PEER REVIEWED ANIMAL SPECIES IMPACT ASSESSMENT

CLANWILLIAM HOUSING DEVELOPMENT AND WWTW EXPANSION ON A PORTION OF REMAINDER OF ERF 279, CLANWILLIAM

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OCTOBER 2026

EXECUTIVE SUMMARY

This report is to assess the impact of the proposed Clanwilliam Housing Development in two areas and WWTW expansion on a portion of remainder of Erf 279, Clanwilliam with a total development footprint of ±49.6ha in the Western Cape on animal species. Two layout alternatives were assessed. Both layouts will result in the clearing of indigenous vegetation and therefore impact on animal species habitat. The development area consisting of Citrusdal Vygieveld vegetation on the edge and wedge in between the town, area impacted by squatter activities, golf course and wetlands which represents the animal species habitat on site. The bigger development area is ecologically connected to the south and east.

A desktop assessment was undertaken prior to the site visit to determine whether there are any Species of Conservation Concern and habitat features within the site that are considered sensitive. This was followed by field surveys on 6 October 2019 and 28 July 2023 which also informed the findings in this report. These surveys were focus on identified habitats that may host SCC. No SCC were recorded during the survey, but the area and habitat was identified to host black harriers. The Site Ecological Importance for the black harriers was assessed to be high. Breeding habitat was not identified and recorded on the site and exists to the east. They may therefore use the area to roam, but due to the vast habitat to the south and east and away from residential activities, they will not be impacted or affected.

The Department of Environmental Affairs screening report from the national web based environmental screening tool reported a “high and medium sensitivity (mostly medium with small area mapped high in southern edge) for animal species. The site sensitivity verification and specialist assessment does not differ from the designation of “medium” animal species as identified in the national web based environmental screening tool. The development of the site would have a **medium Negative** impact on animal species.

Potential negative impacts that may arise from the proposed development is:
- Disturbance
- Injury/mortality of species
- Human/animal conflict

Mitigation measures, both best practise and essential, include the following:
- Should any faunal SCC be encountered during construction and operation, these must be recorded (i.e. be photographed, GPS co-ordinates taken) and photographs placed on iNaturalist
- Any faunal species that may die as a result of construction activities must be recorded (i.e. be photographed, GPS co-ordinates taken) and these records placed on iNaturalist.
- In addition to all mitigations listed above a clause must be included in contracts for ALL personnel working on site stating that: “no wild animals will be hunted, killed, poisoned or captured. No wild animals will be imported into, exported from or transported in or through the province. No wild animals will be sold, bought, donated and no person associated with the development will be in possession of any live wild animal, carcass or anything manufactured from the carcass.” A clause relating to fines, possible dismissal and legal prosecution must be included should any of the above transgressions occur, especially for SCC.

Based on the impacts assessed in this report, it is recommended that the proposed development proceed with the implementation of strict environmentally responsible practices as outlined in the recommended mitigation measures.

The animal species assessment was peer reviewed by Prof Jan Venter who made the following comments that was addressed in the report as indicated under which sections in the report.

- **Habitat Mapping** (refer to 4.4.9 below for update on onsite habitat as per recommended actions)

On site habitat link to species included in table under Likelihood of occurrence based on habitat and current records).

Issue

The report includes a habitat map, but the habitats shown on the map are not adequately described in the text. Furthermore, at least one habitat unit on the map does not appear to have a clearly defined name or description. There are also no photographs of these habitats which is a requirement. Habitats are further not defined in terms of topography, soil typer and substrate.

Why this is important

A robust faunal habitat baseline is necessary to evaluate habitat suitability for SCC and to determine the spatial extent of potential ecological impacts. Faunal habitats are rarely uniform across properties of this size. Habitat features such as drainage lines, rocky areas, vegetation structure, and disturbance gradients often support different faunal assemblages. Without clear descriptions of the mapped habitats it is difficult to determine their ecological importance or their potential to support species of conservation concern.

Recommended correction

Each habitat unit shown on the map should be clearly described in the text. Habitat descriptions should include vegetation structure, dominant plant species where relevant, topographic context, and the degree of disturbance or transformation. All habitat units shown on the map should be clearly named and consistently referenced throughout the report. Supportive photographs should be provided.

- **Habitat–Species Linkage** (refer to table 1 below. On site habitat link to species included in table under Likelihood of occurrence based on habitat and current records).

Issue

The species assessment presented in the report is not clearly linked to the mapped habitat units. Species are discussed in a general manner without indicating which specific habitats on the site may support them.

Why this is important

Species occurrence is strongly influenced by habitat characteristics. Without linking species to specific habitat types it is difficult to determine which habitats are important for biodiversity, which habitats may support species of conservation concern, and which habitats may be most sensitive to disturbance.

Recommended correction

The report should clearly indicate which species are associated with each mapped habitat type. This would allow the assessment to identify habitats that may support species of conservation concern and evaluate how the proposed development may affect those habitats.

- **Identification of Species of Conservation Concern (SCC)** (table 1 was used to refined the list and the list of species further assessed that are likely to be impacted by the development was list below the table and further assessed in the assessment section.

Issue

The list of species of conservation concern appears to have been derived largely from the screening tool output, with limited refinement based on habitat suitability within the study area. As a result, some species, for example Aquila rapax, included in the assessment appear unlikely to occur within the study area. The protocol requires that screening tool outputs be refined using site-specific habitat suitability and likelihood of occurrence before detailed assessment is undertaken.

Why this is important

The Species Protocol requires specialists to refine screening tool species lists based on habitat suitability and likelihood of occurrence. Including species that are unlikely to occur within the study area may reduce the clarity of the ecological analysis.

Recommended correction

The SCC assessment should clearly show the process used to refine the screening tool species list. This should include the initial list generated by the screening tool, a well-motivated habitat suitability filter, and a final list of species that are realistically likely to occur within the study area. This final list is then assessed in the rest of the impact assessment.

- **Site Ecological Importance (SEI) Assessment**

Issue 1 – SEI methodology not defined (the SEI methodology was defined and included under section 1.9 Sensitivity Mapping and Assessment)

The report assigns SEI values using components such as CI, BI, FI and RR. However, the report does not explain how these scores were determined or how they were combined to derive the final SEI rating.

Why this is important

The SANBI Species Environmental Assessment Guideline requires that the basis for SEI scoring be transparent and reproducible. Impact assessment methods must be transparent and reproducible. Without clear definitions and scoring criteria it is not possible to evaluate the validity of the SEI ratings.

Recommended correction

The report should define each SEI component, provide clear scoring criteria, and explain how the different components are combined to produce the final SEI rating. See the SANBI Species Environmental Assessment Guidelines for clear instructions on this.

Issue 2 – SEI applied incorrectly (the SEI as per the methodology was done per species and does include habitat in the assessment as per the methodology under section 1.9. Sensitivity Mapping and Assessment. The habitat SEI was also assessed and included)

The SEI values appear to be applied as attributes of the species rather than as an assessment of the ecological importance of the site (e.g. habitat) for those species.

Why this is important

SEI is intended to reflect the ecological importance of the site itself. The assessment should therefore evaluate how important the site is for the species rather than simply considering the conservation status of the species.

Recommended correction

The SEI assessment should be revised so that it evaluates the ecological importance of the site based on habitat quality, ecological function, and the role of the site within the surrounding landscape.

Issue 3 – Generic scoring (the SEI as per the methodology was done per species and does include habitat in the assessment as per the methodology under section 1.9. Sensitivity Mapping and Assessment. The habitat SEI was also assessed and included)
Many of the species assessed are assigned identical values for the SEI components. This suggests that the scores may have been applied generically rather than derived through species specific ecological analysis.

Why this is important

Species differ significantly in habitat requirements, ecological roles, and conservation status. Applying identical scores to multiple species may not accurately reflect their ecological relationships with the site.

Recommended correction

The SEI scores should be reviewed and justified individually for each species based on habitat suitability and ecological context.

- **Impact Assessment Methodology**

Issue 1 – Risk matrix not appropriate for fauna

The risk matrix used in the report includes criteria such as volume thresholds and toxicity levels, which are typically associated with pollution risk assessments and not faunal impact assessments.

Why this is important

Faunal impact assessments normally evaluate ecological impacts using criteria such as duration, extent, intensity, probability, and receptor sensitivity.

Recommended correction

The impact assessment methodology should be revised to use a framework that is appropriate for ecological impact assessment.

Issue 2 – Inconsistency between methodology and impact tables

The methodology section describes a probability–magnitude matrix, yet the impact tables include numerical significance values that cannot be clearly derived from this matrix.

Why this is important

Impact ratings should be transparent and reproducible.

Recommended correction

The report should clarify the formula used to derive impact significance scores and ensure consistency between the methodology description and the impact tables.

- **Assumption that Species Can Relocate to Adjacent Habitat** (refer to updated conclusion. The following text were added. There are wetlands east of the site associated to the Jan Dissels River and significant undisturbed indigenous vegetation in good quality to the south of the site and town and east towards the Jan Dissels river and beyond that the Cederberge.

Issue

In sections of the report the conclusion that impacts will be low appears to rely on the assumption that species occurring on the site can relocate to surrounding habitat. This reasoning is used in different parts of the report, including the discussion of Black Harriers where it is stated that the species may roam through the area but will not be impacted because extensive habitat exists to the south and east. Similar reasoning is used in the ecological connectivity section where it is concluded that the development will not affect ecological processes because significant habitat and corridors occur in the surrounding landscape. In addition, the report concludes that the site is not regionally important for animal species and that impacts will therefore be limited, and in some cases, species are dismissed as being unaffected simply because they were not recorded during the survey.

Why this is important
While many mobile species can move away from local disturbance, the assumption that individuals can simply relocate to adjacent habitat requires ecological justification. The presence of surrounding habitat does not necessarily mean that displaced individuals can successfully relocate without consequences. Adjacent habitat may already be occupied, may differ in quality, or may not provide the same ecological function as the habitat affected by development.

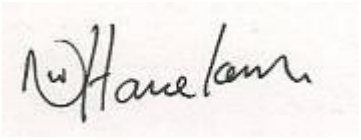
Furthermore, the Species Environmental Assessment Guidelines require the specialist to assess the importance of the site itself for species of conservation concern, rather than assuming that impacts are negligible because habitat exists elsewhere in the landscape. Reliance on this assumption without supporting ecological analysis may therefore underestimate potential impacts and weaken the justification for low significance ratings.

Recommended correction
Where the report concludes that impacts are low because species can move to surrounding habitat, this assumption should be supported with ecological analysis. This may include an assessment of habitat availability and quality in the surrounding landscape, consideration of species mobility and habitat requirements, and evaluation of the role of the site within the broader ecological network. The assessment should also distinguish between species that may only occasionally use the site and those for which the site may provide important habitat or ecological functions. Where uncertainty exists, the impact significance should be reconsidered or supported with a clearer ecological justification.

DECLARATION OF THE SPECIALIST

I **Nicolaas Willem Hanekom**, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that:

- In terms of the general requirement to be independent:
    - other than fair remuneration for work performed in terms of this application, have no business, financial, personal, or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity; or
- In terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;
- I have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any Report, plan or document prepared or to be prepared as part of the application; and
- I am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations.



Nicolaas Hanekom
Pri.Sci.Nat (Ecology) 004415 **20 OCTOBER 2026**

Signature of the Specialist: Date:

Enviro-EAP (Pty) Ltd

Name of company (if applicable):

COMPLIANCE WITH THE DEPARTMENT OF ENVIRONMENTAL AFFAIRS SCREENING TOOL PROTOCOLS (GOVERNMENT NOTICE NO.1150, GOVERNMENT GAZETTE 43855: 30 OCTOBER 2020)

Department of Environmental Affairs screening Tool	ADDRESSED IN SPECIALIST REPORT
Contact details and curriculum vitae of the specialist including SACNASP registration number and field of expertise and their curriculum vitae	Page 1
A signed statement of independence by the specialist	Page 2 of report
Duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment	Section 1.8
A description of the methodology used to undertake the impact assessment and site inspection, including equipment and modelling used where relevant	Section 1.5
A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations	Section 1.6
Details of all Species of Conservation Concern ("SCC") found or suspected to occur on site, ensuring sensitive species are appropriately reported	Section 4.4
The online database name, hyperlink, and record accession numbers for disseminated evidence of SCC found within the study area	Section 4.4
The location of areas not suitable for development and to be avoided during construction where relevant	Section 4.4
Areas not suitable for development, to be avoided during construction and operation (where relevant)	Section 4.4
Additional environmental impacts expected from the proposed development based on those already evident on the site and a discussion on the cumulative impacts	Section 5
A discussion on the cumulative impacts	Section 5
Impact management actions and impact management outcomes proposed by the specialist for inclusion in the EMPr	Section 5
A motivation where the development footprint was not considered stating reasons why these were not being considered	Section 1 and 6
A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, and any conditions to which the statement is subjected	Section 6
A motivation must be provided if there were any development footprints identified as above that were identified as having "low" or "medium" animal species sensitivity and were not considered appropriate	Section 6

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1. INTRODUCTION AND METHODOLOGY

The Department of Environmental Affairs screening report from the national web based environmental screening tool reported a "high sensitivity" for animal species. The site sensitivity verification and specialist assessment does differ from the designation of "medium" animal species as identified in the national web based environmental screening

tool. This report presents the findings of the Animal Species Impact Assessment that was prepared by Nicolaas Hanekom as part of the EIA for the proposed development application.

1.1. Background & Competency

Nicolaas Hanekom is a registered Professional Natural Scientist in the ecological science field with the South African Council for Natural Scientific Professions ("SACNASP"), (Ecology field) and a qualified registered Environmental Assessment Practitioner ("EAP") who holds a Masters Technologiae, Nature Conservation ("Vegetation, Animal, Ecology and Biodiversity Assessment") degree from the Cape Peninsula University of Technology (Refer to Appendix A, CV). Nicolaas Hanekom is suitably qualified SACNASP registered specialist.

1.2. Conditions Relating to this Report

The findings, results, observations, conclusions, and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information and knowledge of the area. Nicolaas Hanekom reserves the right to modify aspects of the report including the recommendations if and when new information may become available from on-going research or further work in this field, pertaining to this assessment.

This report may not be altered or added to without the prior written consent of the author. This restraint also refers to electronic copies of this report which are supplied as sub portion of other reports, including main reports. Similarly, any recommendations, statements, or conclusions drawn from or based on this report must specifically refer to this report. If such comments form part of a main report for this investigation, the report must be included in its entirety as an appendix or separate section to the main report.

1.3. Scope and Objectives

The assessments entailed both a literature review of the region, as well as on site evaluations, during which specific primary data will be collected and evaluated. In addition, the identification of animal species features will be undertaken allowing for the interpretation of the prevailing habitat form and associated processes.

All data collected in the field and during the literature review will be evaluated and interpreted in order to provide an understanding of the nature of the prevailing environment at a landscape and habitat level. In addition, specific evaluation of data relating to habitat form and structure will be undertaken, aiding in the identification of bio-physical anomalies within the prevailing environment. Such variance may be considered to be indicative of differing habitat forms, which under consideration, may be of higher order ecological value in relation of the prevailing environment. The protocol[1] provides the criteria for the reporting of requirements for the assessment and reporting of impacts on animal species for activities requiring environmental authorisation.

[1] Published in Government Notice No. 1150. GOVERNMENT GAZETTE 43855 30 OCTOBER 2020.This gazette is also available free online at www.gpwonline.co.za

General Information

An applicant intending to undertake an activity identified in the Scope of this Protocol, on a site identified as being of "high sensitivity" for animal species on the national web based environmental screening tool must submit an animal species impact assessment report. Where the information gathered from the Initial Site Sensitivity Verification and the specialist assessment differs from the designation of "very high, high or medium" animal species sensitivity from the national web based environmental screening tool and it is found to be of a "low" sensitivity, then an animal species impact assessment is not required. Should this apply, an animal species Compliance Statement is to be provided.

1.4. Terms of Reference

The assessment must be undertaken by a suitably qualified and SACNASP registered specialist, within the preferred development site and on the preferred development footprint. The description of the preferred site must include the following aspects, as a minimum and must be considered in the baseline description:

- The assessment must be undertaken in accordance with the *Species Environmental Assessment Guideline*[2]; and must; identify the SCC which were found, observed or are likely to occur within the study area;
- provide evidence (photographs or sound recordings) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility[3], immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3);
- identify the distribution, location, viability[4] and provide a detailed description of population size of the SCC, identified within the study area;
- identify the nature and the extent of the potential impact of the proposed development on the population of the SCC located within the study area;
- determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases, including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases;
- determine the potential impact of the proposed development on the habitat of the SCC located within the study area;
- include a review of relevant literature on the population size of the SCC, the conservation interventions as well as any national or provincial species management plans for the SCC. This review must provide information on the need to conserve the SCC and indicate whether the development is compliant with the applicable species management plans and if not, include a motivation for the deviation;
- identify any dynamic ecological processes occurring within the broader landscape that might be disrupted by the development and result in negative impact on the identified SCC, for example, fires in fire-prone systems;
- identify any potential impact of ecological connectivity in relation to the broader landscape, resulting in impacts on the identified SCC and its long term viability;

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[2] Available at https://bgis.sanbi.org/

[3] The preferred platform is iNaturalist.org but any other national or international virtual museum

[4] the ability to survive and reproduce in the long term

- determine buffer distances as per the *Species Environmental Assessment Guidelines* used for the population of each SCC;
- discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, *Data Deficient* or *Near Threatened Species*, as well as any undescribed species[5]; or roosting and breeding or foraging areas used by migratory species where these species show significant congregations, occurring in the vicinity; and
- identify any alternative development footprints within the preferred site which would be of "low" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification.

The findings of the Animal Species Impact Assessment must be written up in an Animal Species Impact Assessment Report. This report must include as a minimum the following information:

- Contact details and curriculum vitae of the specialist including SACNASP registration number and field of expertise and their curriculum vitae;
- A signed statement of independence by the specialist;
- Duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- A description of the methodology used to undertake the impact assessment and site inspection, including equipment and modelling used where relevant; a description of the mean density of observations/number of sample sites per unit area[6] and the site inspection observations;
- a description of the assumptions made and any uncertainties or gaps in knowledge or data;
- details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;
- the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;
- the location of areas not suitable for development and to be avoided during construction where relevant;
- a discussion on the cumulative impacts;
- impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);
- a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and
- a motivation must be provided if there were any development footprints identified as above that were identified as having "low" or "medium" animal species sensitivity and were not considered appropriate.

1.5. Approach and Methodology

A literature review and desktop analysis were undertaken prior to the field investigation, utilising various sources including the South African National Biodiversity Institute ("SANBI") data and other relevant sources. Recent and historical aerial imagery of the site was reviewed

[5] Undescribed species are to be assessed as "High Sensitivity"
[6] Species Environmental Assessment Guideline

in order to identify points for investigation during the field survey. Utilising the above information, a field investigation was undertaken whereby:

- Sites of geomorphological or topographic variance were identified and subjected to an evaluation of species present within line transects established across the selected site.
- Species were identified and collated.
- Additional random sample points were selected from other sites surrounding the proposed impacted areas for comparative purposes.
- Any additional species of significance, not identified within the sample sites were also noted.

As explained below, there is specific period for the assessment of habitat within this region and in terms of animal species can be conducted anytime of the year.

All data was collated and subjected to evaluation using methods in order to:

- Give consideration to the overall structure of habitat within the subject site.
- Identify any habitat anomalies that may be identified in such analysis.
- Allow for the interpretation of such data in order to prioritise and evaluate habitat form and structure within the study area.

1.6. Assumptions and limitations

The presence of fauna must be evaluated based on the literature and available databases but in many cases, these databases are not intended for fine-scale use and the reliability and adequacy of these data sources relies heavily on the extent to which the area has been sampled in the past. Many areas have not been well sampled with the result that the species lists derived for the area do not always adequately reflect the actual fauna and flora present at the site. Cryptic/nocturnal animals might not have been sampled and encountered. This is acknowledged as a limitation of the study, however it is substantially reduced through extracting the species lists for a substantially larger area than the site and through the inclusion of information from previous experience in the wider area. The assessment was undertaken using sampling methods appropriate to the protocols, terms of reference and methodologies described above.

For the Avi-Fauna point counts, which involve standing at designated locations to record birds seen or heard, walking transects, walk along predefined lines and observations when in the area were used as sampling methods. Sampling was done within the months recommended in the Species Environmental Assessment Guidelines.

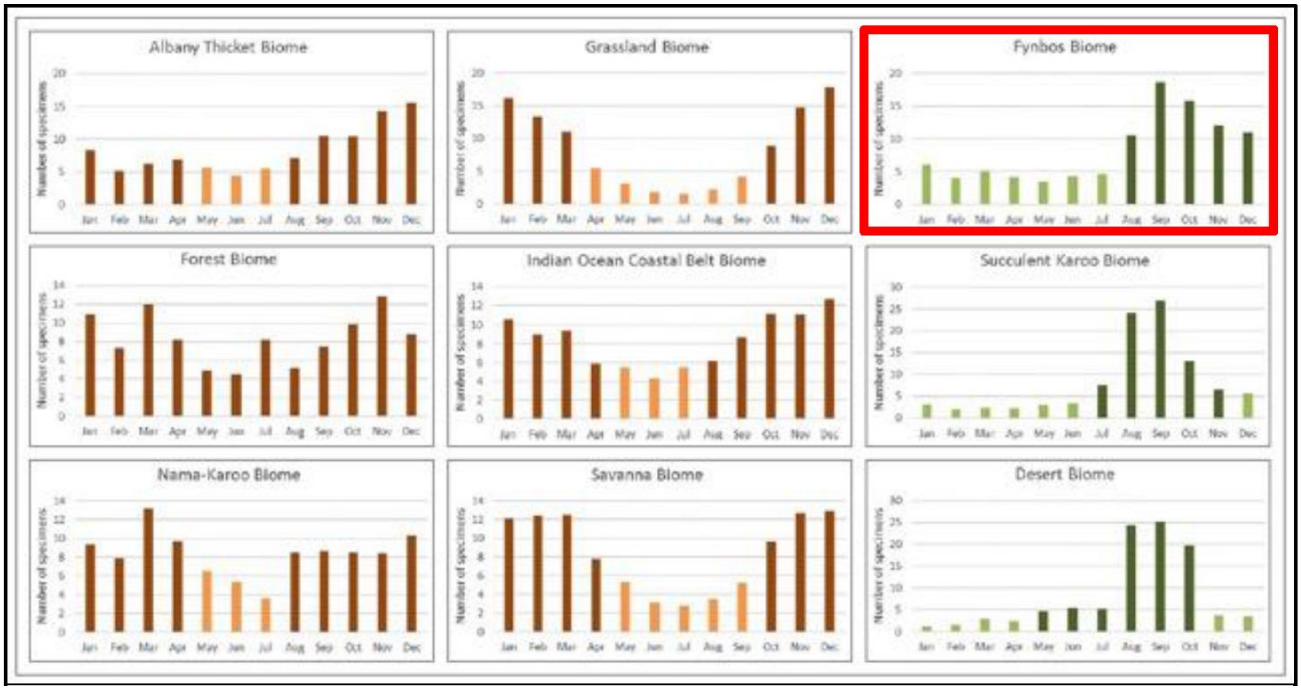

Figure 1: Recommended survey periods for different biomes (Species Environmental Assessment Guidelines). The site is within the fynbos biome.

For the listed species likely to be impacted survey sampling and recording was focused on their habitat.

The timing of the survey is therefore regarded as optimal in terms of accurately assessing the fauna of the site. The overall condition of the vegetation can still be determined with a high degree of confidence. An accurate idea of the priority conservation areas, animals and botanical species was gained, due to the use of a combined habitat and species-based approach, and confidence in the accuracy of the findings is high. The overall confidence in the completeness and accuracy of the animal species findings at this point in time is considered to be good. A follow-up survey is not considered essential for decision-making.

1.7. Source of Information

A literature review and desktop analysis were undertaken prior to the field investigation. Literature sources included:

- Amphibians –Du Preez & Carruthers (2009), FrogMap (FitzPatrick, 2023).
- Reptiles – Alexander & Marias (2007), ReptileMap (FitzPatrick, 2023).
- Mammals –MammalMap (FitzPatrick, 2023).
- IUCN, 2023.
- iNaturalist, 2023.

Recent and historical aerial imagery of the site was reviewed in order to identify points for investigation during the field survey. Utilising the above information, a field investigation was undertaken whereby:

- Sites of geomorphological or topographic variance were identified and subjected to an evaluation of species present within transects established across the selected site.
- Species were identified and collated.

- Additional random sample points were selected from other sites surrounding the proposed impacted areas for comparative purposes.

1.8. Site Visit

The site surveys were conducted on 6 October 2019 and 28 July 2023. The weather conditions were perfect for animal species surveys. The surveys were conducted in an ideal period for the assessment of animal species within this region, especially the October survey. The sampling and analysis of the site during the optimal season provides suitable data and results to present an informed decision on the local animal species. During the site visit, the different biodiversity features, habitat, vegetation, and landscape units present were identified and recorded in the field. Walk-through-surveys were conducted of representative habitats and areas of interest and all animal species observed were recorded. Searches for listed and protected animal species at the site were conducted and the location of all listed animal species observed was recorded (if present). Observations were visual (i.e., the animals were observed), acoustic (the animals were heard), or based on the presence of tracks or dung. The survey consisted of walking throughout the study area, observing the study site from different vantage points, and attempting to cover the entire property sufficiently to determine the presence or absence of the SCC (with an emphasis on the area that forms the development footprint, and the areas directly around the development footprint). The main purposes of the site visit were to determine whether any of the SCC flagged by the screening tool occur at the study site and if there are any SCC present at the site that were not picked up by the screening tool.

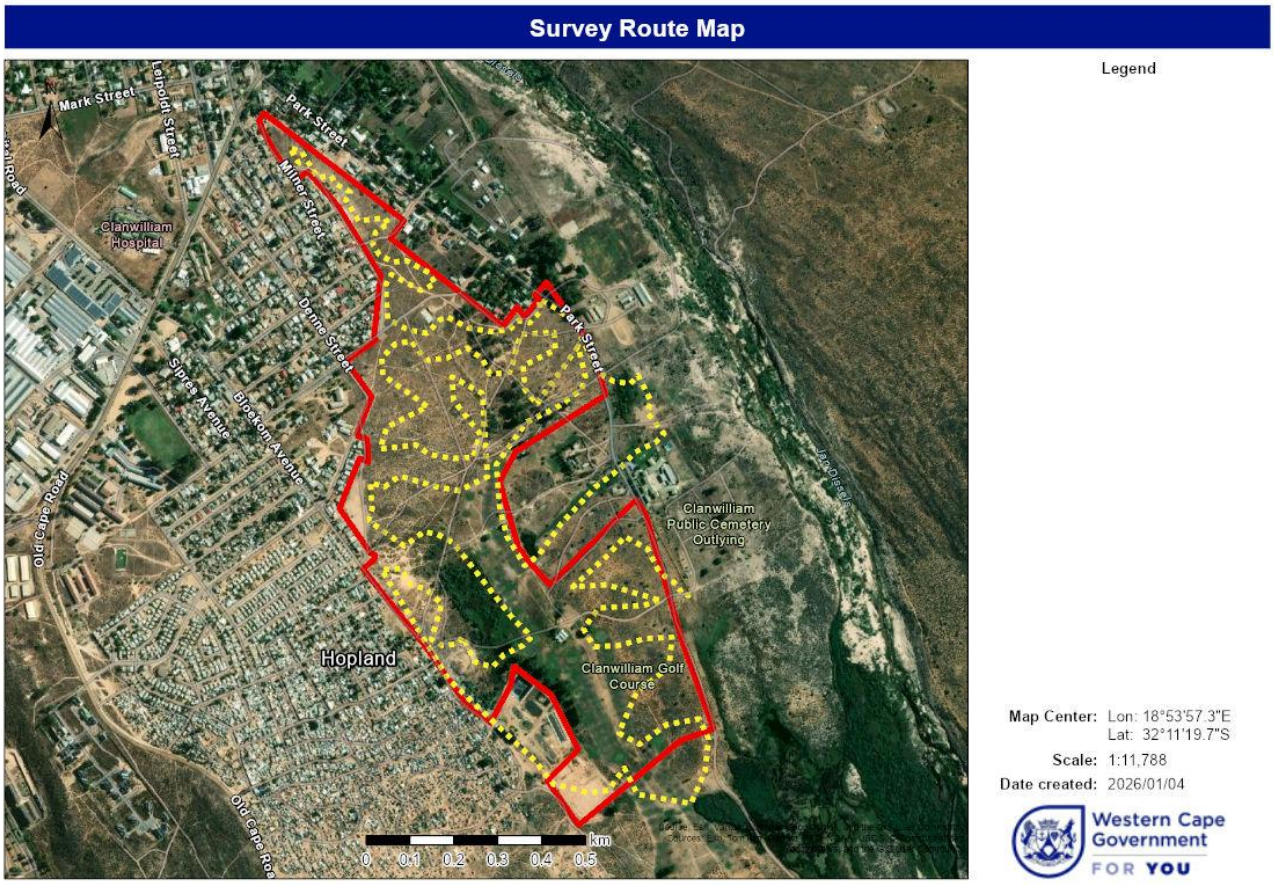

Figure 2: Survey Map

1.9. Sensitivity Mapping and Assessment

Habitat *Sensitivity Mapping and Assessment and methodology*

Sensitivity Mapping and Assessment (Site Ecological Importance)[7]

Where the site-specific assessment produces lower or higher SEI classification than the 'environmental sensitivity' output of the screening tool for that particular site, it is the responsibility of the specialist to provide a clear and defensible justification for the difference. SEI is considered to be a function of the biodiversity importance (BI) of the receptor (e.g. species of conservation concern, the vegetation/fauna community or habitat type present on the site and its resilience to impacts (receptor resilience [RR]) as follows:

$$SEI = BI + RR$$

BI in turn is a function of conservation importance (CI) and the functional integrity (FI) of the receptor as follows:

$$BI = CI + FI$$

Conservation importance (CI) is evaluated in accordance with recognised established internationally acceptable principles and criteria for the determination of biodiversity-related value, including the IUCN Red List of Species, Red List of Ecosystems and Key Biodiversity Areas (KBA; IUCN [2016]).

Conservation importance is defined here as:
"The importance of a site for supporting biodiversity features of conservation concern present, e.g. populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.'

These criteria are defined as follows:
IUCN threatened and Near Threatened species (CR, EN, VU and NT) are defined as either the global or national assessments of the risk of extinction as evaluated by a dedicated panel of species specialists according to the criteria of the International Union for The Conservation of Nature (www.iucnredlist.org). Where the global and national assessments differ for the same taxon, the national evaluation of status should be used in calculating SEI unless the global assessment is both more recent and of a more threatened category. It is important to note that the specialist is required to have a firm understanding of the IUCN Red List Categories and Criteria (IUCN 2012) in order to appropriately apply these for the evaluation of SEI. This criterion can be assessed using confirmed occurrences of species or the suitability of the habitat to support these species.

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[7] South African National Biodiversity Institute (SANBI). 2020. *Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa.* South African National Biodiversity Institute, Pretoria. Version 3.1. 2022.

Rare species are those included on South Africa's National Red List as Rare or Critically Rare or Extremely Rare. These are highly restricted species that are currently not declining. However, should any development impact on a population of these species they will immediately qualify under one of the IUCN categories of threat.

Range-restricted species – the presence of terrestrial flora, vertebrate and invertebrate fauna with a global population extent of occurrence (EOO) of 10 000 km^2 or less.

Globally significant populations of congregatory species – a roughly estimated proportion (%) of the global population of a fauna species that congregate for breeding/ feeding/hibernation/other reasons.

Significant areas of threatened vegetation types – this is a function of both the area (size) being considered in relation to the total extent of that vegetation type (i.e. proportion) and how threatened (CR, EN, VU) the vegetation types are.

Natural processes – natural unmanaged areas with low levels of ecological disturbance have largely intact natural processes such as pollination, seed dispersal and migration, and thus have greater intrinsic conservation importance than those that are modified through ecological disturbance.

While most of the features that will be included in the CI will be provided by the screening tool, it is important to note that CI is evaluated at a much finer spatial scale and based on fieldwork data collection and comprehensive desktop analyses performed by the specialist during the EA process. As a minimum requirement, CI needs to be determined for each identified habitat within the project footprint/PAOI, but best practice recommendation is that it should be determined for all habitats within the entire PAOI.

Fulfilling criteria to evaluate CI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation, providing a more robust evaluation of CI as per table below.

Conservation importance	**Fulfilling criteria**
Very high	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that have a global EOO of < 10 km^2. Any area of natural habitat of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type. Globally significant populations of congregatory species (> 10% of global population).
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A, if listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining.

	Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species. Globally significant populations of congregatory species (> 1% but < 10% of global population).
Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.
Low	No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC.
Very low	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

Furthermore, while CI is most likely to be assessed based on data collected during the fieldwork survey, it can also be an assessment of the suitability of the receptor to support populations conforming to the fulfilling criteria. As can be seen from the worked example below, each of these evaluations of the fulfilling criteria demand necessary justification.

Functional integrity (FI) of the receptor (e.g. the vegetation/fauna community or habitat type) is defined here as the receptors' current ability to maintain the structure and functions that define it, compared to its known or predicted state under ideal conditions. Simply stated, FI is:
'A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.'

These criteria can be defined as:

- Connectivity to other natural areas – connectivity, which can also be measured conversely as the degree of habitat fragmentation, refers to how connected habitat patches are to each other, which has a significant influence on numerous ecological process, such as migration and dispersal opportunities of biota and therefore genetic exchange between populations. Connectivity to other similar habitats becomes more important as the remaining intact and functional area of a habitat decreases, mainly because population sizes decrease and are therefore at greater risk from ecological perturbations and inbreeding effects. The degree of connectivity between habitat patches varies greatly with the dispersal ability of the taxon or taxon group (e.g. fossorial reptiles) in question.

- Degree of current persistent negative ecological impacts – persistent negative impacts such as uncontrolled spread of alien and invasive flora effectively decreases both the remaining intact area and ecosystem functioning of a particular habitat.

- Remaining intact and functional area – the proportion of the receptor that supports natural habitat with intact ecological processes – small areas are less likely to withstand ecological degradation compared to large areas, and the latter are therefore better able to maintain structure and function allowing for intact ecological processes.

$$SEI = BI + RR$$

BI in turn is a function of conservation importance (CI) and the functional integrity (FI) of the receptor as follows:

CI = **low** for Citrusdal Vygie Veld and wetlands habitat and **low** the golf course and infrastructure impacted habitat. > 50% of receptor contains natural habitat with potential to support SCC. The PAOI vegetation and habitat has LC conservation status.

- FI= **high** for Citrusdal Vygie Veld and wetlands habitat and **low** the golf course and infrastructure impacted habitat. Reason be that the vegetation and habitat has not been lost. No Species of Conservation Concern was mapped.

BI = CI + FI

Therefore, using table below, the BI was assessed to be **medium** for Citrusdal Vygie Veld and wetlands habitat and **low** the golf course and infrastructure impacted habitat

Recalling that biodiversity importance (BI) is a function of conservation importance (CI) and the functional integrity (FI) of a receptor, BI can be derived from a simple matrix of CI and FI as per table below.

Biodiversity importance		Conservation importance				
		Very high	High	Medium	Low	Very low
Functional integrity	Very high	Very high	Very high	High	Medium	Low
	High	Very high	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very low
	Low	Medium	Medium	Low	Low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

Receptor resilience (RR) is defined here as:

'The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.'

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor (refer to table below) and will require justification by the specialist. The specialist needs to bear in mind that resilience will often be linked to a particular disturbance or impact, or even time of year, and needs to be described in relation to these factors. Receptor resilience needs to be evaluated by the specialist and justification for each evaluation must be provided in the report.

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

The RR = **medium** for Citrusdal Vygie Veld and wetlands habitat and **very high** the golf course and infrastructure impacted habitat because the site will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed**.** Reason be that the vegetation and habitat has not been lost for intact vegetation that can recover.

Finally, after the successful evaluation of both BI and RR as described above, it is possible to evaluate SEI from the final matrix below.

SEI should be described in the above manner for each impact receptor within the PAOI and clearly mapped in relation to the proposed development activities and infrastructure. Interpretation of SEI in the context of the proposed development activities as per table below must be provided by the specialist. It is very important to note that SEI is specific to the proposed development activities and cannot be meaningfully compared between different proposed projects with different associated activities on the same spatial location. However, SEI for the same proposed development with multiple alternative layouts and/or locations may be compared within the same study.

Site ecological importance		Biodiversity importance				
		Very high	High	Medium	Low	Very low
Receptor resilience	Very low	Very high	Very high	High	Medium	Low
	Low	Very high	Very high	High	Medium	Very low
	Medium	Very high	High	Medium	Low	Very low
	High	High	Medium	Low	Very low	Very low
	Very high	Medium	Low	Very low	Very low	Very low

Guidelines for interpreting SEI in the context of the proposed development activities.

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

SEI **(medium although in the screen tool report mapped as low in PAOI)** = BI (**medium**) + RR (**medium**) for Citrusdal Vygie Veld and wetlands habitat and **very low** for the golf course and infrastructure impacted habitat.

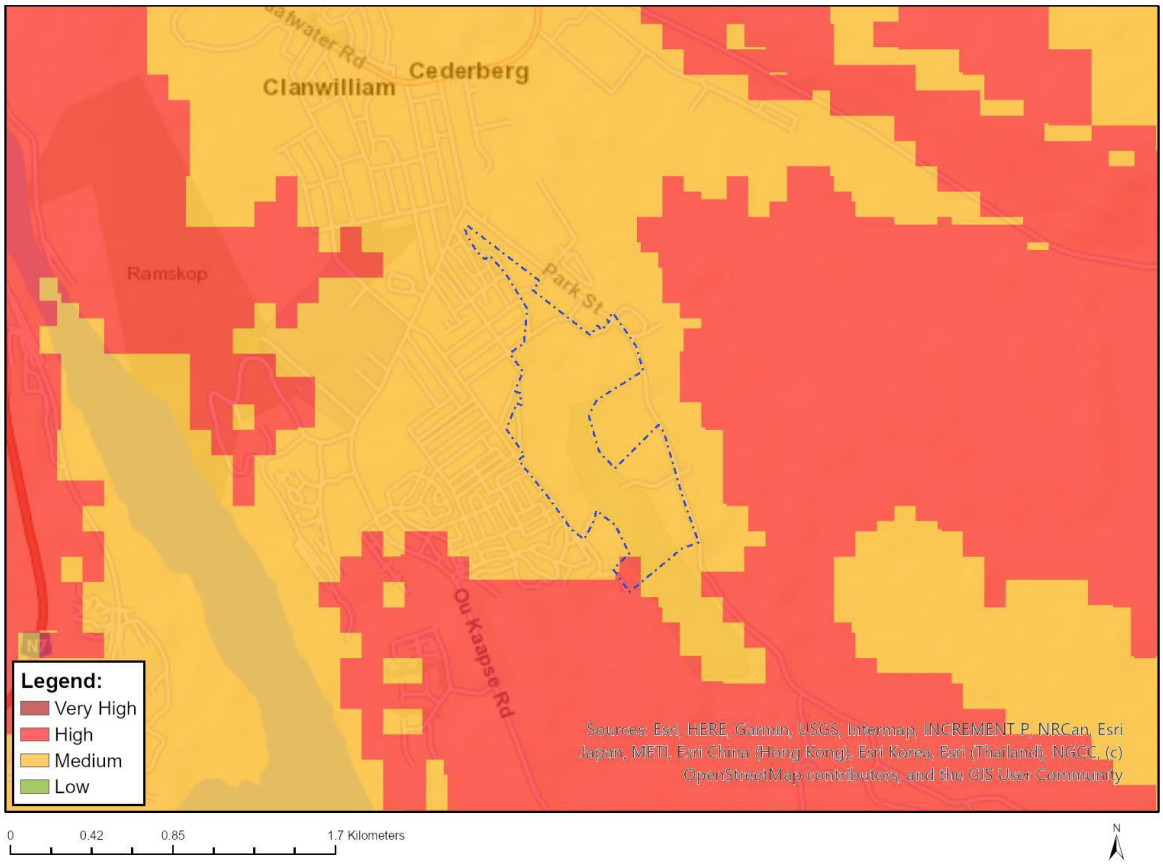

Figure 3: Project Area of Influence map relevant to plant species as per the environmental screen tool report.

The following sensitive species were list in the environmental screen report and special focus was placed on these species, their habitat, presence and signs of their existence on the site during the site survey:

- Aves - *Circus maurus* (EN) **High sensitivity**
- Aves - *Polemaetus bellicosus* (EN) **High sensitivity**
- Aves - *Sagittarius serpentarius* (VU) **Medium sensitivity**
- Aves - *Neotis ludwigii* (EN) **Medium sensitivity**
- Aves - *Aquila rapax* (EN) **Medium sensitivity**
- Reptilia - Sensitive species 32 (EN) **Medium sensitivity**
- Invertebrate- *Pachysoma aesculapius* (VU) **Medium sensitivity**
- Invertebrate- *Pachysoma glentoni* (VU) **Medium sensitivity**
- Invertebrate- *Brinckiella mauerbergerorum* (VU) **Medium sensitivity**
- Invertebrate- *Brinckiella aptera* (VU) **Medium sensitivity**

The following additional animal species of significance that could be impacted by the proposed development not listed in the Environmental Screen tool report were list for the Quarter Degree Squares (QDS) which was extracted from the SABIF/SIBIS database hosted by SANBI:

- Tent Tortoise *Psammobates tentorius* (Near Threatened) Habitat not on site
- Blue Crane *Anthropoides paradiseus* (Vulnerable) Not recorded and will not be impacted
- Grey Rhebok *Pelea capreolus* (Near Threatened) Not recorded and will not be

impacted

- Leopard *Panthera pardus* (Vulnerable) Not recorded and will not be impacted.
- Barnard's Rock-catfish *Austroglanis barnardi* (Endangered) Not recorded and will not be impacted. Habitat not on site.
- Clanwilliam Yellowfish *Labeobarbus seeberi* (Near threatened). Not recorded and will not be impacted. Habitat not on site.

Criteria for establishing Site Ecological Importance and description of criteria.

Criteria	Description
Conservation Importance (CI)	*The importance of a site for supporting biodiversity features of conservation concern present e.g. populations of Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types,*
Functional Integrity (FI)	*A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current*
Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor.	
Receptor Resilience (RR)	*The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or*
Site Ecological Importance (SEI) is a function of Biodiversity Importance (BI) and Receptor Resilience (RR)	

TABLE 1: LISTED SPECIES OF CONSERVATION CONCERN, THEIR THREAT STATUS, HABITAT REQUIREMENT, LIKELIHOOD OF OCCURRENCE BASED ON HABITAT REQUIREMENTS AND SITE ECOLOGICAL IMPORTANCE.				
Species	**Threat status**	**Habitat requirements**	**Likelihood of occurrence based on habitat and current records** **Probability of Occurrence**	**Site Ecological Importance (SEI)** **Importance (CI)** **Biodiversity Importance (BI)** **Functional Integrity (FI)** **Receptor Resilience (RR)**
Aquila rapax	EN	The regional population of Tawny Eagle *Aquila rapax* appears to have decreased at a rate greater than 50% over three generations, satisfying the thresholds for regionally Endangered under criterion A2. In addition, the regional population of less than 1 000 birds is estimated to be undergoing a continuous decline estimated to be greater than 20% in two generations, satisfying the population criterion C1 for regionally Endangered. Distribution The Tawny Eagle is widespread throughout sub-Saharan Africa (Ferguson-Lees and Christie 2001). In southern Africa, it is largely concentrated in protected areas in the north-east and central parts of the region (Simmons 1997), which is	Tawny eagles have an extremely extensive natural distribution. They normally occur and are recorded in the northern and central parts of South Africa, i.e. mainly north of the Orange River but sometimes down to the Cape Province. The likelihood of them being recorded on site is very low or unlikely. They were not recorded during the survey and will not be impacted.	**SEI – Low Sensitivity** **CI = Medium** **FI = High** **BI = Medium** **RR = High. Habitat not on site or in close proximity.**

		confirmed by more recent SABAP2 data. The species is well represented in the IBA network, with Kruger National Park having the highest reporting rates, followed by Kgalagadi Transfrontier Park in Northern Cape and the northern KwaZulu-Natal parks of Ndumo, Mkuze, Hluhluwe-iMfolozi and the iSimangaliso Wetland Park. Outside of protected areas, the Tawny Eagle has disappeared from large parts of its former range, with reporting rates being substantially lower in SABAP2 than in SABAP1, or with the species now completely absent from certain grid cells. This is consistent with findings by Herremans and Herremans-Tonnoeyr (2000) who found that Tawny Eagle densities in Botswana declined significantly with an increase in distance away from protected land. In particular, the species seems to have disappeared from large parts of the Northern Cape, Free State and Limpopo provinces. A small, sparsely distributed population persists in the		

		grassy Karoo where they have capitalised on power-lines, using pylons as nest structures (Simmons 1997). There are no clear seasonal movements and the species appears to be sedentary (Steyn 1982). It is considered to be a vagrant to Lesotho (Osborne and Tigar 1990). In different parts of southern Africa, population densities depend on soil types and primary productivity (Hustler and Howells 1986) and on the extent of protected areas (Tarboton and Allan 1984, Brown 1991b), with densities much higher (1.5 pairs/100 km2) within conservation areas than outside (0.3-1 pair/100 km2). The AoO provided by SABAP2 is 98 187 km2 of which 34 146 km2 is protected and 64 031 km2 unprotected. While the EoO estimates have decreased only marginally (9%) between SABAP1 and SABAP2, the AoO has decreased by 58% since SABAP1 (mainly 1987-1993).[8]		

[8] https://speciesstatus.sanbi.org/assessment/last-assessment/2983/

Polemaetus bellicosus	EN	The regional population of the majestic Martial Eagle Polemaetus bellicosus is estimated at c. 800 mature individuals and is believed to be undergoing a continuous population decline of greater than 20% over a period of two generations. In addition, there appears to have been a suspected population size reduction of greater than 30% over the last three generations where the reduction or its causes may not have ceased or may not be understood or may not be reversible. For these reasons, it is listed as regionally Endangered. The Martial Eagle is found throughout sub-Saharan Africa, only being absent from the lowland forests of West Africa (Ferguson-Lees and Christie 2001). With the exception of Lesotho, the species is widespread in the region but is more commonly encountered in protected areas such as in the Lowveld and Kalahari (Barnes 2000). Two conservation areas, the Kruger National Park and the Kgalagadi Transfrontier Park,	Was not recorded on site. Citrusdal vygie veld and surrounding area habitat in the project area is appropriate for this species. Was recorded in the greater area. However, due to the closeness of the impact area to the existing town and on its edge, this species utilize the bigger surrounded areas into the Cederberg.	**SEI – Low Sensitivity** **CI = Medium** **FI = High** **BI = Medium** **RR = High. Habitat not on site or in close proximity.**

		together hold a substantial proportion of the region's population. Outside of protected areas in the former Transvaal, Martial Eagle territory sizes are on average between 300 and 1 000 km^2 in extent; however, such territory sizes are probably not natural, and may be attributable to persecution and human-induced alteration of primary productivity (van Zyl 1992). In more natural situations, Martial Eagles still require an exceptionally large home range, in excess of 130 km2 (Brown et al. 1982). Densities in areas stocked with indigenous game are higher than in areas supporting only domestic stock, and the species is virtually absent from cultivated areas (Machange et al. 2005). Breeding adults are thought to be sedentary; juveniles and immature birds, however, wander widely from their natal areas (Simmons 2005). The recent SABAP2 maps indicate a decrease in EoO (13.99%) while the AoO estimates show an alarming decrease of		

		53.47% indicating that it has not been detected in more than half of its former range. The pressure that this species is facing outside of the large protected areas is even more dramatic with reporting rates from the SABAP2 project showing large decreases or even absence from large areas of their former range. According to Parker (1999) it is scarce in neighbouring Sul do Save, southern Mozambique. The global population has not been estimated (BirdLife International 2014) although tens of thousands seems probable (Ferguson-Lees and Christie 2001). Despite this large population size, the Martial Eagle is threatened across its range and has experienced a decline in population numbers within the region (Boshoff 1997), as well as outside the region, with declines reported in Namibia (Brown 1991), southern Mozambique (Parker 1999), and possibly Zimbabwe. No regional population estimate currently exists. Figures from		

		1982 suggested approximately 300 mature individuals occurred in Western, Eastern and Northern Cape provinces combined (Brooke 1984). However, a survey of a single electricity pylon line of 1 400 km in the central and south-western Karoo by Machange et al. (2005) estimated 34 active Martial Eagle territories indicating that the estimate provided by Brooke (1984) was more than likely an underestimate. Although Tarboton and Allan (1984) suggested 1 000 mature individuals occurred in the former Transvaal, with 137 pairs in Kruger National Park, numbers must be much less than this today. Murn et al. (2012) estimated a breeding population of 110 mature individuals in the Kruger National Park based upon their 2011 aerial survey of nests, a decrease of at least 50%. In 1994, the Swaziland total was estimated at 40 mature individuals (Parker 1994) while more recently Monadjem and Rasmussen		

		(2008) estimated that there were 14 mature individuals within protected areas in Swaziland representing a decline of greater than 50%. In summary, Brooke (1984) suggested a total regional population of less than 2 000 mature individuals while Barnes (2000) estimated there to be less than1 200 mature individuals in the region. Taking into account historical as well as reported decreases, the present regional population is estimated be c. 800 mature individuals. The confidence in this regional population estimate is medium. The global population trend is difficult to quantify but is suspected to have undergone a moderately rapid decline over the past 56 years (BirdLife International 2014). Lower reporting rates outside protected and sparsely inhabited areas suggest a dramatic decrease in densities throughout the region. Worryingly, reporting rates for large protected areas, such as Kruger National Park, also		

		show a large decrease. The large number of checklists available for pentads in these areas means that the differences in protocol between SABAP1 and SABAP2 cannot be responsible for the consistent decrease in reporting rates. Based upon this, the decline seen in past years is probably ongoing and is believed to have been greater than 40% over the past three generations (56 years). This reduction in population size has not ceased and may not be reversible. The confidence in this regional population trend estimate is medium[9].		
Black Harrier *Circus maurus*	EN	1,340,000km^2 251-999 individuals This species occurs in coastal and montane fynbos in the Western Cape particularly near vleis, marshes, streams or dams as well as dry grasslands, Karoo subdesert scrub, open plains with low shrubs and croplands. In renosterveld breeding	Was recorded roaming inland, but is also likely to roam the area. *Rhabdomys pumilio* does occur in the project area suggesting that it could use the project area for foraging. Primary nesting habitat is not present. Harriers breed close to coastal and upland marshes, damp sites, near vleis or streams with tall shrubs or reeds. Could roam the area and especially the	**SEI – High Sensitivty** **CI = Medium** **FI = High** **BI = Medium** **RR = Low.** **SEI – High (Correct sensitivity as reported in screen tool report.**

[9] https://speciesstatus.sanbi.org/assessment/last-assessment/3140/

		restricted to intact patches exceeding 100ha. Breeds close to coastal and upland marshes with tall shrubs or reeds, damp sites, near vleis, marshes or streams, are preferred for breeding. Nests are shallow platform nests built on the ground, either dry or damp underfoot and not over water. Concealed by rank vegetation. This species breeds from Aug-Nov with nestlings departing approximately two months later. Prefers open ground with low vegetation for hunting, where it feeds on a diet comprising mainly of small mammals, especially *Otomys* and *Rhabdomys* species at coastal sites and birds in montane habitats. At inland sites the diet shifts between small mammals to birds depending on the season. (BirdLife Int., 2016; Taylor et al., 2015; Tarboton, 2014 and Chittenden, 2009)	citrusdal vygie vegetation habitat area.	
Sagittarius serpentarius	EN	The regional population of the magnificent Secretarybird Sagittarius serpentarius	Was not recorded on site. Habitat in the project area is not appropriate for this species. Is	**SEI – Low Sensitivity** **CI = Medium** **FI = High**

		satisfied the criteria for regionally Vulnerable, having undergone a population size reduction of greater than 30% over the past 10 years; this reduction and its causes may not have ceased, is not fully understood and may not be reversible (A4). Trends are based on data from (a) direct observation, (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat, and (d) levels of exploitation. In addition, the population size is estimated to number less than 10 000 mature individuals and is projected to undergo a continuing decline of at least 10% within the next three generations. This species is widespread throughout sub-Saharan Africa (Ferguson-Lees and Christie 2001). In South Africa the species has a broad distribution having been reported in 1 262 or 64.9% of South Africa's Quarter Degree Squares (QDSs) at the time of writing (Hofmeyr et al. 2014) In Swaziland, the species is only regularly encountered in	known and has been recorded or observed in the past in the greater vicinity.	**BI = Medium** **RR = High. Habitat not on site or in close proximity.**

		Malolotja National Park and neighbouring areas in the north-east of the country (Monadjem et al. 2003). The species occurs sparsely in Lesotho, where it is found mainly in the western lowlands. Secretarybirds are not migratory, but are highly mobile. Young birds in particular undertake extensive and often rapid movements (see map), primarily in arid areas, as indicated by fluctuations in numbers (Boshoff and Allan 1997, Herholdt and Anderson 2006). Simmons (2005) reported an individual that moved 1 537 km from its ringing site in the Mpumalanga Lowveld, to northern Namibia. The density of breeding pairs varies across the range. Tarboton and Allan (1984) reported densities of 0.2-2.0 pairs/100 km2 across the former Transvaal, while Kemp (1995) provides an estimate of 150 km2/pair in Highveld grasslands. A similar estimate of 140 km2/pair was made in the Kgalagadi Transfrontier		

		Park and inter-nest distances of 4.5-15 km suggest comparable densities (Ferguson-Lees and Christie 2001). Actual territory sizes are estimated to be smaller, due to unsuitable habitat or paucity of nest trees between territories, with Kemp (1994) reporting estimates of 70 km2/pair in Highveld grasslands and 45-20 km2/pair in open and more wooded savannahs. The species is well represented in the Important Bird Area network in South Africa, being reported from over 74 IBAs. The global population of the Secretarybird remains unquantified, but is unlikely to be 'above five figures' (Ferguson-Lees and Christie 2001). Numbers fluctuate widely between years in any one area (Tarboton and Allan 1984), making a regional population estimate extremely difficult. 1 068 pairs were estimated to occur in the former Transvaal (Tarboton and Allan 1984), although this estimate is almost certainly outdated. Kemp et al. (2001)		

		estimated there to be 256±50 mature individuals in Kruger National Park and 128±50 mature individuals in the Kgalagadi Transfrontier Park. Parker (1994) estimated a total of 50 mature individuals in Swaziland, but Monadjem et al. (2003) reduced this to 10 mature individuals. 2 667 birds were recorded in the summer 2013 Coordinated Avifaunal Roadcounts (CAR) while 793 were recorded in winter surveys (Hofmeyr et al. 2014). However, CAR routes excluded large portions of the region, so the number of birds in South Africa could conceivably be between 3 500 and 5 000 mature individuals. The confidence in this estimate is low and requires verification. Ad-hoc records, localised surveys and anecdotal observations indicate apparent declines in many parts of the species' global range and, based on this evidence, the Secretarybird is suspected to be undergoing a rapid decline globally (BirdLife International 2014). Various		

		authors have also reported Secretarybird declines in the region. Boshoff et al. (1983) mentioned that the species had declined in Northern Cape and Western Cape provinces since 1960, while Hockey et al. (1989) mentioned a further decline in the southern Western Cape during the 1980s. Between 2009 and 2012, counts conducted by Ezemvelo KwaZulu-Natal Wildlife have indicated a greater than 50% decline in Secretarybird numbers (Ezemvelo KwaZulu-Natal Wildlife unpubl. data in Hofmeyr et al. 2014). A comparison of SABAP2 reporting rates has indicated a decrease of 73.5% relative to SABAP1 (Hofmeyr et al. 2014); reporting rates decreased in greater than 60% of the QDSs that the species was reported from in either atlas project. This consistent decrease in bird atlas reporting rates for the Secretarybird in a large proportion of QDSs suggests a decrease in abundance across most of its South		

		African range between 1991 and 2007 (Hofmeyr et al. 2014). A 27% decline in AoO from SABAP1 to SABAP2 further reinforces the conclusion that the regional population is in decline. The population trend is therefore deemed negative and ongoing. The rate of decline over the past three generations is greater than 30% although the exact rate of decline is unknown. The confidence in population trend estimate is medium. Habitat loss, driven by agriculture and urban development, is the primary threat to this species (Barnes 2000, Hofmeyr et al. 2014). Excessive burning and overgrazing of grasslands for livestock may reduce carrying capacity and availability of prey species (Parker 1994). Bush encroachment, which renders habitat unsuitable for Secretarybirds, has been proposed as the driver behind declines in abundance in Kruger National Park (Hofmeyr et al. 2014) and in Swaziland (Parker 1994). To a		

		smaller extent, trade of the species may be problematic but limited data are available and it uncertain whether the regional population is affected by this activity. Direct hunting and nest-raiding for uses other than trade have also been reported (Monadjem et al. 2003). Indiscriminate poisoning at waterholes is also listed as a potential threat, as is drowning in sheer-walled reservoirs (Anderson et al. 1999). Secretarybirds suffer mortalities through collisions with power-lines (Hartley 1991) and there is a risk in South Africa that wind farms might negatively affect this species in the future (EF Retief pers. obs). Secretarybirds are widely acknowledged as snake-eaters by rural people; ironically, persecution and disturbance of Secretarybirds at the nest, impedes the natural snake control that the birds exert10.		
Neotis ludwigii	VU	This species is only known from six localities in the Cape	Was not recorded on site.	**SEI – Low Sensitivity** **CI = Medium**

[10] https://speciesstatus.sanbi.org/assessment/last-assessment/3158/

		region of South Africa. Its estimated extent of occurrence (EOO) is ca 170,000 km², while its area of occupancy (AOO) is probably between 100 and 1,000 km². A record from Maclear (Armstrong and van Hensbergen 1999) is considered here uncertain as it is quite far away from the rest of the range. The species is associated with fynbos vegetation, where it has been collected "amongst partly burnt stands of evergreen Sclerophyll in rocky foothills" (Brown 1960). It prefers south-facing cool slopes (Kinvig 2005).	Citrusdal vygie veld and surrounding area habitat in the project area is appropriate for this species. However due to the closeness to the town and on edge and human activities on site, the likelihood of them being impacted or recorded on site is low and they will utilize bigger appropriate habitat in greater area.	**FI = High** **BI = Medium** **RR = High. Habitat not on site or in close proximity.**
Sensitive species 32	EN	Habitat on site is limited. The species shows a particular preference for rocky terrain (Loehr 2002a), which includes typical Namaqualand and Hardeveld granite koppies in the north, and typical Sandveld and Cederberg sandstone koppies and rocky ridges in the south. It occurs in low to medium-high Namaqualand succulent blomveld and heuweltjieveld, and fynbos and strandveld	Was not recorded on site. Habitat in the project area is appropriate for this species but limited to the citrusdal vygie veld habitat.	**SEI – High Sensitivty** **CI = Medium** **FI = High** **BI = Medium** **RR = Low.** **SEI – High (Correct sensitivity as reported in screen tool report.**

		shrub vegetation, both in the Succulent Karoo and Fynbos biomes. The species prefers to shelter in rock crevices or under medium to large boulders and rock slabs (Loehr 2002a), a behavior that provides protection to these small tortoises against temperature extremes (Loehr 2017b) and predation. The species has very small home ranges (average 3,470 square meters = 0.35 ha) and short daily movement distances (30-50 m) compared to other tortoises (Loehr 2015).		
Pachysoma aesculapius	VU	This beetle is part of the scarab beetle family and is listed as vulnerable by IUCN (Davis, 2013). However, as most of the historical distribution range of this species is within modified or developing coastline. Since it is unsure if this species is present in the in the West Coast National Park it must be regarded as the most threatened South African Pachysoma species (Harrison et.al., 2003). According to Harrison et. al., 2003, this beetle, historically,	*P. aesculapius* is a large, diurnal, flightless dung beetle. It is associated with firm, deep sands of coastal hummocks, riverbanks, and vegetated dunes. The species constructs permanent burrows where it stores collected dung pellets and plant detritus. Was not recorded on site. The study area is not near the coastal domain.	**SEI – Low Sensitivity** **CI = Medium** **FI = High** **BI = Medium** **RR = High. Habitat not on site or in close proximity.**

		could be found from Cape Town to the mouth of the Olifants River (which might be the barrier to the northwards extension of its distribution. The southern populations (Somerset West, Cape Flats, Salt River) material only dated from between 1882 to 1886 and are possibly now extinct (the most recent collection in the south is from the Modder River in 1987, which runs to the north of Grotto Bay). The West Coast National Park is the closest conservation area for this species, with a single record from the 1960's (which remains unconfirmed). This species of beetle appears to prefer firm sands on coastal hummocks, riverbanks and vegetated dunes (Harrison et. al., 2003). According to the IUCN red list database's geographical range, the study area might fall within the potential historical distribution range for this species. The most recent southern observation of this species was made at the Modder River, which is far to the northwest and nearer to		

		the coast. The study area is not near the coastal domain and the site itself is significantly degraded/transformed. According to Davis (2013) it is presumed locally extinct in the southernmost part of its known range. As a result, is considered highly unlikely that the proposed project will have any significant additional impact on the survival or distribution of this species.		
Pachysoma glentoni	VU	They are unique detritivores, subsisting solely on dry plant litter rather than dung, which they drag into underground storage chambers. Threats: The species is highly localized and restricted to specific dune habitats, making them vulnerable to habitat disturbance. Population: Estimated at approximately 10,000 individuals, though precise monitoring is difficult.	Pachysoma glentoni inhabits arid desert regions with sparse vegetation and sandy soil. Was not recorded on site and habitat is not on site.	**SEI – Low Sensitivity** **CI = Medium** **FI = High** **BI = Medium** **RR = High. Habitat not on site or in close proximity.**
Brinckiella mauerbergerorum	VU	Mauerberger's Winter Katydid is Vulnerable under criteria B1 and B2 because its extent of occurrence and area of occupancy are small (12000 and 40 km2, respectively), it	**Low** Was not recorded on site. Habitat in the project area is not appropriate for this species.	**SEI – Low Sensitivity** **CI = Low** **FI = High** **BI = Medium** **RR = High.**

		has only been recorded in ten locations, and area and extent of its habitat are estimated to be in decline. This species occurs within the Succulent Karoo and Fynbos biomes of Northern Cape and Western Cape Provinces, South Africa. Both biomes are notable biodiversity hotspots, naturally geographically restricted and under anthropogenic stress. This habitat type is predominantly utilized for livestock grazing, which causes shifts to the vegetation assemblage and can be detrimental to the species' host plants. This genus experienced an adaptive radiation in the Fynbos and Succulent Karoo biomes of Western and Northern Cape Provinces, South Africa, with at least 9 species known in a relatively small geographic area. Mauerberger's Winter Katydid has not been found within any nature reserve. This species is found in the Succulent Karoo biome, on succulent shrubs.[11]		

[11] https://speciesstatus.sanbi.org/taxa/detail/4301/

Brinckiella aptera	VU	The Mute Winter Katydid (Brinckiella aptera) is Vulnerable under criterion B1 because its extent of occurrence is relatively small (~12,500 km2), it has only been recorded in four locations, and its habitat quality is estimated to be in decline. This species occurs within the Fynbos and Succulent Karoo biomes, both of which are notable biodiversity hotspots, naturally geographically restricted and under anthropogenic stress. This habitat type is predominantly utilized for livestock grazing, cultivation with annual crops, and urban development which may be detrimental to the host plants of the species. The genus of this species experienced an adaptive radiation in the region, with at least 9 species known in a relatively small geographic area. This species is not known to occur within any protected areas. Distribution The Mute Winter Katydid is endemic to the Northern and	**Low** Was not recorded on site. Habitat in the project area is not appropriate for this species.	**SEI – Low Sensitivity** **CI = Low** **FI = High** **BI = Medium** **RR = High.**

		Western Cape Provinces of South Africa. Terrestrial This species is endemic to the Fynbos and Succulent Karoo biomes. It probably feeds on flowers and leaves of a very narrow range of host plants and occurs primarily on low, herbaceous shrubs. This species feeds and stridulates at night but can be found basking in the daytime on sunny days during the winter and early spring, from August until October, a time when very few insects are active. Very unusually for the genus and for katydids in general, this species is the first in its subfamily to display a complete lack of stridulatory organs, raising interesting evolutionary questions regarding mate attraction and intraspecies communication (Naskrecki and Bazelet 2009).		

The table above was used to refine the screen tool species list and include a well-motivated habitat suitability filter. The following species as listed in table below whose habitat is on site and likely to be impacted was further assessed in the assessment report:

- *Circus maurus*
- Sensitive species 32

Below listing observed fauna or uploading verified records from recognised biodiversity database (e.g., iNaturalist) in close proximity. Graceful Crag Lizard (*Hemicordylus capensis*); Toktok beetles; Graceful Crag Lizard (*Hemicordylus capensis*); *Cyphonistes vallatus vallatus*; Antlions and Owlflies; Red-winged Starling
(Onychognathus morio); Rain Spiders; Cape White-Eye (*Zosterops virens*); Southern Double-collared Sunbird (*Cinnyris chalybeus*); Large Southern Masked Weaver (*Ploceus velatus velatus*); Southern Red Bishop (*Euplectes orix*); Southern Laughing Dove (*Spilopelia senegalensis senegalensis*); Cape Sparrow (*Passer melanurus*); Southern Laughing Dove (*Spilopelia senegalensis senegalensis*); Large Southern Masked Weaver (*Ploceus velatus velatus*); Southern Masked Weaver (*Ploceus velatus*); House Sparrow (*Passer domesticus*); Digger Bees; African Red-eyed Bulbul (*Pycnonotus nigricans*); Egyptian Goose (*Alopochen aegyptiaca*); Cederberg Rock Scorpion (*Hadogenes minor*); Knox's Ocellated Sand Lizard (*Meroles knoxii*); Angulate Tortoise (*Chersina angulata*); Orange-winged Dropwing (*Trithemis kirbyi*); Ixoxo Eliklabalasayo (*Sclerophrys capensis*); Cape Legless Skink (*Acontias meleagris*); Yellow Bee Pirate (*Philanthus triangulum diadema*); Boas Rhinoceros Beetle (*Oryctes boas*); Pepper Ticks; Booted Eagle (*Hieraaetus pennatus*); Little Swift (*Apus affinis*); Sun Jumping Spiders and Asphodel Leaf Beetles.

2. APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

The proposed development within the study site is considered to elicit a requirement for possible compliance with the following legislation applicable to this assessment.

- The National Environmental Management: Biodiversity Act (Act 10 of 2004)

The potential applicability of the abovementioned acts to the subject site is provided below:

The National Environmental Management: Biodiversity Act (Act 10 of 2004)

This Act serves to control the disturbance and land utilisation within certain habitats, as well as the planting and control of certain exotic species. The effective disturbance and removal of species identified above, as well as possible other species (i.e. Threatened or Protected Species ("TOPS") species), will require specific permission from the applicable authorities. In addition, the planting and management of exotic plant species on site, if and where required, will be governed by the Alien and Invasive Species ("AIS") regulations, which were gazetted in 2014. These regulations compel landowners to manage exotic weeds on land under their jurisdiction and control.

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered

("CR"), endangered ("EN"), vulnerable ("VU") or protected. The Act provides for the listing of species as threatened or protected, fewer than one of the following categories:

- Critically Endangered: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- Endangered: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- Vulnerable: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future, although it is not a critically endangered species or an endangered species.
- Protected species: any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora ("CITES").

In this context, some indigenous genera and protected species were found on-site and is included in the respective species lists.

3. DESCRIPTION OF PROJECT ASPECTS RELEVANT TO ANIMAL SPECIES FEATURES

Cederberg Municipality for the Clanwilliam Housing Development in two areas and WWTW expansion on a portion of remainder of Erf 279, Clanwilliam to develop:

Area 1: CLANWILLIAM HOUSING IRDP PROJECT

- 126 Single Residential Zone 1 erven - Average erf size: ±208m²
- 692 Single Residential Zone 2 erven - Average erf size: ±150m²
- 13 Open Space Zone 1 erven
- 5 Community Zone II (church) erven
- 1 Community Zone I (crèche) erven
- 1 Community Zone I (school) erf
- 1 Community Zone I (community center) erf
- 1 Community Zone III (clinic) erf
- 3 Local Business Zone II erven
- 2 Authority & Utility Zone erf
- Transport Zone II erven

With a total development footprint of ±29.3883 ha

Area 2: CLANWILLIAM HOUSING UISP PROJECT

- 459 Single Residential Zone II erven - Average erf size: ±120m²
- 4 Open Space Zone I erven
- 2 Community Zone II (church) erven
- 2 Community Zone I (crèche) erven
- 1 Local Business Zone II erven
- Transport Zone II erven

With a total development footprint of ±19.7680ha

Expansion of the WWTW footprint by approximately 0.5ha to expand the WWTW infrastructure to treat less than 2000 cubic meters of effluent per day.

With a total Development footprint of ±49.6ha

Water Services
The existing water reticulation system of the Cederville reservoir water distribution zone has insufficient capacity to accommodate the proposed development.

Network upgrade
- Item 1 – 190m x 200mm diameter; replace existing 160mm pipe
- Item 2 – 90m x 160m diameter; replace existing 75mm pipe
- Item 3 – 285m x 160mm diameter internal water pipes
- Item 4 – 550mm x 160mm diameter internal water pipes
- CCIW2.1 – 220m x 315mm new supply pipe
- CCIW2.2 – 320m x 315mm; replace existing 75mm pipe
- CCIW2.3 – 260m x 315mm; replace existing 75mm pipe
- CCIW2.6 – 190m x 110mm new supply pipe

Reservoir
- CCIW.B1: 3 000 kL additional storage capacity for Cederville reservoir site
- CCIW.B12: 90 m x 315 mm Ø New feeder pipe to Cederville no. 2 reservoir
- CCIW.B16: 90 m x 315 mm Ø link pipe between Cederville no. 1 & 2 reservoirs
- CCIW.B17: 5 m x 160 mm Ø inter-connection pipe between 2x bulk pipes

Sewer Services
- CCIS6.1 – 380 m x 450 mm Ø Upgrade existing 150 mm Ø outfall sewer
- CCIS6.2 – 950 m x 200 mm Ø Upgrade existing 160 mm Ø outfall sewer
- CCIS6.3 – 475 m x 525 mm Ø Upgrade existing 150 mm Ø bulk sewer
- CCIS2.2 – 370 m x 200 mm Ø Upgrade existing 150 mm Ø outfall sewer
- CCIS2.3 – Upgrade capacity of Milner Street PS to 55 L/s
- CCIS2.4 – 780 m x 315 mm Ø Upgrade existing 200 mm Ø rising main
- CCIS4.1 – 260 m x 200 mm Ø New outfall sewer
- CCIS4.2 – 270 m x 250 mm Ø New outfall sewer
- CCIS4.3 – 350 m x 200 mm Ø New outfall sewer
- CCIS4.4 – New 20 L/s Future PS CI2
- CCIS4.5 – 1 005 m x 160 mm Ø New rising main

For the development of Area A the following upgrades are required:
- Master plan items CCIS6.2 & CCIS6.3 to reinforce the capacity of the existing gravity system
- between the proposed development and the Clanwilliam WWTP.
- Link services items CCIS4.1 & CCIS4.2 to connect the internal sewer network of the development area to future PS CI2, and

- Future PS CI2 (master plan item CCIS4.4) and rising main (master plan item CCIS4.5) to service the larger drainage area.
- A small portion of the development drains towards the existing Milner Street PS, which discharges into the Clanwilliam Gravity drainage areas. The bulk sewer downstream of the Milner Street PS is at capacity and should be upgraded (master plan items CCIS6.1 & CCIS6.3).
- The existing Milner Street PS drainage area has spare capacity to accommodate the erven within development area A which drains towards the Milner Street PS. In the sewer master plan for Clanwilliam upgrading of the Milner Street PS and accommodating rising main is however proposed (refer to master plan items CCIS2.3 & CCIS2.4), as well as upgrading of the main outfall sewer gravitating toward the Milner Street PS (refer to master plan item CCIS2.2). It can be considered to upgrade the PS, rising main and outfall sewer (master plan items CCIS2.2, CCIS2.3 & CCIS2.4) as part of the construction of the development as these items runs through the development area.

For the development of Area B the following upgrades are required:
- Link services items CCIS4.2 & CCIS4.3 to connect the internal sewer network of the development area to future PS CI2, and
- Future PS CI2 (master plan item CCIS4.4) and rising main (master plan item CCIS4.5) to service the larger drainage area.

Stormwater
An underground piped stormwater system will be provided to accommodate for the minor storm events (up to RI 1: 5 years). The major storm events will be accommodated within the street reserves. Stormwater run-off will be channelled to the existing Jan Dissels River flowing to the east of the proposed development using existing non-perennial river after it was detained and controlled released on an open space erf specifically created for stormwater control inside the development. Six other outlets on the eastern side will be constructed where stormwater pipe outlets will release stormwater next to roads and infrastructure. The degraded wetland on the western side and north of the WWTW with its greater open space area will be used to collect the existing stormwater released from the development on the western edge and other generated stormwater on the development. Building rubble and litter, as well as alien invasive trees will be controlled and eradicated from this area.

The stormwater infrastructure, comprising 21 headwalls, four attenuation ponds and a piped connection within the central valley-bottom wetland system, and the refurbishment and expansion of the WWTW, with a new 1.5 Ml/day module and the upgraded works intended to treat at least 3.6 Ml/day at peak, were assessed. With mitigation, the construction impacts and the operational impacts of the stormwater system are of Low significance. Combined with the Wetland Rehabilitation and Management Plan (Delta Ecology, 2026), the stormwater design offers an opportunity to improve the central wetland, which currently receives untreated stormwater from the informal settlement and township.

Roads
Access to the proposed development will be provided from the existing Bloekom Avenue, south of the proposed development, Denne and Buitekant Street to the west and from Oranje, Protea and Viooltjie Streets to the north. The internal roads (main access road 16m wide and other internal roads 10m wide) will consist of surfaced streets.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT.

4.1. Locality

Clanwilliam is situated in the West Coast District Municipality of the Western Cape Province. The town falls under the jurisdiction of the Cederberg Local Municipality for
local government purposes. Clanwilliam is the largest town in the Cederberg Municipality. Clanwilliam is situated at an elevation of 100 meters above mean sea level, between the western slopes of the Cederberg mountains and the east bank of the Olifants River, which is impounded nearby by the Clanwilliam Dam. It is situated at the foot of the Cedarberg Range where the Jan Dissels River flows into the broad Olifants River. Clanwilliam is located just off the N7 national road, which runs from Cape Town to the Namibian border. Clanwilliam is 230 kilometres from Cape Town by road.

The development is on a portion of remainder of Erf 279, Clanwilliam, which is situated on the south, south east and south western section of the town.

The sites are accessed via streets in town, especially Disa Avenue, Heuningtee Street, Bloekom Avenue and Ou Kaapse Weg. Property SG code is C02000020000027900000.

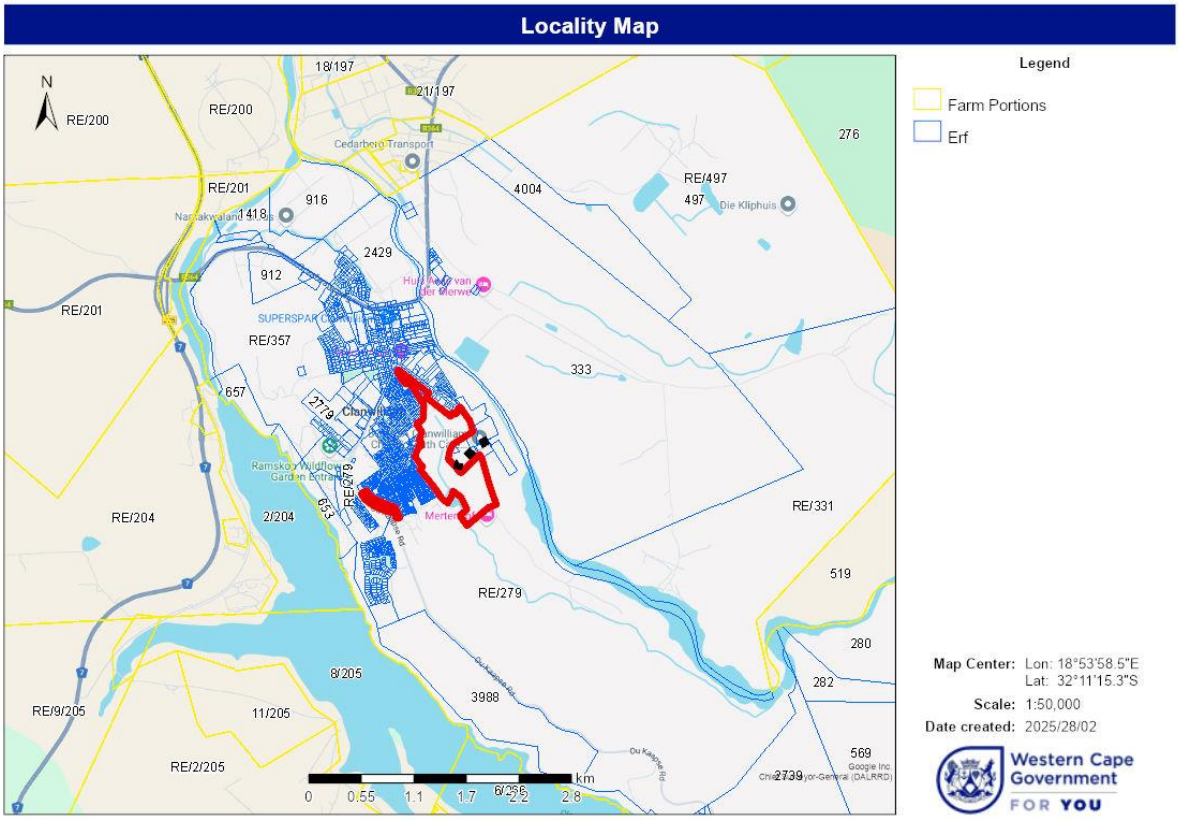

Figure 4: Locality Map

4.2. Topography

All three site has a low to moderate slope. Some steep slope areas are present on the south eastern section, but these areas is excluded from the development area.

4.3. Geology and Soils

Land Type: Ia196
Soil: Miscellaneous land classes, undifferentiated deep deposits
Geology: Alluvium and colluvium with mainly quartzitic sandstone of the Table Mountain Group and shale, siltstone and sandstone of the Bokkeveld Group.
Source: CapeFarmMapper dated 26 October 2023

4.4. Description of the Animal (Fauna) Species

Fauna occurring on site include assemblages within the terrestrial ecosystem and these includes mammals, birds, reptiles, amphibians, fish, and invertebrates.

4.4.1. Identify The SCC Which Were Found, Observed Or Are Likely To Occur Within The Study Area

The following additional animal species of significance that could be impacted by the proposed development not listed in the Environmental Screen tool report were list for the Quarter Degree Squares (QDS) which was extracted from the SABIF/SIBIS database hosted by SANBI:

- Tent Tortoise *Psammobates tentorius* (Near Threatened)
- Secretarybird Sagittarius serpentarius (Endangered)
- Blue Crane *Anthropoides paradiseus* (Vulnerable)
- Grey Rhebok *Pelea capreolus* (Near Threatened)
- Leopard *Panthera pardus* (Vulnerable)
- Barnard's Rock-catfish *Austroglanis barnardi* (Endangered)
- Clanwilliam Yellowfish *Labeobarbus seeberi* (Near threatened).

- **Amphibians And Reptiles (Herptiles)**

With respect to amphibians, Minter et al (2004) state that "habitat loss or modification as a result of agriculture and other forms of human activity remains the most important single threat to the survival of amphibian populations. The scale of these changes and their relative permanence being the major cause. At greatest risk are species that have limited distributions." As reported in Alexander *et al* (2007) 47 reptile species are likely to inhabit the area.

No amphibian or reptile activities were observed on site during the survey. Amphibian species will however be present in the area due to the presents of the non-perennial river and wetland.

- **Mammals**

As reported in Smithers (1983) small buck e.g. common duiker, steenbok and grysbok, rodents such as mole rats, field mice and hares, as well as carnivores such as genets and mongoose are likely to inhabit the area. Some 54 species are known to occur in the bigger area (Smithers 1983).

Animal Species recorded during the survey includes *Afrotis afra* (in the bigger area and not on site. Recorded on the Ou Kaapste weg road close to western section and Clanwilliam Dam)*, Sylvicapra grommia, Orycteropus afer* (diggings)*, Cryptomys hottentotus, Microhodotermes viator, Amblyomma hebraeum, Orthetrum trinacria, Chersina angulate,* Toktok beetles; *Onychognathus morio*; *Zosterops virens*; *Cinnyris chalybeus*; *Ploceus velatus velatus*; *Euplectes orix*; *Spilopelia senegalensis senegalensis*; *Passer melanurus*; *Ploceus velatus velatus*; *Ploceus velatus*; *Passer domesticus*; *Pycnonotus nigricans*; *Alopochen aegyptiaca*; Pepper Ticks; and *Apus affinis.*

- **Birds (Avifauna)**

202 species are known to occur in the bigger area (Hockey et al 2006).

No rare and localized reptile or amphibian species were recorded, and none are expected in viable numbers.

Red Listed species of reptiles could include the following:

- Namaqua Plated Lizard *Gerrhosaurus typicus*: An assessment of this species' conservation status included it as a Near Threatened category.
- Small Scaled Dwarf Leaf-toed Gecko *Goggia microlepidota*: An assessment of this species' conservation status included it as a Near Threatened category.
- Speckled Padloper *Homopus signatus*: An assessment of this species' conservation status included it as a Near Threatened category.
- Plain Mountain Adder *Bitis inornata*: An assessment of this species' conservation status included it as a Vulnerable category

All of the above could occur on the property. None of them were observed during the site survey.

The Speckled Padloper *Homopus signatus* is unlikely to occur on the property due to lack of habitat. They are usually found on granite slabs, of which none occur on site. The Namaqua Plated Lizard *Gerrhosaurus typicus* is unlikely to occur on the property due to lack of habitat. They occur in karrooid succulent veld, of which none occurs on site. Species ranges include the Little Namaqualand and Central Karoo. The Small Scaled Dwarf Leaf-toed Gecko *Goggia microlepidota* are unlikely to occur on the property due to the lack of habitat. Its habitat is usually large rock cracks in sandstone outcrops or under the bark of dead Cedar trees, of which none occur on site. The Plain Mountain Adder *Bitis inornata* are unlikely to occur on the property due to the lack of habitat. Its habitat is usually grassveld of rocky mountain plateaus.

Mammals

The following table gives the Red Data listed mammal species which are predicted, or confirmed to occur in the general area and possibly within the study area:
(SANBI).

RED DATA SPECIES			
COMMON NAME	**SCIENTIFIC NAME**	**RED DATA CATEGORY**	**PREDICTED OCCURRENCE**
Forest shrew	*Myosorex varius*	Data deficient	Unlikely
Egyptian Split Faced Bat	*Nycteris thebaica*	Near threatened	Possible
Lesueur's Wing-gland Bat	*Cistugo lesueuri*	Near threatened	Possible
Cape golden mole	*Chrysochloris asiatica*	Data deficient	Unlikely
Grants Golden Mole	*Eremitalpa granti*	Vulnareble	Unlikely
Schreibers' Long-fingered Bat	*Miniopterus schreibersii*	Near Threatened	Possible
Temminck's Hairy Bat	*Myotis tricolor*	Near Threatened	Possible
Cape Serotine Bat	*Neoromicia capensis*	Least Concern	Possible
Egyptian Free-tailed Bat	*Tadarida aegyptiaca*	Least Concern	Possible
Cape Clawless Otter	*Aonyx capensis*	Least Concern	Possible
Geoffroy's horseshoe bat	*Rhinolophus clivosus*	Near threatened	Possible
Water Mongoose	*Atilax paludinosus*	Least Concern	Likely
Long-tailed Serotine Bat	*Eptesicus hottentotus*	Least Concern	Unlikely

Honey badger	*Mellivora capensis*	Near threatened	Possible
Cape Spiny Mouse	*Acomys subspinosus*	Least Threatened	Possible
African Weasel	*Poecilogale albinucha*	Data deficient	Unlikely
Water Rat	*Dasymys incomtus*	Near Threatened	Unlikely
Grey Climbing Mouse	*Dendromus melanotis*	Least Concern	Possible
Brant's Climbing Mouse	*Dendromus mesomelas*	Least Concern	Possible
Cape Mole Rat	*Georychus capensis*	Least Concern	Definite
Cape Dune Mole Rat	*Bathyergus suillus*	Least Concern	Likely
Common Mole Rat	*Cryptomys hottentotus*	Least Concern	Likely
Short Tailed Gerbil	*Desmodillus auricularis*	Least Concern	Unlikely
Hairy Footed Gerbil	*Gerbillurus paeba*	Least Concern	Possible
Spectacled Dormouse	*Graphiurus ocularis*	Least Concern	Possible
Porcupine	*Hystrix africaeaustralis*	Least Concern	Likely
Pygmy Mouse	*Mus minutoides*	Least Concern	Unlikely
Verreaux's Mouse	*Myomyscus verreauxi*	Least Concern	Unlikely
Namaqua Rock Mouse	*Aethomys namaquensis*	Least Concern	Unlikely
White-Tailed Rat	*Mystromys albicaudatus*	Endangered	Unlikely
Vlei Rat	*Otomys irroratus*	Least Concern	Likely
Saunders Vlei Rat	*Otomys saundersiae*	Least Concern	Unlikely
Karoo Bush Rat	*Otomys unisulcatus*	Least Concern	Unlikely
Striped Mouse	*Rhabdomys pumilio*	Least Concern	Likely
Pouched Mouse	*Saccostomus campestris*	Least Concern	Unlikely
Krebs Fat Mouse	*Steatomys krebsii*	Least Concern	Likely
Cape Gerbil	*Tatera afra*	Least Concern	Unlikely
Cape Rock Elephant-shrew	*Elephantulus edwardii*	Least Concern	Unlikely
Aardvark	*Orycteropus afer*	Least Concern	Definitive
Chacma Baboon	*Papio ursinus*	Least Concern	Unlikely
Cape Hare	*Lepus capensis*	Least Concern	Unlikely
Scrub Hare	*Lepus saxatilis*	Least Concern	Possible
Hewitts Red Rock Rabbit	*Pronolagus saundersiae*	Least Concern	Unlikely
Reddish-grey Musk Shrew	*Crocidura cyanea*	Data Deficient	Possible
Greater Musk Shrew	*Crocidura flavescens*	Data Deficient	Possible
Lesser Dwarf Shrew	*Suncus varilla*	Data Deficient	Possible
Black-backed Jackal	*Canis mesomelas*	Least Concern	Unlikely
Caracal	*Caracal caracal*	Least Concern	Likely
Yellow Mongoose	*Cynictis penicillata*	Least Concern	Possible
African Wild Cat	*Felis silvestris*	Least Concern	Likely
Small-spotted Genet	*Genetta genetta*	Least Concern	Likely
Large-spotted Genet	*Genetta tigrina*	Least Concern	Likely
Large Grey Mongoose	*Herpestes ichneumon*	Least Concern	Likely
Small Grey Mongoose	*Galerella pulverulenta*	Least Concern	Likely
Striped Polecat	*Ictonyx striatus*	Least Concern	Possible
Bat-eared Fox	*Otocyon megalotis*	Least Concern	Likely
Aardwolf	*Proteles cristatus*	Least Concern	Unlikely
Cape Fox	*Vulpes chama*	Least Concern	Unlikely
Rock Hyrax	*Procavia capensis*	Least Concern	Unlikely
Red Hartebeest	*Alcelaphus buselaphus*	Least Concern	Unlikely
Steenbok	*Raphicerus campestris*	Least Concern	Likely
Cape Grysbok	*Raphicerus melanotis*	Least Concern	Likely
Common Duiker	*Sylvicapra grimmia*	Least Concern	Definitive
Leopard	*Panthera pardus*	Least Concern	Unlikely
Klipspringer	*Oreotragus oreotragus*	Least Concern	Unlikely
Springbok	*Antidorcas marsupialis*	Least Concern	Unlikely

Grey Rhebok	*Palea capreolus*	Least Concern	Unlikely
Cape horseshoe bat	*Rhinolophus capensis*	Near threatened	Possible
Flat-headed free tail Bat	*Sauromys petrophilus*	Least Concern	Unlikely
Large-eared Mouse	*Malacothrix typica*	Least Concern	Unlikely

No golden mole activity was observed on site during the survey. Bats are also classified as near threatened. The bats will be unaffected by development, as there are no roosting sites within the affected area that could be impacted upon by development. The striped weasel is considered to be under threat due to habitat and prey reduction. It is unlikely to occur in the study area and no African weasel or any sign of such activity was observed during the survey. The development will not have significant impacts on this species. No extensive habitat loss will occur.

In addition to the Red Data species above, the following mammals have recently been listed as having protected species status in terms of Section 56(1) of the National Environmental Management: Biodiversity Act (Act 10 of 2004) and might occur in the area:

Caracal caracal – caracal
Hystrix africeaustralis - porcupine
Sylvicapra grimmia - common duiker.
Cape Grysbok - *Raphicerus melanotis*

Of the mammal Red Data listed species, the mole species are likely to be impacted on. The rest of the species should not be specifically threatened; either in number or habitat by the proposed development should such occur on the development site. They can simply move to extensive, nearby undisturbed habitat. The proposed development should not have significant impact on the red data listed species likely or observed in the study area.

Avifauna

Red Listed species of avifauna could include the following:

The only avifauna species of special significance likely to occur on site are the Black Harrier *Circus maurus* (Near Threatened). None of them were observed or likely to occur on the area and will also not be impacted by the development.

4.4.2. Provide Evidence (Photographs or Sound Recordings) Of Each SCC Found Or Observed Within The Study Area

None were recorded during the survey and the other species listed are unlikely to occur on the area. The Avi-fauna species may roam the area, but the development will not negatively affect them. The Invertebrates identified in the Environmental Screen tool report were not recorded and is unlikely to be in the area. However, should they be present, the development will not negatively affect them. Extensive habitat is however available for them to utilize outside the proposed development area.

4.4.3. Identify The Distribution, Location, Viability and Provide a Detailed Description of Population Size of the SCC

No SCC were recorded during the survey, but the area and habitat was identified to host Black Harriers. The Site Ecological Importance for the Black Harriers was assessed to be high. Breeding habitat was not identified and recorded on the site and exists to the east. They may therefore use the area to roam, but due to the vast habitat to the south and east and away from residential activities, they will not be impacted or affected. The Black Harrier have a restricted distribution that is mainly centered in the fynbos and Karoo areas of the Western and Eastern Cape of South Africa. Peripheral populations occur in the grasslands of Free State, Lesotho and KwaZulu-Natal and in north-eastern South Africa, Botswana and Namibia. It has lost over 50% of its breeding habitat in the last century from changes in land use patterns because of agriculture and urbanisation. As a result it has a restricted range and a small global population (1000-2000) and so it is categorised as Vulnerable.

4.4.4. Identify The Nature and The Extent Of The Potential Impact of the Proposed Development on The Population of the SCC

No SCC were recorded during the survey, but the area and habitat was identified to host Black Harriers. The Site Ecological Importance for the Black Harriers was assessed to be high. Breeding habitat was not identified and recorded on the site and exists to the east. They may therefore use the area to roam, but due to the vast habitat to the south and east and away from residential activities, they will not be impacted or affected.

4.4.5. Determine the Importance of the Conservation of the Population of the SCC Identified within the Study Area

No SCC were recorded during the survey, but the area and habitat was identified to host Black Harriers. The Site Ecological Importance for the Black Harriers was assessed to be high. Breeding habitat was not identified and recorded on the site and exists to the east. They may therefore use the area to roam, but due to the vast habitat to the south and east and away from residential activities, they will not be impacted or affected.

4.4.6. List of Species, and/or other relevant databases

This survey did not identify the study area as a regionally important specific site from an animal species point of view, as it does not lie within priority animal species corridors, habitat, or home ranges.

4.4.7. Determine The Potential Impact of the Proposed Development on the Habitat of the SCC Located within the Study Area

No SCC were recorded during the survey, but the area and habitat was identified to host Black Harriers. The Site Ecological Importance for the Black Harriers was assessed to be high. Breeding habitat was not identified and recorded on the site and exists to the east. They may

therefore use the area to roam, but due to the vast habitat to the south and east and away from residential activities, they will not be impacted or affected.

4.4.8. Include a Review of Relevant Literature on the Population Size of the SCC, the Conservation Interventions as well as any National or Provincial Species Management Plans for the SCC

No SCC were recorded during the survey, but the area and habitat was identified to host Black Harriers. The Site Ecological Importance for the Black Harriers was assessed to be high. Breeding habitat was not identified and recorded on the site and exists to the east. They may therefore use the area to roam, but due to the vast habitat to the south and east and away from residential activities, they will not be impacted or affected.

4.4.9. Identify Any Dynamic Ecological Processes occurring within the Broader Landscape that Might be Disrupted by the Development and Result in Negative Impact on the Identified SCC

The development area consisting of Citrusdal Vygieveld vegetation on the edge and wedge in between the town, area impacted by squatter activities, golf course and wetlands which represents the animal species habitat on site. The bigger development area is ecologically connected to the south and east.

This survey did not identify the study area as a regionally important specific site from an animal species point of view, as it does not lie within priority animal species corridors, habitat, or home ranges.

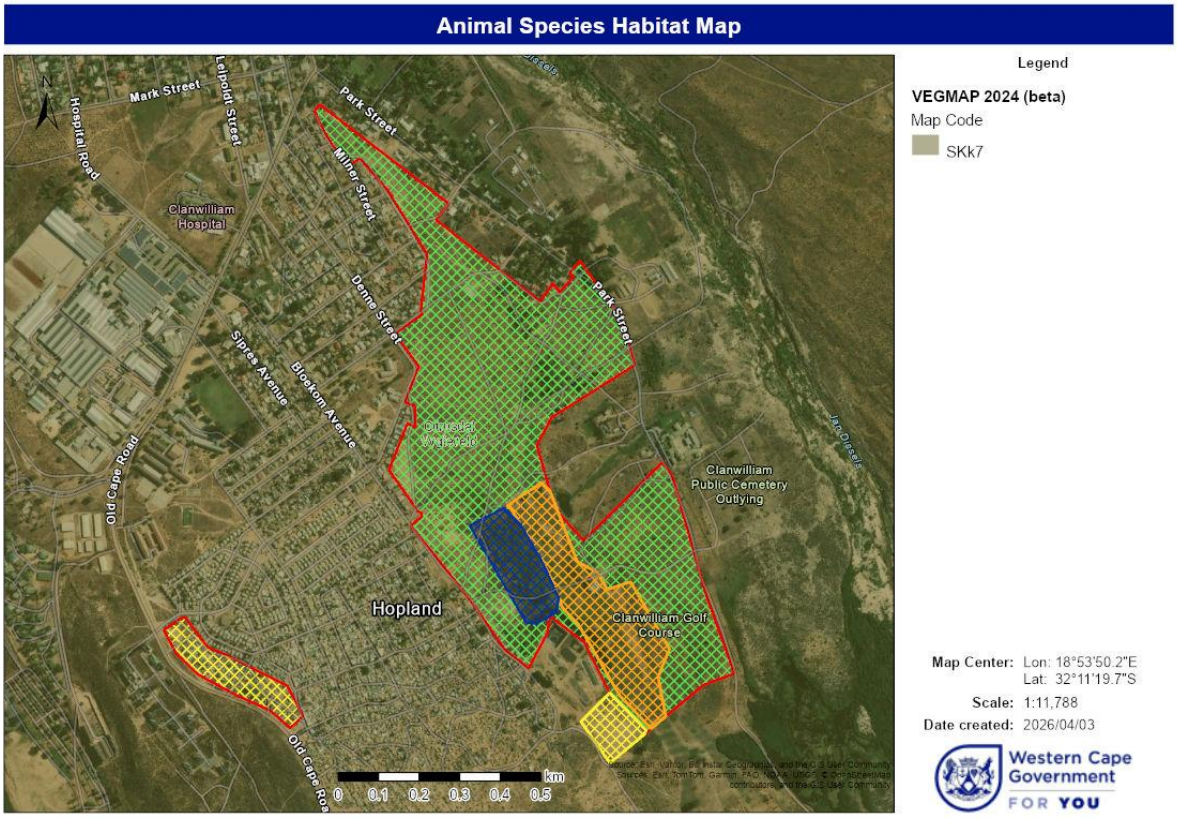

Figure 5: Animal Species Habitat Map. Green - Citrusdal Vygie Veld, Blue – wetlands degraded to be rehabilitated, Orange – Golf course, Yellow - squatters and infrastructure.

Citrusdal Vygie Veld Habitat (Green on map)

The Citrusdal Vygie Veld habitat on site is a habitat characterized by succulent-rich shrublands (vygies/mesembs) on sandy and rocky soils. The habitat consists of an area with low to moderate slopes. The vegetation structure consists of shrubs with open space areas in between covered by annual plants and representative habitat for the species recorded on site or likely to occur on site.

Photograph 1: Habitat condition of mapped cirtusdal vygieveld.

Wetlands (degraded to be rehabilitated) (Blue on map)

The two wetlands on site consist of degraded wetlands that is covered with alien invasive plants, waste and rubble. The rehabilitation and removal of alien invasive plants will improve animal species' habitat on site. Both mapped wetlands are in low lying areas and consist of sand deposits covered by vegetation.

Photograph 2: Habitat condition of mapped wetland.

Golf course (orange on map)
Fair way and greens covered by moved grass in low lying flat area.

Photograph 3: Habitat condition of golf course.

Squatters and infrastructure. Yellow on map
Historic Citrusdal Vygie Veld habitat totally cleared and impacted by infrastructure and squatters. No animal species habitat on site.

Photograph 4: Habitat condition of squatter area.

4.4.10. Identify Any Potential Impact of Ecological Connectivity in Relation to the Broader Landscape

Loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna will not be affected or altered. The location of the proposed development will not affect terrestrial biodiversity process and corridors. The significant ecological corridors south and east of the proposed impact areas is sufficient to allow for ecological processes to continue and function. No protected area or priority areas for protected area expansion are inside or close to the study area.

4.4.11. Discuss The Presence or Likelihood of Additional SCC Including Threatened Species Not Identified by the Screening Tool

No SCC were recorded during the survey, but the area and habitat was identified to host Black Harriers. The Site Ecological Importance for the Black Harriers was assessed to be high. Breeding habitat was not identified and recorded on the site and exists to the east. They may therefore use the area to roam, but due to the vast habitat to the south and east and away from residential activities, they will not be impacted or affected.

4.4.12. Identify Any Alternative Development Footprints Within the Preferred Site Which Would Be of "Low" or "Medium" Sensitivity

The whole proposed development area consists of moderate and low sensitivity areas for fauna species and can be development without any negative or unreversible impacts on animal species.

5. IMPACT ASSESSMENT

Sensitive Species 32 (which cannot be disclosed), was not recorded at the study site during the surveys. This species shows a particular preference for rocky terrain (Loehr 2002a), which includes typical Namaqualand and Hardeveld granite koppies in the north, and typical Sandveld and Cederberg sandstone koppies and rocky ridges in the south. It occurs in low to medium-high Namaqualand succulent blomveld and heuweltjieveld, and fynbos and strandveld shrub vegetation. The typical Cederberg sandstone koppies and rocky ridges is limited to a small area in the western section of the site next to the existing town.

Table 2: The likely impacts on Sensitive Species 32 during the construction phase of the development, for the two alternatives.

	Alternative	**Preferred Alternative**	**No Go Option**
Nature of impact	Loss of a section of habitat, particularly the rocky ridge limited to a small area in the western section of the site next to the existing town. Also, noise	Loss of a section of habitat, particularly the rocky ridge limited to a small area in the western section of the site next to the existing town. Also, noise	None, apart from potential habitat loss due to existing residential activities in close proximity.

	disturbance during construction.	disturbance during construction.	
Extent and duration of impact	Largely confined to the study area; development would remove the habitat to sustain this species, and the mobility of this species in the surrounding landscape. Permanent on the development area considering the habitat will be destroyed.	Largely confined to the study area; development would remove the habitat to sustain this species, and the mobility of this species in the surrounding landscape. Permanent on the development area considering the habitat will be destroyed.	None, apart from potential habitat loss due to existing residential activities in close proximity.
Consequences of impact or risk	High, destructive impact. Potential habitat will be lost.	High, destructive impact. Potential habitat will be lost.	None, apart from potential habitat loss due to existing residential activities in close proximity.
Probability of occurrence	Probable; Due to potential habitat loss.	Probable; Due to potential habitat loss.	None, apart from potential habitat loss due to existing residential activities in close proximity.
Degree to which the impact may cause irreplaceable loss of resources	If unmitigated, this could result in the eventual local disappearance of this species from the study area, if it is present.	If unmitigated, this could result in the eventual local disappearance of this species from the study area, if it is present.	None, apart from potential habitat loss due to existing residential activities in close proximity.
Degree to which the impact can be reversed	Habitat loss would be impossible to replace/reverse on site.	Habitat loss would be impossible to replace/reverse on site.	None, apart from potential habitat loss due to existing residential activities in close proximity.
Indirect impacts	None	None	None
Cumulative impact prior to mitigation	High (-)	High (-)	High (-)
Significance rating of impact prior to mitigation	High (-)	High (-)	High (-)
Can these impacts be mitigated?	No	No	No
Proposed mitigation	No unsupervised workers on the property and ensuring that no animals are captured on the property (close supervision). Mitigation measures, both best practise and essential, include the following: Should any faunal SCC be encountered during construction and operation, these must be recorded (i.e. be photographed, GPS co-ordinates taken) and photographs placed on iNaturalist		

	Any faunal species that may die as a result of construction activities must be recorded (i.e. be photographed, GPS co-ordinates taken) and these records placed on iNaturalist. In addition to all mitigations listed above a clause must be included in contracts for ALL personnel working on site stating that: "no wild animals will be hunted, killed, poisoned or captured. No wild animals will be imported into, exported from or transported in or through the province. No wild animals will be sold, bought, donated and no person associated with the development will be in possession of any live wild animal, carcass or anything manufactured from the carcass." A clause relating to fines, possible dismissal and legal prosecution must be included should any of the above transgressions occur, especially for SCC.		
Degree of confidence	Medium (not certain whether this species is absent from the site or simply unrecorded during the site visit)	Medium (not certain whether this species is absent from the site or simply unrecorded during the site visit)	Medium (not certain whether this species is absent from the site or simply unrecorded during the site visit)
Significance of impacts on the development	Medium. Species not recorded on site and unlikely to be present due to closeness of existing residential activities.		

Circus maurus*,* was not recorded during the survey.

This species main distribution centred on the fynbos and karoo inland of that. Black Harriers breed in the montane fynbos, renosterveld and strandveld habitats of the Western Cape and many individuals disperse into the karoo and grassland habitats during the autumn and winter months. This species prefers coastal and mountain fynbos, highland grasslands, Karoo sub-desert scrub and open plains with low shrubs and croplands. Harriers breed close to coastal and upland marshes, damp sites, near vleis or streams with tall shrubs or reeds. There are wetlands east of the site associated to the Jan Dissels River and in adjacent areas that could potentially be suitable, but it is unknown if they occur there or not. In the event that they did occur in the area, the proposed project would have no effect on them. No nests of any birds were found within the footprint area and the although they may use the area for foraging, significant undisturbed and indigenous vegetation in good quality that provide foraging grounds existing to the south of the site and town and east towards the Jan Dissels river and beyond that the Cederberge.

Table 3: The likely impacts on *Circus maurus* during the construction phase of the development, for the two alternatives.

	Alternative	**Preferred Alternative**	**No Go Option**
Nature of impact	Loss of a section of roaming and foraging habitat, particularly the citrusdal vygieveld Also, noise disturbance during construction.	Loss of a section of roaming and foraging habitat, particularly the citrusdal vygieveld Also, noise disturbance during construction.	None, apart from potential habitat loss due to existing residential activities in close proximity.
Extent and duration of impact	Largely confined to the study area; development would remove the foraging habitat to sustain this species. Permanent on	Largely confined to the study area; development would remove the foraging habitat to sustain this species. Permanent on	None, apart from potential habitat loss due to existing residential activities in close proximity.

	the development area considering the habitat will be destroyed.	the development area considering the habitat will be destroyed.	
Consequences of impact or risk	High, destructive impact. Potential habitat will be lost.	High, destructive impact. Potential habitat will be lost.	None, apart from potential habitat loss due to existing residential activities in close proximity.
Probability of occurrence	Probable; Due to habitat loss.	Probable; Due to habitat loss.	None, apart from potential habitat loss due to existing residential activities in close proximity.
Degree to which the impact may cause irreplaceable loss of resources	If unmitigated, this could result in the eventual local disappearance of this species from the study area, if it is present.	If unmitigated, this could result in the eventual local disappearance of this species from the study area, if it is present.	None, apart from potential habitat loss due to existing residential activities in close proximity.
Degree to which the impact can be reversed	Habitat loss would be impossible to replace/reverse on site.	Habitat loss would be impossible to replace/reverse on site.	None, apart from potential habitat loss due to existing residential activities in close proximity.
Indirect impacts	None	None	None
Cumulative impact prior to mitigation	High (-)	High (-)	High (-)
Significance rating of impact prior to mitigation	High (-)	High (-)	High (-)
Can these impacts be mitigated?	No	No	No
Proposed mitigation	No unsupervised workers on the property and ensuring that no animals are captured on the property (close supervision).		
Degree of confidence	Medium (not certain whether this species is absent from the site or simply unrecorded during the site visit)	Medium (not certain whether this species is absent from the site or simply unrecorded during the site visit)	Medium (not certain whether this species is absent from the site or simply unrecorded during the site visit)
Significance of impacts on the development	Medium. Species not recorded on site and unlikely to be present due to closeness of existing residential activities. Significant suitable habitat to the south and east that the species will prefer to utilize due to on site disturbance impacts		

Cumulative Impacts

Cumulative impacts arise from the combined presence of several similar developments within an area which affect animal species. There are other developments that also represent a source of disturbance and habitat loss, which when combined with the proposed development would result in some cumulative impact. However, when taken in context of the broader landscape, the

cumulative impacts are not likely to be highly significant given the animal species known to occur in the broader area.

6. CONCLUSION AND RECOMMENDATIONS

The sampling and analysis of the site during the optimum season and year, provides suitable data and results to present an informed decision on the local animal species. The lists of species for the site are based on those observed at the site as well as those likely to occur in the area based on their distribution and habitat preferences. This represents a sufficiently conservative and cautious approach. During the site visit, the different biodiversity features, habitat, vegetation, and landscape units present were identified and recorded in the field. Walk-through-surveys were conducted of representative habitats and areas of interest and species observed were recorded. Searches for listed species of conservation concern at the site were conducted. Extensive habitat is however available for them to utilize outside the proposed vegetation clear area. There are wetlands east of the site associated to the Jan Dissels River and significant undisturbed indigenous vegetation in good quality to the south of the site and town and east towards the Jan Dissels river and beyond that the Cederberge. The presence of sensitive habitats such as wetlands or pans and unique edaphic environments, such as rocky outcrops or quartz patches, such as SCC habitats are present and therefore was recorded and mapped.

The study recorded medium and low sensitivity areas within the study area. The development of the site would have a **Medium Negative** impact on animal species. The proposed clearing will have relatively little animal species impacts provided that appropriate mitigation measures included in the impact table above are included in the EMPr and adhered to.

No additional survey or further assessment is in the authors view recommended. Provided that activities are restricted to the property and the mitigation measures to reduce the impacts of the activities are implemented, then the activities are not likely to result in long-term degradation of the receiving environment or significant net loss of SCC animal species.

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APPENDIX A
SPECIALIST CV

CURRICULUM VITAE – NICOLAAS WILLEM HANEKOM

Profession: Environmental Scientist and Environmental Assessment Practitioner
Date of Birth: 01/02/1967

BIOGRAPHICAL SKETCH

Nicolaas Hanekom is a qualified Environmental Assessment Practitioner (”EAP”) who holds a Masters Technologiae, Nature Conservation (“Vegetation Ecology and Biodiversity Assessment”) degree from the Cape Peninsula University of Technology. Nicolaas is certified in terms of section 20(3)(a) of the Natural Scientific Professions Act, 2003 (Act 27 of 2003), as a Professional Natural Scientist (Ecological Science) Registration Number: 004415. He further qualified in Environmental Management Systems ISO 14001:2004, at the Centre for Environmental Management, North-West University, as well as Environmental Management Systems ISO 14001:2004 Audit: Internal Auditors Course to ISO 19011:2003 level, from the Centre for Environmental Management, North-West University qualifying him to execute audits to ISO/SANS environmental compliance and EMS standards.

He has also completed the suite of Greener Governance courses with certificates in;

- An Overview of Environmental Management at the Local Government Level, Centre for Environmental Management, North-West University;
- Greener Governance for Local Authorities, Centre for Environmental Management, North-West University;
- Tools for Integrated Environmental Management and Governance, Centre for Environmental Management, North-West University.

He further attended and obtained a certificate on Integrated Protected Area Planning at the Centre for Environmental Development, University of Kwa Zulu Natal and a certificate in Project Management (Theory and Practical), through CS Holdings. Nicolaas has lectured in two subjects at the Cape Peninsula University of Technology. He has 26 years of environmental planning experience, working for Free State and Western Cape departments of environmental affairs, where he reviewed and commented on development (EIA) applications, in the West Coast Region.

He has, as practising EAP been responsible for many environmental impact assessments and EIA applications, waste license and atmospheric emission license applications.

He has also been involved in the implementation of several environmental management systems. He has engaged successfully with various clients as set out below.

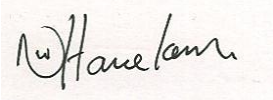
Areas of specialisation:	• Ecosystem (terrestrial and aquatic) monitoring and assessments • Design of monitoring programmes for ecosystems (terrestrial and aquatic) • Environmental Impact Assessments • River classification and environmental water requirements • Wetlands Delineation • River and Wetlands management • Water Use Authorization Applications • Water quality management • River Health Assessments
Countries of Work Experience:	South Africa (Northern Cape, Western Cape, Free State, Mpumalanga, Gauteng)
Employment Record	• Student at Bontebok National Park (1992) • Assistant Reserve Manager at Gariep Dam Nature Reserve, Free State (1993 - 1998) • Reserve Manager, Conservation Services Manager for Western Cape Nature Conservation Board (1998 - 2006) • External Lecturer at Cape Peninsula University of Technology (2003 - 2005) • Director: Environmental Management at Cape Lowlands Environmental Services (2006 – 2010)

	• Director, Environmental Management and lead Environmental Impact Assessment Practitioner at Eco Impact (Pty) Ltd (2010 – to August 2019) • Director, Environmental Management and lead Environmental Impact Assessment Practitioner at Enviro-EAP (Pty) Ltd (September 2019 – to date)
Professional membership, accreditations and courses	• South African Council for Natural Scientists Professions Pri.Sci.Nat (Ecological Science) • Riparian vegetation identification and health assessment. Internal Western Cape Nature Conservation short course presented by Dr C Boucher (Stellenbosch University) in 2000. • SASS5 Aquatic Biomonitoring Training Course. 2 to 5 September 2013. Ground Truth Water and Environmental Engineering consultancy in partnership with the Department of Water Affairs. • Workshop on "Section 21(c) and (i) Water Use Training: Understanding Watercourses and Managing Impacts to their Characteristics". 10 May 2017. Presented by Dr Wietsche Roets of the Department of Water and Sanitation (Sub-Directorate: Instream Water Use).
Summary of experience	1992: South African National Parks. Student at Bontebok National Park with management and monitoring actions related to the Breede River. 1993 -1998: Free State Nature Conservation. Ecological management and monitoring actions related to the Gariep Dam, Orange and Caledon Rivers. 1998 -2006: CapeNature. Ecological management and monitoring actions related to the Berg River Estuary, Verlorenvlei, Lamberts bay's Jackalsvlei, Wadrift Soutpanne, Oliphant's River mouth, Rocherpan Nature Reserve, etc. Review and assessment of EIA applications, inclusive of Freshwater ecology. Did some site visits with Department of Water Affairs and Forestry (Hester Lyons) to confirm the presence of aquatic ecological features during EIA water use registration applications. 2006 to date: Cape Lowland Environmental Services, Eco Impact Legal Consultant and Enviro-EAP. Ecological (Freshwater and aquatic) Specialist input, assessment, monitoring and reports.
Publications and assessment reports	Just to name a few. Was involved in many Ecological Assessments, monitoring and inputs in EIA applications. • Elandskloof Farm 475 Citrusdal Biodiversity Baseline Survey. August 2010. This Biodiversity Assessment Covering Terrestrial and Aquatic Aspects to Inform Decisions Regarding The Proposed Elandskloof Weir Flood Damage Project On Farm 475, In The Citrusdal Area. • Cape Solar Energy Electricity Generation Facility. Farm 187/3 & 187/13 Kenhardt. Biodiversity And Ecological Baseline Survey. January 2011. (Included Terrestrial and aquatic ecological assessments and water use authorization applications) • Prieska Photvoltaic Power Generation Project. Prieska Commonage Northern Cape. Biodiversity And Ecological Baseline Survey. July

	2011. (Included Terrestrial and aquatic ecological assessments and water use authorization applications) • Witteklip Erf 123 Extension, Vredenburg. Biodiversity Baseline Survey. Updated - October 2012 (Included Terrestrial and aquatic ecological assessments and water use authorization applications) • Baseline Biodiversity Survey And Wetland Delineation for ECCA Holdings: Cape Bentonite Mine on Erf 1412 Near Heidelberg. Prepared for: Shangoni Management Services Pry (Ltd). October 2014. • Freshwater Impact Assessment Laingsburg Flood Damage Repairs & Storm Water Infrastructure. 18 February 2016. • Ecological Assessment for Swartland Municipality - Upgrades To Voortrekker/Bokomo Road And Voortrekker/Rozenburg Road Intersections and Upgrade to the Diep River Bridge, Malmesbury on A Portion Of Erf 327, Malmesbury (Road) Erf 1530, Diep River Bridge Crossing, and Erf 1528, Property South of Diep River where Road Widening and Turning Circle Will Be Constructed. March 2016. (Freshwater Ecology Inputs and Water Use Registration) • Freshwater Impact Assessment. McGregor Bridge, Robertson Bridge and Willem Nels River Maintenance Management Plan. 24 June 2016. (Freshwater Ecology assessment and input as well as Water Use Registration) • Water Use Authorization Application Risk Matrix. Orange Grove Trust Vegetation Clearing and Agricultural Development on Portion 4 of Farm Glen Heatlie No 316, Worcester. 12 June 2017. (Freshwater ecological inputs in EIA process and Water Use Registration). • Water Use Authorization Application Risk Matrix Prepared For: Witzenberg Municipality Sand Mine Farm 1 Prince Alfred Hamlet. 28 March 2017. (Freshwater ecological inputs in EIA process and Water Use Registration). • Proposed Hartmanshoop Agri Vegetation Clearing Project and Irrigation on Erf 686, Laingsburg. 12 August 2017. (Freshwater ecological inputs in Water Use Registration). • County Fair: Hocraft Abattoir And Rendering Facility Waste Water Treatment Works “CF Hocraft WWTW” Mosselbank River Second Quarter 2018 Biomonitoring Report. June 2018. (Done quarterly biomonitoring for the last three years).

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe my qualifications, my experience, and me.



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