Appendix C of Part A.

2.2 Sensitivity Mapping

All the ecological features associated with the sites were considered, and sensitive areas were assessed. In addition, identified locations of protected species were marked by means of Global Positioning System (GPS). A Geographic Information System (GIS) was used to project these features onto satellite imagery and/or topographic maps. The sensitivity map should guide the final design and layout of the study area. Please refer to Section 4 of this report for further details.

2.3 Faunal Species of Conservational Concern Assessment

During field assessments, it is not always feasible to identify or observe all species within an area, largely due to the secretive nature of many faunal species, possible low population

numbers or varying habits of species. As such, and to specifically assess an area for faunal SCC, a Probability of Occurrence (POC) estimation is used, considering several factors to determine the probability of faunal SCC occurrence within the sites. Species listed in Appendix B whose known distribution ranges and habitat preferences include the proposed infrastructure development sites were taken into consideration. Faunal species likely to occur within the study area are indicated and briefly discussed within each of the relevant dashboards, along with their POC.

3   FAUNAL ASSESSMENT RESULTS

3.1 Faunal Habitat

Based on the results of the field investigation, the following habitat units were identified within the study area. These habitat units are discussed briefly below in terms of faunal utilisation and importance and are visually depicted in the Figures 2 - 6 below. For a more detailed description and discussion of these habitat units in terms of the vegetative composition please refer to the Part B: Floral Report.

Thornveld Habitat:

Natural vegetation communities where species composition and vegetation structure have not deviated significantly from the reference states and only restricted disturbances were noted on site. The Thornveld Habitat unit includes two sub-units, namely:

  ➢ Open Thornveld; and
  ➢ Semi-closed Thornveld.

Although these two sub-units differed in vegetative structure and plant species composition, there were still some shared plants species between them. These habitat units provided suitable habitat to a diversity of faunal species, and given the varied structure between them, provided suitable habitat diversity for these species. These two sub-units were predominantly favoured by species that select for more open areas, where they can more readily forage and move through.

Freshwater Habitat

This habitat unit is associated with the Ga-Mogara river system over which the proposed powerline will traverse. The habitat is dominated by alien plant species, particularly *Prosopis glandulosa* (Honey mesquite), which has formed dense and, in some instances, impenetrable thickets. Due to the encroached nature of this habitat unit, faunal habitat is limited. Faunal species which were prevalent in this habitat unit included small mammals, invertebrates and reptiles which select for denser patches of vegetation where they can readily find shelter and protection from potential predators and threats. This habitat unit however, was limited in forage availability and as such, these species would likely have to venture out into the surrounding habitats in search of food to meet their daily energy requirements.

Transformed Habitat

This habitat encompasses the areas where vegetation clearance has taken place as part of excavation / construction activities or where areas currently form part of the Black Rock mine

footprint. The limited and largely bare ground provides little to no habitat for fauna, other than some hardy invertebrate species which select for these open bare areas.

Figures 2 - 6 below provides a visual representation of the above-mentioned habitat units while Section 3.2 - 3.4 provide a dashboard report of the findings of each faunal class associated with the various habitat units.
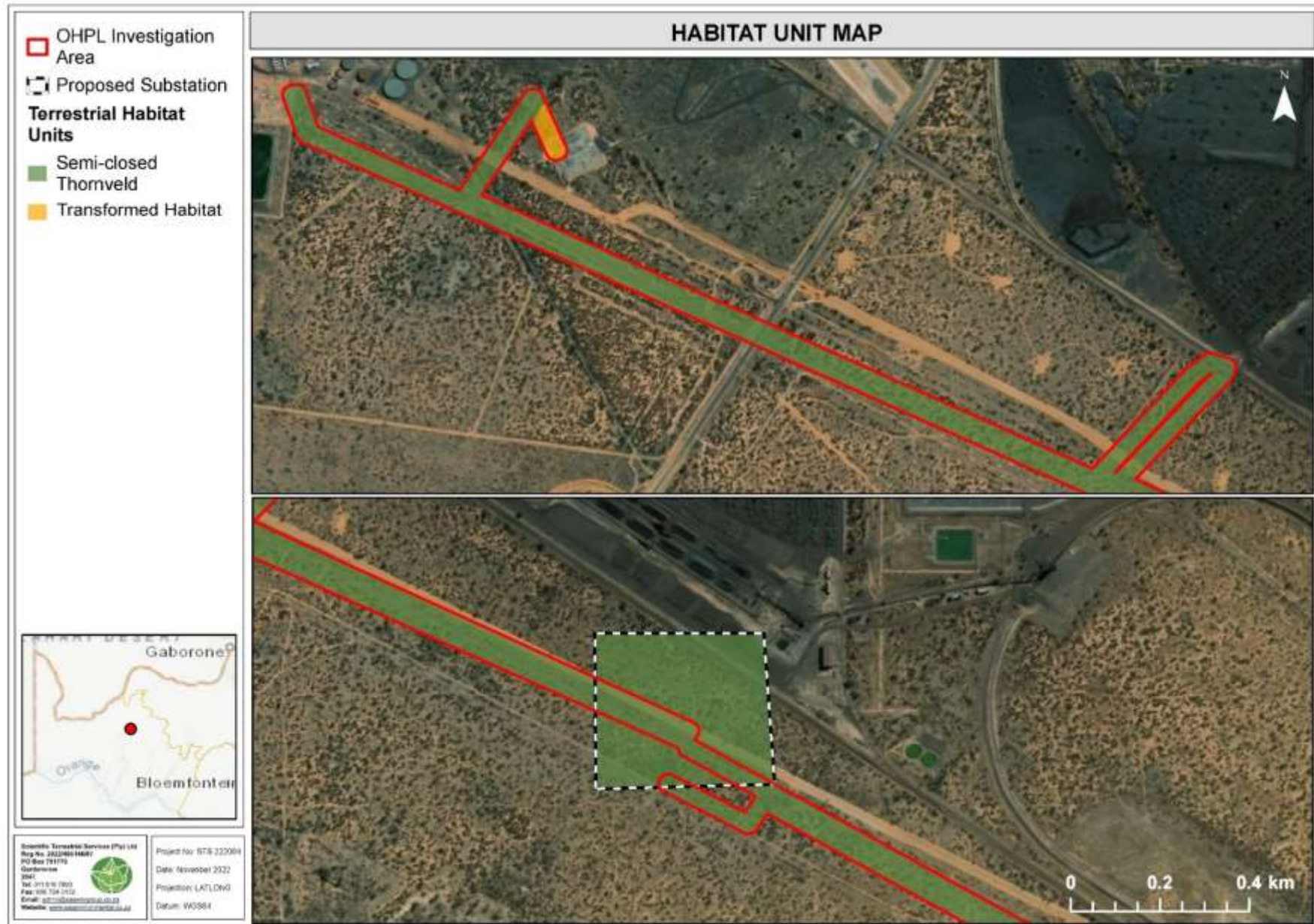
Figure 2: Habitat units associated with the study area.

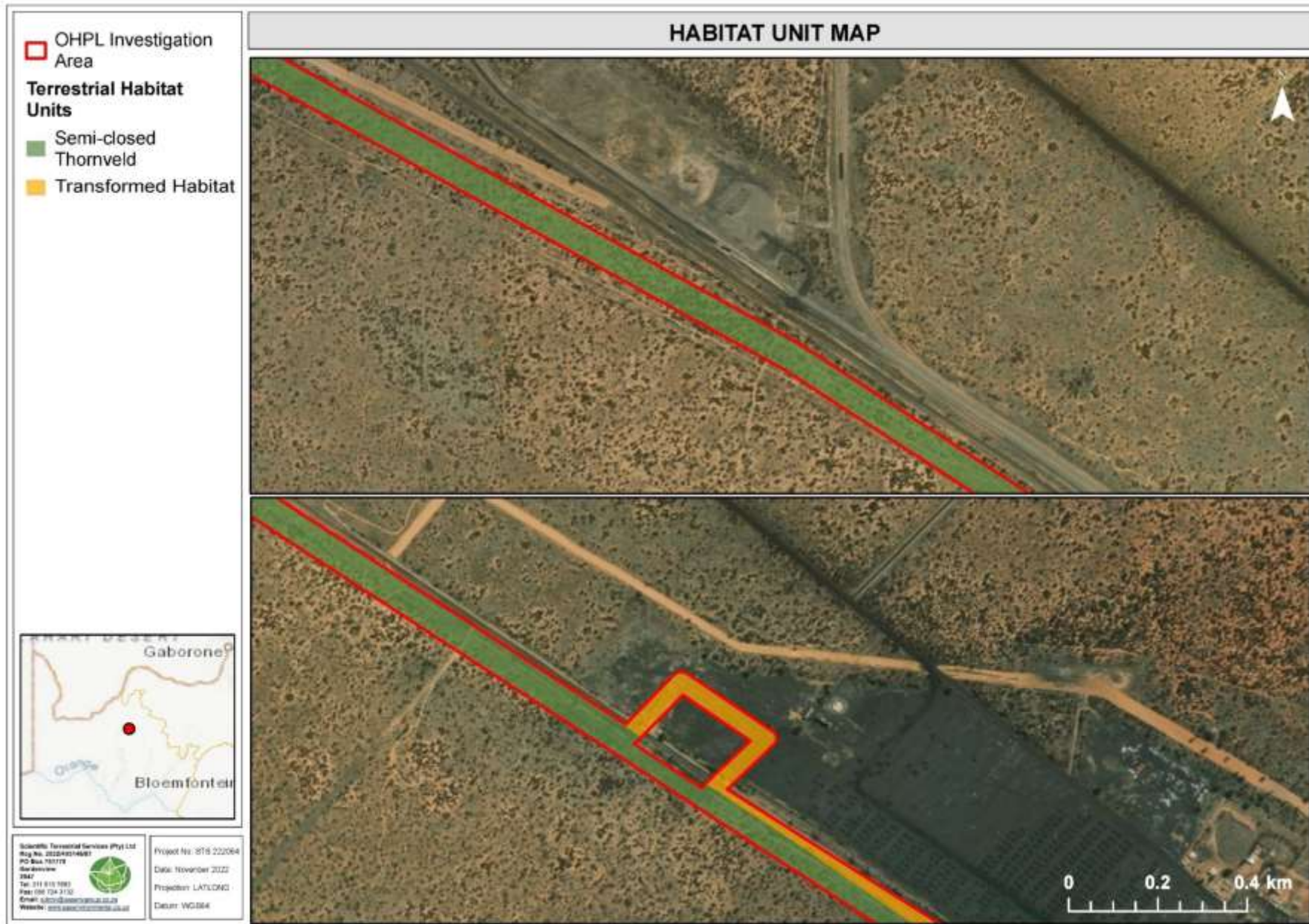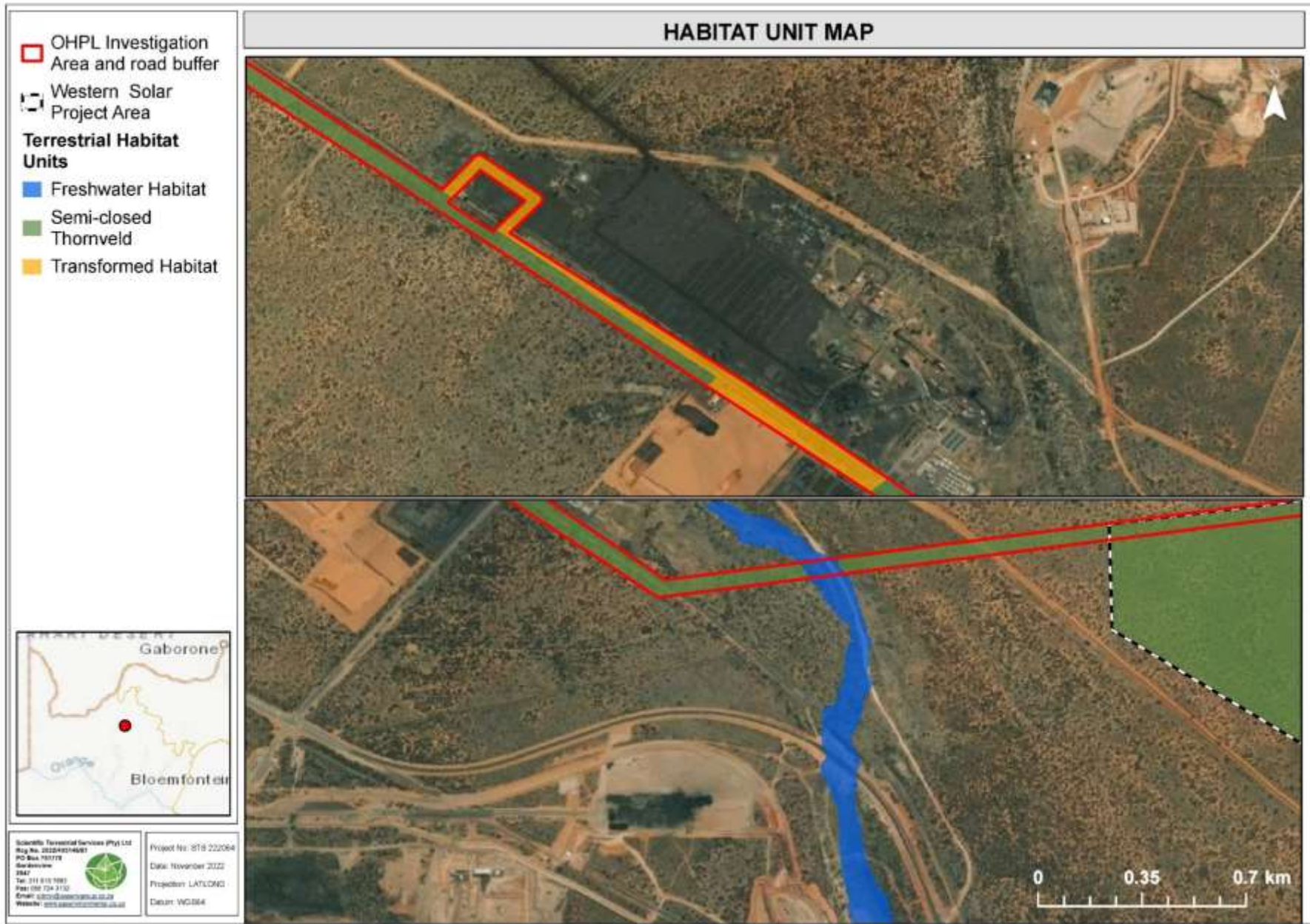**Figure 3: Habitat units associated with the study area.**
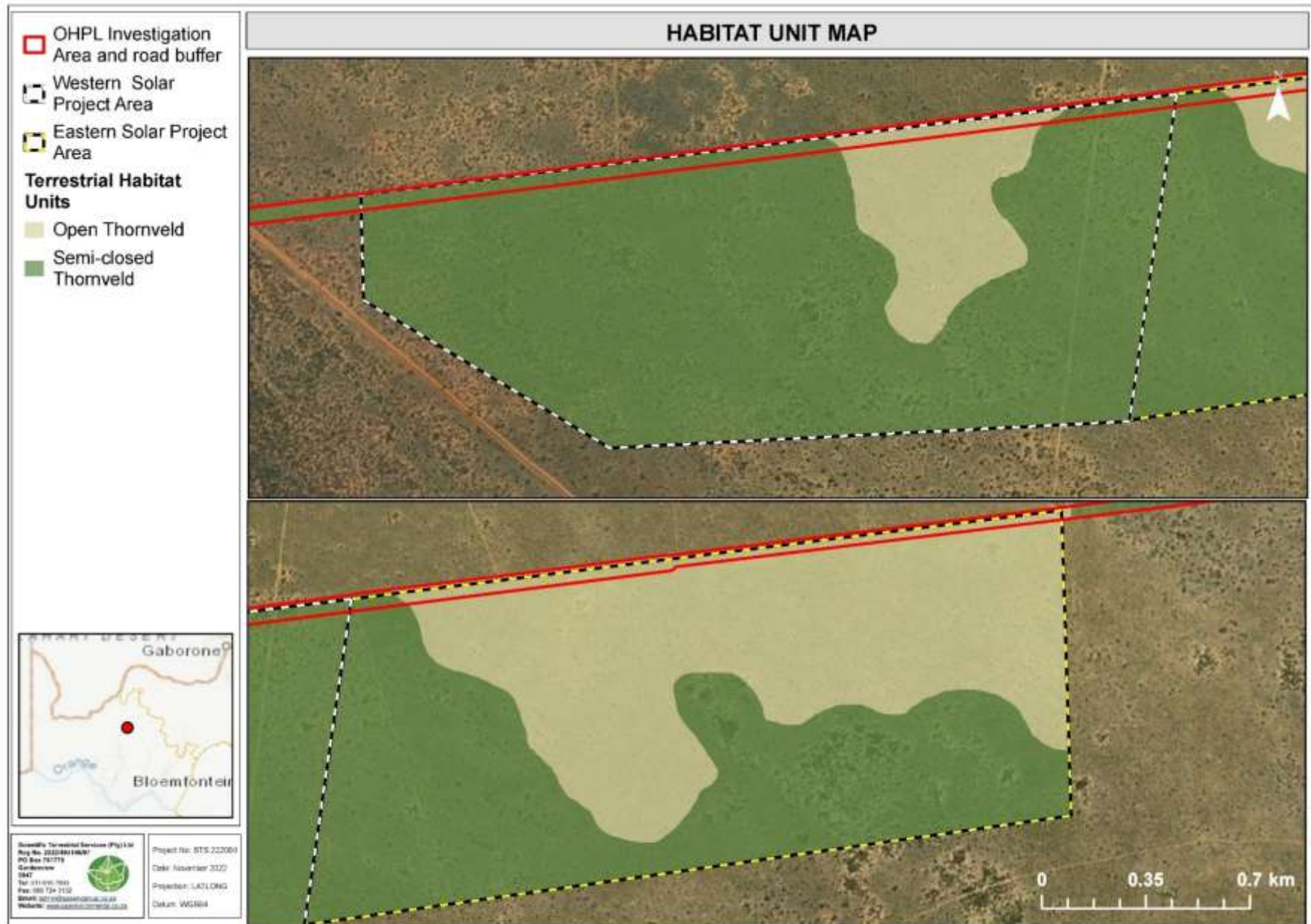
Figure 4: Habitat units associated with the study area.

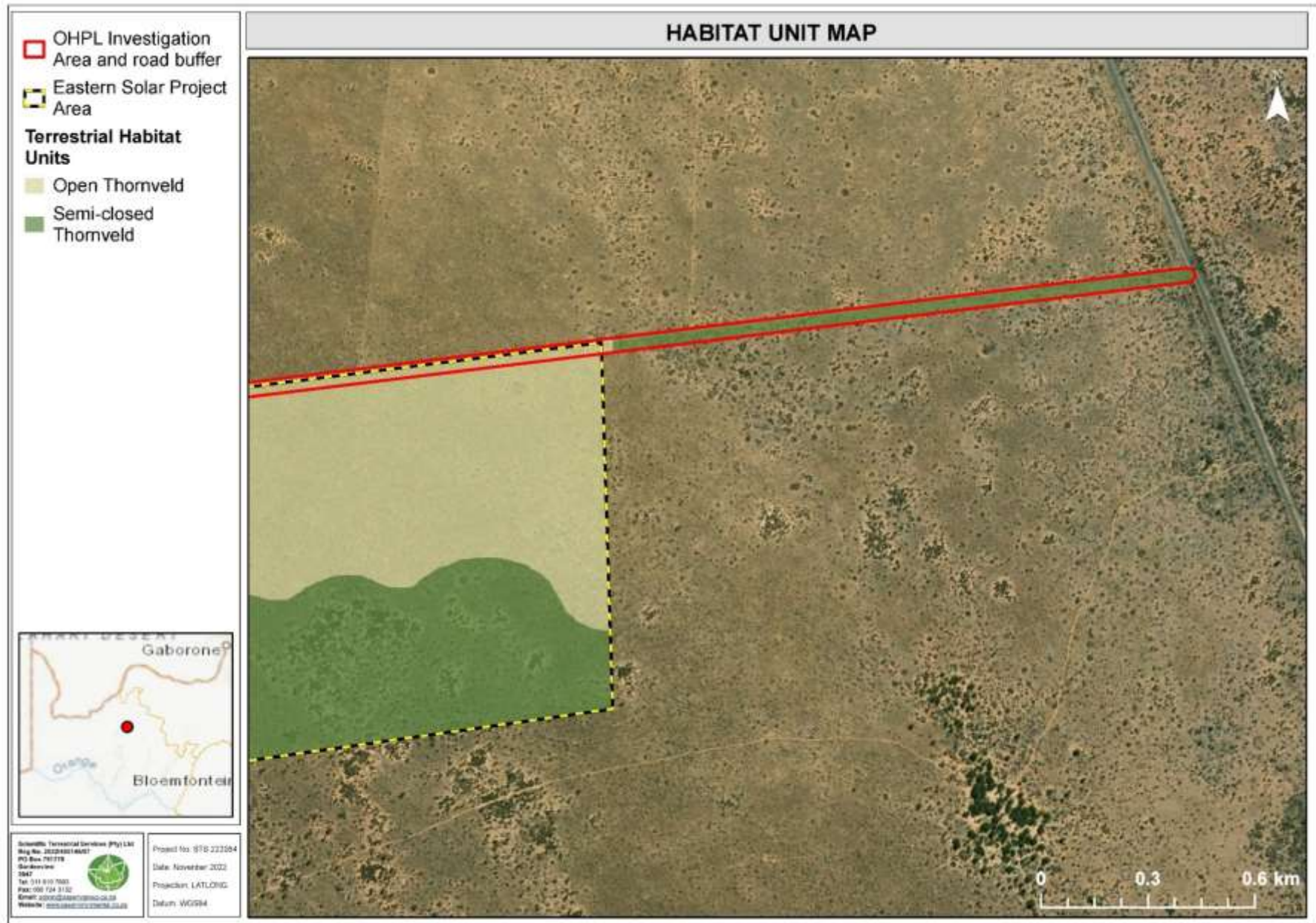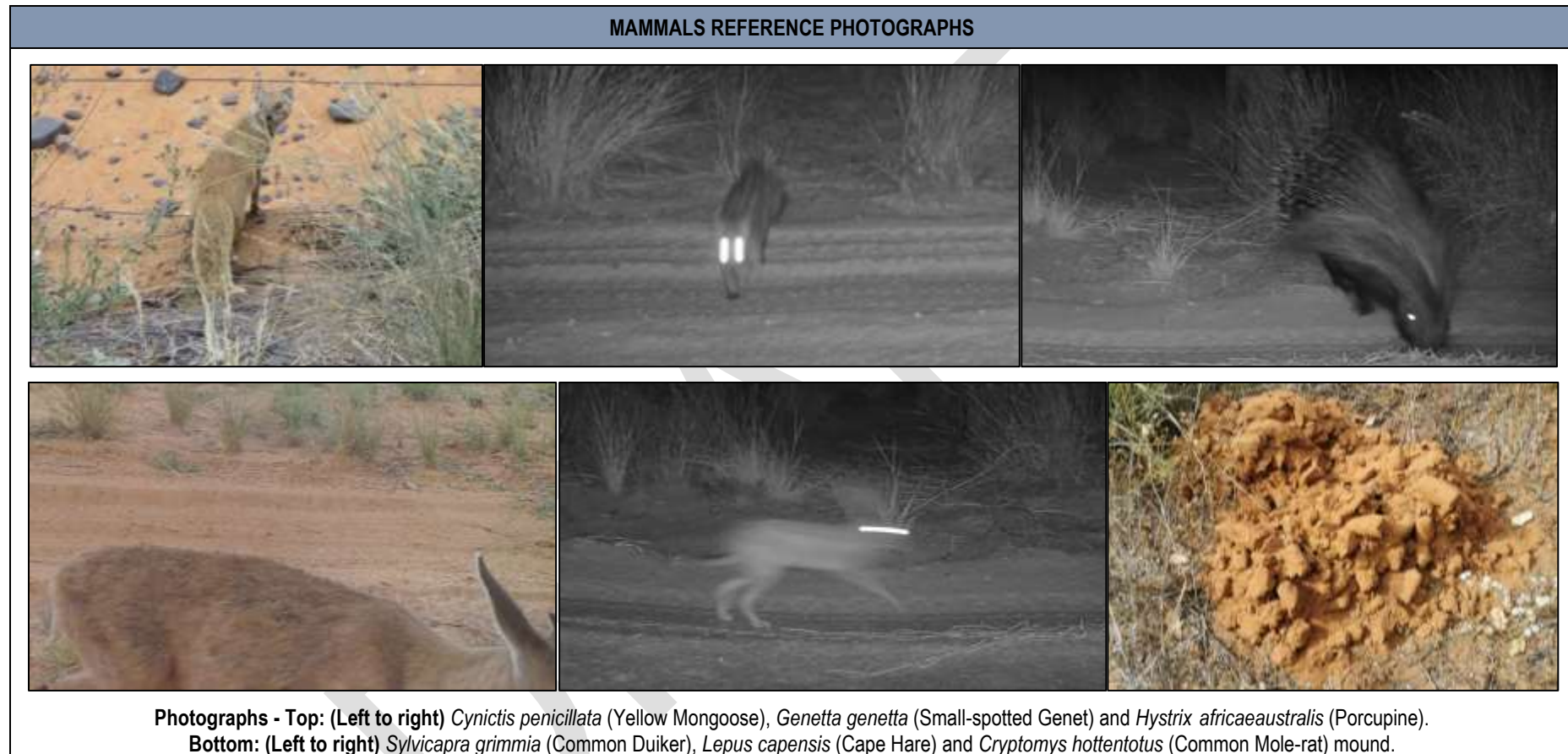**Figure 5: Habitat units associated with the study area.**

Figure 6: Habitat units associated with the study area.

3.2 Mammals

Table 1: Field assessment results pertaining to mammal species within the study area.

MAMMALS REFERENCE PHOTOGRAPHS

Photographs - Top: (Left to right) *Cynictis penicillata* (Yellow Mongoose), *Genetta genetta* (Small-spotted Genet) and *Hystrix africaeaustralis* (Porcupine).
Bottom: (Left to right) *Sylvicapra grimmia* (Common Duiker), *Lepus capensis* (Cape Hare) and *Cryptomys hottentotus* (Common Mole-rat) mound.

DISCUSSION

The eastern and western solar project footprint areas comprise of large open space areas, with little anthropogenic structures or activities that may hinder species movement. Mammal species are free to move both within and out of the footprint areas, maintaining continued ecological connectivity. Although there are several fences present, the mammal species in the region appear to be well adept at moving past these boundaries, either by jumping over, climbing under or in some instances were possible, through the fence itself. As this is an arid region, continued large scale habitat connectivity is important as food resources will be limited requiring mammals, notably larger mammals, to cover greater distances in order to meet their individual energy demands. Mammal diversity and abundance deceased notably where the OHPL and road traverses adjacent the Black Rock Mine (BRM) operations, as the route is prone to increased anthropogenic activities reduced resources in terms of space and food whilst ecological connectivity in these areas has been notably degraded due to the mine infrastructure present.
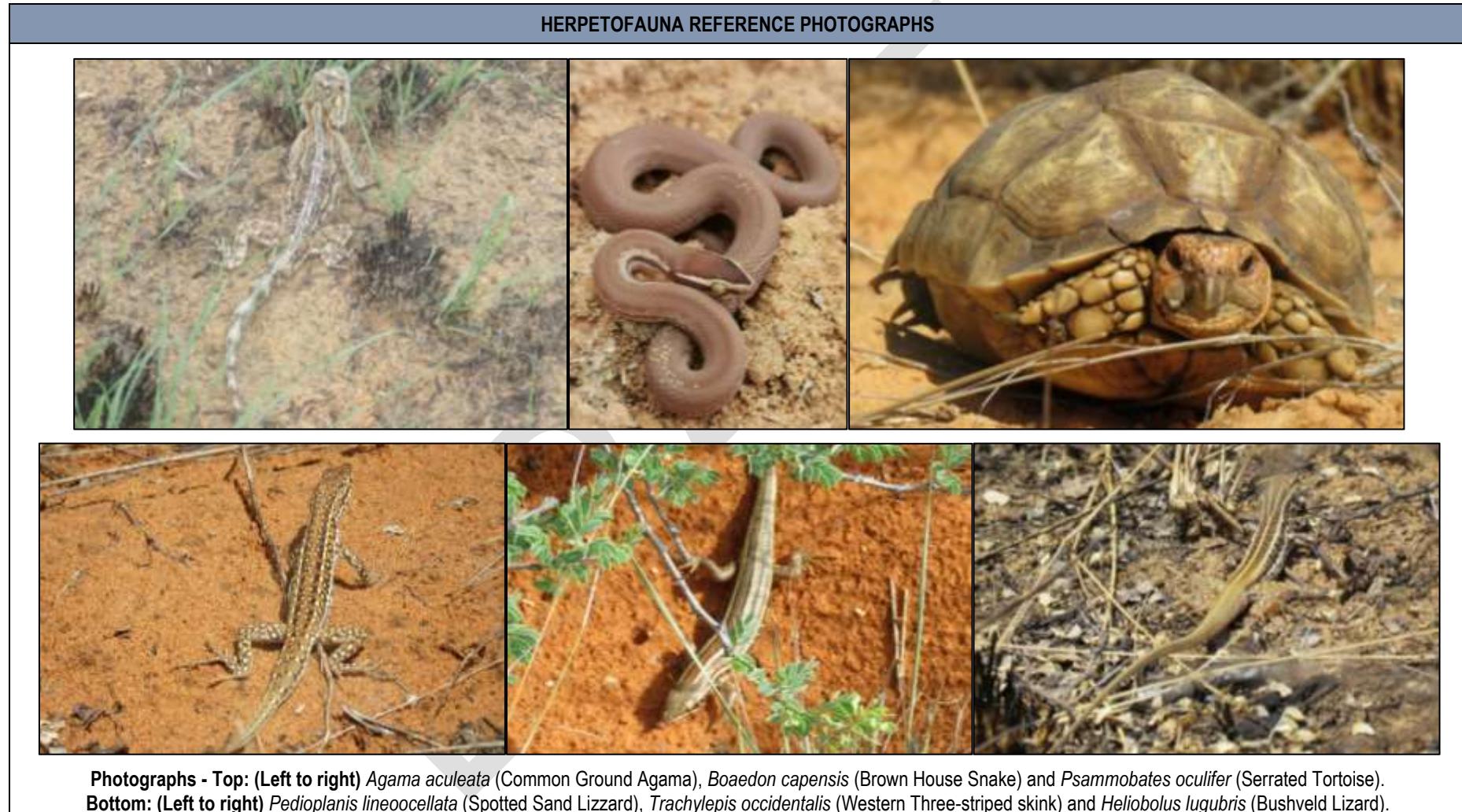
MAMMAL SCC							
Species	**Habitat and Resources in the project boundary**	**RSA Status**	**POC**	**Species**	**Habitat and Resources in the project boundary**	**RSA Status**	**POC**
Felis nigripes (Black footed Cat)	This species is extremely secretive with a nocturnal or crepuscular lifestyle. Inhabits drier parts of the country. Preys upon rodents but will also feed upon small reptiles.	VU TOPS	Medium	*Mellivora Capensis* (Honey Badger)	This is a highly adaptable species and occurs in a variety of habitats from rain forest to desert. Is a tenacious predator well adapted to consuming a variety of foods including fruits, invertebrates and vertebrates. This species is able to cover large distances in search of food,	TOPS	Medium
Manis temminckii (Pangolin)	This species is extremely secretive with a nocturnal or crepuscular lifestyle. Inhabits drier parts of the country. Feeds solely on ants, with, often specialising on only a few species of ants depending on the region the species occurs in.	VU TOPS	Medium	*Atelerix frontalis* (Hedgehog)	It is found in a wide variety of semi-arid and subtemperate habitats. Generally recorded from scrub brush, western Karoo, grassland and suburban gardens (Skinner and Chimimba 2005). This species spends much of the day in burrows, coming out at dusk to feed. Preys upon invertebrates, earthworms and consumes plant material as well.	TOPS NT	Medium
CONCLUDING REMARKS							
The east and west solar farm footprints are located within a largely functional and ecologically intact landscape that is able to support mammal species akin to the region. The town of Hotazel is located approximately 1,6 km to the south of the solar footprint areas, and dog tracks were noted sporadically within the study area. The tracks encountered were always of a single dog and not a pack, indicating that the study area does not appear to be used for poaching with hunting dogs. Although predatory, individual dogs periodically moving through the area are unlikely to significantly impact upon mammal species therein. The study area did not provide any unique or niche habitat for mammal species, and as such, the risk to specialist mammal species is low. Habitat loss and the resultant loss of ecological connectivity from north to south are considered to be the main impacts that will occur, along with the inevitable displacement of mammal species from these footprint areas. For a full list of observed mammal species of the study area, refer to Appendix C.							

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3.3 *Herpetofauna* (Reptiles and Amphibians)

Table 2: Field assessment results pertaining to herpetofauna within the study area.

HERPETOFAUNA REFERENCE PHOTOGRAPHS

Photographs - Top: (Left to right) *Agama aculeata* (Common Ground Agama), *Boaedon capensis* (Brown House Snake) and *Psammobates oculifer* (Serrated Tortoise).
Bottom: (Left to right) *Pedioplanis lineoocellata* (Spotted Sand Lizzard), *Trachylepis occidentalis* (Western Three-striped skink) and *Heliobolus lugubris* (Bushveld Lizard).

DISCUSSION
Reptiles are inherently well adapted to surviving within arid regions, largely as they are not reliant of permanent water sources, but also as they can regulate their metabolic rates, syncing with seasonal changes as well as food availability. This allows them to survive in areas where regular food resources are not available and often highly seasonal. The study area lacks rupicolous habitat (rocky areas and outcrops), however the deep sandy soils provide suitable burrowing substrate in which to easily excavate burrows. Further, woody species and dead wood on the ground provide shelter and areas of refuge for reptiles. Reptile species within the study area are not limited in terms of habitat connectivity, however smaller skinks and lizards are less likely to expend energy reserves moving over large distances, unless in search of new food resources where necessary.   The Ga-Mogara River, the only watercourse on site, is highly ephemeral in nature. This is a result of the region's dry climate, coupled with high rates of rainfall infiltration due to the dominance of sandy soils in the region, resulting in the river system remaining dry for extended periods of time. Other than the river system, no further freshwater areas (permanent or temporary), occur within the study area. As such, suitable habitat for water dependant amphibians is absent from the site, which significantly limits amphibian species, as very few can survive in such dry conditions. *Breviceps adspersus* (Common Rain Frog, LC) and *Tomopterna cryptotis* (Tremelo Sand Frog, LC) do show increased tolerance to dry conditions and have been recorded further south of the study area. These species were however observed in close association with artificial water bodies and wetland in the area, none of which occur in the study area. Further , the Ga-Mogara river associated with the study area lacks sufficient soil moisture content to support either of these species.

HERPETOFAUNA SCC

Species	Habitat and Resources in the project boundary	RSA Status	POC
Python natalensis (African Rock Python)	African Rock pythons often utilize burrows dug by Aardvark and other burrowing mammals to lay eggs, escape to when disturbed or when the outside temperatures increase. These snakes are ambush predators that kill by constriction. They wait silently for a suitable prey item to move into striking range. Pythons will feed on a variety of small and medium sized mammals, depending on the size of the snake. Smaller snakes may also prey upon lizards and frogs.	TOPS	Medium

CONCLUDING REMARKS
Reptiles, notably skinks and lizards, were abundant within the study area, whilst predatory snakes, whilst present, were less abundant. Amphibian species are not expected to occur within the study area, largely due to the lack of suitable moisture driven habitat. Overall, the study area can be considered largely homogenous in terms of habitat provisioning for reptile herpetofauna, lacking any unique or niche habitats that may support increased species diversity or unique species assemblages, such as wetland systems. As such, the species compliment of the study area does not differ from the surrounding areas nor does it provide increased opportunities for SCC occurrence. Habitat loss and the resultant loss of ecological connectivity are considered to be the main impacts that will occur, along with the inevitable displacement of species from the footprint areas. For a full list of observed herpetofaunal species of the study area, refer to Appendix C.

3.4 Invertebrates (Insects and Arachnids)

Table 3: Field assessment results pertaining to invertebrates within the study area.

INVERTEBRATE REFERENCE PHOTOGRAPHS

Photographs - Top: (Left to right) *Parabuthus raudus* (Rough Thick-tailed Scorpion), *Opistophthalmus carinatus* (Robust Burrowing Scorpion), Family Solifugae (Sun Spider) and Family Agelenidae (Funnel Web Spider).

Bottom: (Left to right) *Cigaritis natalensis* (Natal Bar), *Anthia andersoni* ssp. *andersoni* (Ground Beetle), *Proagoderus sapphirinus* (Dung Beetle) and Genus *Lamarckiana* (Rain Locust).

DISCUSSION
Suitable habitat for insects and arachnids that are adapted to the arid nature of the region is present within the study area, however, the relatively homogenous structure and absence of niche habitat such as natural ridges, rocky outcrops and wetlands does limit the occurrence of specialist invertebrate species. Further, as many insect species are attracted to light and use the stars and moon at night for navigation, the nearby presence of Black Rock Mine and the town of Hotazel with their ambient night lights may impact on insect movement, attracting insects away from the study area, thereby impacting diversity and abundance therein. A decreased abundance of insect species will have a notable knock-on effect on arachnids, as insect serve as the primary food resource for these species. In addition, many other vertebrate species rely on insect species for food resources, the decrease of which would impacting on vertebrate presence in the study area. Although several arachnid species were observed at the time of assessment, it is likely that the abundance thereof will be higher, given the secretive and often nocturnal nature of such species. As expected, scorpions appeared to be the most abundant arachnids in the study area, with numerous burrowing scorpion burrows (*Opistophthalmus* sp) being observed throughout the study area. The recent good rainfall in the weeks leading up to the site visit resulted in a notable increase in insect species, the emergence of which are often tied to rainfall events. The increase in available food resources along with increased soil moisture was likely the contributing factor for the increased observation rate of arachnid species during the site assessment.

INVERTEBRATE SCC

Species	Habitat and Resources in the project boundary	RSA Status	POC	Species	Habitat and Resources in the project boundary	RSA Status	POC
Opistophthalmus fitzsimonsi (FitzSimons' Burrowing Scorpion)	It is found under rocks, dead wood and the bark of dead trees as well as in excavated burrows. Dead wood on the ground and burrows were abundant in the solar farm footprint. This species had previously been recorded in the open areas adjacent the proposed OHPL.	P	H	*Opistophthalmus carinatus* (Robust Burrowing Scorpion)	It is found under rocks, dead wood and the bark of dead trees as well as in excavated burrows. Dead wood on the ground and burrows were abundant in the solar farm footprint, where this species was observed.	P	Confirmed
Harpactira hamiltoni (Highveld Baboon Spider)	*Harpactira hamiltoni* is a fossorial species, living in deep burrows they either modify from a crevice between rocks, or construct themselves beneath rocks, tree stumps and even at the base of shrubs.	P	M	*Opistophthalmus wahlbergii* (Kalahari Burrowing Scorpion	It burrows in open sandy areas where the burrows may be up to a meter deep. Open sandy areas are abundant in the Savanna habitat unit. They are often active at night.	P	M

CONCLUDING REMARKS

The study area was largely homogenous in terms of habitat provisioning for invertebrate species, lacking notably unique or niche habitat for invertebrate species. Habitat loss and the resultant loss of ecological connectivity are considered to be the main impacts that will occur, along with the inevitable displacement of species from the footprint areas. For a full list of observed invertebrate species of the study area, refer to Appendix C.
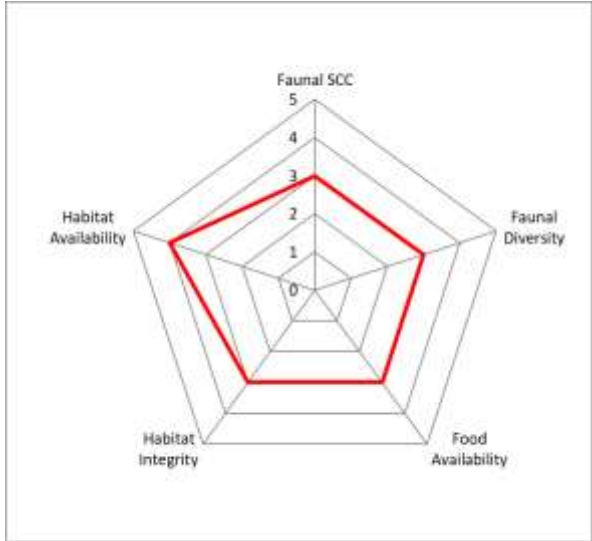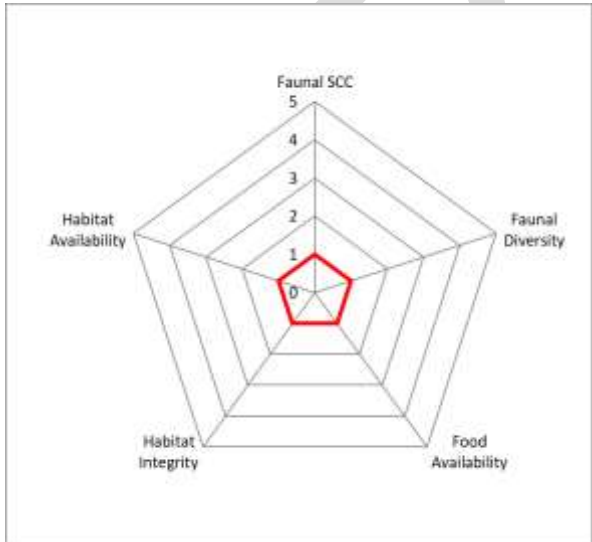
4 SENSITIVITY MAPPING

Figure below conceptually illustrates the faunal ecological sensitivity for the various areas. The areas are depicted according to their sensitivity in terms of the presence or potential for faunal SCC, habitat integrity, levels of disturbance and overall levels of diversity. Table 5 below presents the sensitivity of each habitat along with an associated conservation objective and implications for the proposed activities.

Table 4: A summary of the sensitivity of each habitat unit and the implications for the proposed BRMO activities.

| Habitat Unit	Habitat Sensitivity Graph	Sensitivity	Key Habitat Characteristics
Thornveld Habitat **Freshwater Habitat**		**INTERMEDIATE** Conservation Objective Preserve and enhance biodiversity of the habitat unit and surrounds while optimising development potential	- Habitat remains largely intact with minimal disturbances to faunal habitat. - Habitat comprises natural vegetation, providing food resources and shelter to faunal species common to the region. - One invertebrate SCC observed on site. - Several vertebrate and invertebrate SCC have between medium and high POCs for this study area.
Transformed habitat		**LOW** Conservation Objective Optimise development potential.	- This habitat is not considered important to faunal species. - Faunal habitat has been notably disturbed and/or cleared. - No faunal SCC were found or are expected to occur here-in.
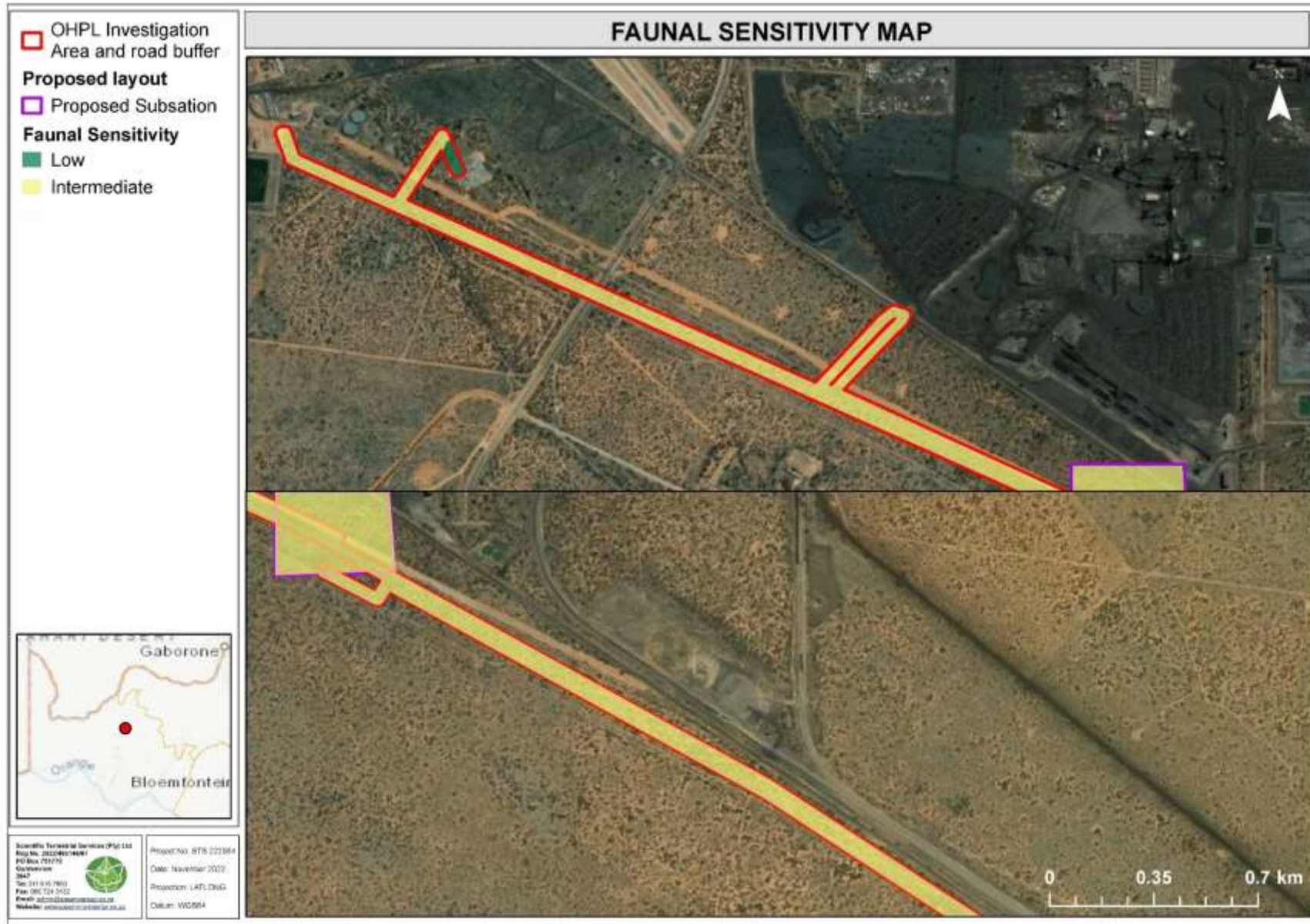
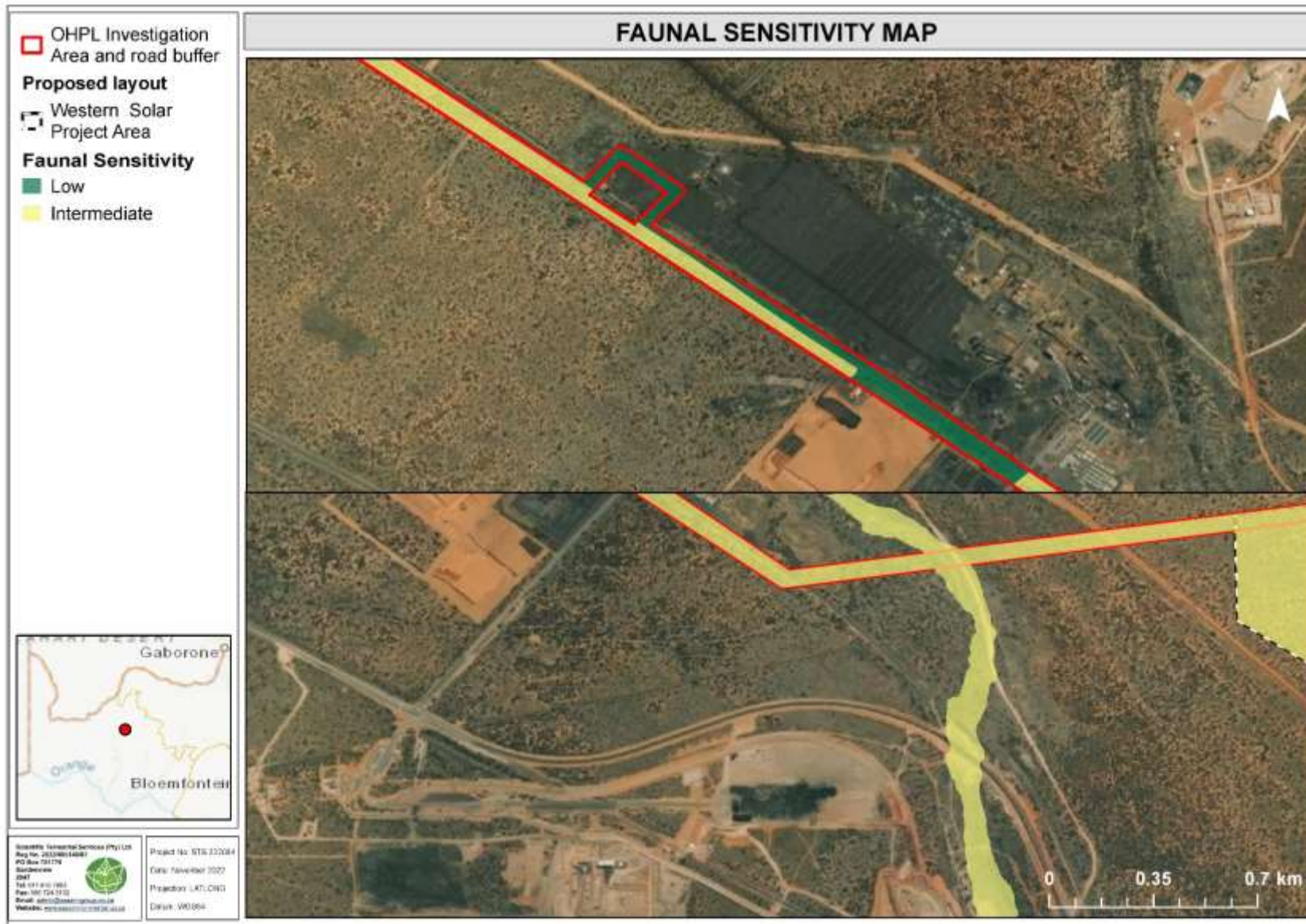**Figure 7: Habitat sensitivities associated with the study area (map 1).**

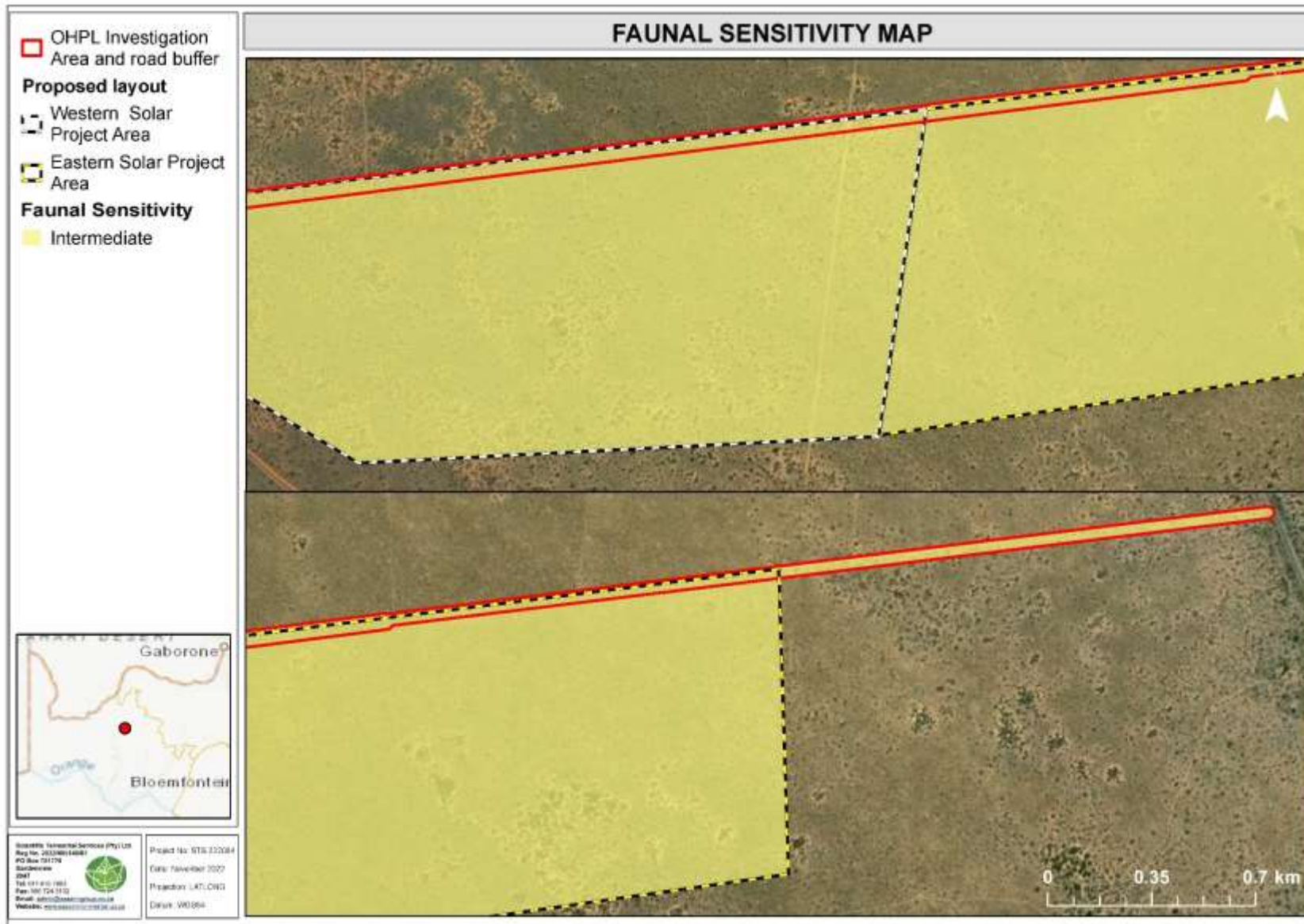**Figure 8: Habitat sensitivities associated with the study area (map 2).**

Figure 9: Habitat sensitivities associated with the study area (map 3).

5   CONCLUSION

Scientific Terrestrial Services (Pty) Ltd (STS) was appointed to conduct a terrestrial biodiversity assessment as part of the environmental authorisation process for the proposed Black Rock Solar Plant Facility, near Hotazel, Northern Cape Province. The Black Rock Solar Project consists of the Overhead Powerline (OHPL), Access Road, Proposed Substation and two solar project areas (e.g., western and eastern) collectively the layout will be referred to as the "study area".

The study area comprised of three main habitat units, namely the Thornveld habitat, Freshwater habitat and Transformed habitat. The Thornveld habitat hosts the majority of faunal species and SCC observed on site. The freshwater habitat supports several common faunal species, however the proliferation of alien plants notably decreases faunal species diversity. The transformed habitat provides limited support to fauna.

The objective of this study was to provide sufficient information on the faunal ecology of the area, together with other studies on the physical and socio-cultural environment, in order for the Environmental Assessment Practitioner (EAP) and the relevant authorities to apply the principles of Integrated Environmental Management (IEM) and the concept of sustainable development. The needs for conservation as well as the risks to other spheres of the physical and socio-cultural environment need to be compared and considered along with the need to ensure economic development of the country. This study provides the relevant information required in order to implement IEM and to ensure that the best long-term use of the ecological resources in the area of assessment will be made in support of the principle of sustainable development.

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APPENDIX A: Faunal Method of Assessment

It is important to note that due to the nature and habits of fauna, varied stages of life cycles, seasonal and temporal fluctuations along with other external factors, it is unlikely that all faunal species will have been recorded during the site assessment. The presence of anthropogenic activities near the proposed study area may have an impact on faunal behaviour and in turn the rate of observations. In order to increase overall observation time within the study area, as well as increasing the likelihood of observing shy and hesitant species, Sherman and camera traps were strategically utilised. Sherman traps were used to increase the likelihood of capturing and observing small mammal species, notably small nocturnal mammals.

Mammals

Small mammals are unlikely to be directly observed in the field because of their nocturnal/crepuscular and cryptic nature. A simple and effective solution to this problem is to use Sherman traps. A Sherman trap is a small aluminium box with a spring-loaded door (Figure A1). Once the animal is inside the trap, it steps on a small plate that causes the door to snap shut, thereby capturing the individual. In the event of capturing a small mammal during the night, the animal would be photographed and then set free unharmed early the following morning. Traps were baited with a universal mixture of oats, peanut butter, and fish paste.

Figure A1: Sherman trap and bait used to capture and identify small mammal species.

Furthermore, mammal species were recorded during the field assessment with the use of visual identification, spoor, call and dung and camera traps. Specific attention was given to mammal SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).

Reptiles

Reptiles were identified during the field survey. Suitable applicable habitat areas (rock piles and fallen dead trees) were inspected, and all reptiles encountered were identified. The data gathered during the assessment along with the habitat analysis provided an accurate indication of which reptile species are likely to occur in the study area. Specific attention was given to reptile SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).

Amphibians

Identifying amphibian species is done by the use of direct visual identification along with call identification technique. Amphibian species flourish in and around wetland, riparian and moist grassland areas. It is unlikely that all amphibian species will have been recorded during the site assessment, due to their cryptic nature and habits, varied stages of life cycles and seasonal and temporal fluctuations within the environment. The data gathered during the assessment along with the habitat analysis provided an accurate indication of which amphibian species are likely to occur within the study area as well as the surrounding area.

Invertebrates

Whilst conducting transects through the study area, all insect species visually observed were identified, and where possible photographs taken.

It must be noted however that due to the cryptic nature and habits of insects, varied stages of life cycles and seasonal and temporal fluctuations within the environment, it is unlikely that all insect species will have been recorded during the site assessment period. Nevertheless, the data gathered during the assessment along with the habitat analysis provided an accurate indication of which species are likely to occur in the study area at the time of the survey. Specific attention was given to insect SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).

Arachnids

Suitable applicable habitat areas (rocky outcrops, sandy areas and fallen dead trees) where spiders and scorpions are likely to reside were searched. Rocks were overturned and inspected for signs of these species. Specific attention was paid to searching for Mygalomorphae arachnids (Trapdoor and Baboon spiders) as well as potential SCC scorpions within the study area.

Faunal Species of Conservation Concern Assessment

The Probability of Occurrence (POC) for each faunal SCC was determined using the following four parameters:
- ➢ Species distribution;
- ➢ Habitat availability;
- ➢ Food availability; and
- ➢ Habitat disturbance.

The Probability of Occurrence (POC) for each faunal SCC is described:
- ➢ "**Confirmed'**: if observed during the survey;
- ➢ "**High**": if within the species' known distribution range and suitable habitat is available;
- ➢ "**Medium**": if either within the known distribution range of the species or if suitable habitat is present; or
- ➢ "**Low**": if the habitat is not suitable and falls outside the distribution range of the species.

The accuracy of the POC is based on the available knowledge about the species in question, with many of the species lacking in-depth habitat research.

Faunal Habitat Sensitivity

The sensitivity of the proposed BRMO activities for each faunal class (i.e. mammals, birds, reptiles, amphibians and invertebrates) was determined by calculating the mean of five different parameters which influence each faunal class and provide an indication of the overall faunal ecological integrity, importance and sensitivity of the proposed BRMO activities for each class. Each of the following parameters are subjectively rated on a scale of 1 to 5 (1 = lowest and 5 = highest):
- ➢ **Faunal SCC:** The confirmed presence or potential for faunal SCC or any other significant species, such as endemics, to occur within the habitat unit;
- ➢ **Habitat Availability:** The presence of suitable habitat for each class;
- ➢ **Food Availability:** The availability of food within the proposed BRMO activities for each faunal class;
- ➢ **Faunal Diversity:** The recorded faunal diversity compared to a suitable reference condition such as surrounding natural areas or available faunal databases; and
- ➢ **Habitat Integrity:** The degree to which the habitat is transformed based on observed disturbances which may affect habitat integrity.

Each of these values contribute equally to the mean score, which determines the suitability and sensitivity of the proposed BRMO activities for each faunal class. A conservation and land-use objective

is also assigned to each sensitivity class which aims to guide the responsible and sustainable utilization of the proposed BRMO activities in relation to each faunal class. The different classes and land-use objectives are presented in the table below:

Table A1: Faunal habitat sensitivity rankings and associated land-use objectives.

Score	Rating significance	Conservation objective
1.0 < 1.5	Low	Optimise development potential.
≥1.5 <2.5	Moderately low	Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects.
≥2.5 <3.5	Intermediate	Preserve and enhance biodiversity of the habitat unit and surrounds while optimising development potential.
≥3.5<4.5	Moderately high	Preserve and enhance the biodiversity of the habitat unit, limit development and disturbance.
≥4.5 ≤ 5.0	High	Preserve and enhance the biodiversity of the habitat unit, no-go alternative must be considered.

APPENDIX B: Faunal SCC

The tables below list the faunal Species of Conservation Concern for the study area:

Table B1: TOPS list of faunal species (2007) that require a permit, should they need to be transported for relocation purposes

Scientific Name	Common Name	POC
CRITICALLY ENDANGERED SPECIES		
REPTILIA		
Caretta	Loggerhead Sea Turtle	Low
Dermochelys coriacea	Leatherback Sea Turtle	Low
Eretmochelys imbricate	Hawksbill Sea Turtle	Low
AVES		
Grus carunculatus	Wattled Crane	Low
Hirundo atrocaerulea	Blue Swallow	Low
Neophron percnopterus	Egyptian Vulture	Low
Poicephalus robustus	Cape Parrot	
MAMMALIA		
Bunolagus monticularis	Riverine Rabbit	Low
Chrysospalax	Rough-haired Golden Mole	Low
ENDANGERED SPECIES		
REPTILIA		
Chelonia mydas	Green Turtle	Low
Cordylus giganteus	Giant Girdled Lizard	Low
Lepidochelys olivacea	Olive Ridley Turtle	Low
Psammobates geometricus	Geometric Tortoise	Low
AVIFAUNA		
Anthropoides paradiseus	Blue Crane	Low
Balearica regulorum	Grey Crowned Crane	Low
Ephippiorhynchus senegalensis	Saddle-billed Stork	Low
Gypaetus barbatus	Bearded Vulture	Low
Gyps africanus	White-backed Vulture	High
Gyps coprotheres	Cape Vulture	Medium
Necrosyrtes	Hooded Vulture	Low
Pelecanus rufescens	Pink-backed Pelican	Low
Scotopelia peli	Pel's Fishing Owl	Low
Torgos tracheliotus	Lappet-faced Vulture	Medium
MAMMALIA		
Amblysomus robustus	Robust Golden Mole	Low
Damaliscus tunatus	Tsessebe	Low
Diceros bicornis	Black Rhinoceros	Low
Equus zebra	Mountain Zebra	Low
Lycaon pictus	African Wild Dog	Low
Neamblysomus gunningi	Gunning's Golden Mole	Low
Ourebia ourebi	Oribi	Low
Paraxerus palliatus	Red Squirrel	Low
Petrodromus tetradactylus	Four-toed Elephant-shrew	Low
INVERTEBRATA		
Colophon spp - species	Stag Beetles	Low
VULNERABLE SPECIES		
AVES		
Trigonoceps occipitalis	White-headed Vulture	Low
Aquila rapax	Tawny Eagle	Medium
Ardeotis kori	Kori Bustard	High
Ciconia nigra	Black Stork	Low

Scientific Name	Common Name	POC
Circaetus fasciolatus	Southern Banded Snake Eagle	Low
Eupodotis caerulescens	Blue Korhaan	Low
Falco fasciinucha	Falcon	Low
Falco naumanni	Lesser Kestrel	Low
Falco peregrinus	Peregrine Falcon	Low
Geronticus calvus	Bald Ibis	Low
Neotis ludwidii	Ludwig's Bustard	Medium
Polemaetus bellicosus	Martial Eagle	High
Terathopius ecaudatus	Bateleur	Low
Tyto capensis	Grass Owl	Low
MAMMALIA		
Acinonyx jubatus	Cheetah	Low
Chrysospalax trevelyani	Giant Golden Mole	Low
Cricetomys gambianus	Giant Rat	Low
Damaliscus pyrgorgus pygargus	Bontebok	Low
Dendrohyrax arboreus	Tree Hyrax	Low
Hippotragus equinus	Roan Antelope	Low
Smutsia temminckii	Pangolin	Confirmed
Neamblysomus julianae	Juliana's Golden Mole	Low
Neotragus moschatus	Suni	Low
Panthera leo	Lion	Low
Panthera pardus	Leopard	Low
Philantomba monticola	Blue Duiker	Low
INVERTEBRATA		
Peripatopsis alba	White Cave Velvet Worm	Low
PROTECTED SPECIES		
AMPHIBIA		
Pyxicephalus adspersus	Giant Bullfrog	Low
Pyxicephalus edulis	African Lesser Bullfrog	Low
REPTILIA		
Bitis gabonica	Gaboon Adder	Low
Bitis schneideri	Namaqua Dwarf Adder	Low
Bradypodion taeniabronchum	Smith's Dwarf Chameleon	Low
Cordylus cataphractus	Girdled Lizard	Low
Crocodylus niloticus	Nile crocodile	Low
Python natalensis	African Rock Python	Low
AVES		
Bucowus leadeateri	Southern Ground-Hornbill	Low
Circus ranivorus	African Marsh Harrier	Low
Neotis denhami	Denham's Bustard	Low
Spheniscus	Jackass Penguin	Low
MAMMALIA		
Atelerix frontalis	South African Hedgehog	Medium
Ceratotherium simum	White Rhinoceros	Low
Connochaetes	Black Wildebeest	Low
Crocuta crocuta	Spotted Hyaena	Low
Felis nigripes	Black-footed Cat	High
Parahyaena brunnea	Brown Hyaena	Low
Leptailurus serval	Serval	Low
Loxodonta africana	African elephant	Low
Lutra maculicollis	Spotted-necked Otter	Low
Millivora capensis	Honey Badger	Medium
Raphicerus sharpei	Sharpe's Grysbok	Low
Redunca	Reedbuck	Low

Scientific Name	Common Name	POC
Vulpes chama	Cape Fox	Confirmed
INVERTEBRATA		
Aloeides clarki	Coega Copper Butterfly	Low
Ceratogyrus spp - All species	Horned Baboon Spiders	Medium
Echinodiscus bisperforatus	Pansy Shell	Low
Dromica spp - All species	Tiger Beetles	low
Graphipterus assimilis	Velvet Ground Beetle	Medium
Hadogenes spp -species	Flat Rock Scorpions	Low
Haliotis midae	South African Abalone	Low
Harpactira spp - All species	Common Baboon Spiders	Medium
Ichnestoma - Aspecies	Fruit Chafer Beetles	Low
Manticora spp - Aspecies	Monster Tiger Beetles	Medium
Megacephala asperata	Tiger Beetle	DD
Megacephala regalis	Tiger Beetle	DD
Nigidius auriculatus	Stag beetle	DD
Oonotus adspersus	Stag Beetle	DD
Oonotus interioris	Stag Beetle	DD
Oonotus rex	Stag Beetle	DD
Oonotus sericeus	Stag Beetle	DD
Opisthacanthus spp - All species	Creeping Scorpions	Low
Opistophthalmus spp - All species	Burrowing Scorpions	Medium
Platychile pallida	Tiger Beetle	DD
Prosopocoilus petitclerci	Stag Beetle	DD
Prothyma guttipennis	Tiger Beetle	DD
Pterinochilus spp - All species	Golden Baboon Spiders	Medium

DD = Data Deficient

APPENDIX C: Faunal Species List

Table C1: Mammal species likely to be associated with the study area.

Scientific Name	Common Name	IUCN Status
Sylvicapra grimmia	Common duiker	LC
Lepus saxatilis	Scrub hare	LC
Lepus capensis	Cape hare	LC
Tragelaphus strepsiceros	Kudu	LC
Phacochoerus africanus	Warthog	LC
Raphicerus campestris	Steenbok	LC
Geosciurus inauris	Ground Squirrel	LC
Elephantulus intufi	Bushveld Sengi	LC
Rhabdomys pumilio	Four-striped grass mouse	LC
Cynictis penicillata	Yellow mongoose	LC
Hystrix africaeaustralis	Porcupine	LC

LC = Least concerned

Table C2: Avifaunal species recorded during the field surveys.

Scientific name	Common name	Threat Status
Streptopelia capicola	Cape turtledove	LC
Pycnonotus nigricans	Red-eyed Bulbul	LC
Uraeginthus granatinus	Violet eared waxbill	LC
Colies colius	White-backed mousebird	LC
Bradornis mariquensis	Marico Flycatcher	LC
Upupa africana	African Hoopoe	LC
Sylvia subcaerulea	Chestnut-vented tit-babbler	LC
Prinia masulosa	Karoo Prinia	LC
Serinus flaviventris	Yellow Canary	LC
Passer melanurus	Cape Sparrow	LC
Sporopipes squamifrons	Scaly-feathered Finch	LC
Spreo bicolor	Pied Starling	LC
Saxicola torquata	African Stonechat	LC
Cisticola fulvicapillus	Neddicky	LC
Numida meleagris	Helmeted Guineafowl	LC
Elanus caeruleus	Black-shouldered Kite	LC
Calendulauda africanoides	Fawn-coloured Lark	LC
Dicrurus adsimilis	Fork-tailed Drongo	LC
Hirundo fuligula	Rock Martin	LC
Parus cinerascens	Ashy Tit	LC
Batis pririt	Pririt Batis	LC
Sigelus silens	Fiscal Flycatcher	LC
Erythropygia paena	Kalahari scrub Robin	LC

LC = Least Concern

Table C3: Insect species observed during the site assessment.

Scientific Name	Common Name	Threat Status
Hodotermes mossambicus	Northern harvester termite	NYBA
Junonia hierta	Yellow Pansy	LC
Passalidius fortipes	Burrowing ground beetle	NYBA
Apterogyna sp.	Velvet ant	NA
Eremoides bicristatus	Crested Owlfly	NYBA

Scientific Name	Common Name	Threat Status
Stips sp.	Ridged seed beetle	NYBA
Gonometa postica	African silk moth	NYBA
Calidea dregii	Rainbow Shield Bug	NYBA
Catopsilia florella	African Migrant	NYBA
Belenois aurota	Brown-veined White	NYBA
Junonia orithya	Eyed Pansy	NYBA
Danaus chrysippus	African Monarch	NYBA
Colotis euippe	Smokey Orange Tip	NYBA
Eurema brigitta	Broad-bordered Grass Yellow	NYBA
Spalia sp	Sandman	NYBA
Order Mantodea	Mantids	NYBA
Loxostege frustalis	Karoo Moth	NYBA
Cynthia cardui	Painted Lady	LC
Pachylomerus femoralis	Flattened Giant Dung Beetle	NYBA
Platypleura sp	Cicada	NYBA
Sphingonotus scabriculus	Blue-wing	NYBA
Garreta sp	Dung Beetle	NYBA
Pachylomera femoralis	Flattened Giant Dung Beetle	NYBA
Cerocala sp	Moths	NYBA
Zonocerus elegans	Elegant Grasshopper	NYBA
Gastrimargus sp.	N/A	NYBA
Rhachitopis sp	N/A	NYBA
Systophlochius palochius	Orange wing	NYBA
Anterhynchium fallax	N/A	NYBA
Camponotus fulvopilosus	Bal-byter	NYBA
Crematogaster peringueyi	Cocktail Ant	NYBA
Pantala flavescens	Wandering Glider	LC
Mylabris oculata	CMR Bean Beetle	NYBA

LC = Least concerned, NYBA = Not yet been assessed by the IUCN

Table C4: Arachnid species recorded during the site assessment.

Common Name	Scientific Name	IUCN 2016 Status
Common Garden Orbweb Spider	*Argiope australis*	NYBA
Grass funnel-web spiders	*Agelena* sp.	NYBA
Opistophthalmus fitzsimonsi	FitzSimons' Burrowing Scorpion	NCNCA Protected
Sun spider	Solifugae sp	NYBA

LC = Least Concern, NYBA = Not Yet Been Assessed, NA = Not applicable

Table C5: Reptile species observed during the site assessment.

Scientific name	Common Name	IUCN Red List Status
Trachylepis occidentalis	Western Three-striped skink	LC
Pedioplanis lineoocellata lineoocellata	Spotted Sand Lizzard	LC

LC = Least Concern, NYBA = Not Yet Been Assessed, NA = Not applicable