# TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

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

**Prepared by:** Nicolaas Hanekom
Pri.Sci.Nat (Ecology) 004415
**Contact details:** Telephone: 0769636450
or email: nicolaas@enviro-eap.co.za

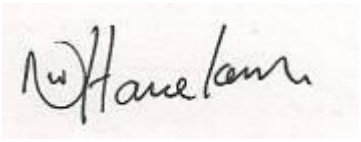
**OCTOBER 2026**

## DECLARATION OF THE SPECIALIST

**Note:** Duplicate this section where there is more than one 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 ~~EAP~~/ Specialist: Date:

**Enviro-EAP (Pty) Ltd**

Name of company (if applicable):

**COMPLIANCE WITH THE DEPARTMENT OF ENVIRONMENTAL AFFAIRS SCREENING TOOL (GOVERNMENT NOTICE NO. 320, GOVERNMENT GAZETTE 43110: 20 MARCH 2020)**

| **Department of Environmental Affairs screening Tool (Government Notice No. 320, GOVERNMENT GAZETTE 43110: 20 MARCH 2020)** | **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 |
| Areas not suitable for development, to be avoided during construction and operation (where relevant) | Section 5 |
| Additional environmental impacts expected from the proposed development based on those already evident on the site and a discussion on the cumulative impacts | Section 6 |
| Impact management actions and impact management outcomes proposed by the specialist for inclusion in the EMPr | Section 6 |
| A motivation where the development footprint identified as per section 2.3 in this Table were not considered stating reasons why these were not being considered | Section 1 and 7 |
| 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 7 |

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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 “Very High for Terrestrial Biodiversity” sensitivity. The site sensitivity verification and the specialist assessment does differ from the designation of “very high” terrestrial biodiversity and did not agree with the findings of the national web based environmental screening tool. However, a terrestrial biodiversity impact assessment was conducted. This report presents the findings of the Terrestrial Biodiversity Impact Assessment that was prepared by Nicolaas Hanekom as part of the EIA for the proposed development.

## *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 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 key ecological 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 terrestrial biodiversity for activities requiring environmental authorisation.

**General Information**

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

### *1.4. Methodology 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:

- A description of the ecological drivers/processes of the system and how the proposed development will impact these;
- Ecological functioning and ecological processes (e.g. fire, migration, pollination, etc.) that operate within the proposed development site;
- The ecological corridors that the development would impede including migration and movement of flora and fauna;
- The description of any significant landscape features (including rare or important flora/faunal associations, presence of Strategic Water Source Areas (SWSAs) or Freshwater Ecosystem Priority Areas (FEPA) sub-catchments;
- The description of the terrestrial biodiversity and ecosystems on the proposed development site must include:
  - Main vegetation types;
  - Threatened ecosystems, including Listed Ecosystems as well as locally important habitat types identified;
  - Ecological connectivity, habitat fragmentation, ecological processes and fine-scale habitats; and
  - Species, distribution, important habitats (e.g. feeding grounds, nesting sites, etc.) and movement patterns identified.

The assessment must identify any alternative development footprints within the preferred development site which would be of a "low" sensitivity as identified by the national web based environmental screening tool and verified through the Initial Site Sensitivity Verification. The

1 Published in Government Notice No. 648 GOVERNMENT GAZETTE 4542110 MAY 2019.This gazette is also available free online at www.gpwonline.co.za

Terrestrial Biodiversity Impact Assessment must be based on the results of a site inspection undertaken on the preferred development site and must identify:

The assessment report must describe Terrestrial Critical Biodiversity Areas (CBAs), including:

- The reasons why an area has been identified as a CBA;
- An indication of whether or not the development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation;
- The impact on species composition and structure of vegetation with an indication of the extent of clearing activities;
- The impact on ecosystem threat status;
- The impact on explicit subtypes in the vegetation;
- The impact on overall species and ecosystem diversity of the site; and
- The impact on populations of species of special concern in the CBA.

The assessment report must describe Terrestrial Ecological Support Areas, including:

- The impact on the ecological processes that operate within or across the site;
- The extent the development will impact on the functionality of the ESA; and
- 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.

The assessment report must describe Protected Areas as defined by the National Environmental Management: Protected Areas Act, 2004 including an opinion on whether the proposed development aligns with the objectives/purpose of the Protected Area and the zoning as per the Protected Area Management Plan.

The assessment report must describe Priority Areas for Protected Area Expansion, including the way in which the development will compromise or contribute to the expansion of the protected area network.

The assessment report must describe Strategic Water Source Areas (SWSA) including:

- The impact(s) on the terrestrial habitat of a Strategic Water Source Area, and
- The impacts of the development on the SWSA water quality and quantity (e.g. describing potential increased runoff leading to increased sediment load in water courses).

The assessment report must describe Freshwater Ecosystem Priority Area (FEPA) sub catchments, including the impacts of the development on habitat condition and/or species in the FEPA sub catchment, including National wetland map 5.
The assessment report must describe Indigenous Forests, including:

- Impact on the ecological integrity of the forest;
- Extent of natural or near natural indigenous forest area lost.

The findings of the Terrestrial Biodiversity Impact Assessment must be written up in a Terrestrial Biodiversity 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 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;
- Areas not suitable for development, to be avoided during construction and operation (where relevant);
- Additional environmental impacts expected from the proposed development based on those already evident on the site and a discussion on the cumulative impacts;
- Impact management actions and impact management outcomes proposed by the specialist for inclusion in the EMPr;
- A motivation why any alternative development footprints within the preferred development site which would be of a “low” sensitivity as identified by the national web based environmental screening tool were not considered stating reasons why these were not being not considered; and
- 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.

### *1.5. Approach and Methodology*

A literature review and desktop analysis were undertaken prior to the field investigation, utilizing 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 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.
- Any additional species of significance, not identified within the sample sites were also noted.

As explained below, the ideal period for the assessment of habitat within this region is between August and end October months. The site survey was conducted on 6 October 2019 and 28 July 2023.

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. 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. The timing of the survey is therefore regarded as optimal in terms of accurately assessing the flora and fauna of the site. The overall condition of the vegetation was 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 terrestrial biodiversity 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*

This assessment was undertaken utilising:

- 1:50 000 topographic mapping sourced from the Surveyor General's office;
- Aerial imagery sourced from Google Earth.
- Aerial imagery sourced from ESRI.
- Vegetation types and their conservation status was extracted from the South African National Vegetation Map (Mucina and Rutherford 2018).
- Information on plant and animal species recorded for the Quarter Degree Squares (QDS) was extracted from the SABIF/SIBIS database hosted by SANBI.
- The IUCN conservation status of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2011).
- Threatened Ecosystem data was extracted from the National List of Threatened Ecosystems 2022.
- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel et al. 2011) and National Wetlands Map.
- Important catchments and protected areas expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).
- The CapeNature Spatial Biodiversity Plan 2023
- The Western Cape Biodiversity Spatial Plan Handbook (Pool-Stanvliet et al 2017)

In addition, use was made of the following data:

- Wetland and riparian habitat Geographic Information System (GIS) data sourced from the National Freshwater Ecological Priority Area Programme of South African National Biodiversity Institute (SANBI);
- SANBI veld types data; and
- Literature as referenced

### *1.8. Site Visit*

The site survey was conducted on 6 October 2019 and 28 July 2023 which is an optimal time for surveys. The survey was conducted in an ideal period for the assessment of terrestrial biodiversity within this region. The sampling and analysis of the site during this season provides suitable data and results to present an informed decision on the local animal and the October site visit was optimal in terms of plants. 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 and plant species observed were recorded. Searches for listed and protected animal and plant species at the site were conducted and the location of all listed animal and plant species observed was recorded (if present).

Approximately 26ha was mapped as aquatic ESA's habitats in the Eastern Housing section and WWTW expansion area. The western housing areas is incorrectly mapped as an ESA. All vegetation and ecological functioning are loss as a result of the squatter activities. The vegetation that will be lost was not mapped under the WCBSP 2023 as a terrestrial Critical Biodiversity Area or Ecological Support area. Only as an Aquatic Ecological Support Area in terms of ground water protection. The Department of Water and Sanitation did not raise any comment or concern on impacts on ground water as a result of the development. Because the vegetation has a least threatened ecosystem protection status, was not mapped as terrestrial CBA or ESA and no species of conservation concern was mapped, no biodiversity offset as mitigation is required.

Please refer to the Aquatic Biodiversity assessment for more detail on the mapped Freshwater ecologic features and buffers with management and mitigation measures to protect them. Included in the Environmental Management Plan is management and mitigation measures to protect the groundwater resources. In terms of the Upland-lowland interface corridor, the proposed development will not result in the loss of this interface corridor because the development is on the edge and wedge into the existing town of Clanwilliam with significant areas to the south to act as this upland lowland interface. The proposed development will therefore not impact on the mapped BSP objectives.

Two sets of conservation mapping results are of relevance to the national and provincial identification of the biodiversity conservation importance that has been attributed to the freshwater features in the study area. The Western Cape's Biodiversity Spatial Plan (WCBSP) that contains Critical Biodiversity Areas (CBA) which is a product of the Provincial Fine Scale mapping process, as well as the National Freshwater Ecosystem Priority Areas (FEPA) map. FEPAs are intended to provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources.

The Jan Dissels river and its flood plain east of the proposed development was the only NFEPA features mapped.

**Photograph 1:** WWTW expansion area. Photograph dated 28 July 2023.

**Photograph 2:** Ecological condition of the housing area mapped as ESA. Photograph dated 28 July 2023.

**Photograph 3:** Ecological condition of the housing area mapped as ESA. Photograph dated 28 July 2023.

**Photograph 4:** Ecological condition of the housing area mapped as ESA. Photograph dated 28 July 2023.

**Photograph 5:** Ecological condition of the housing area mapped as ESA. Photograph dated 28 July 2023.

**Photograph 6:** Ecological condition of the housing area mapped as ESA. Photograph dated 28 July 2023.

**Photograph 7:** Ecological condition of the housing area mapped as ESA. Photograph dated 28 July 2023.

**Photograph 8:** Ecological condition of the housing area mapped as ESA. Photograph dated 28 July 2023.

### *1.9. Sensitivity Mapping and Assessment*

**Habitat *Sensitivity Mapping and Assessment and methodology***

***Sensitivity Mapping and Assessment (Site Ecological Importance)[2]***

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:

$$SEI = BI + RR$$

[2] 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.

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.

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 $km^2$.<br>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.<br>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.<br>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.<br>Presence of Rare species.<br>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.<br>Any area of natural habitat of threatened ecosystem type with status of VU.<br>Presence of range-restricted species.<br>> 50% of receptor contains natural habitat with potential to support SCC. |
| Low | No confirmed or highly likely populations of SCC.<br>No confirmed or highly likely populations of range-restricted species.<br>< 50% of receptor contains natural habitat with limited potential to support SCC. |
| Very low | No confirmed and highly unlikely populations of SCC.<br>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 because the and **low** the golf course and infrastructure impacted habitat because the habitat can quickly recovered if the impact is removed due to transformed nature of the site.

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.

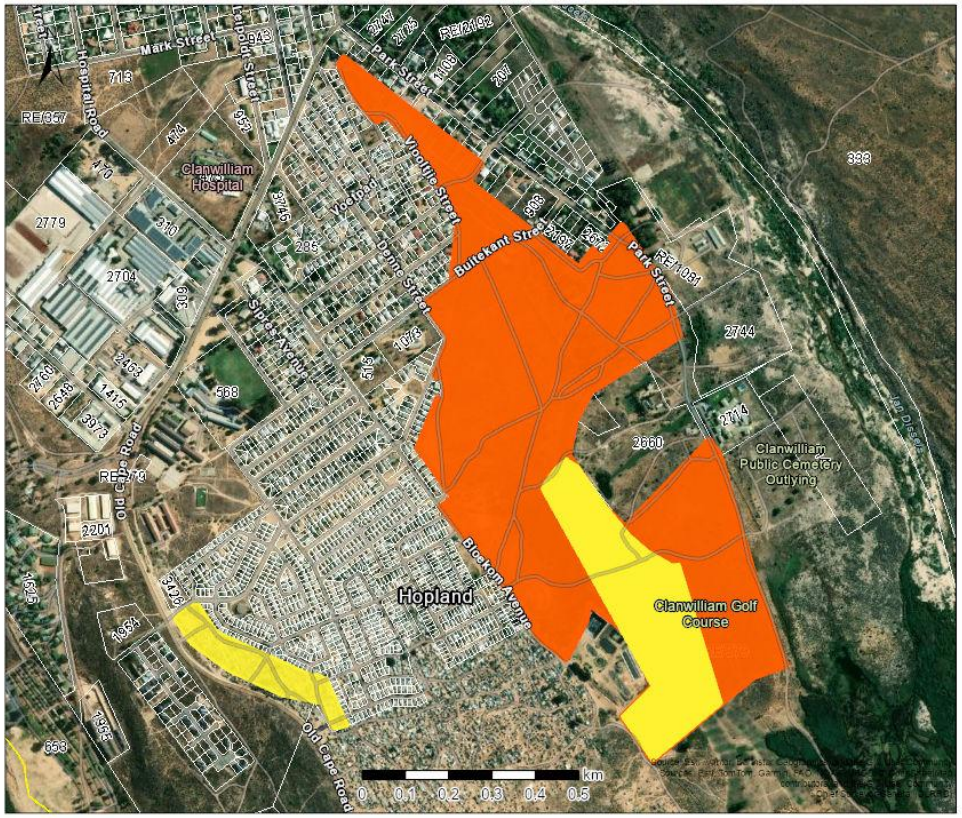
| Site ecological importance | | Biodiversity importance | | | | |
|---|---|---|---|---|---|---|
| | | Very high | High | Medium | Low | Very low |
| Receptor resilience | Very low | Very high | Very high | High | Medium | Low |
| | Low | Very high | Very high | High | Medium | Very low |
| | Medium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

## Site Ecological Importance Map




Legend

Farm Portions

Erf

Map Center: Lon: 18°53'50.2"E
Lat: 32°11'19.6"S

Scale: 1:11,788

Date created: 2026/20/10

Western Cape Government FOR YOU

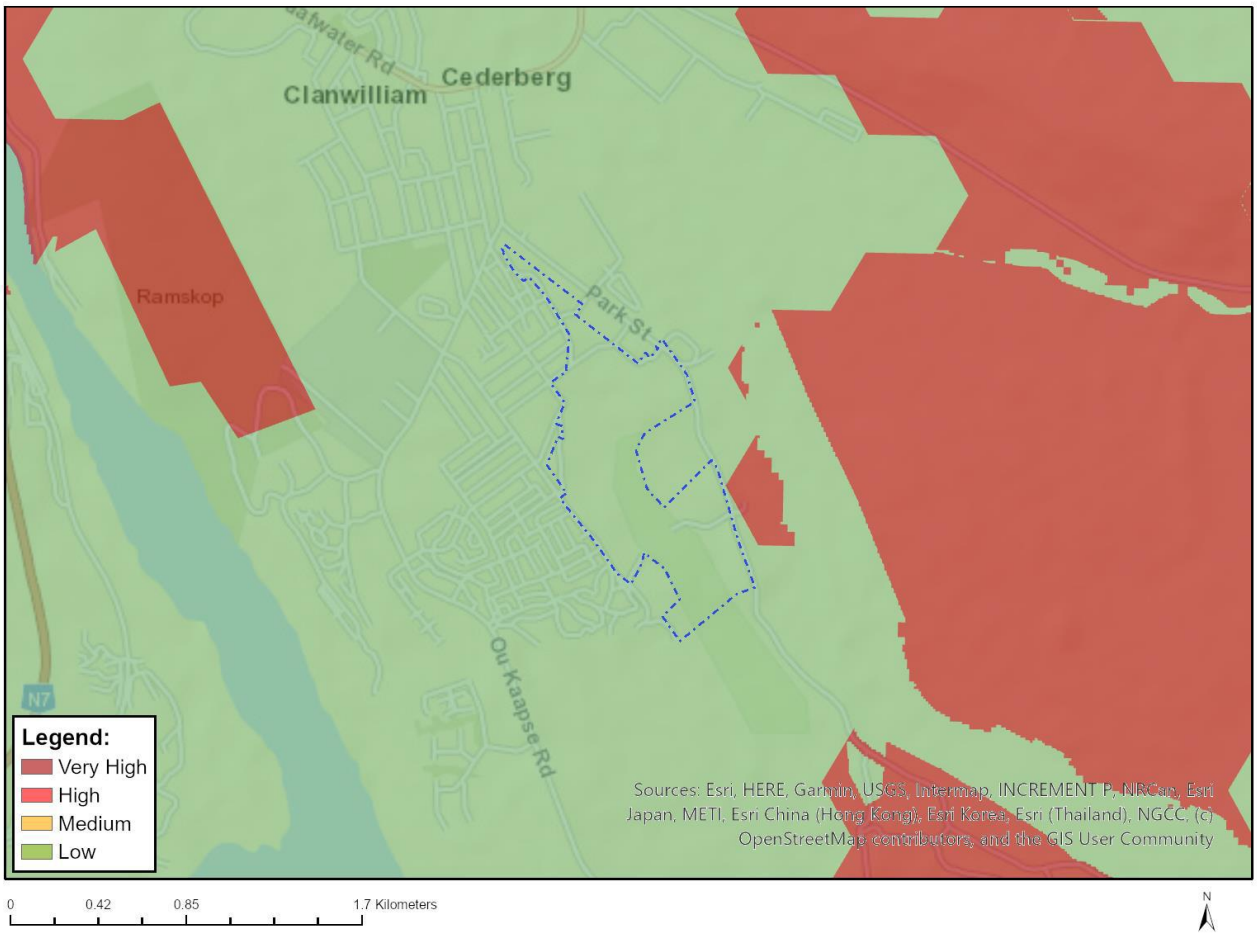



**Figure 1:** Project Area of Influence map relevant to terrestrial biodiversity as per the environmental screen tool report.

## 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 National Water Act (Act 36 of 1998)
- The National Forest Act (Act 84 of 1998)
- Invasive species are controlled by the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) - Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014

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 proposed development, taking place in the identified environment, may not necessitate any particular application for a change in land use from an aquatic and terrestrial biodiversity and ecological perspective. However, 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 act is not applicable to this site.

***The National Water Act (Act 36 of 1998)***
The National Water Act controls activities in and around water resources, as well as the general management of water resources, including abstraction of groundwater and disposal of water. Authorisation for activities impacting on the land other than the current landuse, up to 500 m from a defined (water source) wetland system and 100m from a defined water sources (river) will require an application for a Water Use Licence from the Department of Water and Sanitation.

***The National Forest Act (Act 84 of 1998)***
The National Forest Act (Act 84 of 1998) governs the removal, disturbance, cutting or damage and destruction of identified "protected trees". No listed species were encountered or recorded on site and an application for the "clearing of a *natural forest*", as defined within the Act, will not be required on the site in question.

***Invasive species are controlled by the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) - Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014.***
This Act is not applicable to the project as no such plants arise within or adjacent to the project area. Notably most listed alien invasive species are propagated and driven by the disturbance of land during and following construction.

As the recommended sites are not within a protected area, the various regulations within the NEM Protected Areas Act are not applicable to this site. It is also noted that the site does not fall within any expansion area in terms of a conservation strategy for the Western Cape.

## 3. DESCRIPTION OF PROJECT ASPECTS RELEVANT TO TERRESTRIAL BIODIVERSITY 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 Cl2
- 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 Cl2, and
- Future PS Cl2 (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 Cl2, and
- Future PS Cl2 (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

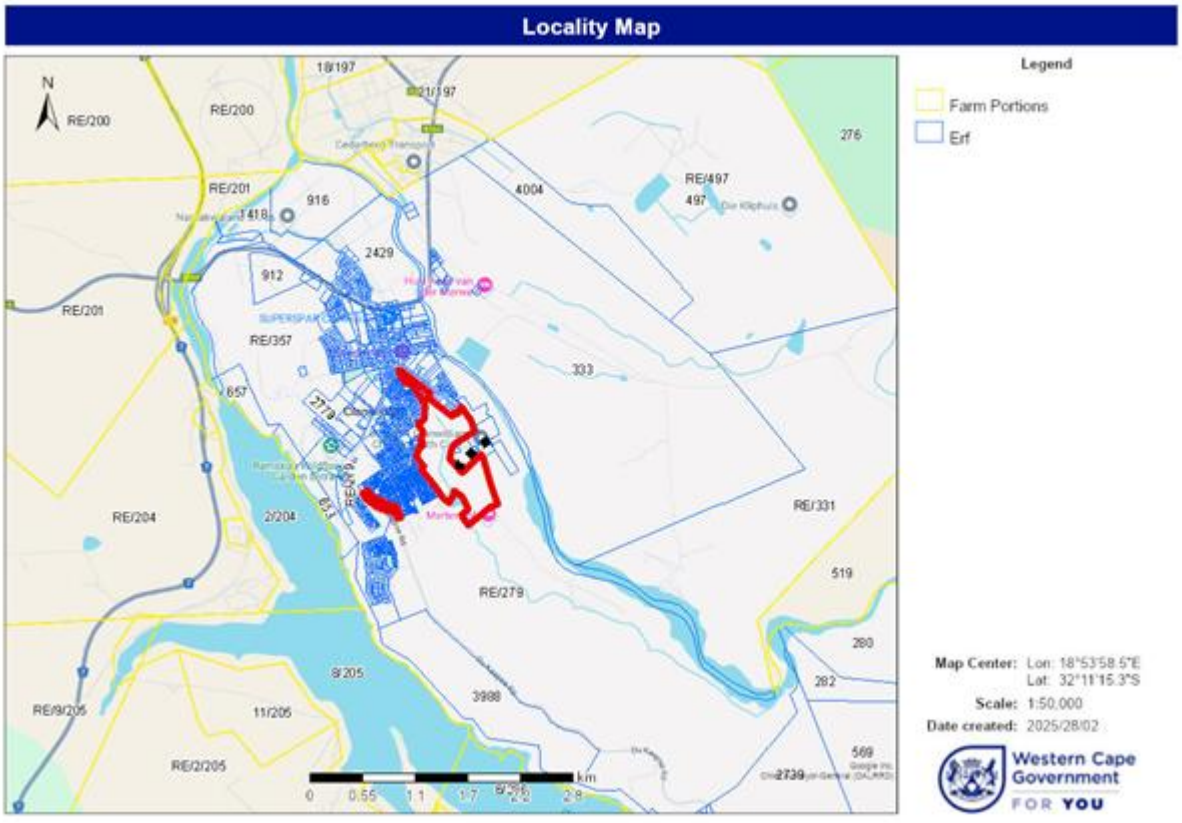
design offers an opportunity to improve the central wetland, which currently receives untreated stormwater from the informal settlement and township.

**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.




Source: Cape Farm Mapper
**Figure 2:** Locality Map

### *4.2. Topography*

All two 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 Ecological Drivers/Processes, Functioning, Ecological Corridors that the Development Would Impede Including Migration and Movement of Flora and Fauna, and Description of any Significant Landscape Features*

Conservation value and sensitivity (terms which are often used interchangeably in ecological assessments) of habitats are a product of species diversity, plant community composition, rarity of habitat, degree of habitat degradation, rarity of species, ecological viability and connectivity, vulnerability to impacts, and reversibility of threats (which in this case generally refers to the rehabilitation potential of the habitat; high sensitivity habitats having low rehabilitation potential). According to *The Vegetation Map of South African, Lesotho and Swaziland* (VEGMAP), (Rebelo *et al*. 2006 in Mucina & Rutherford, 2006; SANBI, 2018) the vegetation of study area is Citrusdal Vygieveld, with a least threatened ecosystem status.

The Western Cape Biodiversity Spatial Plan (WCBSP) is the outcome of a systematic biodiversity planning exercise developed at a relatively fine scale (1:10 000 to 1:50 000) that is used to guide development through identification of both terrestrial and aquatic conservation priorities (Pool-Stanvliet et al. 2017). The WCSBP defines five broad biodiversity priority categories ranging from Core Biodiversity Areas (CBAs) through to Ecological Support Areas (ESAs) through to highly modified areas rated as No Natural Remaining (NNRs) areas. Each category is given a desired management objective and these spatial data were used to inform whether any potentially affected aquatic ecosystems are considered within any of the biodiversity priority categories to establish the desirability of water resource development and make recommendations within this assessment.
The CBA mapping for the site is mostly based on ground and surface water protection and Upland-Lowland interface.

BSP Reasons 2017
Summary 1: Ecological processes (9.84), SA Vegetation Type (11.44), Threatened Vertebrate (11.44), Water resource protection (23.77)
Feature 1: Cape Mountain Zebra
Feature 2: Citrusdal Vygieveld (LT)
Feature 3: Groundwater recharge- Cederberg
Feature 4: Upland-lowland interface
Feature 5: Water source protection- Olifants
Feature 6: Watercourse protection- Western Folded Mountains

Please refer to the Aquatic Biodiversity assessment for more detail on the mapped Freshwater ecologic features and buffers with management and mitigation measures to protect them. Included in the Environmental Management Plan is management and mitigation measures too protect the groundwater resources. In terms of the Upland-lowland interface corridor, the proposed development will not result in the loss of this interface corridor because the development is on the edge and wedge into the existing town of Clanwilliam with significant areas to the south to act as this upland lowland interface. The proposed development will therefore not impact on the mapped BSP objectives.

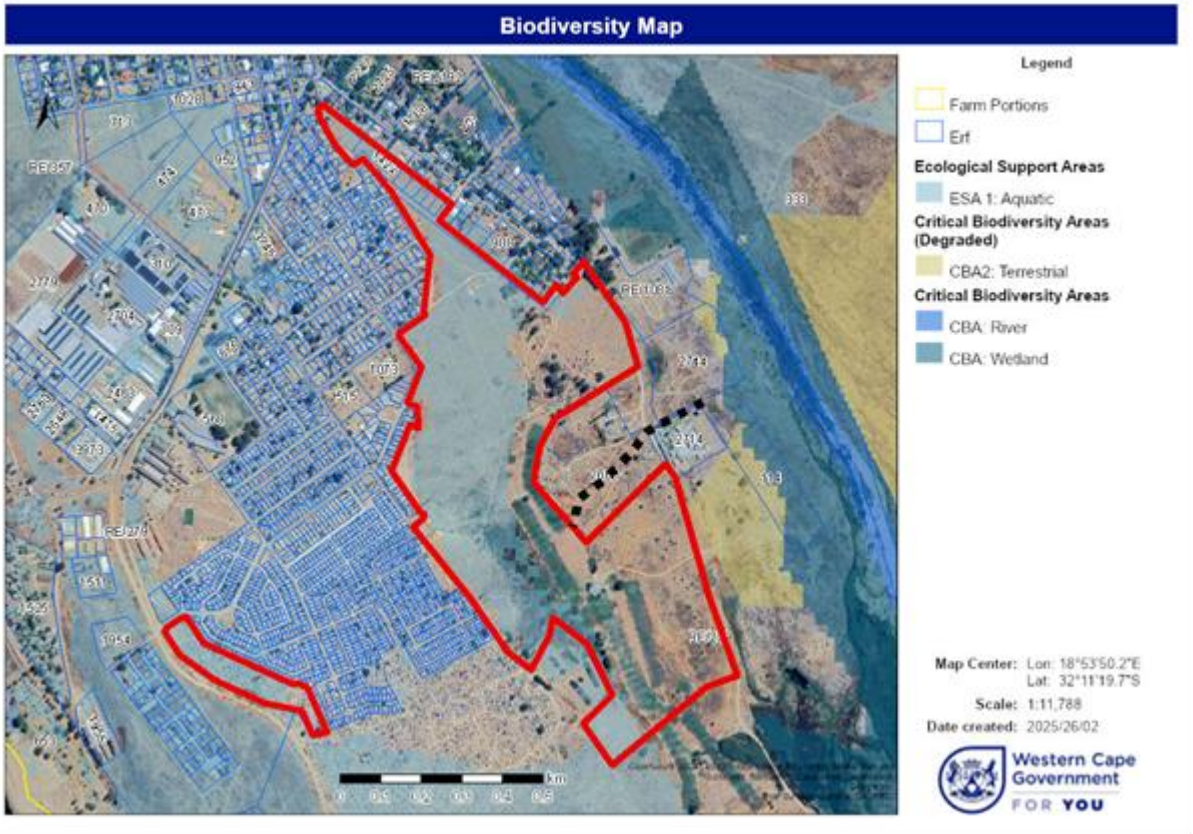



**Figure 3:** Biodiversity Map

The information gathered from the site survey does differs from the Environmental Screen report. The development of the site as per the proposed Site Development Plan would have a **low negative** impact.

### *4.5. Description of the Terrestrial Biodiversity and Ecosystems*

#### *4.5.1. Main Vegetation Types*

The National Vegetation Map of South Africa (2018) identifies the natural vegetation occurring within the area as Citrusdal Vygieveld with a least threatened ecosystem status. The proposed development will transform the area but will not lead in the change in ecosystem status of the vegetation type.

### *4.5.2. Threatened Ecosystems, Including Listed Ecosystems*

The vegetation type is classified as a least threatened ecosystem status. The proposed development will transform the area but will not lead in the change in ecosystem status of the vegetation type.

### *4.5.3. Ecological Connectivity, Habitat Fragmentation, Ecological Processes and Fine-Scale Habitats*

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 habitats on site. The bigger development area is ecologically connected to the south and east.

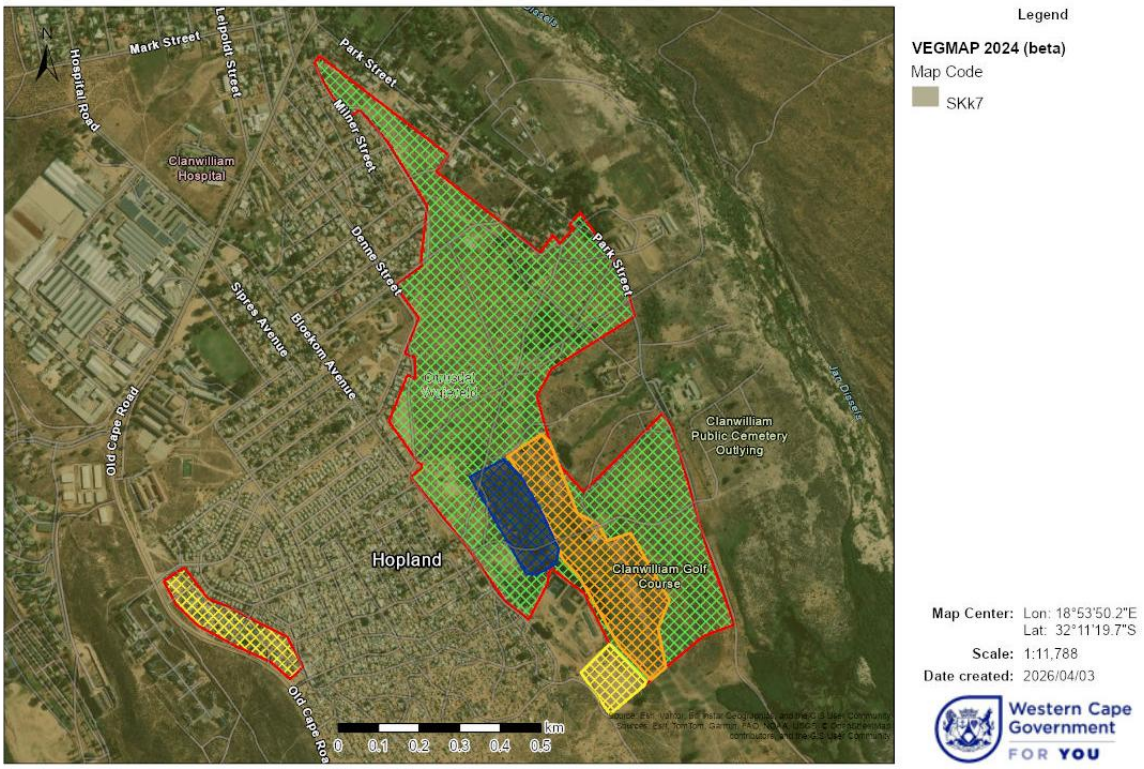



**Figure 4**: Habitat Map. Green - Citrusdal Vygie Veld, Blue – wetlands degraded to be rehabilitated, Orange – Golf course, Yellow - squatters and infrastructure.

**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. The vegetation as mapped above on site is a true reflection of Citrusdal vygieveld habitat in moderate condition.

**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. It is dominated by *Phragmites australis* and *Typha capensis*, with arum lilies (*Zantedeschia aethiopica*) and the NEM:BA Category 1b invasive species Port Jackson (Acacia saligna). 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.

**Golf course (orange on map)**
Fair way and greens covered by moved grass in low lying flat area.
**Squatters and infrastructure. Yellow on map**
Historic Citrusdal Vygie Veld habitat totally cleared and impacted by infrastructure and squatters.

### *4.5.4. Species, Distribution, Important Habitats*

Refer to animal impact assessment and plant species compliance statement for more detail.

### *4.6. Terrestrial Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs)*

No terrestrial CBA or ESA was mapped on site

### *4.7. Protected Areas and Priority Areas for Protected Area Expansion*

No protected area or priority areas for protected area expansion are inside the study area.

### *4.8. Strategic Water Source Areas (SWSA)*

None mapped for the area.

### *4.9. Freshwater Ecosystem Priority Area (FEPA) and Freshwater Ecological features*

No NFEPA mapped for the development area. A valley bottom wetland was mapped on the area.

### *4.10. Indigenous Forests*

No indigenous forests are inside or close to the study area.

## 5. SITE SENSITIVITY ASSESSMENT

The ecological sensitivity for the impacted area is assessed to be low, which is confirmed and as recorded in the environmental screen tool report.

The proposed development as proposed can be done.

## 6. IMPACT ASSESSMENT

### *6.1. Assessment & Significance Criteria*

The assessment criteria used in the assessment are drawn from the protocol for the specialist assessment and minimum report content requirements for environmental impacts (published in Government Notice **no. 320 in** Government Gazette **43110** 20 March 2020) were used.

### *6.2. Assessment of Potential Impacts*

The impacts identified are assessed below, before and after mitigation as well as during construction.

The impact assessment which follows is based on the site sensitivity and any deviations from the site sensitivity map as provided may invalidate the results of the assessment.

### *6.3. Risk Assessment Criteria*

**Step 1**: Determine the **PROBABILITY** of the impact by calculating the average between the Frequency of the Aspect, the Availability of a pathway to the receptor and the availability of the receptor (thus: Sum of the three column scores below ÷ 3)

| Frequency of Aspect / Unwanted Event | Score | Availability of pathway from the source to the receptor | Score | Availability of receptor | Score |
|---|---|---|---|---|---|
| Never known to have happened, but may happen | 1 | A pathway to allow for the impact to occur is never available | 1 | The receptor is never available | 1 |
| Known to happen in industry | 2 | A pathway to allow for the impact to occur is almost never available | 2 | The receptor is almost never available | 2 |
| < once a year | 3 | A pathway to allow for the impact to occur is sometimes available | 3 | The receptor is sometimes available | 3 |
| Once per year to up to once per month | 4 | A pathway to allow for the impact to occur is almost always available | 4 | The receptor is almost always available | 4 |
| Once a month - Continuous | 5 | A pathway to allow for the impact to occur is always available | 5 | The receptor is always available | 5 |

**Step 2**: Determine the **MAGNITUDE** of the impact by calculating the average of the factors below (thus: Sum of all six column ratings below ÷ 6)

| Source | | | | | | | | Receptor | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Duration of impact** | **Score** | **Extent** | **Score** | **Volume / Quantity / Intensity** | **Score** | **Toxicity / Destruction Effect** | **Score** | **Reversibility** | **Score** | **Sensitivity of environmental component** | **Score** |
| Lasting days to a month | 1 | Effect limited to the site. (metres); | 1 | Very small quantities / volumes / intensity (e.g. < 50L or < 1Ha) | 1 | Nontoxic (e.g. water) / Very low potential to create damage or destruction to the environment | 1 | Bio-physical and/or social functions and/or processes will remain unaltered. | 1 | Current environmental component(s) are largely disturbed from the natural state.<br>Receptor of low significance / sensitivity | 1 |
| Lasting 1 month to 1 year | 2 | Effect limited to the activity and its immediate surroundings. (tens of metres) | 2 | Small quantities / volumes / intensity (e.g. 50L to 210L or 1Ha to 5Ha) | 2 | Slightly toxic / Harmful (e.g. diluted brine) / Low potential to create damage or destruction to the environment | 2 | Bio-physical and/or social functions and/or processes might be negligibly altered or enhanced / Still reversible | 2 | Current environmental component(s) are moderately disturbed from the natural state.<br>No environmentally sensitive components. | 2 |
| Lasting 1 – 5 years | 3 | Impacts on extended area beyond site boundary (hundreds of metres) | 3 | Moderate quantities / volumes / intensity (e.g. > 210 L < 5000L or 5 – 8Ha) | 3 | Moderately toxic (e.g. slimes) Potential to create damage or destruction to the environment | 3 | Bio-physical and/or social functions and/or processes might be notably altered or enhanced / Partially reversible | 3 | Current environmental component(s) are a mix of disturbed and undisturbed areas.<br>Area with some environmental sensitivity (scarce / valuable environment etc.). | 3 |
| Lasting 5 years to Life of Organisation | 4 | Impact on local scale / adjacent sites (km's) | 4 | Very large quantities / volumes / intensity (e.g. 5000 L – 10 000L or 8Ha– 12Ha) | 4 | Toxic (e.g. diesel & Sodium Hydroxide) | 4 | Bio-physical and/or social functions and/or processes might be considerably altered or enhanced / potentially irreversible | 4 | Current environmental component(s) are in a natural state.<br>Environmentally sensitive environment / receptor (endangered species / habitats etc.). | 4 |

| Source | | | | | | | | Receptor | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Duration of impact** | **Score** | **Extent** | **Score** | **Volume / Quantity / Intensity** | **Score** | **Toxicity / Destruction Effect** | **Score** | **Reversibility** | **Score** | **Sensitivity of environmental component** | **Score** |
| Beyond life of Organization / Permanent impacts | 5 | Extends widely (nationally or globally) | 5 | Very large quantities / volumes / intensity (e.g. > 10 000 L or > 12Ha) | 5 | Highly toxic (e.g. arsenic or TCE) | 5 | Bio-physical and/or social functions and/or processes might be severely/substantially altered or enhanced / Irreversible | 5 | Current environmental component(s) are in a pristine natural state. Highly Sensitive area (endangered species, wetlands, protected habitats etc.) | 5 |

**Step 3**: Determine the **SEVERITY** of the impact by plotting the averages that were obtained above for Probability and Magnitude in the table below.

| ENVIRONMENTAL IMPACT RATING / PRIORITY | | | | | |
|---|---|---|---|---|---|
| | **MAGNITUDE** | | | | |
| **PROBABILITY** | **1 Minor** | **2 Low** | **3 Medium** | **4 High** | **5 Major** |
| **5 Almost Certain** | Low | Medium | High | High | High |
| **4 Likely** | Low | Medium | High | High | High |
| **3 Possible** | Low | Medium | Medium | High | High |
| **2 Unlikely** | Low | Low | Medium | Medium | High |
| **1 Rare** | Low | Low | Low | Medium | Medium |

TERRESTRIAL BIODIVERSITY IMPACTS

| **Development Construction** | **TERRESTRIAL BIODIVERSITY IMPACTS** |
|---|---|
| **PLANNING, DESIGN AND DEVELOPMENT PHASE** | |
| Potential impact and risk: | **Terrestrial Biodiversity Impacts** |
| Nature of impact: | **Discussion:**<br>The vegetation type is classified as least threatened. No terrestrial CBA or ESA's were mapped on the development area. No protected area or priority areas for protected area expansion are inside the study area. No indigenous forests are inside or close to the study area. |
| Extent and duration of impact: | **Extent (footprint) & Duration (Construction period)** |
| Magnitude: | **Moderate** |
| Consequence of impact or risk: | **Loss or impacts on indigenous vegetation** |
| Probability of occurrence: | **Definitive** |
| Degree to which the impact may cause irreplaceable loss of resources: | **Moderate** |
| Degree to which the impact can be reversed: | **Cannot be reversed** |
| Indirect impacts: | **Disturbance to surface area can result in impacts on indigenous vegetation** |
| Cumulative impact prior to mitigation: | **Habitat fragmentation, loss of ecological connectivity and erosion** |
| Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High) | **High** |
| Degree to which the impact can be avoided: | **High** |
| Degree to which the impact can be managed: | **High** |
| Degree to which the impact can be mitigated: | **High** |
| Proposed mitigation: | • **Demarcate no-go areas before any land clearing occurs under the supervision of an ECO. Demarcation must be clearly visible and effective and no-go area must remain demarcated throughout construction phase. The no-go areas is the wetland area, boundary of the site and non-perennial river mapped.**<br>• **Site clearance along the border of the no-go areas must be done under the supervision of an ECO.**<br>• **Search and rescue for SCC must be conducted before construction commence.** |
| Residual impacts: | **It is not anticipated that the impact will be high if the mitigation measures are adhered to.** |

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| Cumulative impact post mitigation: | **It is not anticipated that the impact will be high if the mitigation measures are adhered to.** |
| Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High) | **Low** |
| **OPERATIONAL PHASE** | |
| Potential impact and risk: | **Impact on terrestrial biodiversity** |
| Nature of impact: | **None. Area will be developed** |
| Extent and duration of impact: | **None. Area will be developed** |
| Magnitude: | **None. Area will be developed** |
| Consequence of impact or risk: | **None. Area will be developed** |
| Probability of occurrence: | **None. Area will be developed** |
| Degree to which the impact may cause irreplaceable loss of resources: | **None. Area will be developed** |
| Degree to which the impact can be reversed: | **None. Area will be developed** |
| Indirect impacts: | **None. Area will be developed** |
| Cumulative impact prior to mitigation: | **None. Area will be developed** |
| Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High) | **None. Area will be developed** |
| Degree to which the impact can be avoided: | **None. Area will be developed** |
| Degree to which the impact can be managed: | **None. Area will be developed** |
| Degree to which the impact can be mitigated: | **None. Area will be developed** |
| Proposed mitigation: | **None. Area will be developed** |
| Residual impacts: | **None. Area will be developed** |
| Cumulative impact post mitigation: | **None. Area will be developed** |
| Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High) | **None. Area will be developed** |
| **DECOMMISSIONING AND CLOSURE PHASE** | |
| **Potential impact and risk:** | **Impact on indigenous vegetation** |
| Nature of impact: | **Similar to that in the development phase.** |

***Cumulative Impacts***

Cumulative impacts arise from the combined presence of several similar developments within

an area which affect terrestrial biodiversity. There are other developments that also represents 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 terrestrial biodiversity, animal and plant species known to occur in the broader area.

## 7. CONCLUSION AND RECOMMENDATIONS

The sampling and analysis of the site, provides suitable data and results to present an informed decision on the local ecology and terrestrial biodiversity features. 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 visits, 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, but none were observed which required the recording of their location. The study recorded low and very low sensitivity areas within the development area. No terrestrial CBA or ESA were mapped on the impact area.

Please refer to the Aquatic Biodiversity assessment for more detail on the mapped Freshwater ecologic features and buffers with management and mitigation measures to protect them. Included in the Environmental Management Plan is management and mitigation measures too protect the groundwater resources.

No additional survey or further assessment is in the authors view recommended.

The proposed area as per the Site Development Plan will have relatively little terrestrial biodiversity and ecological impact on sensitivity areas and the surrounding terrestrial biodiversity features provided that the development stays within the Site Development Plan area and appropriate mitigation measures included in the impact table above are included in the EMPr and adhered to.

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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 (Pri.Sci.Nat); Aquatic Science & Conservation Science (Cand.Sci.Nat), 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.

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| **Areas of specialisation:** | • Ecosystem (terrestrial and aquatic) monitoring and assessments<br>• Design of monitoring programmes for ecosystems (terrestrial and aquatic)<br>• Environmental Impact Assessments<br>• River classification and environmental water requirements<br>• Wetlands Delineation<br>• River and Wetlands management<br>• Water Use Authorization Applications<br>• Water quality management<br>• 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)<br>• Assistant Reserve Manager at Gariep Dam Nature Reserve, Free State (1993 - 1998)<br>• Reserve Manager, Conservation Services Manager for Western Cape Nature Conservation Board (1998 - 2006)<br>• External Lecturer at Cape Peninsula University of Technology (2003 - 2005)<br>• Director: Environmental Management at Cape Lowlands Environmental Services (2006 – 2010)<br>• Director, Environmental Management and lead Environmental Impact Assessment Practitioner at Eco Impact (Pty) Ltd (2010 – to August 2019)<br>• Director, Environmental Management and lead Environmental Impact Assessment Practitioner at Enviro-EAP (Pty) Ltd (September 2019 – to date) |

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| **Professional membership, accreditations and courses** | • South African Council for Natural Scientists Professions Pri.Sci.Nat (Ecological Science)<br>• Riparian vegetation identification and health assessment. Internal Western Cape Nature Conservation short course presented by Dr C Boucher (Stellenbosch University) in 2000.<br>• 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.<br>• 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.<br>1993 -1998: Free State Nature Conservation. Ecological management and monitoring actions related to the Gariep Dam, Orange and Caledon Rivers.<br>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.<br>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.<br>• 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.<br>• 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)<br>• Prieska Photvoltaic Power Generation Project. Prieska Commonage Northern Cape. Biodiversity And Ecological Baseline Survey. July 2011. (Included Terrestrial and aquatic |

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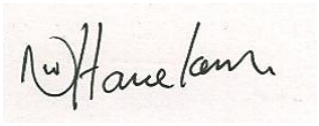
| | ecological assessments and water use authorization applications)<br>• Witteklip Erf 123 Extension, Vredenburg. Biodiversity Baseline Survey. Updated - October 2012 (Included Terrestrial and aquatic ecological assessments and water use authorization applications)<br>• Baseline Biodiversity Survey And Wetland Delineation for ECCA Holdings: Cape Bentonite Mine on Erf 1412 Near Heidelberg. Prepared for: Shangoni Management Services Pry (Ltd). October 2014.<br>• Freshwater Impact Assessment Laingsburg Flood Damage Repairs & Storm Water Infrastructure. 18 February 2016.<br>• 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)<br>• 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)<br>• 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).<br>• 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).<br>• Proposed Hartmanshoop Agri Vegetation Clearing Project and Irrigation on Erf 686, Laingsburg. 12 August 2017. (Freshwater ecological inputs in Water Use Registration).<br>• 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.



Nicolaas Hanekom Pri Sci Nat (Ecology).
Registration number 004415