

PROPOSED RESIDENTIAL DEVELOPMENT ON ERF 3122 HARTENBOS HEUWELS, WESTERN
CAPE PROVINCE

FAUNA SPECIALIST SCOPING STUDY



PRODUCED FOR CAPE EAPRAC

BY



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DECLARATION OF CONSULTANTS' INDEPENDENCE

- I Simon Todd, 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, 2010 and any specific environmental management Act;
- have and will not have no 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, 2010 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- 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 in terms of regulation 71 of GN No. R. 543.

Note: The terms of reference must be attached.



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March 2018

1 INTRODUCTION

Cape EAPrac has been appointed by the ATKV to re-apply for the housing development on Erf 3122, Hartenbos, Western Cape Province. The development is currently in the Scoping Phase and ATKV has appointed 3Foxes Biodiversity Solutions to provide a faunal specialist scoping study for the development as part of the EIA process.

The purpose of the Fauna Scoping Report is to describe and detail the faunal ecological features of the proposed site; provide a preliminary assessment of the faunal sensitivity of the site and identify the likely impacts that may be associated with the development of a housing development on the site. Two site visits as well as a desktop review of the available ecological information for the area was conducted in order to identify and characterise the faunal ecological features of the site. This information is used to derive a draft faunal sensitivity map that presents the faunal constraints and opportunities for development at the site. The information and sensitivity map presented here provides a baseline that can be used in the planning phase of the development to ensure that the potential negative ecological impacts associated with the development can be minimised. Furthermore, the study defines the terms of reference for the EIA phase of the project and outlines a plan of study for the EIA which will follow the Scoping Study.

1.1 TERMS OF REFERENCE

The study includes the following activities:

- a description of the environment that may be affected by a specific activity and the manner in which the environment may be affected by the proposed project;
- a description and evaluation of environmental issues and potential impacts (including assessment of direct, indirect and cumulative impacts) that have been identified;
- a statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts;
- an indication of the methodology used in determining the significance of potential environmental impacts;
- an assessment of the significance of direct indirect and cumulative impacts of the development;
- a description and comparative assessment of all alternatives including cumulative impacts;
- recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Programme (EMPr);
- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- a description of any assumptions uncertainties and gaps in knowledge; and

- an environmental impact statement which contains:
- a summary of the key findings of the environmental impact assessment;
- an assessment of the positive and negative implications of the proposed activity; and
- a comparative assessment of the positive and negative implications of identified alternatives.

General Considerations for the study included the following:

- Disclose any gaps in information (and limitations in the study) or assumptions made.
- Identify recommendations for mitigation measures to minimise impacts.
- Outline additional management guidelines.
- Provide monitoring requirements, mitigation measures and recommendations in a table format as input into the EMPr for faunal or flora related issues.
- The assessment of the potential impacts of the development and the recommended mitigation measures provided have been separated into the following project phases:
 - Planning and Construction
 - Operational
 - Decommissioning

1.2 APPROACH AND METHODOLOGY

This assessment is conducted according to the 2014 EIA Regulations (Government Notice Regulation 982) in terms of the National Environmental Management Act (Act 107 of 1998) as amended (NEMA), as well as best-practice guidelines and principles for biodiversity assessment as outlined by Brownlie (2005) and De Villiers *et al.* (2005).

In terms of NEMA, this assessment demonstrates how the proponent intends to comply with the principles contained in Section 2 of NEMA, which amongst other things, indicates that environmental management should:

- (In order of priority) aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
- Avoid degradation of the environment;
- Avoid jeopardising ecosystem integrity;
- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

Furthermore, in terms of best practice guidelines as outlined by Brownlie (2005) and De Villiers *et al.* (2005), a precautionary and risk-averse approach should be adopted for projects which

may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas: i.e. Critical Biodiversity Areas (CBAs) (as identified by systematic conservation plans, Biodiversity Sector Plans or Bioregional Plans) and Freshwater Ecosystem Priority Areas.

In order to adhere to the above principles and best-practice guidelines, the following approach forms the basis for the study approach and assessment philosophy:

- The study includes data searches, desktop studies, site walkovers / field survey of the property and baseline data collection, describing:
- A description of the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

In terms of **pattern**, the following will be identified or described:

Community and ecosystem level

- Threatened or vulnerable ecosystems (*Spatial Biodiversity Assessment, fine-scale systematic conservation plans, etc*).

Fauna

- Describe and assess the terrestrial fauna present in the area that will be affected by the proposed development.
- Conduct a faunal assessment that can be integrated into the ecological study.
- Describe the existing impacts of current land use as they affect the fauna.
- Clarify species of special concern (SSC) and that are known to be:
 - endemic to the region;
 - that are considered to be of conservational concern;
 - that are in commercial trade (CITES listed species); or
 - are of cultural significance.
- Provide monitoring requirements as input into the EMPr for faunal related issues.

Other pattern issues

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).
- The condition of the site in terms of current or previous land uses.

In terms of **process**, the following will be identified and/or described:

- The key ecological “drivers” of ecosystems on the site and in the vicinity, such as fire.

- Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. *corridors* such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and *vegetation boundaries* such as edaphic interfaces, upland-lowland interfaces or biome boundaries).
- Any possible changes in key processes.
- Furthermore, any further studies that may be required during or after the EIA process will be outlined.
- All relevant legislation, permits and standards that would apply to the development will be identified.
- The opportunities and constraints for development will be described and shown graphically on an aerial photograph, satellite image or map delineated at an appropriate level of spatial accuracy.

1.3 RELEVANT ASPECTS OF THE DEVELOPMENT

The development proposal consists of residential housing infrastructure, along with access road, infrastructure and services. A draft layout of the development has been developed by ATKV based on screening-level input from the various specialists. The layout has the following components, which are illustrated below in Figure 1.

- 187 large erven (500-700sq/m)
- 162 smaller erven (200sq/m)
- 72 sectional titel erven around the Clinic
- Clinic
- Sports facilities
- Club house
- Entrance and internal infrastructure

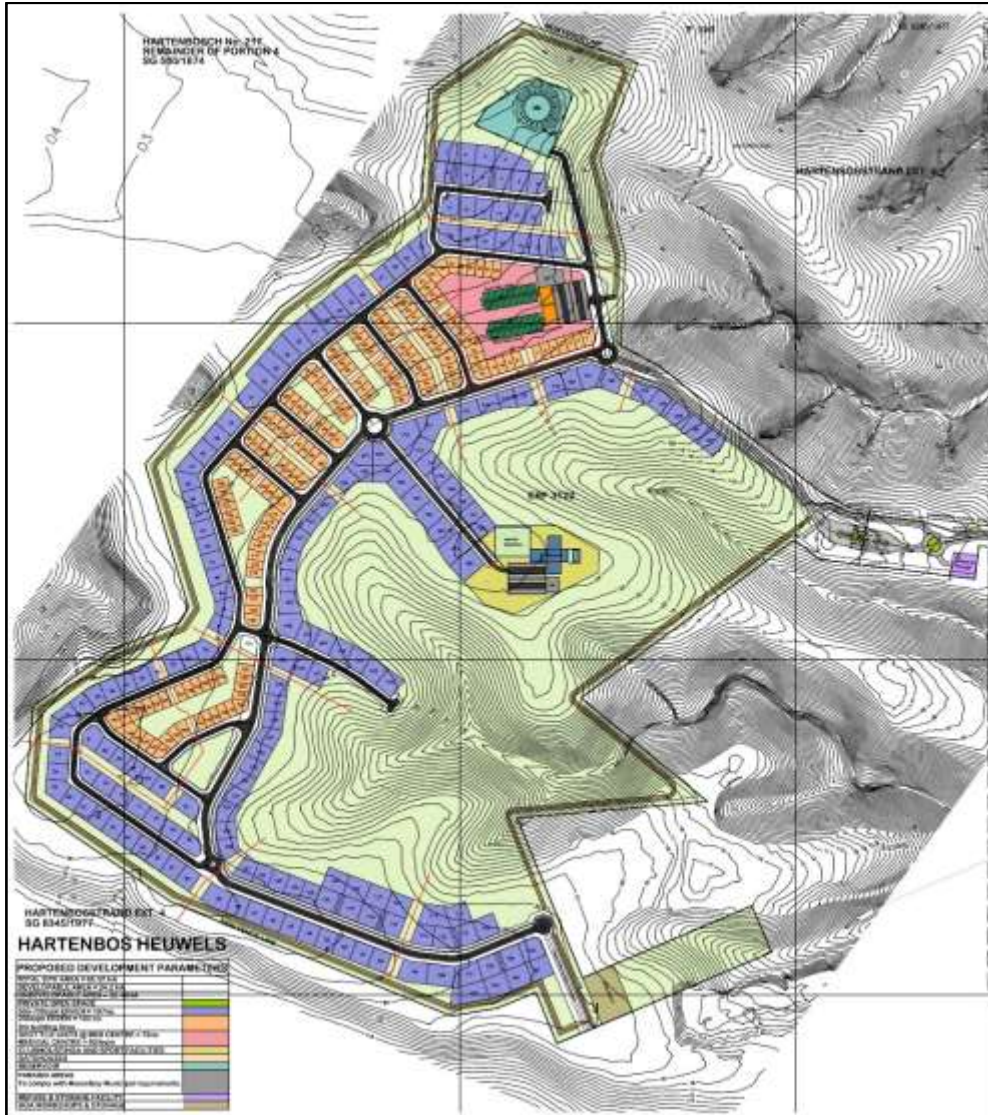


Figure 1. Proposed layout of the Hartenbos Heuwels development.

2 METHODOLOGY

2.1 DATA SOURCING AND REVIEW

Data sources from the literature consulted and used where necessary in the study includes the following:

Habitats & Ecosystems:

- Vegetation types and their conservation status were extracted from the South African National Vegetation Map (Mucina and Rutherford 2006, 2012) as well as

the Western Cape BSP (2017) in order to understand habitat types across the site.

- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel et al. 2011).
- Important catchments and protected areas expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).

Fauna

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and various spatial databases.
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, Friedmann and Daly (2004) and Skinner and Chimimba (2005), EWT & SANBI (2016, the Red Data List for South Africa, Lesotho & Swaziland) for mammals.
- Lists of fauna were also extracted from the MammalMap, ReptileMap and FrogMap databases hosted by the ADU, <http://vmus.adu.org.za> for study area.
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as a preliminary assessment of the availability and quality of suitable habitat at the site.

2.2 SITE VISIT

The main site visit for the scoping phase took place in August 2017. During the site visit, the various parts of the site were investigated in the field. All roads on the site were driven and various areas of interest were investigated on foot. All habitats observed were recorded and the presence of any sensitive features in the development area was recorded and mapped. Areas that were degraded or invaded by alien species were also observed and recorded with a GPS in the field as well. In addition, the wider site was investigated to observe areas of significance for fauna as well as the most important areas required to maintain the connectivity of the landscape. Photographs of features of significance were taken for documentation and reference purposes. Camera traps were also set up across the site to start a baseline faunal survey. The cameras were retrieved from the field on the 10th of November 2017.

2.3 SENSITIVITY MAPPING & ASSESSMENT

A faunal sensitivity map of the site was produced by integrating the information collected on-site with the available ecological and biodiversity information available in the literature and various spatial databases. This includes delineating the different habitat units identified

in the field and assigning sensitivity values to the units based on their ecological properties, conservation value and the observed presence of faunal species of conservation concern. The faunal sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low** – Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. Most types of development can proceed within these areas with little ecological impact.
- **Medium**- Areas of natural or previously transformed habitat where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- **High** – Areas of natural or transformed habitat where a high impact is anticipated due to the high faunal biodiversity value, sensitivity or important ecological role of the area. These areas may contain or be important habitat for faunal species or provide important ecological services such as water flow regulation or forage provision. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
- **Very High** – Critical and unique faunal habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible.

In some situations, areas were also classified between the above categories, such as Medium-High, where it was deemed that an area did not fit well into a certain category but rather fell most appropriately between two sensitivity categories.

2.4 SAMPLING LIMITATIONS AND ASSUMPTIONS

There are a number of limitations regarding the study, related primarily to the prevailing dry conditions and the timing of the site visit. Low temperatures and windy conditions during the preliminary site visit resulted in low reptile and bird activity at the time, with the result that relatively few species can be confirmed present at the site. The presence of fauna at the site is however based on an evaluation of the habitat and the likelihood that the various species known from the area are present at the site. Additional field sampling will however be conducted before the EIA phase to better characterise the faunal community of the site. In addition, butterflies are a potential issue at the site due to the presence of a number of species of conservation concern. As a result, these will be specifically looked at under a separate butterfly specialist study and are consequently not covered here.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT- BASELINE

3.1 HABITATS & ECOSYSTEMS

The vegetation of the site is detailed in the botanical specialist report and is only reported here as it pertains to faunal habitat. Although the site is mapped as falling within the Groot Brak Dune Strandveld vegetation type (Mucina & Rutherford 2006, 2012), this is clearly not an adequate description of the vegetation of the site, which consists of fynbos on the lower slopes, thicket in the wetter drainage lines and degraded renosterveld on the plateau area. The plateau area is considered to be degraded as it has been previously ploughed for croplands and there is also an old airstrip present. The sensitivity of the various parts of the site is described in Section 3.4 and is not detailed here.



The drainage lines of the site and their adjacent slopes are considered the most sensitive feature of the site and are important for landscape connectivity. They are however generally degraded and dominated by alien *Acacia cyclops*. Species such as Bushbuck and Duiker were recorded present in the drainage lines.



The plateau of the site is flat and fairly homogenous and is not considered highly sensitive from a faunal perspective as a large proportion of this area has been previously transformed. It is however still used by a variety of small mammals, birds and reptiles and retains some value as habitat as well as for broad-scale connectivity. A variety of species including Caracal, Porcupine, Cape Hare and Aardwolf were recorded on the plateau area.

3.2 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

The CBA map for the area has been updated as part of the 2017 Western Cape Biodiversity Spatial Plan. This biodiversity assessment identifies Critical Biodiversity Areas (CBAs) which represent biodiversity priority areas which should be maintained in a natural to near natural state. The assessment is designed to identify an efficient set of Critical Biodiversity Areas (and Ecological Support Areas) that meet the targets for the underlying biodiversity features in as small an area as possible and in areas with least conflict with other activities. Of fundamental importance is that these areas are identified in a configuration that deliberately facilitates the functioning of ecological processes (both currently and in the face of climate change) which are required to ensure that the biodiversity features persist in the long term. The CBA map for the area is illustrated below in Figure 2. The site falls across a CBA 1 which has a number of significant implications for the study and the development potential of the site. The CBA has been classified as CBA based on the threat status of Groot Brak Dune Strandveld. However, as the vast majority of the site clearly does not correspond with this vegetation type, the validity of the CBA can be questioned on these grounds. Nevertheless, the slopes and some parts of the plateau are natural and should be

considered an important part of the CBAs of the area. The major impact of the development on CBAs and ecological processes would be the disruption of connectivity due to the presence of the development and the fencing which is likely to surround it.



Figure 2. Critical Biodiversity Areas map of the broad study area around Hartenbos Heuwels.

3.3 FAUNAL COMMUNITIES

Mammals

According to the MammalMap database, 17 mammals have been recorded from the quarter degree square and a further 43 species could occur there according to their distribution maps. Although Honey Badger *Mellivora capensis* is known from the wider area, this species is no longer considered a Species of Special Concern (Least Concern, 2016). The Leopard (*Panthera pardus*) is classified as Vulnerable and is found in the wider region but would be extremely unlikely to occur or use the site due to the lack of cover and exposure to human presence and its potential presence at the site can be dismissed. The African Striped Weasel *Poecilogale albinucha* is classified as Near Threatened and could occur at the site but not in significant numbers.

The Fynbos Golden Mole *Amblysomus corriae* (NT) and Long-tailed Forest Shrew *Myosorex longicaudatus* (NT) are habitat specialists and little to none of their habitat requirements are available at the site. The African Clawless Otter *Aonyx capensis*, (NT) is predominantly

aquatic and does not occur far from permanent water bodies and as the drainage lines at the site do not carry water on a regular basis, it is not likely to be present at the site. There is a fairly low probability that the White-tailed Mouse *Myodomys albicaudatus* (VU) occurs in the site, as it's usually associated with more arid conditions.

Six faunal species were confirmed in the study area in the prior ecological survey by SEF - *Sylvicapra grimmia* (Common Duiker), *Hesperestes pulverulentus* (Cape Grey Mongoose), *Ictonyx striatus* (Striped Pole Cat), *Genetta genetta* (Common Genet), *Lepus saxatilis* (Scrub Hare) and *Hystrix africaeaustralis* (Cape Porcupine). The team also reviewed 5 listed bat species as being potentially present at the site but the latest Red Data Listing undertaken by the EWT and SANBI in 2016 have categorized all these species as Least Concern. Species picked up by the camera traps include Common Duiker, Bushbuck, Common Genet, Caracal, Cape Hare, Cape Porcupine and Aardwolf. The presence of large species such as Bushbuck, Caracal and Aardwolf indicate that the site is still relatively well connected to a network of large intact areas able to support these species and highlights the potential impact of the development on landscape connectivity.

It was clear from the site visit that the drainage lines are the most important areas for fauna at the site and are used significantly more than the other parts of the site. The drainage lines would also be the most important areas for landscape connectivity and it would be important to keep these areas clear of development. Overall, the development would result in some habitat loss for fauna, but this would be of local significance and would not be likely to result in any highly significant impacts on any listed species. It would however be important to protect the riparian areas as they provide a key role for wildlife movement and refuge in the landscape.

Reptiles

According to the SARCA database 21 reptiles have been recorded in the vicinity of the site, none of which are listed, and a further 21 are known from the wider area. No listed species have been recorded from the area and only two Data Deficient species could potentially occur there: *Cordylus coeruleopunctatus*, the Blue-spotted Girdled Lizard which usually favours rock outcrops in fynbos and forest fringes and thus is unlikely to occur at the site, and *Chamaesaura anguina*, the Cape Grass Lizard which is listed as DDT but closely related spp are considered NT, that occupies grassy or fynbos covered slopes and as such there is potentially suitable habitat at the site for this species. Only one species, *Bradypodion gutturale* (Karoo Dwarf Chameleon) (LC) was recorded during the prior field survey by SEF. Other typical species likely to be present include Puffadder, Cape Cobra, Mole Snake, House Snake, Red-lipped Herold and Boomslang, while lizards and skinks likely to be common include Marbled Leaf-toed Gecko, Red-sided Skink and Cape Legless Skink. Due to the poor

weather conditions experienced at the preliminary site visit, few reptiles were active and only the Angulate tortoise was observed.

The development would result in some habitat loss for reptiles, but this would be of local significance only as there are no local endemics or species of high conservation concern that occur in the area. As with mammals, the drainage lines are likely to be the most important areas for reptiles within the site and it is likely that the plateau area has the lowest diversity.

Amphibians

Nine frog species have been recorded in the FrogMap database for the area and 2 species according to their potential distribution. One species, *Cacosternum boettgeri* (Common Caco) (LC) was recorded during the prior faunal survey by SEF, while *Vandijkophrynus angusticeps* (Sand Toad) (LC) was given a high probability of occurring in the study area based on the presence of suitable habitat. Although there is no permanent water on the site, there are several drainage lines as well as areas in these where there is likely to be standing water for sufficiently long for breeding. As such, these are clearly the most important parts of the site for amphibians and the plateau area is not likely to be very important for frogs.

Overall the site is not considered that important for amphibians and no highly significant impacts area likely apart from some local habitat loss of low significance.

Avifauna

The pentad in which the study site falls shows that 298 bird species occur in the wider area around the site. Some of these species, however, are associated with the coastal areas of the pentad (and are accordingly not included as they are not associated within inland environments). Several bird species are listed (see Table 1), including passerines such as the Knysna Warbler *Bradypterus sylvaticus* (VU) and the Knysna Woodpecker *Campethera notata* (NT), birds of prey such as Martial Eagle *Polemaetus bellicosus* (EN) and the Lanner Falcon *Falco biarmicus* (VU) and bustards (Denham's Bustard *Neotis denhami* (VU)). The prior faunal study undertaken by SEF, recorded three species of conservation concern *Circus maurus* – Black Harrier (EN) observed on the plateau towards the centre of the study area and again during the current site visit; *Neotis ludwigii* – Ludwig's Bustard (VU), observed feeding in the short renosterveld towards the centre of the study area; and *Falco biarmicus* – Lanner Falcon (VU) recorded on the power lines towards the south eastern boundary of the study area.

Table 1. List of bird of concern which have been recorded in the region of the Hartenbos Heuwels site, based on the SABAP2 database. Conservation status is from the 2016 Birdlife Red Data Book of Birds of South Africa, Lesotho and Swaziland.

Common Name	Taxon name	Reporting Rate	Status (Regional)
Harrier, Black	<i>Circus maurus</i>	2,71	EN
Marsh-harrier, African	<i>Circus ranivorus</i>	1,20	EN
Crane, Blue	<i>Anthropoides paradiseus</i>	21,08	NT
Curlew, Eurasian	<i>Numenius arquata</i>	0,60	NT
Flamingo, Greater	<i>Phoenicopterus ruber</i>	8,43	NT
Lark, Agulhas Long-billed	<i>Certhilauda brevirostris</i>	7,53	NT
Seedeater, Protea	<i>Crithagra leucopterus</i>	0,90	NT
Woodpecker, Knysna	<i>Campethera notata</i>	1,20	NT
Bustard, Denham's	<i>Neotis denhami</i>	4,52	VU
Eagle, Martial	<i>Polemaetus bellicosus</i>	3,61	VU
Eagle, Verreaux's	<i>Aquila verreauxii</i>	0,30	VU
Falcon, Lanner	<i>Falco biarmicus</i>	3,31	VU
Secretarybird, Secretarybird	<i>Sagittarius serpentarius</i>	1,51	VU
Stork, Black	<i>Ciconia nigra</i>	0,60	VU
Warbler, Knysna	<i>Bradypterus sylvaticus</i>	6,33	VU

3.4 SITE SENSITIVITY ASSESSMENT

The sensitivity map for the site is illustrated below in Figure 3. The drainage lines are considered the most sensitive feature of the site and have been buffered by 50m to provide corridors for the movement of fauna. The lower-lying areas and slopes are in a significantly better condition than the plateau area and are considered medium sensitivity, while the plateau is considered low sensitivity as it has been significantly degraded by previous land use. In terms of the implications of this map for development, it is clear that the valleys and drainage lines should be avoided as much as possible. Development within the 50m buffers around the drainage lines should be restricted as much as possible. The plateau area is considered generally low sensitivity for fauna but as the camera trapping clearly illustrates, is still used by fauna and remains important for broad-scale connectivity of the landscape. Under the provisional layout provided for scoping, the footprint is largely restricted to the low sensitivity areas. However, the area to be fenced is significantly larger than the footprint and for the larger mammals of the area, the habitat loss resulting from the development is equivalent to fenced area and not just the footprint.



Figure 3. Faunal sensitivity assessment for Hartenbos Heuwels study area, showing the high sensitivity of the drainage lines and valleys and lower sensitivity of the plateau area.

4 SCOPING ASSESSMENT OF POTENTIAL IMPACTS

The majority of impacts associated with the development will occur during the construction phase as a result of the disturbance, clearing and levelling associated with the construction of the housing and resort development. After construction, impacts would be generated by human activity and the presence of the development which may reduce broad-scale ecological processes such as landscape connectivity. The nature and likely significance of the impacts associated with the development are highlighted below.

Construction Phase Impacts

Direct Impacts on Fauna Due to Construction Activities

The construction phase of the development will result in habitat loss, noise and disturbance on site. This will lead to direct and indirect disturbance of fauna. Some slow-moving or retiring species such as many reptiles would likely not be able to escape the construction machinery and may be killed. There are also species present

at the site which are vulnerable to poaching and there is a risk that these species may be targeted. This impact would be caused the presence and operation of construction machinery and personnel on the site.

This impact would be of relatively high intensity, but apart from the habitat loss, the disturbance would be transient and restricted to the construction period only. Before mitigation, this impact is expected to be of **Moderate Significance**. Important mitigation and avoidance measures that should be implemented include the following:

- Avoidance of identified areas of high fauna importance such as the drainage lines and their buffers at the design stage.
- Search and rescue for reptiles and other vulnerable species during construction, before areas are cleared.
- Limiting access to the site and ensuring that construction staff and machinery remain within the demarcated construction areas during the construction phase.
- Environmental induction for all staff and contractors on-site.

After mitigation this impact is likely to be reduced to a **Low Significance**.

Operational Phase Impacts

Impacts on Critical Biodiversity Areas

The development area falls largely within a Critical Biodiversity Area. The development of the site and especially the fencing of the resort complex would impact the ecological functioning of the CBA. A large part of the development footprint has however been previously transformed and this does not appear to have been taken into account when delineating the CBA. In terms of fauna, the major impact on the development in CBAs would be related primarily to habitat loss within the CBA as well as the loss of ecological functioning within the CBA related to the loss of connectivity. The intensity of this impact would be moderate, but as this would operate in the long-term for the life of the development, this impact would be of **Moderate Significance** before mitigation. Recommended mitigation and avoidance measures include

- Minimise the development footprint as far as possible.
- Include some near-natural corridors through the development to enhance connectivity.
- The fence around the development should not have electrified strands within 30cm of the ground.

- Night-lighting within the development should be environmentally sensitive and downward directed lighting with LED-type bulbs.

After mitigation, this impact would remain **Moderate Significance** as it would not be possible to fully mitigate the impact on the CBA as the affected area is not substitutable.

Cumulative Habitat Loss for Fauna

The area has been significantly affected by transformation for agriculture as well as urbanisation. The development will contribute further to habitat loss and cumulative loss of ecological functioning in the area. For smaller fauna such as reptiles and small mammals, the habitat loss would be equivalent to the development footprint but for larger species this would include the larger fenced-off area as it is not likely that they would be able to get through the fence. The extent of the development is however fairly low and as there are no fauna that are highly localised and restricted to the study area, the overall contribution to cumulative impact is considered to operate at a local scale only and would be of **Moderate to Low Significance** before mitigation. Recommended mitigation and avoidance measures include the following:

- Alien clearing should be implemented in the remainder of the intact area around the development site in order to improve the quality of the remaining habitat.
- Dogs and cats within the development should be restricted to fenced areas and dogs should be walked only on a leash.

After mitigation, this impact could be reduced to a **Low Significance**.

5 CONCLUSION & RECOMMENDATIONS

The Hartenbos Heuwels site is considered fairly degraded, with significant alien invasion in the drainage lines and negative impacts of past land on the plateau area. Although there are numerous listed fauna that occur in the broader area, it is not likely that many of these occur within the site due to its proximity to Hartenbos as well as the generally poor condition of the site and the transformed nature of much of the surrounding area. The camera trapping at the site however revealed that a variety of moderate sized mammals are present including Caracal, Aardwolf and Bushbuck and their presence indicate that a major impact of the development on such species would be the disruption of ecological connectivity. In addition, the site falls largely within a CBA1 and the development would reduce the ecological value and functioning of this area. As the presence of the development will result in the majority of this impact, it cannot be fully mitigated.

However, there is an opportunity to reduce the impacts on landscape connectivity and cumulative impact through improved management of the remainder of the site, especially the control of alien vegetation.

It is likely that the impacts of the development on fauna would be low to moderate after mitigation and there are no impacts that represent a fatal flaw or which would remain high after mitigation. As such, there are no faunal reasons for the development to proceed to the EIA phase. A plan of study for the EIA phase is briefly outlined below.

6 *Plan of Study for the EIA Phase*

Although significant baseline information has been collected at the site, additional fieldwork for site characterisation will be conducted for the EIA. In particular additional information on avifauna, small mammals and reptiles at the site will be collected. Based on the results of the fieldwork conducted to date and the features of the site, the following activities and outputs are planned to inform the EIA phase of the development:

- Characterise the faunal communities at the site in greater detail. Camera traps have already been deployed at the site and this will be complemented with information from small mammal trapping and reptile and avifaunal surveys.
- Provide a more detailed assessment of the impact of the development on the CBAs of the area as well as the cumulative impact associated with the development. This will include a more detailed investigation of the condition of the site as well as the identification of important corridors and spatial linkages that should be maintained.
- Evaluate, based on the site attributes and final layout of the development, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- Assess the impacts identified above in light of the site-specific findings and the final layout for assessment in the EIA Phase to be provided by the developer.

7 REFERENCES

- Alexander, G. & Marais, J. 2007. *A Guide to the Reptiles of Southern Africa*. Struik Nature, Cape Town.
- Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J. & de Villiers, M. S. 2014. Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland. Strelitzia 32. SANBI, Pretoria.
- Branch W.R. 1998. *Field guide to snakes and other reptiles of southern Africa*. Struik, Cape Town.
- Brownlie, S. 2005. Guideline for involving biodiversity specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 C. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Du Preez, L. & Carruthers, V. 2009. *A Complete Guide to the Frogs of Southern Africa*. Struik Nature., Cape Town.
- Edge, D. 2005. Butterfly Conservation In The Southern Cape, South Africa. *Metamorphosis*, VOL. 16, No. 2:29-46.
- EWT & SANBI, 2016. Red List of Mammals of South Africa, Lesotho and Swaziland. EWT, Johannesburg.
- Henning, G.A., Terblanche, R.F. & Ball, J.B. (eds) 2009. South African Red Data Book: butterflies. SANBI Biodiversity Series 13. South African National Biodiversity Institute, Pretoria.
- Holness, S. D., Bradshaw, P. L., & Brown, A. E. (2010). Critical Biodiversity Areas of the Garden Route: Conservation Planning Technical Report, Garden Route Initiative. SANParks, Port Elizabeth.
- Hübner. 1819. Genus *Aloeides* In: Hübner, [1816-1826]. *Verzeichniss bekannter Schmettlinge*: 73 (432 + 72 pp.). Augsburg. Type-species: *Papilio pierus* Cramer, by subsequent designation (Scudder, 1875. *Proceedings of the American Academy of Arts and Sciences* **10**: 107 (91-293).).
- Marais, J. 2004. *Complete Guide to the Snakes of Southern Africa*. Struik Nature, Cape Town.
- Mecenero, S., Ball, J.B., Edge, D.A., Hamer, M.L., Henning, G.A., Krüger, M., Pringle, E.L., Terblanche, R.F. and Williams, M.C. (eds.). 2013. *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Safronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town.

- Migdoll, I. 1988. Field guide to the butterflies of Southern Africa. New Holland: 256 pp.
- Minter LR, Burger M, Harrison JA, Braack HH, Bishop PJ & Kloepfer D (eds). 2004. Atlas and Red Data book of the frogs of South Africa, Lesotho and Swaziland. SI/MAB Series no. 9. Smithsonian Institution, Washington, D.C.
- Mucina L. & Rutherford M.C. (eds) 2006. *The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- Nel, J.L., Murray, K.M., Maherry, A.M., Petersen, C.P., Roux, D.J., Driver, A., Hill, L., Van Deventer, H., Funke, N., Swartz, E.R., Smith-Adao, L.B., Mbona, N., Downsborough, L. and Nienaber, S. (2011). Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.
- Skinner, J.D. & Chimimba, C.T. 2005. The mammals of the Southern African Subregion. Cambridge University Press, Cambridge.
- Strategic Environmental Focus. 2013. Hartenbos Heuwels Residential Development: Faunal Assessment. Prepared For: Mr Schalk Cilliers (Atkv).
- Threatened Ecosystems in South Africa: Descriptions and Maps (available on BGIS website: <http://bgis.sanbi.org>).

8 ANNEX 1. LIST OF MAMMALS

List of mammals which have been recorded in the region of the proposed Hartenbos Heuwels project site (QDS 3422AA) and those that are expected in the region according to their distribution (Skinner & Chimimba 2005). Conservation dependent large mammals and non-free ranging or introduced species are not included in the list.

Family	Genus	Species	Sub-species	Common name	Red list category	Habitat	No. records/Probability
<i>Bathyergidae</i>	<i>Cryptomys</i>	<i>hottentotus</i>		African Mole Rat	LC	Wide diversity of substrates, from sandy soils to heavier compact substrates such as decomposed schists and stony soils	High
<i>Bathyergidae</i>	<i>Bathyergus</i>	<i>suillus</i>		Cape Dune Mole-rat	LC		1
<i>Bathyergidae</i>	<i>Georychus</i>	<i>capensis</i>		Cape Mole Rat	LC		Sandy soils, in coastal dunes, in sandy alluvium along river

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					systems and montane regions of the Western Cape	
<i>Bovidae</i>	<i>Oreotragus</i>	<i>oreotragus</i>	Klipspringer	LC	Closely confined to rocky habitat.	Low
<i>Bovidae</i>	<i>Raphicerus</i>	<i>campestris</i>	Steenbok	LC	Inhabits open country,	High
<i>Bovidae</i>	<i>Raphicerus</i>	<i>melanotis</i>	Cape Grysbok	LC		1
<i>Bovidae</i>	<i>Sylvicapra</i>	<i>grimmia</i>	Common Duiker	LC	Presence of bushes is essential	High
<i>Bovidae</i>	<i>Tragelaphus</i>	<i>sylvaticus</i>	Bushbuck	LC	Riverine or other types or underbrush near water	High
<i>Canidae</i>	<i>Canis</i>	<i>mesomelas</i>	Black-backed Jackal	LC	Wide habitat tolerance, more common in drier areas.	Low
<i>Canidae</i>	<i>Otocyon</i>	<i>megalotis</i>	Bat-eared Fox	LC		1
<i>Cercopithecidae</i>	<i>Papio</i>	<i>ursinus</i>	Chacma Baboon	LC	Can exploit fynbos, montane grasslands, riverine courses in deserts, and simply need water and access to refuges.	Low
<i>Chrysochloridae</i>	<i>Amblysomus</i>	<i>corriae</i>	Fynbos Golden Mole	NT	Restricted to fynbos, forest and rensoterveld	High
<i>Emballonuridae</i>	<i>Taphozous</i>	<i>mauritanus</i>	Mauritian Tomb Bat	LC	Predominantly open woodland with rainfall above 500mm	High
<i>Felidae</i>	<i>Caracal</i>	<i>caracal</i>	Caracal	LC		2
<i>Felidae</i>	<i>Felis</i>	<i>silvestris</i>	Wildcat	LC		1
<i>Felidae</i>	<i>Panthera</i>	<i>pardus</i>	Leopard	Vulnerable		2
<i>Gliridae</i>	<i>Graphiurus</i>	<i>murinus</i>	Woodland Dormouse	LC	Woodland, rocky areas and shrubland within grassland areas	High
<i>Herpestidae</i>	<i>Atilax</i>	<i>paludinosus</i>	Marsh Mongoose	LC	Associated with well-watered terrain, living in close association with rivers, streams, marshes, etc.	High
<i>Herpestidae</i>	<i>Herpestes</i>	<i>ichneumon</i>	Large Grey Mongoose	LC	Associated with riparian conditions	High
<i>Herpestidae</i>	<i>Herpestes</i>	<i>pulverulentus</i>	Cape Gray Mongoose	LC		1
<i>Herpestidae</i>	<i>Herpestes</i>	<i>sanguineus</i>	Slender Mongoose	LC		1
<i>Hyaenidae</i>	<i>Proteles</i>	<i>cristata</i>	Aardwolf	LC		3
<i>Hysticidae</i>	<i>Hystrix</i>	<i>africaeausstralis</i>	Cape Porcupine	LC	Catholic in habitat requirements.	High
<i>Leporidae</i>	<i>Lepus</i>	<i>saxatilis</i>	Scrub Hare	LC	Common in agriculturally	High

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<i>Macroscelididae</i>	<i>Macroscelides</i>	<i>proboscideus</i>	Round-eared Elephant Shrew	LC	developed areas, especially in crop-growing areas or in fallow lands where there is some bush development. Species of open country, with preference for shrub bush and sparse grass cover, also occur on hard gravel plains with sparse boulders for shelter, and on loose sandy soil provided there is some bush cover	Moderate
<i>Molossidae</i>	<i>Tadarida</i>	<i>aegyptiaca</i>	Egyptian Free-tailed Bat	LC	In arid areas. often associated with water sources	High
<i>Molossidae</i>	<i>Chaerephon</i> <i>pumilus</i>	<i>pumila</i>	Little free-tailed bat	LC	Wide habitat tolerance	High
<i>Muridae</i>	<i>Acomys</i>	<i>subspinosus</i>	Cape Spiny Mouse	LC	Associated with rocky areas on mountain slopes in Fynbos Catholic in their habitat requirements, but where there are rocky koppies, outcrops or boulder-strewn hillsides they use these preferentially	Low
<i>Muridae</i>	<i>Aethomys</i>	<i>namaquensis</i>	Namaqua Rock Mouse	LC		Moderate
<i>Muridae</i>	<i>Gerbilliscus</i>	<i>afra</i>	Cape Gerbil	LC		1
<i>Muridae</i>	<i>Gerbilliscus</i>	<i>paeba</i>	Hairy-footed Gerbil	LC	Gerbils associated with Nama and Succulent Karoo preferring sandy soil or sandy alluvium with a grass, scrub or light woodland cover	High
<i>Muridae</i>	<i>Mus</i>	<i>minutoides</i>	Pygmy Mouse	LC	Wide habitat tolerance	High
<i>Muridae</i>	<i>Myomyscus</i>	<i>verreauxii</i>	Verreaux's Mouse	LC	Scrub on grassy hillsides and riverine forest	High
<i>Muridae</i>	<i>Otomys</i>	<i>irroratus</i>	Vlei Rat	LC	Abundant in habitats associated with damp soil in vleis or along streams and rivers.	High
<i>Muridae</i>	<i>Rhabdomys</i>	<i>pumilio</i>	Xeric Four-striped Grass Rat	LC		1
<i>Mustelidae</i>	<i>Aonyx</i>	<i>capensis</i>	African	NT	Predominantly aquatic	High

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			Clawless Otter		and do not occur far from permanent water	
<i>Mustelidae</i>	<i>Ictonyx</i>	<i>striatus</i>	Striped Polecat	LC		1
<i>Mustelidae</i>	<i>Mellivora</i>	<i>capensis</i>	Honey Badger	LC		1
<i>Mustelidae</i>	<i>Poecilogale</i>	<i>albinucha</i>	African Striped Weasel	Near Threatened		1
<i>Nesomyidae</i>	<i>Dendromus</i>	<i>melanotis</i>	Grey Climbing Mouse	LC	Often associated with stands of tall grass especially if thickened with bushes and other vegetation	High
<i>Nesomyidae</i>	<i>Dendromus</i>	<i>mesomelas</i>	Brants' Climbing Mouse	Lc	Associated with rank vegetation, especially tall grass and scrub	High
<i>Nesomyidae</i>	<i>Mystromys</i>	<i>albicaudatus</i>	White-tailed Mouse	VU	Variable vegetation, but live in cracks or burrows in the soil	Low
<i>Nesomyidae</i>	<i>Steatomys</i>	<i>krebsii</i>	Krebs's Fat Mouse	LC	Prefer a sandy substrate.	High
<i>Nesomyidae</i>	<i>Saccostomus</i>	<i>campestris</i>	Southern Pouched Mouse	LC		1
<i>Nycteridae</i>	<i>Nycteris</i>	<i>thebaica</i>	Egyptian Slit-faced Bat	LC	Wide habitat tolerance	High
<i>Procaviidae</i>	<i>Procavia</i>	<i>capensis</i>	Rock Hyrax	LC		1
<i>Pteropodidae</i>	<i>Eidolon</i>	<i>helvum</i>	Straw-coloured fruit bat	LC	Occasional migratory visitors within southern Africa	Low
<i>Pteropodidae</i>	<i>Rousettus</i>	<i>aegyptiacus</i>	Egyptian Rousette	LC	Require fruit and caves for roosting in the vicinity	High
<i>Rhinolophidae</i>	<i>Rhinolophus</i>	<i>capensis</i>	Cape horseshoe bat	LC	Many records from coastal caves	High
<i>Soricidae</i>	<i>Crocidura</i>	<i>flavescens</i>	Greater Red Musk Shrew	LC	Wide habitat tolerance	High
<i>Soricidae</i>	<i>Myosorex</i>	<i>varius</i>	Forest Shrew	LC	Prefers moist, densely vegetated habitat	High
<i>Soricidae</i>	<i>Myosorex</i>	<i>longicaudatus</i>	Long-tailed Forest Shrew	Endangered	Essentially forest but also ventures into fynbos and other moist habitats	Medium
<i>Soricidae</i>	<i>Suncus</i>	<i>infinitesimus</i>	Least Dwarf Shrew	LC		1
<i>Suidae</i>	<i>Potamochoerus</i>	<i>larvatus</i>	Bushpig	LC	Forest, thickets, riparian undercover, reed beds etc	High
<i>Vespertilionidae</i>	<i>Eptesicus</i>	<i>hottentotus</i>	Long-tailed serotine bat	LC	Wide habitat tolerance	High
<i>Vespertilionidae</i>	<i>Miniopterus</i>	<i>natalensis</i>	Natal long-	LC	Cave dwelling and	High

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e			fingered bat		suitable caves are an essential habitat requirement	
<i>Vespertilionida</i>	<i>Myotis</i>	<i>tricolor</i>	Temminck's hairy Bat	LC	Occurrence may be governed by the presence of caves	High
<i>Vespertilionida</i>	<i>Neoromicia</i>	<i>capensis</i>	Cape Serotine Bat	LC	Wide habitat tolerances, but often found near open water	High
<i>Viverridae</i>	<i>Genetta</i>	<i>genetta</i>	Small-spotted genet	LC	Occur in open arid associations	High
<i>Viverridae</i>	<i>Genetta</i>	<i>tigrina</i>	Large-spotted genet	LC	Fynbos and savanna particularly along riverine areas	High

9 ANNEX 2. LIST OF REPTILES

List of reptiles which have been recorded in the region of the proposed Hartenbos Heuvel project site (based on distribution maps from Branch (1988) and Alexander and Marais (2007), and observed records in ADU VMU in QDS 3422AA). Conservation status is from Bates et al. (2014).

Family	Genus	Species	Subspecies	Common name	Red list category	Habitat	No. records or probability
Colubridae	<i>Amplorhinus</i>	<i>multimaculatus</i>		Many-spotted Snake	LC	Reed beds and riverside vegetation in fynbos	High
Viperidae	<i>Bitis</i>	<i>atropos</i>		Berg Adder	LC	Mountain fynbos to montane grassland, from sea level to 3000m	High
Viperidae	<i>Causus</i>	<i>rhombeatus</i>		Common Night Adder	LC	Damp environments in moist savannahs, lowland forest and fynbos	High
Colubridae	<i>Crotaphopeltis</i>	<i>hotamboeia</i>		Herald Snake	LC	Terrestrial but more common in wetlands & marshy areas	High
Colubridae	<i>Dasypeltis</i>	<i>scabra</i>		Common/Rhombic Egg Eater	LC	Absent only from true desert & closed-canopy forest	High
Elapidae	<i>Hemachatus</i>	<i>haemachatus</i>		Rinkhals	LC	Grassland from the coast up to 2500 m	High
Lamprophiidae	<i>Lycodonomorphus</i>	<i>inornatus</i>		Olive House Snake	LC	Moist savanna, lowland forest and fynbos	High
Elapidae	<i>Naja</i>	<i>nivea</i>		Cape Cobra	LC	Arid karroid regions, particularly along river courses, entering well drained open areas along the southern coast	High
Colubridae	<i>Prosymna</i>	<i>sundevalli</i>		Sundevall's Shovel-Snout	LC	Dry areas, incl savannah woodlands, highveld & karroid areas, entering valley bushveld & fynbos in the Cape	High
Colubridae	<i>Pseudaspis</i>	<i>cana</i>		Mole Snake	LC	Sandy scrubland in SW Cape, highveld grassland & mountainous & desert regions	High
Typhlopidae	<i>Rhinotyphlops</i>	<i>lalandei</i>		Delalande's Beaked Blind Snake	LC	Varied: semi-desert, coastal bush, fynbos & savannah	High
Leptotyphlopidae	<i>Leptotyphlops</i>	<i>nigricans</i>		Black Thread Snake	LC	Fynbos, thicket, grassland and sananna	High
Cordylidae	<i>Chmaesaura</i>	<i>anguina</i>		Cape Grass Lizard	DDT (but closely)	Grassy or fynbos covered slopes	High

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Family	Genus	Species	Subspecies	Common name	Red list category	Habitat	No. records or probability
					related spp are NT)		
<i>Cordylidae</i>	<i>Cordylus</i>	<i>coeruleopunctatus</i>		Blue-spotted Girdled Lizard	DDT	Rock outcrops in fynbos and forest fringes	Low
<i>Cordylidae</i>	<i>Cordylus</i>	<i>Cordylus</i>		Cape Girdled Lizard	LC	Diverse, coastal cliffs, rock plateaus in fynbos and montane grassland.	High
<i>Gerrhosauridae</i>	<i>Gerrhosaurus</i>	<i>flavigularis</i>		Yellow-throated Plated Lizard	LC	Montane grassland, savanna, bushveld and low open coastal forest	High
<i>Lacertidae</i>	<i>Pedioplanis</i>	<i>lineocellata</i>		Spotted Sand Lizard	LC	Very varied: karroid veld, valley bushveld & arid & mesic savannah	High
<i>Cordylidae</i>	<i>Pseudocordylus</i>	<i>microlepidotus</i>		Cape Crag Lizard	LC	Mountain plateaus & upper slopes in fynbos or montane grassland	Low
<i>Gerrhosauridae</i>	<i>Tetradactylus</i>	<i>seps</i>		Short-legged Seps	LC	Coastal forests or mountain plateaus	Medium
<i>Lacertidae</i>	<i>Tropidosaura</i>	<i>gularis</i>		Cape Mountain Lizard	LC	Fynbos-covered mountain summits	Low
<i>Scincidae</i>	<i>Acontias</i>	<i>meleagris</i>		Cape Legless Skink	LC		4
<i>Gekkonidae</i>	<i>Afrogecko</i>	<i>porphyreus</i>		Marbled Leaf-toed Gecko	LC		4
<i>Agamidae</i>	<i>Agama</i>	<i>atra</i>		Southern Rock Agama	LC		9
<i>Viperidae</i>	<i>Bitis</i>	<i>arietans</i>	<i>arietans</i>	Puff Adder	LC		2
<i>Colubridae</i>	<i>Boaedon</i>	<i>capensis</i>		Brown House Snake	LC		1
<i>Chamaeleonidae</i>	<i>Bradypodion</i>	<i>damaranum</i>		Knysna Dwarf Chameleon	LC		1
<i>Chamaeleonidae</i>	<i>Bradypodion</i>	<i>gutturale</i>		Little Karoo Dwarf Chameleon	LC		1
<i>Testudinidae</i>	<i>Chersina</i>	<i>angulata</i>		Angulate Tortoise	LC		6
<i>Colubridae</i>	<i>Dispholidus</i>	<i>typus</i>	<i>typus</i>	Boomslang	LC		1
<i>Lamprophiidae</i>	<i>Duberria</i>	<i>lutrix</i>	<i>lutrix</i>	South African Slug-eater	LC		2
<i>Gekkonidae</i>	<i>Hemidactylus</i>	<i>mabouia</i>		Common Tropical House Gecko	LC		1
<i>Testudinidae</i>	<i>Homopus</i>	<i>areolatus</i>		Parrot-beaked Tortoise	LC		2
<i>Lamprophiidae</i>	<i>Homoroselaps</i>	<i>lacteus</i>		Spotted Harlequin Snake	LC		4
<i>Colubridae</i>	<i>Lamprophis</i>	<i>aurora</i>		Aurora House Snake	LC		1
<i>Lamprophiidae</i>	<i>Lycodonomorph</i>	<i>rufulus</i>		Common	LC		1

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Family	Genus	Species	Subspecies	Common name	Red list category	Habitat	No. records or probability
		<i>us</i>		Water Snake			
<i>Gekkonidae</i>	<i>Pachydactylus</i>	<i>geitje</i>		Ocellated Gecko	LC		3
<i>Pelomedusoid ea</i>	<i>Pelomedusa</i>	<i>subrufa</i>		Marsh Terrapin	LC	Slow-moving & still water, incl temporary pans	NA
<i>Lamprophiidae</i>	<i>Psammophylax</i>	<i>rhombeatus</i>	<i>rhombeatus</i>	Spotted Grass Snake	LC		2
<i>Scincidae</i>	<i>Scelotes</i>	<i>bipes</i>		Silvery Dwarf Burrowing Skink	LC		2
<i>Testudinidae</i>	<i>Stigmochelys</i>	<i>pardalis</i>		Leopard Tortoise	LC		2
<i>Scincidae</i>	<i>Trachylepis</i>	<i>capensis</i>		Cape Skink	LC		1
<i>Scincidae</i>	<i>Trachylepis</i>	<i>homalocephala</i>		Red-sided Skink	LC		3

10 ANNEX 3. LIST OF AMPHIBIANS

List of amphibians which have been recorded in the region of the proposed Hartenbos Heuwels project site from distribution ranges in Du Preez and Carruthers (2009), and from the observations recorded in the ADU VMU in QDS 3422AA).

Family	Genus	Species	Subspecies	Common name	Red list category	Habitat	No. records/Probability
<i>Bufo</i> nidae	<i>Sclerophrys</i>	<i>capensis</i>		Raucous Toad	LC	Rivers and stream in grassland and fynbos	5
<i>Hyperoliidae</i>	<i>Hyperolius</i>	<i>marmoratus</i>		Painted Reed Frog	LC		5
<i>Pipidae</i>	<i>Xenopus</i>	<i>laevis</i>		Common Platanna	LC		2
<i>Pyxicephalidae</i>	<i>Amietia</i>	<i>fuscigula</i>		Cape River Frog	LC		1
<i>Pyxicephalidae</i>	<i>Cacosternum</i>	<i>boettgeri</i>		Common Caco	LC		3
<i>Pyxicephalidae</i>	<i>Cacosternum</i>	<i>nanum</i>		Bronze Caco	LC		4
<i>Pyxicephalidae</i>	<i>Strongylopus</i>	<i>fasciatus</i>		Striped Stream Frog	LC		5
<i>Pyxicephalidae</i>	<i>Strongylopus</i>	<i>grayii</i>		Clicking Stream Frog	LC		1
<i>Pyxicephalidae</i>	<i>Tomopterna</i>	<i>delalandii</i>		Cape Sand Frog	LC		1
<i>Bufo</i> nidae	<i>Vandijkophrynus</i>	<i>angusticeps</i>		Cape Sand Toad	LC	Temporary rain-filled depressions in sandy soils	High
<i>Brevicipitidae</i>	<i>Breviceps</i>	<i>rosei</i>	<i>rosei</i>	Sand Rain Frog	LC	Well vegetated low-lying sandy areas in coastal lowlands	Low

