# TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

## OUDTSHOORN GG KAMP DEVELOPMENT. THE FORMALIZATION OF EXISTING SQUATTER AREA AND DEVELOPMENT OF SUPERBLOCKS TO SERVICE SQUATTERS, REALIGN ROADS, STORMWATER INFRASTRUCTURE AND SERVICES ON APPROXIMATELY 19HA ON REMAINDER OF ERF 10413, ERF 13206, ERF 15012 AND ERF 11111, OUDTSHOORN.

Enviro-EAP
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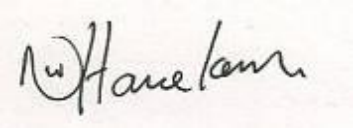
**FEBRUARY 2026**

## 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** **12 February 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. 648, GOVERNMENT GAZETTE 45421: 10 MAY 2019)**

| **Department of Environmental Affairs screening Tool (Government Notice No. 648, GOVERNMENT GAZETTE 45421: 10 MAY 2019)** | **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 sensitivity for terrestrial biodiversity” sensitivity due to the presence of mapped CBA: Terrestrial and endangered Eastern Little Karoo and Muscadel Riviere. The site sensitivity verification and the specialist assessment does differ from the designation of “very high” terrestrial biodiversity and do not agree with the findings of the national web based environmental screening tool. Poor ecological condition indigenous mapped as Muscadel Riviere and Eastern Little Karoo both with an endangered protection status vegetation were recorded as a result of the impacts of the urban development activities on boundary. Two non-perennial river streams occur on site. The one will be maintained with its flood line as buffer. The other one is already severely degraded and transformed and infilled upstream and the proposal is to infill and channel the outflow into the historical stream west of the site to ensure hydrological flow and functioning downstream. The Olifants river to the south of the site floodplain wetlands originally occurred

on a portion of the southern edge, but these wetlands and floodplains were destroyed long ago with the established agricultural fields, water channel, roads and railway line between the impact area and the Olifants river. 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 residential 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.

A freshwater specialist conducting aquatic biodiversity assessments would typically register under Ecological Science field of practice or Aquatic Sciences, depending on the specific job that the Scientist is carrying out. Ecological Science field mainly covers professionals who work on ecosystems, biodiversity, and environmental assessments, including freshwater ecosystems. Sometimes as alluded above, depending on the task/job that the Scientist carries out, it might fall under Aquatic Science or a related field within Conservation Sciences.

The following are typical tasks that a freshwater specialist conducting aquatic biodiversity assessments can be involved in:

1. Surveying and sampling freshwater ecosystems (rivers, lakes, wetlands, etc.) to collect data on species presence, abundance, and diversity.
2. Identifying aquatic species, including fish, macroinvertebrates, algae, and plants.
3. Assessing ecosystem health and water quality by analysing biological indicators.
4. Evaluating impacts of environmental changes or developments on freshwater biodiversity.
5. Compiling reports and data summaries to inform conservation decisions, environmental impact assessments (EIAs), or resource management plans.
6. Recommending mitigation measures or conservation strategies based on assessment results.
7. Compliance and regulation work related to freshwater biodiversity protection laws and policies.

The assessment of the freshwater ecological features in this study meets the requirements of SACNASP ecological science field registration.

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[1] Published in Government Notice No. 320 GOVERNMENT GAZETTE 43110 20 MARCH 2020.

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 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 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 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 on 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 terrestrial plants within this region is between August and end October months. The sampling and analysis of the site outside the optimum season (26 June 2024), provides suitable data and results to present an informed decision on the local ecology due to the transformed state of the site.

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.

The site visit included surveying and sampling freshwater ecosystems (rivers, lakes, wetlands, etc.) to collect data on species presence, abundance, and diversity.
Identifying aquatic species, including fish, macroinvertebrates, algae, and plants.
Assessing ecosystem health and water quality by analysing biological indicators.
Evaluating impacts of environmental changes or developments on freshwater biodiversity.

### *1.6. Assumptions and limitations*

The presence of flora and 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 overall condition of the vegetation and habitat on the impact areas 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 comprehensive assessment of conservation value (or ecological importance/sensitivity) can pose a significant challenge, particularly when considering SCC and threatened vegetation types. The inherent difficulty stems from the multi-dimensional nature of “value”, encompassing ecological functionality, distinctiveness/uniqueness, cultural significance, and even the provision of ecosystem services. Quantifying these diverse facets is frequently hampered by data deficiencies, especially concerning the population dynamics, distributional ranges, and specific habitat requirements of many rare or elusive species. Furthermore, the complex

interdependencies between species often result in unforeseen ecological cascades, making the prediction of long-term conservation outcomes difficult. The evaluation of conservation value is further complicated in transition zones, or ecotones. These areas, characterized by their inherent dynamic nature, serve as critical ecological interfaces. The simultaneous presence of diverse species from adjacent ecosystems, even though they might be common within the broader landscape, exacerbates the challenge of prioritizing conservation efforts for such areas. 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).
- National Geospatial Information and Vector data for rivers (NGI Rivers database, available on Cape Farm Mapper);
- The National Wetlands Map Vers. 5 (NWM5, CSIR, 2018); and
- The Western Cape Biodiversity Spatial Plan (WCBSP, 2023).

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 26 June 2024. Poor ecological condition indigenous vegetation mapped as Muscadel Riviere and Eastern Little Karoo both with an endangered protection status as a result of the impacts of the urban development activities on boundary. Two non-perennial river streams occur on site. The one will be maintained with its flood line as buffer. The other one is already severely degraded and transformed and infilled upstream

and the proposal is to infill and channel the outflow into the historical stream west of the site to ensure hydrological flow and functioning downstream. The Olifants river to the south of the site floodplain wetlands originally occurred on a portion of the southern edge, but this wetlands and floodplain was destroyed long ago with the established agricultural fields, water channel, roads and railway line between the impact area and the Olifants river.

Walk-through-surveys were conducted of representative habitats and impact areas in search of Species of conservation concern or the species listed in the environmental screen tool report. None were recorded.

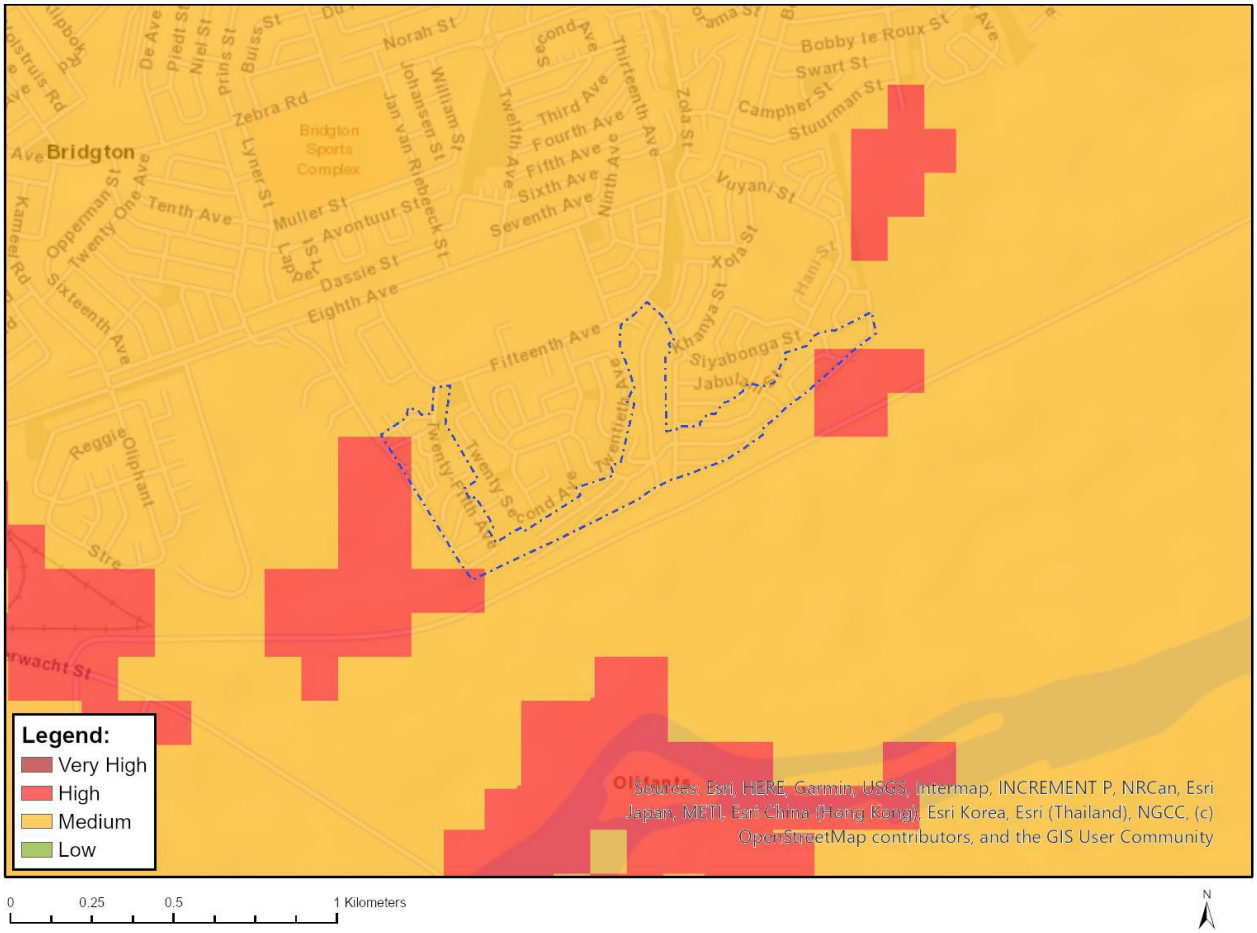


**Figure 1:** Project Area Of Influence (PAOI) map relevant to Animal Species as per the environmental screen tool report.

**Figure 2:** Project Area Of Influence (PAOI) map relevant to Aquatic Biodiversity as per the environmental screen tool report.

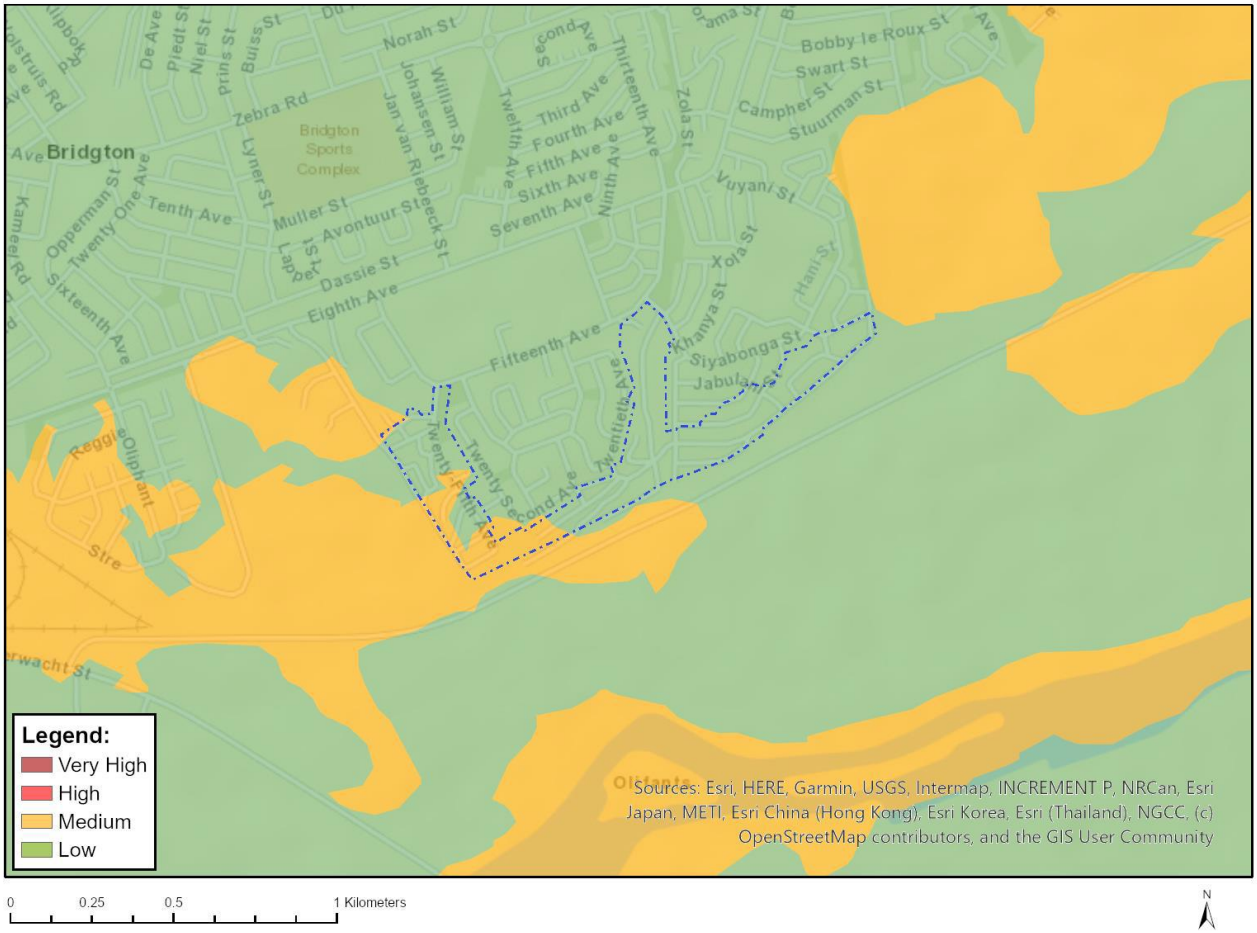


**Figure 3:** Project Area Of Influence (PAOI) map relevant to Plant Species as per the environmental screen tool report.

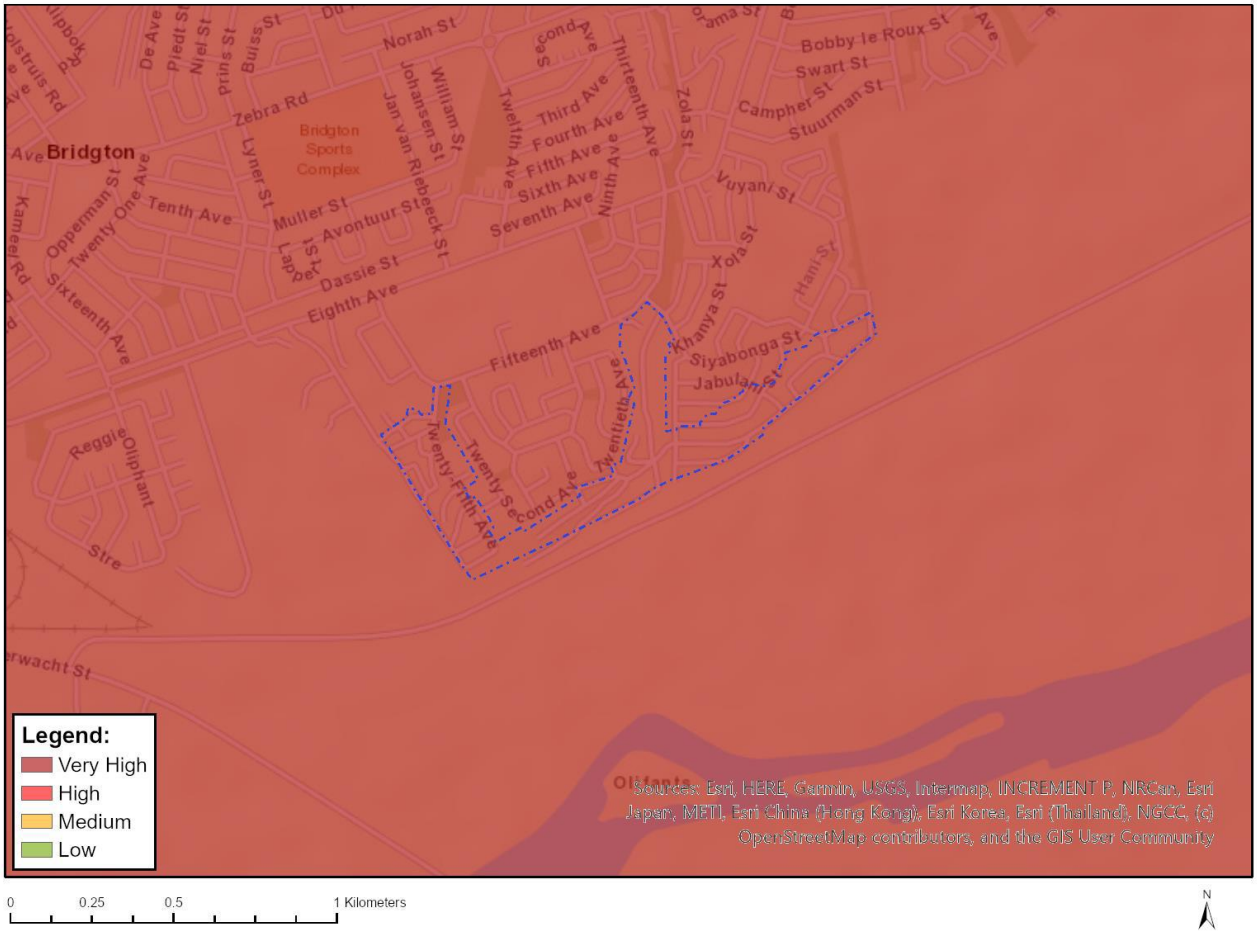


**Figure 4:** Project Area Of Influence (PAOI) map relevant to Terrestrial Biodiversity as per the environmental screen tool report.

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

**Development Footprint Area**

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:

$$BI = CI + FI$$

[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.

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.<br>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:

***Disturbed and Squatter Impact areas***
CI = **very low**. Reason be that no natural habitat remaining.

FI= **very low**. Reason be that no natural habitat remaining.

$$BI = CI + FI$$

Therefore, using table below, the BI was assessed to be **very low** (CI **very low** = and FI = **very low**)

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. |

***Disturbed and squatter area***
The RR = **very low.** Reason be that the habitat is unable to recover from major impacts.

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.

***Disturbed and squatter area***

SEI **(very low)** = BI (**very low)** + RR (**very low**)

| 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. |

The development will have a **very low** SEI on the PAOI.

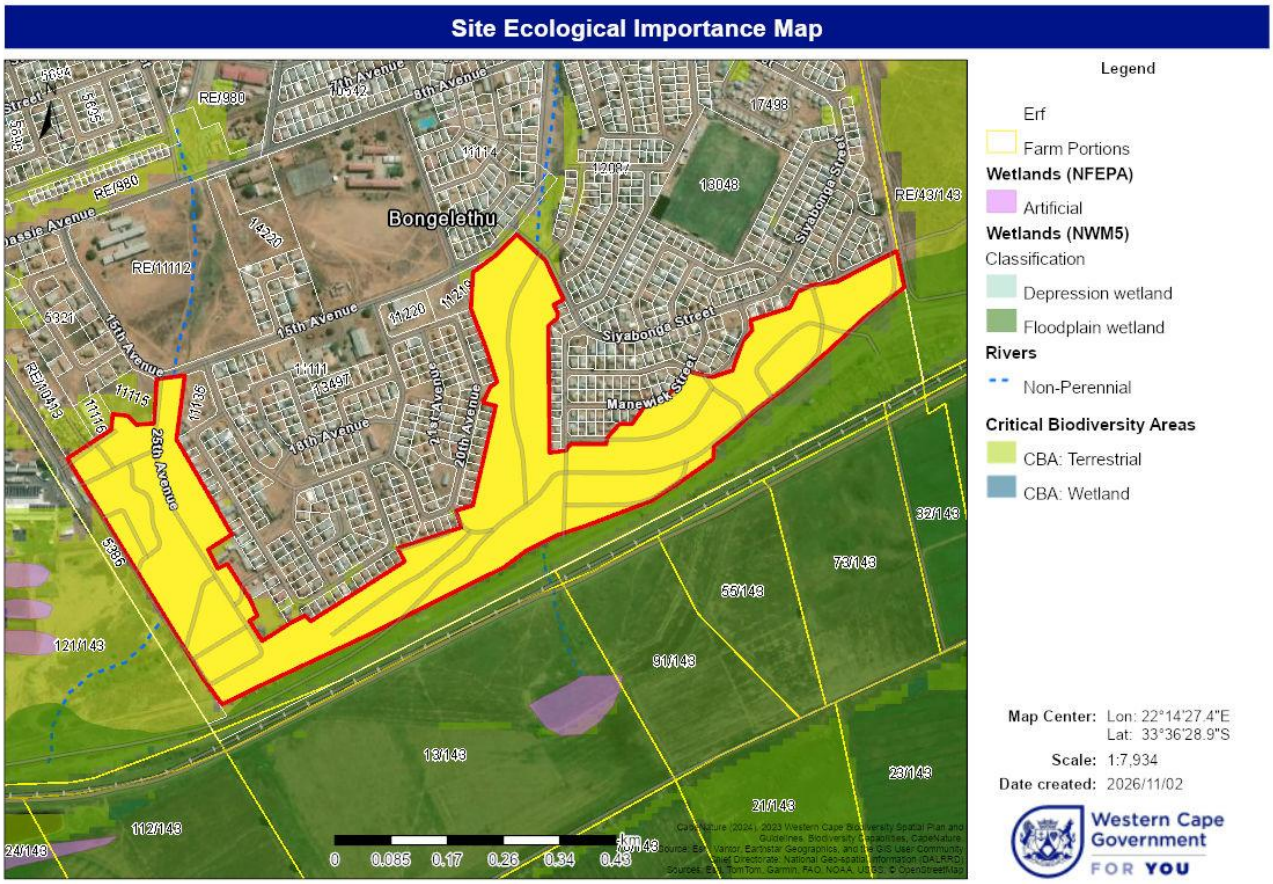


**Figure 5:** Site Sensitivity Map. Yellow – very low sensitivity.

## 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 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 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 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.***

Notably most listed alien invasive species are propagated and driven by the disturbance of land during and following construction. 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. Should alien invasive species during operational phase be recorded on site it must be cleared over time from the site.

## 3. DESCRIPTION OF PROJECT ASPECTS RELEVANT TO TERRESTRIAL BIODIVERSITY FEATURES

**Project and site description –** The formalization of existing squatter area and development of superblocks to service squatters, realign roads, stormwater infrastructure and services on approximately 19ha on remainder of Erf 10413, Erf 13206, Erf 15012 and Erf 11111, Oudtshoorn.

## 4. DESCRIPTION OF THE AFFECTED ENVIRONMENT.

### *4.1. Locality*

The site is located on the southern edge of the town between Bongoletho and the railway line and water channel.

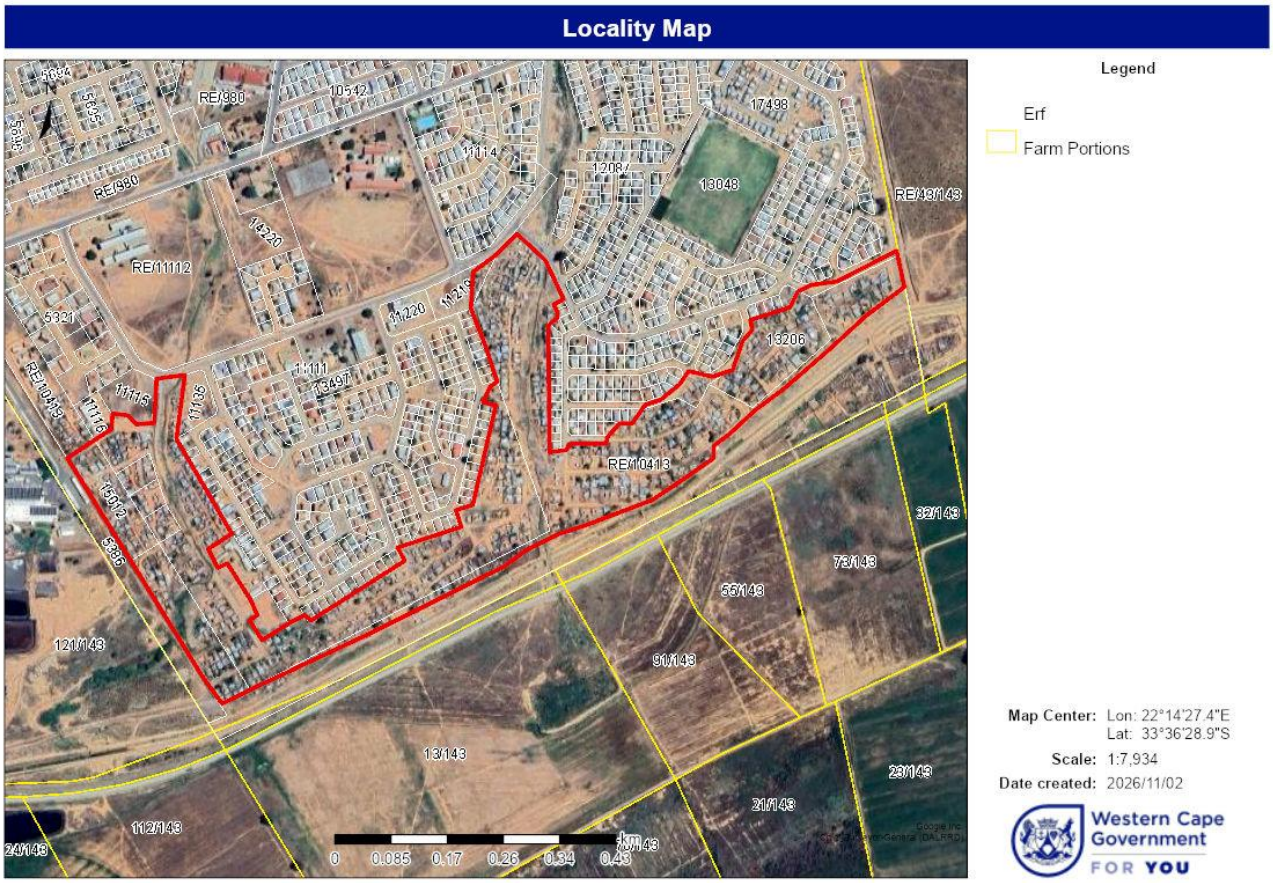


**Figure 6: Locality Map**

### *4.2. Topography*

Topographically the site has a low to moderate slope from north to south.

### *4.3. Geology and Soils*

Broad Soils Classification (ENPAT)
Soil Type: Miscellaneous land classes, undifferentiated deep deposits
Geology: Alluvial valley deposits.
Land Types
Land Type: Ia41
Description: Undifferentiated deep deposits
Class: MISCELLANEOUS LAND CLASSES
Area (Ha): 26939.222
Soil Erodibility
Erodibility: High
Erodibility Factor: 0.54
Soil Clay & Depth
Symbol: EE
Class: Soils with limited pedological development
Description: Soils with negligible to weak profile development, usually occuring on recent flood plains
Depth: >= 750 mm

Clay: < 15%
Soil Types
Symbol: EE
Class: Soils with limited pedological development
Description: Soils with negligible to weak profile development, usually occuring on recent flood plains
Depth: >= 750 mm
Clay: < 15%
Source: CapeFarmMapper dated 11 February 2026.

### *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*

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, 2024) that contains Critical Biodiversity Areas (CBA) 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 impact site in terms of CapeNature Spatial Biodiversity Plan (CapeNature. 2024).

| **Biodiversity Priorities** | **Hectares Lost** | **Is the proposed development aligned with the land management objectives** | **Proximity to Biodiversity Priority Area** |
|---|---|---|---|
| CBA1 | Approximately 4ha was incorrectly mapped as CBA. This mapped area is located on previously disturbed areas. In the 2017 WCBA only the original non-perennial rivers and their buffers were mapped as ESA areas. The new updated 2023 WCBA indicate additional areas and since these areas was already cleared before the mapping and published of the 2023 WCBA, this CBA areas were incorrectly mapped. | Yes. The new updated 2023 WCBA indicate additional areas and since these areas was already cleared before the mapping and published of the 2023 WCBA, this CBA areas were incorrectly mapped. | On site |
| ~~CBA2~~ | | | |
| ~~ESA1~~ | | | |
| ~~ESA2~~ | | | |
| ~~PA~~ | | | |
| ~~Forest~~ | | | |

| | | | |
|---|---|---|---|
| ~~River NFEPA including 32m buffer~~ | | | |
| ~~River NFEPA including 32m buffer~~ | | | |
| ~~Strategic water source area~~ | | | |
| ~~Threatened species and Red Data listed species~~ | | | |

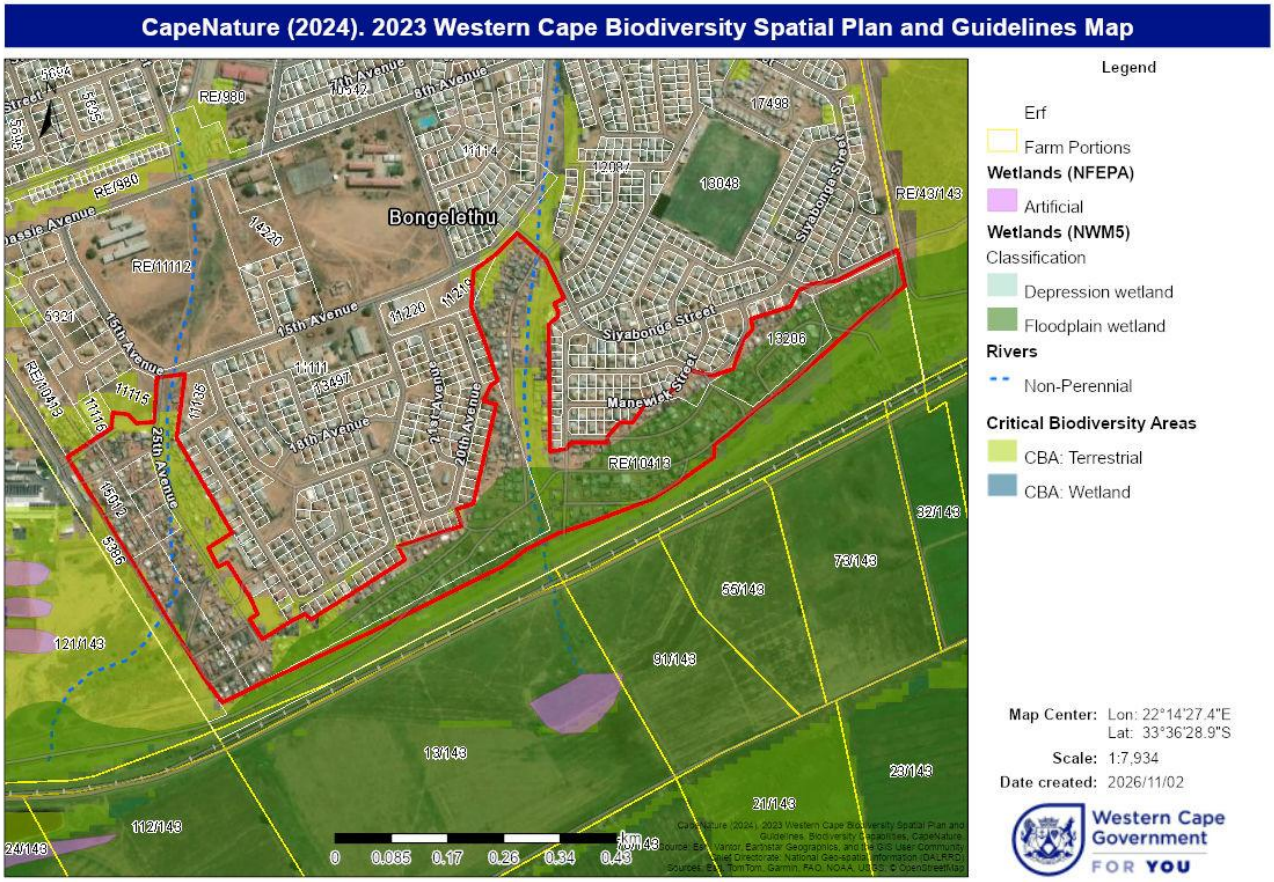


**Figure 7:** Biodiversity Map

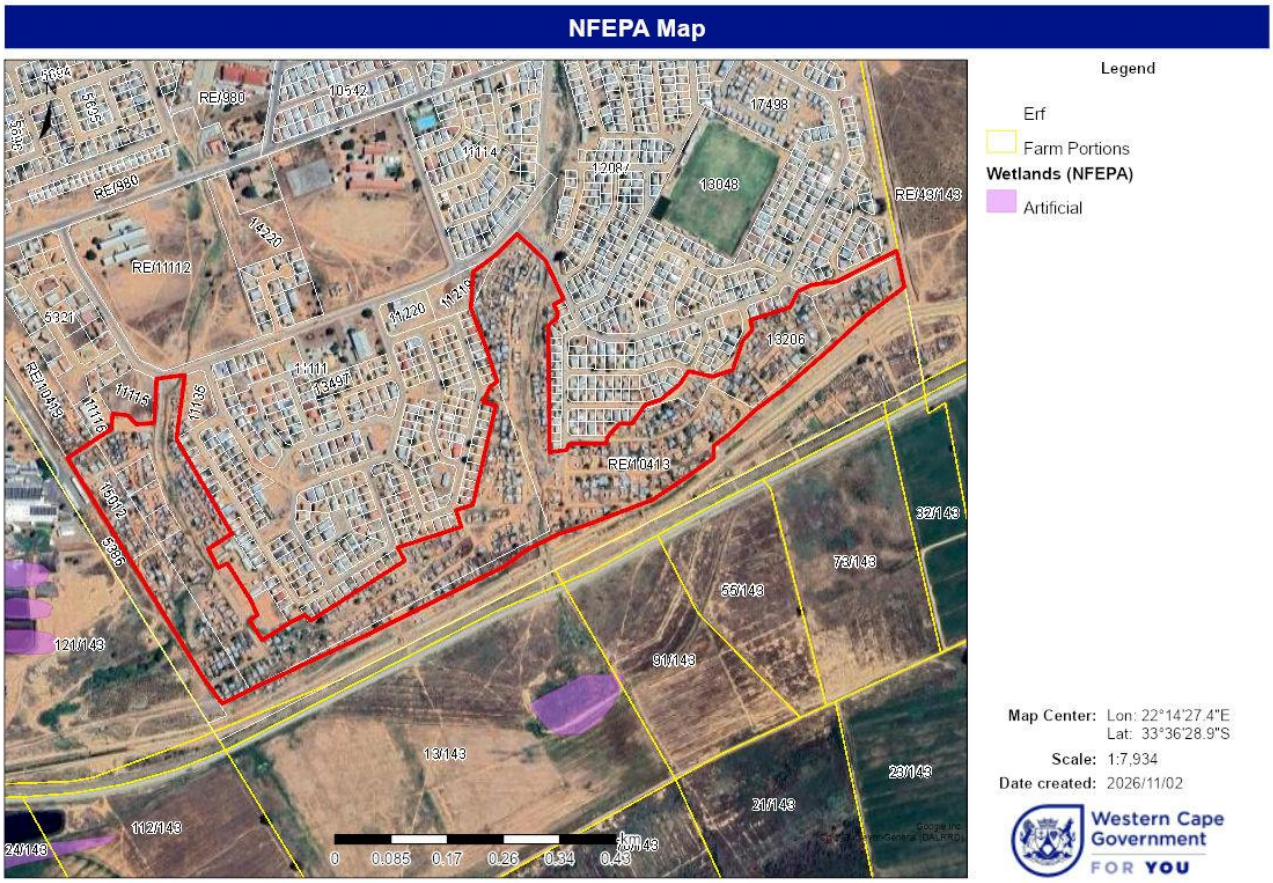


**Figure 8:** NFEPA Map

### *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 remnants of natural vegetation occurring within the area as Muscadel Riviere and Eastern Little Karoo.

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

Both vegetation types are classified as endangered and has been significantly impacted by transformation.

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

The vegetation structures on site as interpreted from google earth images before clearing and onsite vegetation observations for both vegetation types are not present on site. Poor ecological condition indigenous vegetation mapped as Muscadel Riviere and Eastern Little Karoo both with an endangered protection status as a result of the impacts of the urban development activities on boundary.

Two non-perennial river streams occur on site. The one will be maintained with its flood line as buffer. The other want is already severely degraded and transformed and infilled upstream and the proposal is to infill and channel the outflow into the historical stream west of the site

to ensure hydrological flow and functioning downstream. The Olifants river to the south of the site floodplain wetlands originally occurred on a portion of the southern edge, but this wetlands and floodplain was destroyed long ago with the established agricultural fields, water channel, roads and railway line between the impact area and the Olifants river.

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

**Vegetation Characteristics and Description**

**Muscadel Riviere**
**Vegetation & Landscape** Features Flat, in places very broad alluvia originally supporting a complex of riverine thickets dominated by *Acacia karroo* and accompanying succulent gannabos (*Salsola species*) and low vygie shrublands. Today the typical landscape view of these alluvia is dominated by extensive vineyards and orchards, with a narrow alley of alien woody species (*Eucalyptus species, Salix babylonica*) fringing the riverbanks.
**Important Taxa Riparian thickets Trees**: *Acacia karroo* (d), *Salix mucronata subsp. mucronata* (d), *Rhus lancea*. Alluvial shrublands & herblands Tall Shrubs: *Cliffortia strobilifera, Melianthus comosus, Tamarix usneoides*. Low Shrubs: *Galenia africana* (d), *Pentzia incana* (d), *Atriplex vestita var. appendiculata, Chrysanthemoides incana, Polygala virgata var. virgata, Pteronia oblanceolata*. Succulent Shrubs: *Malephora luteola* (d), *Salsola aphylla* (d), *S. arborea* (d), *Bassia salsoloides, Lycium arenicola, Suaeda fruticosa, Zygophyllum sessilifolium*. Herb: *Berkheya spinosa*. Succulent Herb: *Psilocaulon junceum*. Graminoids: *Ehrharta calycina, E. delicatula*. Reed beds Megagraminoids: *Phragmites australis* (d), *Typha capensis* (d). Endemic Taxon Alluvial shrublands & herblands Herb: *Pelargonium citronellum*.
References Joubert (1968), Van der Merwe (1977a), Vlok (2002), Cleaver et al. (2005).

**Eastern Little Karoo**
Succulent Mountain Scrub (Spekboomveld) (51%) (Acocks 1953). LR 8 Spekboom Succulent Thicket (43%), LR 58 Little Succulent Karoo (36%) (Low & Rebelo 1996). BHU 97 Spekboom Xeric Succulent Thicket (43%), BHU 89 Oudtshoorn Broken Veld (34%) (Cowling & Heijnis 2001). STEP Blossoms Karroid Thicket (33%), STEP Calitzdorp Karroid Thicket (21%) (Vlok & Euston-Brown 2002).
**Vegetation & Landscape Features** Irregularly flat plains and undulating piedmont hills covered by dense succulent shrubland dominated by Aizoaceae (*Ruschia, Drosanthemum*) and Crassulaceae (*Cotyledon, Crassula, Tylecodon*) and nonsucculent, mainly shrubs such as *Nymania, Pteronia* and *Rhus*. The spring displays of annual and geophyte flora are spectacular in years with good rain.
**Important Taxa** Succulent Tree: *Aloe ferox*. Succulent Shrubs: *Augea capensis* (d), *Leipoldtia schultzei* (d), *Tylecodon cacalioides* (d), *Cotyledon orbiculata var. orbiculata*, *C. tomentosa subsp. tomentosa, Crassula cultrata, C. nudicaulis, C. ovata, C. rupestris subsp. commutata, Drosanthemum lique, Euphorbia colliculina, E. mauritanica, Glottiphyllum carnosum, G. linguiforme, Lycium oxycarpum, Marlothistella stenophylla, M. uniondalensis, Othonna carnosa, Phyllobolus splendens, Pleiospilos compactus subsp. compactus, Ruschia grisea, R. spinosa, Smicrostigma viride, Tetragonia fruticosa, T. robusta var. psiloptera, Trichodiadema burgeri, Tylecodon paniculatus, T. wallichii subsp. wallichii, Zygophyllum morgsana*. Tall Shrubs: *Cadaba aphylla, Euclea undulata, Nymania capensis, Putterlickia pyracantha, Rhus lucida, R. pallens*. Low Shrubs: *Pentzia incana* (d), *Pteronia incana* (d), *Rhigozum obovatum* (d), *Aptosimum elongatum*, *Asparagus burchellii, A. glaucus, A. recurvispinus, Berkheya spinosa, Carissa haematocarpa, Chrysocoma ciliata, Elytropappus*

*rhinocerotis, Eriocephalus ericoides, Felicia muricata, Galenia africana, G. fruticosa, G. secunda, Garuleum latifolium, Helichrysum asperum var. albidulum, H. simulans, Hermannia filifolia var. grandicalyx, Hirpicium alienatum, Limeum aethiopicum, Macledium relhanioides, Oedera genistifolia, Pegolettia baccaridifolia, Polygala myrtifolia, Pteronia flexicaulis, P. glauca, P. pallens, Rosenia humilis, Tripteris sinuata, Zygophyllum microphyllum, Z. spinosum*. Semiparasitic Shrub: *Thesium lineatum*. Woody Succulent Climbers: *Crassula perforata, Sarcostemma viminale*. Woody Climbers: *Asparagus racemosus, A. retrofractus, Cissampelos capensis*. Herbaceous Succulent Climber: *Othonna amplexifolia*. Herbaceous Climber: *Fockea sinuata*. Semiparasitic Epiphytic Shrub: *Viscum rotundifolium*. Herbs: *Atriplex semibaccata var. appendiculata, Chamaesyce inaequilatera, Galenia papulosa, Galium tomentosum, Helichrysum tinctum, Hermannia althaeifolia, H. pulverata, Indigofera porrecta var. bicolor, Lepidium africanum, L. desertorum, Sutera caerulea, Tribulus terrestris*. Geophytic Herbs: *Chlorophytum crispum, Drimia intricata, Empodium plicatum, Freesia refracta, F. verrucosa*. Succulent Herbs: *Psilocaulon junceum* (d), *Astroloba spiralis, Crassula capitella subsp. capitella, C. expansa subsp. expansa, C. muscosa, Gasteria brachyphylla, Haworthia truncata, Mesembryanthemum guerichianum, Psilocaulon articulatum, Senecio ficoides, Tetragonia microptera*. Graminoids: *Cynodon dactylon, C. incompletus, Ehrharta calycina, Pentaschistis airoides*.
References Van Wyk & Smith (2001), Vlok & Euston-Brown (2002), Van Jaarsveld & Van Wyk (2003), Vlok et al. (2003), Cleaver et al. (2005).

The vegetation structures on site as interpreted from google earth images before clearing and onsite vegetation observations for both vegetation types are not present on site. Poor ecological condition indigenous vegetation mapped as Muscadel Riviere and Eastern Little Karoo both with an endangered protection status as a result of the impacts of the urban development activities on its boundary.

Two non-perennial river streams occur on site. The one will be formalized and maintained with its flood line as buffer. The other one is already severely degraded and transformed and infilled upstream and the proposal is to infill and channel the outflow into the historical stream west of the site to ensure hydrological flow and functioning downstream. The Olifants river to the south of the site floodplain wetlands originally occurred on a portion of the southern edge, but this wetlands and floodplain was destroyed long ago with the established agricultural fields, water channel, roads and railway line between the impact area and the Olifants river.

**Photograph 1:** Ecological condition of non-perennial stream not to be infilled.

**Photograph 2:** Ecological condition of indigenous vegetation.

**Photograph 3:** Ecological condition of non-perennial stream to be infilled.

**Photograph 4:** Ecological condition of non-perennial stream to be infilled.

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

Approximately 4ha was incorrectly mapped as CBA. This mapped area is located on previously disturbed areas. In the 2017 Western Cape Biodiversity Assessment (WCBA) only the original non-perennial rivers and their buffers were mapped as ESA areas. The new updated 2023 WCBA indicate additional areas and since these areas was already cleared before the mapping and published of the 2023 WCBA, this CBA areas were incorrectly mapped.

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

Not close to any protected area.

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

The site does not fall inside a SWSA.

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

The site does not fall inside a FEPA. The NFEPA wetland were mapped. Two non-perennial river streams occur on site. The one will be formalized and maintained with its flood line as buffer. The other one is already severely degraded and transformed and infilled upstream and the proposal is to infill and channel the outflow into the historical stream west of the site to ensure hydrological flow and functioning downstream. The Olifants river to the south of the site floodplain wetlands originally occurred on a portion of the southern edge, but this wetlands and floodplain was destroyed long ago with the established agricultural fields, water channel, roads and railway line between the impact area and the Olifants river.

**Drainage Line To Be Infilled**

The drainage line originates upstream and is totally transformed and act as a stormwater channel.

**Photograph 5:** Upstream view of formalized stream.

**Photograph 6:** Upstream view of formalized stream.

**Photograph 7:** Upstream view of formalized stream where it flows next to and later into the road that followed the route of the original stream.

**Photograph 8:** Road that followed the route of the original stream. Water flow in and next to road.

**Photograph 9:** Original route of the stream.

**Photograph 10:** Diverted stream.

**Photograph 11:** Diverted stream flowing into original stream.

**Photograph 12:** Ecological condition of original stream into which the infilled and formalized stormwater will be discharged into.

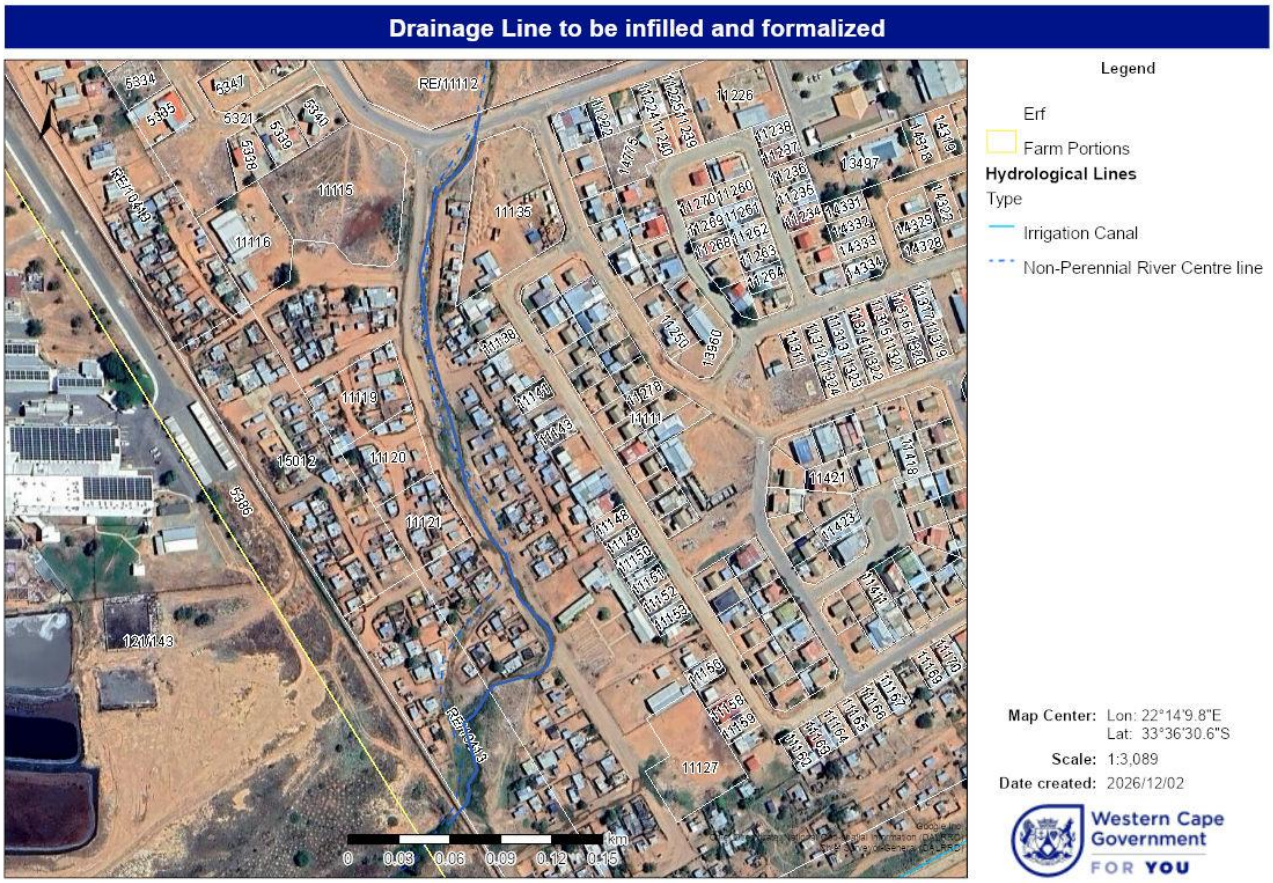


**Figure 9:** Delineated drainage line

**Drainage Line To Be Formalized And Maintained With Its Flood Line Buffer.**
The drainage line is already formalized upstream to ensure proper stormwater managed for the urban area. The proposal is to formalize this section of the drainage line and to maintain the flood line as buffer area.

**Photograph 13:** Upstream view of drainage line to be formalize.

**Photograph 14:** Upstream view of drainage line.

**Photograph 15:** Ecological condition of original stream that will be formalized.

**Photograph 16:** Ecological condition of original stream that will be formalized.

**Photograph 17:** Ecological condition of original stream that will be formalized.

**Photograph 18:** Ecological condition of original stream that will be formalized.

**Photograph 19:** Ecological condition of original stream that will be formalized.

**Photograph 20:** Formalized downstream view of drainage line flowing underneath the road and irrigation water channel.

**Photograph 21:** Formalized downstream view of drainage line flowing underneath the road and irrigation water channel.

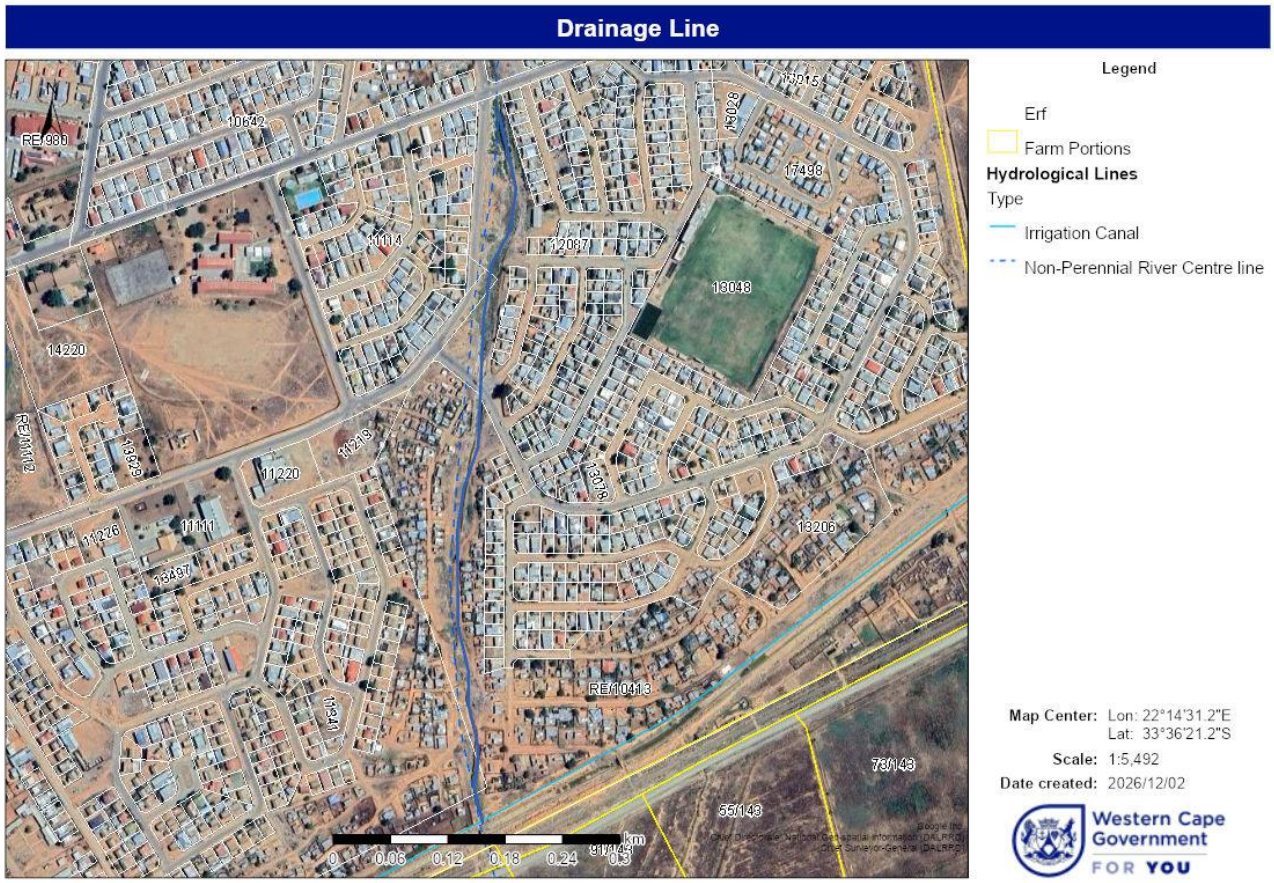


**Figure 10:** Delineated drainage line

## 5. SITE SENSITIVITY ASSESSMENT

The development will have a **very low** SEI on the PAOI.

## 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 |

**<u>Step 3</u>**: 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

| **Formalization of squatter area** | **Impact on approximately 4ha CBA area** |
|---|---|
| **PLANNING, DESIGN AND DEVELOPMENT PHASE** | |
| **Potential impact and risk:** | **Loss of approximately 4ha CBA area.** |
| Nature of impact: | **Taking in consideration and the fact that the areas were previously impacted by the urban and agricultural activities on the border, the impact of the clearing of the areas on ecological and biodiversity is assessed to be low. Due to the poor quality of both non-perennial rivers, the impact on freshwater ecology is low.**<br>**The CBA areas were incorrectly mapped as the areas was degraded. This is confirmed by the WCBA 2017 which does not include these mapped CBA's** |
| Extent and duration of impact: | **Extent permanent** |
| Consequence of impact or risk: | **Activities can disturb and impact on surrounding terrestrial biodiversity features.** |
| Magnitude | **3** |
| Probability of occurrence: | **5** |
| Degree to which the impact may cause irreplaceable loss of resources: | **Resource will be destroyed** |
| Degree to which the impact can be reversed: | **Not reversible** |
| Indirect impacts: | **Disturbance to surface area can result in erosion and dust generation which may affect surrounding terrestrial biodiversity features.** |
| Cumulative impact prior to mitigation: | **Loss of significantly impacted upon vegetation and habitat.** |
| Significance rating of impact prior to mitigation<br>(e.g. Low, Medium, Medium-High, High, or Very-High) | **Low** |
| Degree to which the impact can be avoided: | **Low** |
| Degree to which the impact can be managed: | **Low** |
| Degree to which the impact can be mitigated: | **Low** |
| Proposed mitigation: | **None. Provision of services on squatter area will not impact on terrestrial biodiversity** |
| Residual impacts: | **None. Provision of services on squatter area will not impact on terrestrial biodiversity** |

| | |
|---|---|
| Cumulative impact post mitigation: | **None. Provision of services on squatter area will not impact on terrestrial biodiversity** |
| Significance rating of impact after mitigation<br>(e.g. Low, Medium, Medium-High, High, or Very-High) | **Low** |

**FRESHWATER ECOLOGY**

| **Formalization of squatter area** | **Impact on Freshwater ecology, especially downstream** |
|---|---|
| **PLANNING, DESIGN AND DEVELOPMENT PHASE** | |
| **Potential impact and risk:** | **Impact on Freshwater ecology, especially downstream** |
| Nature of impact: | **One drainage line will be infilled and realigned to ensure proper and effective stormwater management with discharge into the existing stream.**<br>**The other drainage line will be formalize to reduce impact on water quality that affect freshwater ecology.** |
| Extent and duration of impact: | **Extent permanent** |
| Consequence of impact or risk: | **Activities can disturb and impact on downstream freshwater ecology.** |
| Magnitude | **3** |
| Probability of occurrence: | **5** |
| Degree to which the impact may cause irreplaceable loss of resources: | **Resource will be destroyed** |
| Degree to which the impact can be reversed: | **Not reversible** |
| Indirect impacts: | **Disturbance to surface area can result in erosion and impact on water quality which may affect downstream freshwater ecological features.** |
| Cumulative impact prior to mitigation: | **Water quality impacts on downstream freshwater ecology features.** |
| Significance rating of impact prior to mitigation<br>(e.g. Low, Medium, Medium-High, High, or Very-High) | **Very 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: | • **Access to roads and other areas must be controlled to avoid disturbance of areas outside the development footprint. Personnel should be restricted to the immediate clearing areas only.**<br>• **Monitor construction areas frequently for signs of erosion and if signs of erosion are detected implement repair and preventative measures immediately.**<br>**Strict compliance with the EMPr.** |
| Residual impacts: | **It is not anticipated that the impact will be high if the mitigation measures are adhered to.** |
| 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<br>(e.g. Low, Medium, Medium-High, High, or Very-High) | **Medium** |

**PLANT SPECIES**

| | |
|---|---|
| **Formalization of squatter area** | **Degradation / loss of naturally occurring / indigenous flora and habitats** |
| **PLANNING, DESIGN AND DEVELOPMENT PHASE** | |
| **Potential impact and risk:** | **Loss of Terrestrial Biodiversity and ecological functioning. Impact areas located inside and on protected area.** |
| Nature of impact: | **Poor ecological condition indigenous vegetation mapped as Muscadel Riviere and Eastern Little Karoo both with an endangered protection status as a result of the impacts of the urban development activities on boundary. Almost whole area to be serviced and formalized is degraded as a result of the squatter activities. Plant species recorded on site does not represent the vegetation structure of the two mapped vegetation types and consist of mainly pioneer plants.** |
| Extent and duration of impact: | **Extent permanent** |
| Consequence of impact or risk: | **Activities can disturb and impact on surrounding plant species.** |
| Magnitude | **3** |
| Probability of occurrence: | **5** |
| Degree to which the impact may cause irreplaceable loss of resources: | **Resource will be destroyed** |

| | |
|---|---|
| Degree to which the impact can be reversed: | **Not reversible** |
| Indirect impacts: | **Disturbance to surface area can result in erosion and dust generation which may affect surrounding plant species.** |
| Cumulative impact prior to mitigation: | **Loss of species of conservation concern.** |
| Significance rating of impact prior to mitigation<br>(e.g. Low, Medium, Medium-High, High, or Very-High) | **Low** |
| Degree to which the impact can be avoided: | **Low** |
| Degree to which the impact can be managed: | **High** |
| Degree to which the impact can be mitigated: | **Low** |
| Proposed mitigation: | **Construction activities must be controlled to ensure that the adjacent vegetated areas are not negatively impacted.**<br>**Undertake construction activities only in identified and specifically demarcated areas.**<br>**Invasive vegetation to be removed during construction to be disposed of at landfill site in such a manner that seeds must not be able to spread from the disposal site or during transportation.** |
| Residual impacts: | **It is not anticipated that the impact will be high if the mitigation measures are adhered to.** |
| 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<br>(e.g. Low, Medium, Medium-High, High, or Very-High) | **Low** |

**<u>ANIMAL SPECIES</u>**

| | |
|---|---|
| **Formalization of squatter area** | **The environmental screen report mapped *Afrotis afra* as high sensitivity and *Physemacris papillosa* and *Aneuryphymus montanus* as medium sensitivity** |
| **PLANNING, DESIGN AND DEVELOPMENT PHASE** | |
| **Potential impact and risk:** | **Impact on animal species** |
| Nature of impact: | **None of the species listed in the screen tool report nor any Species of Conservation Concern were recorded during the survey. The** |

| | |
|---|---|
| | **site was impacted by the urban activities on the edge and the location of the site in between residential and agricultural activities with roads and railways affecting animal species habitat. After the squatters invaded the area, all habitat was lost.** |
| Extent and duration of impact: | **Extent permanent** |
| Consequence of impact or risk: | **Activities can disturb and impact on animal species.** |
| Magnitude | **3** |
| Probability of occurrence: | **5** |
| Degree to which the impact may cause irreplaceable loss of resources: | **Resource will be destroyed** |
| Degree to which the impact can be reversed: | **Not reversible** |
| Indirect impacts: | **Activities can disturb and impact on animal species.** |
| Cumulative impact prior to mitigation: | **Loss of animal and habitat.** |
| Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High) | **Low** |
| Degree to which the impact can be avoided: | **Low** |
| Degree to which the impact can be managed: | **High** |
| Degree to which the impact can be mitigated: | **Low** |
| Proposed mitigation: | **No animal habitat or species recorded and no mitigation measures required due to the area already degraded and habitat transformed and the proposed activities is to formalize and service the site.** |
| Residual impacts: | **None. Area transformed.** |
| Cumulative impact post mitigation: | **None. Area transformed.** |
| Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High) | **Low** |

| **NO GO OR NO DEVELOPMENT ALTERNATIVE** | |
|---|---|
| **Potential impact and risk:** | **Not applicable.** |

***Cumulative Impacts***

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

an area which affect terrestrial biodiversity, plant species, animal species, freshwater ecology and ecological processes operating at broader scales or which each have a small impact which becomes significant when combined. These remaining remnants have been significantly transformed.

## 7. CONCLUSION AND RECOMMENDATIONS

The sampling and analysis of the site was optimum and provides suitable data and results to present an informed decision on the local ecology, animal species habitat, plant species, freshwater ecological features and terrestrial biodiversity features. 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. Searches for listed species of conservation concern at the site were conducted, but none were observed which required the recording of their location.

Poor ecological condition indigenous vegetation mapped as Muscadel Riviere and Eastern Little Karoo both with an endangered protection status as a result of the impacts of the urban development activities on boundary. Two non-perennial river streams occur on site. The one will be maintained with its flood line as buffer. The other one is already severely degraded and transformed and infilled upstream and the proposal is to infill and channel the outflow into the historical stream west of the site to ensure hydrological flow and functioning downstream. The Olifants river to the south of the site floodplain wetlands originally occurred on a portion of the southern edge, but this wetlands and floodplain was destroyed long ago with the established agricultural fields, water channel, roads and railway line between the impact area and the Olifants river.

No species of conservation concern were recorded and their habitat is not present on site.

Very low sensitive areas were mapped. The proposed development will have relatively little terrestrial biodiversity and ecological impact on the surrounding terrestrial biodiversity features 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 author's view recommended.

Provided that activities are restricted to the property and the mitigation measures to reduce the impacts of the activities are implanted, then the activities are not likely to result in long-term degradation of the receiving environment or significant net loss of terrestrial biodiversity.

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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.

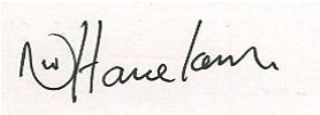
| | |
|---|---|
| **Areas of specialisation:** | • Ecosystem (terrestrial and aquatic) monitoring and assessments<br>• Design of monitoring programmes for ecosystems (terrestrial and aquatic)<br>• Environmental Impact Assessments<br>• River classification and environmental water requirements<br>• Wetlands 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) |

| | |
|---|---|
| **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 |

| | |
|---|---|
| | 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.



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