

**NEMA Section 24G
Ecological Assessment Report**

**Khalinkomo Residential Development,
Wesselsbron, Free State Province**

June 2019 and revised September 2020

Compiled for:



Compiled by:

Rikus Lamprecht

Ecological Specialist (Pr.Sci.Nat)

EcoFocus Consulting

072 230 9598

ajhlamprecht@gmail.com

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Executive Summary

The project applicant, Nala Local Municipality historically cleared an approximate 20.5 ha portion of natural vegetation for the development of low-cost housing in the township of Monyakeng situated directly adjacent north of the town of Wesselsbron, Free State Province. The necessary underground services such as water reticulation, sewage and electrical infrastructure was also installed at the time but no formal aboveground housing infrastructure development took place.

No Environmental Authorisation or Water Use License was however initially obtained for the development from the relevant competent authorities, as is legally required. The applicant has subsequently become aware of this legal transgression and has opted to follow a Section 24G rectification process in accordance with the National Environmental Management Act (Act 107 of 1998) (NEMA) in order to rectify the situation.

The project applicant, Nala Local Municipality proposes to additionally construct a new portion of residential development directly adjacent east of the existing township of Monyakeng. The proposed development will entail formal construction of approximately 82.5 ha for residential infrastructure.

NSVT Consultants was appointed by the applicant as the independent Environmental Assessment Practitioner (EAP) to conduct the NEMA Section 24G rectification process.

Due to the nature of the impacts of the project on the local vegetation, an Ecological Assessment is required. This is required in order to determine the potential historic presence of ecologically significant species, habitats or wetland areas within the project footprint. Proposed mitigation and management measures must also be recommended in order to attempt to reduce/alleviate the identified impacts.

EcoFocus Consulting was therefore subsequently appointed by the EAP as the independent ecological specialist to conduct the required Ecological study for the project. This report constitutes the NEMA Section 24G Ecological Assessment.

A site assessment for the original development footprint area of approximately 20.5 ha was conducted on 11 June 2019. This date forms part of the winter season. It must therefore be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals.

A site assessment was also conducted for a portion of the additional approximate 82.5 ha proposed development area, but the entire area was not assessed as the revised layout was only received during September 2020.

Methodology

The development area and surrounding areas were assessed on foot and visual observations/identifications were made of habitat conditions, ecologically sensitive areas and relevant species present. Species were listed and categorised as per the Red Data Species List; Protected Species List of the National Forests Act (Act 84 of 1998), Invasive Species List of the National Environmental Management: Biodiversity Act (Act 10 of 2004), Alien and Invasive Species Regulations, 2014 and the Provincially Protected species of the Free State's Nature Conservation Ordinance (No 8 of 1969). Georeferenced photographs were taken of ecologically sensitive areas as well as the relevant nationally or provincially protected species if encountered in order to indicate their specific locations in a Geographic Information System (GIS) mapping format.

Ecological impacts of the proposed project on the surrounding natural environment were identified, evaluated and rated. The Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) of the development area were also assessed and rated.

Assessment Area

The original assessment area consists of a single footprint area of approximately 20.5 ha in size. The assessment area is situated on the Remaining Extent of the Farm Oranje Vlei no 174 (SG 21 Digit Code: F0410000000017400000). The area is located in the township of Monyakeng situated directly adjacent north of the town of Wesselsbron. The town forms part of the Nala Local Municipality which in turn, forms part of the Lejweleputswa District Municipality, Free State Province. Access to the assessment area is obtained via the R 505 provincial road and subsequent dirt roads inside the informal residential settlement from the west.

The additional proposed development area is approximately 82.5 ha in size and is situated directly adjacent east of the existing township of Monyakeng. The area is also situated on the Remaining Extent of the Farm Oranje Vlei no 174 (SG 21 Digit Code: F0410000000017400000).

Vegetation Types

According to SANBI (2006-2019), the entire original assessment area falls within the Western Free State Clay Grassland vegetation type (Gh 9) which is characterised by flat bottomlands supporting dry species-poor grassland. A high number of salt pans are embedded within these areas and the grasslands are often substituted by dwarf karroid shrublands in disturbed areas surrounding such pans. This vegetation type is classified as Least Concerned (SANBI, 2006-2019).

The additional proposed development area also falls within the Western Free State Clay Grassland vegetation type (Gh 9).

The water pans present in the areas surrounding the assessment area, form part of the Highveld Salt Pans vegetation type (AZi 10). This vegetation type constitutes depressions in the plateau landscape containing temporary and, less frequently also permanent water bodies. Central portions of such pans are often seasonally inundated and sometimes with floating macrophyte vegetation. Vegetation cover also often develops on drained bottoms of such pans and form typical concentric zonation patterns. Open to sparse grassy dwarf shrubland may develop around the edges of such pans especially when subjected to high grazing pressures. Threats on such pans are ever increasing in the form of agriculture, road building, mining and urbanisation (SANBI, 2006-).

Conservation Categories

The southern, central and western portion of the original assessment area is categorised as degraded land in accordance with the Free State Provincial Spatial Biodiversity Plan 2017, which sets out biodiversity priority areas in the province. The northern and eastern portions of the original assessment area are however categorised as an Ecological Support Area two (ESA 2) and Other Natural Areas (ONA) respectively. ESA's are areas that must be maintained in at least fair ecological condition (semi-natural/moderately modified state) in order to support the ecological functioning of a Critical Biodiversity Area (CBA) or protected area or that play an important role in delivering ecosystem services (Collins, 2017).

'Ground truthing' has however indicated that the entire original assessment area is occupied by an existing informal residential settlement which has virtually completely transformed all previously existing natural surface vegetation.

The majority of the additional proposed development area is categorised as an Ecological Support Area two (ESA 2) in accordance with the Free State Provincial Spatial Biodiversity Plan 2017. Merely a narrow linear portion along the western boundary is categorised as degraded land, while a narrow linear portion along the south-eastern boundary is categorised as Other Natural Areas (ONA).

Results and Conclusion

Original Assessment Area

The entire original assessment area is approximately 20.5 ha in size and is occupied by an existing informal residential settlement which has virtually completely transformed all previously existing natural surface vegetation. The area is also completely isolated to the west by the existing Monyakeng township.

No Red Data Listed-, provincially- or nationally protected species or any other species of conservational significance were found to be present within the original assessment area.

The virtually complete loss and transformation of natural habitat, biota and basic ecosystem functionality within the original assessment area is deemed irreversible. Sufficient ecological restoration of the relevant vegetation type and its functionality within the original assessment area, will therefore not be practicably feasible.

The original assessment area would probably have scored a moderate historic Ecological Importance and Sensitivity (EIS) value and would therefore have been viewed as being of low to moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA 2 as well as water catchment and drainage area towards the water pan.

It must be kept in mind that this existing transformed original assessment area is the only portion which may be applied for and authorised for the proposed development as part of the current NEMA Section 24G process. The additional proposed development area which is still undeveloped, cannot be included into the current NEMA Section 24G process for residential expansion, as the development of such areas will require a separate EIA process.

Additional proposed development area

The additional proposed development area is approximately 82.5 ha in size. It is undeveloped but in a moderately disturbed and degraded state which has likely been caused by significant historic and continued long-term overgrazing by livestock from the local community over time. The additional proposed development area constitutes flat to slightly sloping low growing grassland with a well-represented dwarf karroid shrub layer. This grassland has been subjected to significant historic and continued long-term overgrazing by livestock from the local community over time. The grass layer therefore mainly constitutes a low growing grass 'carpet' and a virtual complete lack of well-represented grass tufting is evident. The additional proposed development area is therefore not reminiscent of the natural climactic state of the relevant Western Free State Clay Grassland vegetation type (Gh 9).

No Red Data Listed-, provincially- or nationally protected species or any other species of conservational significance were found to be present within the additional proposed development area. It is therefore also not anticipated that the original assessment area would necessarily have housed large numbers of any species of conservational significance. It must however be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals. It is therefore recommended that an additional ecological walkthrough be conducted prior to commencement of the project during the flowering period of underground bulbous plant species, if deemed necessary by the competent authority. This will ensure that no provincially protected or significant species have potentially been omitted.

The additional proposed development area does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website (<https://www.birdlife.org.za/what-we-do/important-bird-and-biodiversity-areas/media-and-resources/#1553597171790-6f83422a-a731>). No conservationally significant or important bird species or locally distinct habitats were observed during the site assessment or are necessarily expected to utilise the additional proposed development area for breeding, foraging and/or persistence purposes.

Due to the presence of the existing township along with the significant continued long-term overgrazing by livestock from the local community, the additional proposed development area is subjected to continued anthropogenic activity and disturbance. It is therefore not anticipated that any large or conservationally significant faunal species would utilise the additional proposed development area for breeding and/or persistence purposes or for that matter, would necessarily

have historically utilised the original assessment area. Only common local resident bird species were found to be present.

It is recommended that sufficient grazing management plans and practices must be implemented for livestock of the local community in order to prevent continued significant overgrazing of surrounding undeveloped areas and attempt to improve/restore the ecological condition over time.

The additional proposed development area scored a moderate Ecological Importance and Sensitivity (EIS) value and is therefore viewed as being of moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA 2 as well as water catchment and drainage area towards the water pan.

It must however again be kept in mind that the existing transformed original assessment area is the only portion which may be applied for and authorised for the proposed development as part of the current NEMA Section 24G process. The additional proposed development area which is still undeveloped, cannot be included into the current NEMA Section 24G process for residential expansion, as the development of such areas will require a separate EIA process.

Water Pan

A significantly sized water pan is present approximately 770 m north-east of the original assessment area. The pan is however located merely approximately 120 m north-east of the additional proposed development area. The pan appears to be in a relatively healthy and stable ecological condition and supports an important aquatic habitat which is subsequently utilised by a wide variety of waterbirds, amphibian species and aquatic invertebrates for breeding, foraging and persistence purposes.

A defined surface water drainage area feeds into the pan from the south-east. The original assessment area is located a significant distance (≥ 500 m) away from the defined surface water drainage area and therefore does not necessarily impact directly on surface water runoff towards the pan. Although this is the case, the original assessment area still forms part of the broader surface water catchment and drainage towards this pan. It is therefore recommended that development and layout designs for the new residential development should include adequate storm water management measures to ensure that sufficient volumes and quality of surface water runoff from the footprint area is still channelled back towards the pan.

The additional proposed development area is however located merely approximately 20 m away from the defined surface water drainage area, which feeds into the pan. The additional proposed development area will therefore likely impact directly on surface water runoff towards the pan.

In order to preserve the remaining ecological integrity and -functionality of the pan, it is therefore recommended that a minimum 250 m buffer zone be implemented around the entire pan and its defined surface water drainage area. No further future development may take place within the buffered zone.

Conclusion

The transformation of an Ecological Support Area two (ESA 2) associated with the assessment area as well as the impeding and contamination of the water drainage area's flow regime and subsequent decrease in ecological integrity and -functionality of the pan, were identified and addressed during the construction phase as the only significant potential long-term ecological impacts, associated with the proposed development. These impacts could however merely add a slight cumulative impact to existing negative impacts caused by the existing township and agricultural developments within the broader landscape.

It is the opinion of the specialist, by application of the NEMA Mitigation Hierarchy, that all the potential ecological impacts associated with the proposed development, can be suitably reduced and mitigated to within acceptable residual levels by implementation of the recommended mitigation measures.

The proposed development of the assessment area should therefore be considered by the competent authority for Environmental Authorisation and approval. **It is however recommended that only the original assessment area be considered for the proposed development.** All recommended mitigation measures as per this ecological report must however be adequately implemented and managed for both the construction and operational phases of the proposed development. All necessary authorisations, permits and licenses must also be obtained prior to the commencement of any construction.

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Abbreviations

BA	Basic Assessment
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
DAFF	Department of Agriculture Forestry and Fisheries
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
ESA	Ecological Support Area
MAP	Mean Annual Precipitation
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMA	National Environmental Management Act (Act 107 of 1998)
NFA	National Forests Act (Act 84 of 1998)
NWA	National Water Act (Act 36 of 1998)
ONA	Other Natural Area
PES	Present Ecological State
WULA	Water Use License Application

Declaration of Independence

I, Adriaan Johannes Hendrikus Lamprecht, ID 870727 5043 083, declare that I:

- am the Director and Ecological Specialist of EcoFocus Consulting (Pty) Ltd
- act as an independent specialist consultant in the field of botany and ecology
- am assigned as the Ecological Specialist consultant by the Environmental Assessment Practitioner (EAP), NSVT Consultants, for the proposed project
- do not have or will not have any financial interest in the undertaking of the proposed project activity other than remuneration for work as stipulated in the Purchase Order terms of reference
- confirm that remuneration for my services relating to the proposed project is not linked to approval or rejection of the project by the competent authority
- have no interest in secondary or subsequent developments as a result of the authorisation of the proposed project
- have no and will not engage in any conflicting interests in the undertaking of the activity
- undertake to disclose to the applicant and the competent authority any information that has or may have the potential to influence the decision of the competent authority
- will provide the applicant and competent authority with access to all relevant project information in my possession whether favourable or not

AJH Lamprecht



Signature

1. Introduction

The project applicant, Nala Local Municipality historically cleared an approximate 20.5 ha portion of natural vegetation for the development of low-cost housing in the township of Monyakeng situated directly adjacent north of the town of Wesselsbron, Free State Province. The necessary underground services such as water reticulation, sewage and electrical infrastructure was also installed at the time but no formal aboveground housing infrastructure development took place.

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Due to the nature of the impacts of the project on the local vegetation, an Ecological Assessment is required. This is required in order to determine the potential historic presence of ecologically significant species, habitats or wetland areas within the project footprint. Proposed mitigation and management measures must also be recommended in order to attempt to reduce/alleviate the identified impacts.

EcoFocus Consulting was therefore subsequently appointed by the EAP as the independent ecological specialist to conduct the required Ecological study for the project. This report constitutes the NEMA Section 24G Ecological Assessment.

Preliminary preparations conducted prior to the ecological site assessment where as follows:

- Georeferenced spatial information was obtained of the proposed project area in order to determine the direct impact footprint area.
- A desktop study was conducted of the information available on the relevant vegetation types and national/provincial conservation significance status associated with the assessment area.

2. Date and Season of Ecological Site Assessment

A site assessment for the original development footprint area of approximately 20.5 ha was conducted on 11 June 2019. This date forms part of the winter season. It must therefore be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals.

A site assessment was also conducted for a portion of the additional approximate 82.5 ha proposed development area, but the entire area was not assessed as the revised layout was only received during September 2020.

3. Assessment Rational

South Africa is a country rich in natural resources and splendour and is rated as having some of the highest biodiversity in the world. Other than the pure aesthetic value which our biodiversity and natural resources provides, it also plays a significant positive role in our national economy. While continuous economic development and progress is a key national focus area, which forms a cornerstone in the socio-economic improvement of society and the livelihoods of communities and individuals, the preservation and management of the integrity and sustainability of our natural resources is also essential in achieving this objective.

Socio-economic development and progress can therefore not be completely inhibited for the sake of ensuring environmental conservation, therefore solutions and compromises rather need to be explored in order to achieve the need for socio-economic development without unreasonably jeopardising the needs of environmental conservation. A sustainable and responsible balance needs to be maintained in order to accommodate the requirements of both.

Adequate, sustainable and responsible utilisation and management of our natural resources is crucial. Finding the required balance between socio-economic development and environmental conservation, should therefore always be a priority focus point during any proposed development process.

Various environmental legislation in South Africa makes provision for the protection of our natural resources and the functionality of ecological systems in order to ensure sustainability. Such acts include the National Environmental Management: Biodiversity Act (Act 10 of 2004), National Forests Act (Act 84 of 1998), Conservation of Agricultural Resources Act (Act 43 of 1983), National Water Act (Act 36 of 1998) and framework legislation such as the National Environmental Management Act (Act 10 of 2004).

An Ecological Assessment of the proposed development areas was therefore conducted in order to determine and quantify the potential ecological impacts of the proposed development on the natural environment in the area.

4. Objectives of the Assessment

Ecological and habitat survey:

- Describe the assumed historic vegetation on the assessment area and identify and list conservationally significant faunal and floral species which could likely have been encountered on the project area.
 - List any nationally and/or provincially protected and/or Red Data Listed species.
- Determine and discuss the Present Ecological State (PES) and extent of degradation and/or transformation of the vegetation on the assessment area and surrounding areas. Also indicate the assumed historic Ecological Importance and Sensitivity (EIS) of the assessment area in order to provide an indication of the assumed historic conservational significance of the assessment area.
- Identify and delineate all watercourses/wetland areas potentially present on and in close proximity to the assessment area.
- Identify, evaluate and rate the ecological impacts of the development on the natural environment.
- Provide recommendations on mitigation and management measures in order to attempt to reduce/alleviate these identified ecological impacts.
- Provide recommendations on the suitability of the proposed development area.
- A digital report (this document) as well as the digital KML files of any identified ecologically sensitive/conservationally significant areas will be provided to the applicant.

5. Methodology

- The development area was assessed on foot and visual observations/identifications were made of habitat conditions, ecologically sensitive areas and relevant species present.
- Species were listed and categorised as per the Red Data Species List; Protected Species List of the National Forests Act (Act 84 of 1998), Invasive Species List of the National Environmental Management: Biodiversity Act (Act 10 of 2004), Alien and Invasive Species Regulations, 2014 and the Provincially Protected species of the Free State's Nature Conservation Ordinance (No 8 of 1969).
- Georeferenced photographs were taken of ecologically sensitive areas as well as the relevant nationally or provincially protected species if encountered in order to indicate their specific locations in a Geographic Information System (GIS) mapping format.

The **Present Ecological State (PES)** of the development area was assessed and rated as per the table below.

- The Present Ecological State (PES) refers to the current state or condition of an area in terms of all its characteristics and reflects the change to the area from its reference condition. The value gives an indication of the alterations that have occurred in the ecosystem.

Table 1: Criteria for PES calculations

Ecological Category	Score	Description
A	> 90-100%	Unmodified , natural and pristine.
B	> 80-90%	Largely natural . A small change in natural habitats and biota may have taken place but the ecosystem functionality has remained essentially unchanged.
C	> 60-80%	Moderately modified . Moderate loss and transformation of natural habitat and biota have occurred, but the basic ecosystem functionality has still remained predominantly unchanged.
D	> 40-60%	Largely modified . A significant loss of natural habitat, biota and subsequent basic ecosystem functionality has occurred.
E	> 20-40%	Seriously modified . The loss of natural habitat, biota and basic ecosystem functionality is extensive.
F	0-20%	Critically/Extremely modified . Transformation has reached a critical level and the ecosystem has been modified completely with a virtually complete loss of natural habitat and biota. The basic ecosystem functionality has virtually been destroyed and the transformation is irreversible.

The **Ecological Importance and Sensitivity (EIS)** of the development area and surrounding undeveloped areas was assessed and rated as per the table below.

- The Ecological Importance and Sensitivity (EIS) of an area is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales, and both abiotic and biotic components of the system are taken into consideration. Sensitivity refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred.

Table 2: Criteria for EIS calculations

EIS Categories	Score	Description
Low/Marginal	D	Not ecologically important and/or sensitive on any scale. Biodiversity is ubiquitous and not unique or sensitive to habitat modifications.
Moderate	C	Ecologically important and sensitive on local or possibly provincial scale. Biodiversity is still relatively ubiquitous and not usually sensitive to habitat modifications.
High	B	Ecologically important and sensitive on provincial or possibly national scale. Biodiversity is relatively unique and may be sensitive to habitat modifications.
Very High	A	Ecologically important and sensitive on national and possibly international scale. Biodiversity is very unique and sensitive to habitat modifications.

Ecological impacts of the development on the surrounding natural environment were identified, evaluated and rated as per the methodology described below. The tables below indicate and explain the methodology and criteria used for the evaluation of the Environmental Risk Ratings as well as the calculation of the final Environmental Significance Ratings of the identified ecological impacts. Each ecological impact is scored for each of the Evaluation Components as per the table below.

Table 3: Scale utilised for the evaluation of the Environmental Risk Ratings

Evaluation Component	Rating Scale and Description/Criteria
Magnitude of Negative or Positive Impact	<p>10 - Very high: Bio-physical features and/or ecological functionality/processes may be severely impacted upon.</p> <p>8 - High: Bio-physical features and/or ecological functionality/processes may be significantly impacted upon.</p> <p>6 - Medium: Bio-physical features and/or ecological functionality/processes may be moderately impacted upon.</p> <p>4 - Low: Bio-physical features and/or ecological functionality/processes may be slightly impacted upon.</p> <p>2 - Very Low: Bio-physical features and/or ecological functionality/processes may be slightly impacted upon.</p> <p>0 - Zero: Bio-physical features and/or ecological functionality/processes will not be impacted upon.</p>
Duration of Negative or Positive Impact	<p>5 – Permanent: Impact will continue on a permanent basis.</p> <p>4 - Long term: Impact should cease a period (> 40 years) after the operational phase/project life of the activity.</p> <p>3 - Medium term: Impact may occur for the period of the operational phase/project life of the activity.</p> <p>2 - Short term: Impact may only occur during the construction phase of the activity after which it will cease.</p> <p>1 - Immediate: Impact may only occur as a once off during the construction phase of the activity.</p>

Extent of Positive or Negative Impact	<p>5 - International: Impact will extend beyond National boundaries.</p> <p>4 - National: Impact will extend beyond Provincial boundaries but remain within National boundaries.</p> <p>3 - Regional: Impact will extend beyond 5 km of the development footprint but remain within Provincial boundaries.</p> <p>2 - Local: Impact will not extend beyond 5 km of the development footprint.</p> <p>1 - Site-specific: Impact will only occur on or within 200 m of the development footprint.</p> <p>0 – No impact.</p>
Irreplaceability of Natural Resources being impacted upon	<p>5 – Definite loss of irreplaceable natural resources.</p> <p>4 – High potential for loss of irreplaceable natural resources.</p> <p>3 – Moderate potential for loss of irreplaceable natural resources.</p> <p>2 – Low potential for loss of irreplaceable natural resources.</p> <p>1 – Very low potential for loss of irreplaceable natural resources.</p> <p>0 – No impact.</p>
Reversibility of Impact	<p>5 – Impact cannot be reversed.</p> <p>4 – Low potential that impact may be reversed.</p> <p>3 – Moderate potential that impact may be reversed.</p> <p>2 – High potential that impact may be reversed.</p> <p>1 – Impact will be reversible.</p> <p>0 – No impact.</p>
Probability of Impact Occurrence	<p>5 - Definite: Probability of impact occurring is > 95 %.</p> <p>4 - High: Probability of impact occurring is > 75 %.</p> <p>3 - Medium: Probability of impact occurring is between 25 % - 75 %.</p> <p>2 - Low: Probability of impact occurring is between 5 % - 25 %.</p> <p>1 - Improbable: Probability of impact occurring is < 5 %.</p>
Cumulative Impact	<p>High: Numerous similar historic, present or future development activities in the same geographical area, have taken or are anticipated to take place which may cumulatively contribute and increase the significance of the identified impacts.</p> <p>Medium: Few similar historic, present or future development activities in the same geographical area, have taken or are anticipated to take place which may cumulatively contribute and increase the significance of the identified impacts.</p> <p>Low: Virtually no similar historic, present or future development activities in the same geographical area, have taken or are anticipated to take place which may cumulatively contribute and increase the significance of the identified impacts. The development is anticipated to be an isolated occurrence and should therefore have a negligible cumulative impact.</p> <p>None: No cumulative impact.</p>

Once the Environmental Risk Ratings have been evaluated for each ecological impact, the Significance Score of each ecological impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum Significance Score value is 150.

The Significance Score is then used to rate the Environmental Significance of each ecological impact as per Table 4 below. The Environmental Significance rating process is completed for all identified ecological impacts both before and after implementation of the recommended mitigation measures.

Table 4: Scale used for the evaluation of the Environmental Significance Ratings

Environmental Significance Score	Environmental Significance Rating	Description/Criteria
125 – 150	Very high	An impact of very high significance after mitigation will mean that the development may not take place. The impact cannot be suitably reduced and mitigated to within acceptable levels.
100 – 124	High	An impact of high significance after mitigation should influence a decision about whether or not to proceed with the development. Additional, impact-specific mitigation measures must be implemented if the continuation of the development is to be considered.
75 – 99	Medium-high	Additional, impact-specific mitigation measures must be implemented for an impact of medium-high significance if the continuation of the development is to be considered.
50 – 74	Medium	An impact of medium significance after mitigation must be adequately managed in accordance with the mitigation measures provided by the specialist.
< 50	Low	If any mitigation measures are provided by the specialist for an impact of low significance after mitigation, the impact must be adequately managed in accordance with these measures.
+	Positive impact	A positive impact is likely to result in a beneficial consequence/effect and should therefore be viewed as a motivation for the development to proceed.

Wetlands/watercourses were identified and delineated on the project area as per the methodology described below:

For the purposes of this investigation a wetland was defined according to the definition in the National Water Act (Act 36 of 1998) as: “land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.”

In 2005 DWAF published a wetland delineation procedure in a guideline document titled “A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas”. Guidelines for the undertaking of biodiversity assessments exist. These guidelines contain a number of stipulations relating to the protection of wetlands and the undertaking of wetland assessments.

The wetland delineation procedure identifies the outer edge of the temporary zone of the wetland, which marks the boundary between the wetland and adjacent terrestrial areas. This constitutes the part of the wetland that might remain flooded or saturated close to the soil surface for only a few weeks in the year, but long enough to develop anaerobic conditions and determine the nature of the plants growing in the soil.

The guidelines also state that the locating of the outer edge of the temporary zone must make use of four specific indicators namely:

- terrain unit indicator,
- soil form indicator,
- soil wetness indicator and
- vegetation indicator.

In addition, the wetland/watercourse and a protective buffer zone beginning from the outer edge of the wetland temporary zone, was designated as sensitive in a sensitivity map. The guidelines stipulate buffers to be delineated around the boundary of a wetland. An adequate protective buffer zone, beginning from the outer edge of the wetland temporary zone, was implemented and designated as sensitive within which no development must be allowed to occur.

6. Assessment Area

The original assessment area consists of a single footprint area of approximately 20.5 ha in size. The assessment area is situated on the Remaining Extent of the Farm Oranje Vlei no 174 (SG 21 Digit Code: F0410000000017400000). The area is located in the township of Monyakeng situated directly adjacent north of the town of Wesselsbron. The town forms part of the Nala Local Municipality which in turn, forms part of the Lejweleputswa District Municipality, Free State Province. Access to the assessment area is obtained via the R 505 provincial road and subsequent dirt roads inside the informal residential settlement from the west.

The additional proposed development area is approximately 82.5 ha in size and is situated directly adjacent east of the existing township of Monyakeng. The area is also situated on the Remaining Extent of the Farm Oranje Vlei no 174 (SG 21 Digit Code: F0410000000017400000).

See locality map below (see A3 sized map in the Appendices).

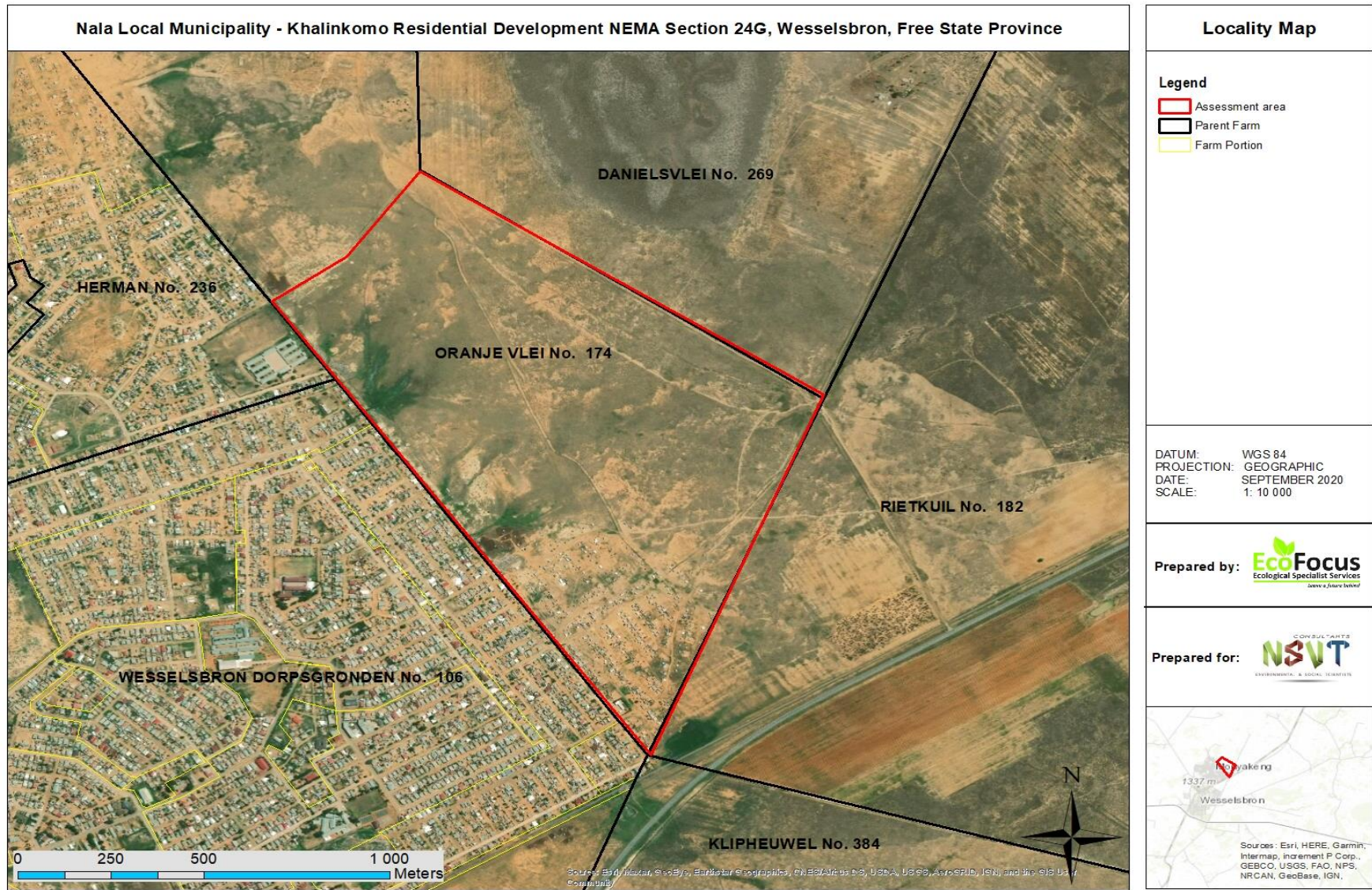


Figure 1: Locality map illustrating the assessment area

6.1. Climate

The rainfall of the region peaks during the summer months and the Mean Annual Precipitation (MAP) of the area is approximately 452 mm (www.climate-data.org). The highest average monthly temperature is approximately 22.7°C in the summer months while the lowest average monthly temperature is approximately 8.9°C during the winter. Maximum monthly temperatures can reach up to 29.8°C in the summer months and dip to as low as 0°C during the winter.

6.2. Geology and Soils

According to Mucina & Rutherford (2006) the geology of the landscape and associated vegetation type can be described as the following:

Deposits of sandstone, mudstone and shale (Volksrust formation, Ecca Group) underlie extensive areas of flat to undulating plains interrupted by dolerite sills in some places. Few if any rivers or streams drain away from these plains and virtually all water drains into pans scattered throughout the area. The area mainly constitutes dry, clayey duplex soils typical of land types Da, Db and Dc.

6.3. Vegetation and Conservation Status

Vegetation Types

According to SANBI (2006-2019), the entire original assessment area falls within the Western Free State Clay Grassland vegetation type (Gh 9) which is characterised by flat bottomlands supporting dry species-poor grassland. A high number of salt pans are embedded within these areas and the grasslands are often substituted by dwarf karroid shrublands in disturbed areas surrounding such pans. This vegetation type is classified as Least Concerned (SANBI, 2006-2019).

The additional proposed development area also falls within the Western Free State Clay Grassland vegetation type (Gh 9).

The water pans present in the areas surrounding the assessment area, form part of the Highveld Salt Pans vegetation type (AZi 10). This vegetation type constitutes depressions in the plateau landscape containing temporary and, less frequently also permanent water bodies. Central portions of such pans are often seasonally inundated and sometimes with floating macrophyte vegetation. Vegetation cover also often develops on drained bottoms of such pans and form typical concentric zonation patterns. Open to sparse grassy dwarf shrubland may develop around the edges of such pans especially when subjected to high grazing pressures. Threats on such pans are ever increasing in the form of agriculture, road building, mining and urbanisation (SANBI, 2006-).

Conservation Categories

The southern, central and western portion of the original assessment area is categorised as degraded land in accordance with the Free State Provincial Spatial Biodiversity Plan 2017, which sets out biodiversity priority areas in the province. The northern and eastern portions of the original assessment area are however categorised as an Ecological Support Area two (ESA 2) and Other Natural Areas (ONA) respectively. ESA's are areas that must be maintained in at least fair ecological condition (semi-natural/moderately modified state) in order to support the ecological functioning of a Critical Biodiversity Area (CBA) or protected area or that play an important role in delivering ecosystem services (Collins, 2017).

'Ground truthing' has however indicated that the entire original assessment area is occupied by an existing informal residential settlement which has virtually completely transformed all previously existing natural surface vegetation.

The majority of the additional proposed development area is categorised as an Ecological Support Area two (ESA 2) in accordance with the Free State Provincial Spatial Biodiversity Plan 2017. Merely a narrow linear portion along the western boundary is categorised as degraded land, while a narrow linear portion along the south-eastern boundary is categorised as Other Natural Areas (ONA).

See vegetation and conservation status maps below (see A3 sized maps in the Appendices).

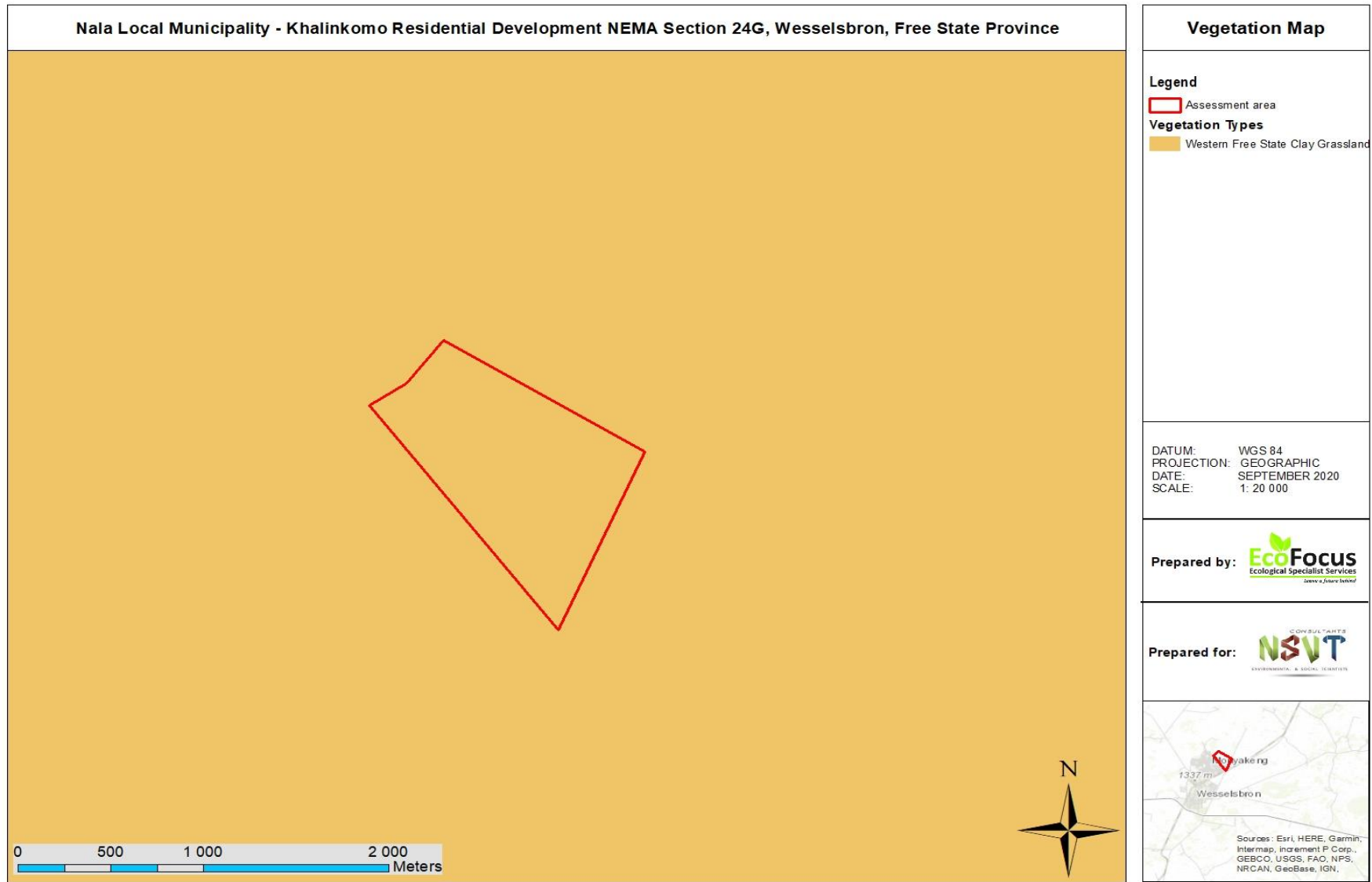


Figure 2: Vegetation map illustrating the vegetation type associated with the assessment area

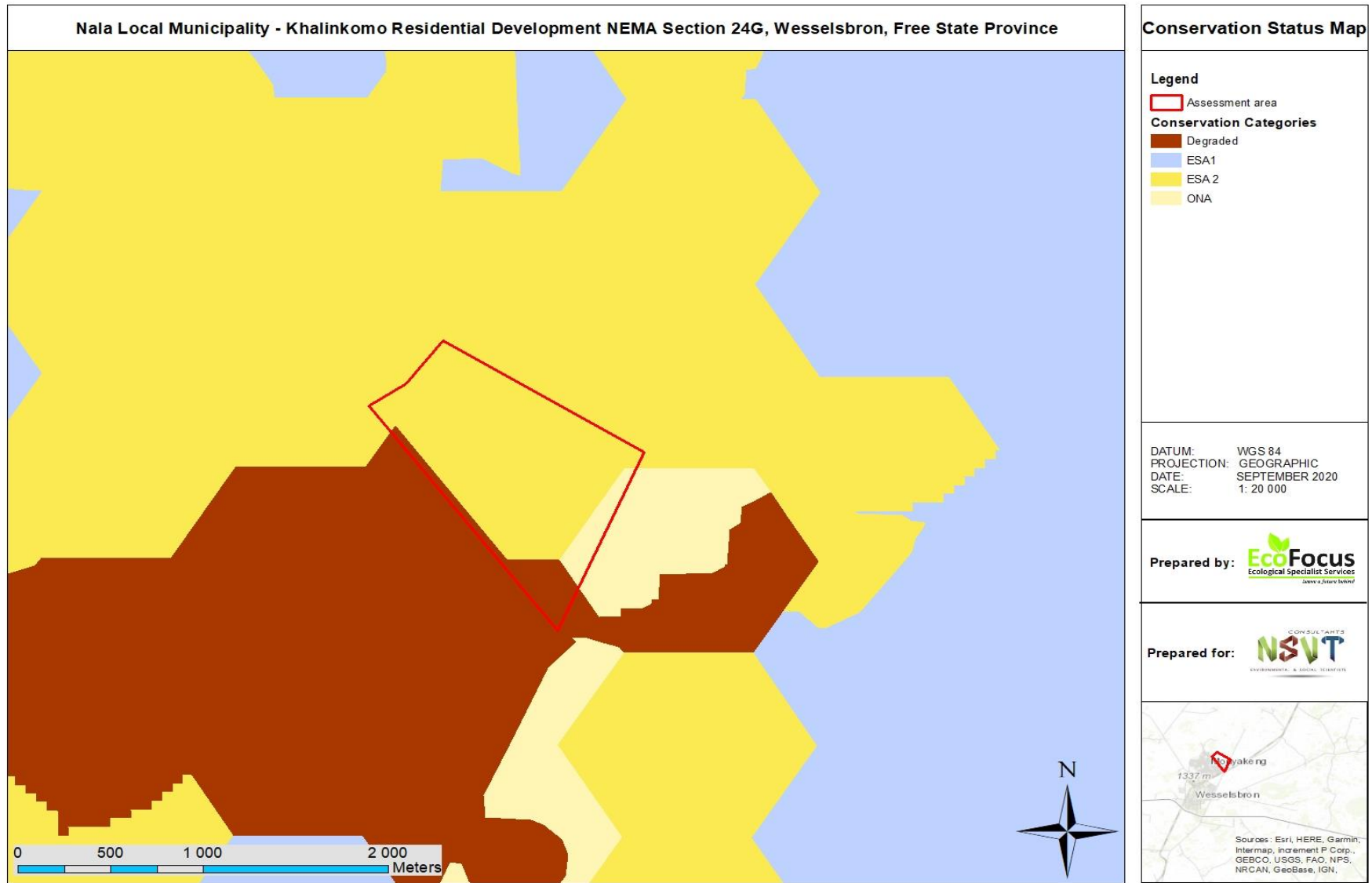


Figure 3: Conservation status map illustrating the conservation statuses associated with the assessment area

7. Assumptions, Uncertainties and Gaps in Knowledge

Various assumptions need to be made during the assessment process at the hand of the relevant specialist. It is therefore assumed that:

- all relevant project information provided by the applicant and engineering design team to the ecological specialist was correct and valid at the time that it was provided.
- the development area as provided by the engineering design team is correct and will not be significantly deviated from as this was the only area assessed.
- the necessary environmental authorisations have been successfully obtained for the surrounding residential developments.
- the public, local communities, relevant organs of state and landowners will receive a sufficient reoccurring opportunity to participate and comment on the project during the NEMA Section 24G rectification process, through the provision of adequately facilitated public participation interventions and timeframes as stipulated in the NEMA: EIA Regulations, 2014.
- the need and desirability of the proposed project is based on strategic national, provincial and local plans and policies which reflect the interests of both statutory and public viewpoints.
- the NEMA Section 24G rectification process is a retrospective assessment process and the specialists are limited to assessing the anticipated historic condition of the project area based on the surrounding natural, undeveloped areas.
- it is assumed that strategic level decision making by the relevant authorities will be conducted through cooperative governance principles, with the consideration of environmentally sustainable and responsible development principles underpinning all decision making.
- it is reasonably assumed that the historic ecology of the assessment area prior to the informal residential transformation, would have been comparable to that of the surrounding undeveloped areas as they are situated directly adjacent to the assessment area. No significant change in soil structure or landscape topography or features is evident between the assessment area and these surrounding undeveloped areas which further supports this assumption.

Given that the NEMA Section 24G process involves prediction, the uncertainty factor forms part of the assessment process. Two types of uncertainty are associated with the process, namely process-related and prediction-related.

- Uncertainty of prediction is critical at the data collection phase as observations and conclusions are made, only based on professional specialist opinion. Adequate research, specialist experience and expertise should however minimise this uncertainty.
- Uncertainty of relevant decision making relates to the interpretation of provided information by relevant authorities during the Section 24G rectification process. Continual two way communication and coordination between EAP's and relevant authorities should however decrease the uncertainty of subjective interpretation. The importance of widespread/comprehensive consultation towards minimising the risk/possibility of omitting significant information and impacts is further stressed. The use of quantitative impact significance rating formulas (as utilised in this document) can further standardise the objective interpretation of results and limit the occurrence and scale of uncertainty and subjectivity.
- The principle of human nature provides for uncertainties and unpredictability with regards to the socio-economic impacts of the development and the subsequent public reaction/opinion which will be received during the Public Participation Process (PPP).

Gaps in knowledge can be attributed to:

- The ecological study process was undertaken retrospectively after the original surface vegetation had already been transformed by the development. The anticipated historic condition of the project site is therefore purely based on the vegetation of the surrounding natural, undeveloped areas.
- A site assessment was conducted for a portion of the additional approximate 82.5 ha proposed development area, but the entire area was not assessed as the revised layout was only received during September 2020.
- The potential of future similar developments in the same geographical area which could lead to cumulative impacts cannot be meaningfully anticipated. It is however expected that further residential development is likely to take place in the broader area.

EcoFocus Consulting is an independent ecological specialist company. All information and recommendations as per this report are therefore provided in a fair and unbiased/objective manner based on professional specialist opinion.

8. Results and Discussion

8.1. Original Assessment Area

The entire original assessment area constitutes an existing dense informal residential settlement which has virtually completely transformed all previously existing natural surface vegetation. The area is also completely isolated to the west by the existing Monyakeng township.

The remaining sparse vegetation present on most of the informal residential properties within the original assessment area mainly consists of exotic and/or legally declared alien invasive species which serve ornamental, consumption and/or shading purposes. Such species include *Prunus persica* (exotic), *Ligustrum lucidum* (Category 3), *Schinus molle* (exotic), *Melia azedarach* (Category 3), *Ricinus communis* (Category 2), *Prosopis sp.* (Category 1b), *Kiggelaria africana* (indigenous) & *Canna indica* (Category 1b). No Red Data Listed-, provincially- or nationally protected species or any other species of conservational significance were found to be present within the original assessment area.

The virtually complete loss and transformation of natural habitat, biota and basic ecosystem functionality within the original assessment area is deemed irreversible. Sufficient ecological restoration of the relevant vegetation type and its functionality within the original assessment area, will therefore not be practicably feasible.

It must be kept in mind that this existing transformed original assessment area is the only portion which may be applied for and authorised for the proposed development as part of the current NEMA Section 24G process. The additional proposed development area which is still undeveloped, cannot be included into the current NEMA Section 24G process for residential expansion, as the development of such areas will require a separate EIA process.



Figure 4: Image illustrating an example of the completely transformed landscape of the original assessment area

8.1.1. Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

The Present Ecological State (PES) of the original assessment area is classified as Class F as it is critically/extremely modified. Transformation has reached a critical level and the ecosystem has been completely modified with a virtually complete loss of natural habitat and biota. The basic ecosystem functionality has virtually been destroyed and the transformation is deemed irreversible.

The historic Ecological Importance and Sensitivity (EIS) of the original assessment area would probably have been classified as Class C (moderate) as this area could have been viewed as being ecologically important and sensitive on local scale mainly due to them forming part of the broader surface water catchment and drainage towards the water pan to the north-east. Biodiversity is however still relatively ubiquitous.

The original assessment area would therefore have been viewed as being of low to moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA 2 as well as water catchment and drainage area towards the water pan.

8.2. Additional Proposed Development Area

The additional proposed development area is undeveloped but in a moderately disturbed and degraded state which has likely been caused by significant historic and continued long-term overgrazing by livestock from the local community over time. It is reasonably assumed that the historic ecology of the original assessment area prior to the informal residential transformation, would have been comparable to that of the additional proposed development area, as it is situated directly adjacent to the original assessment area. No significant change in soil structure or landscape topography or features is evident between the original assessment area and the additional proposed development area, which further supports this assumption. The discussion of the additional proposed development area must therefore also be viewed as a reference area representing the assumed historic ecology of the original assessment area.

8.2.1. Current Existing Vegetation and Site Condition

The additional proposed development area constitutes flat to slightly sloping low growing grassland with a well-represented dwarf karroid shrub layer. This grassland has been subjected to significant historic and continued long-term overgrazing by livestock from the local community over time. The grass layer therefore mainly constitutes a low growing grass 'carpet' and a virtual complete lack of well-represented grass tufting is evident. The additional proposed development area is therefore not reminiscent of the natural climactic state of the relevant Western Free State Clay Grassland vegetation type (Gh 9).

The grass layer is mainly dominated by the species *Eragrostis chloromelas*, *E lehmanniana* as well as the Increaser 2 type pioneer species *Aristida congesta* & *Chloris virgata* (Van Oudtshoorn, 2004), which reiterates the severity level of overgrazing. Other grass species also found to be present but to a significantly lesser extent include *Cynodon dactylon*, *Themeda triandra*, *Eragrostis superba*, *E obtusa*, *Digitaria eriantha* & *Cymbopogon pospischilii*.

Dwarf karroid shrub species found to be well represented include *Ruschia spinosa*, *R hamata*, *Lycium horridum*, *L cinerum*, *Osteospermum leptolobum*, *Pteronia sp.* & *Felicia spp.* A single individual of the legally declared invasive species *Austrocylindropuntia subulata* (Category 1b) was also found to be present. It is recommended that all individuals of the identified alien invasive species must be actively eradicated from the assessment area and adequately disposed of in accordance with the National Environmental Management: Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014.

Forb species found to be well represented include *Bulbine narcissifolia*, *Berkheya onopordifolia*, *Moraea pallida*, *Oxalis depressa* & *Nidorella microcephala*. Other forb species also found to be present but to a significantly lesser extent include *Lessertia pauciflora*, *Gazania krebsiana*, *Colchicum melanthoides*, *Geigeria ornativa*, *Nananthus vittatus* & *Hypertelis sp.*

No Red Data Listed-, provincially- or nationally protected species or any other species of conservational significance were found to be present within the additional proposed development area. It is therefore also not anticipated that the original assessment area would necessarily have housed large numbers of any species of conservational significance. It must however be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals. It is therefore recommended that an additional ecological walkthrough be conducted prior to commencement of the project during the flowering period of underground bulbous plant species, if deemed necessary by the competent authority. This will ensure that no provincially protected or significant species have potentially been omitted.

The additional proposed development area does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website (<https://www.birdlife.org.za/what-we-do/important-bird-and-biodiversity-areas/media-and-resources/#1553597171790-6f83422a-a731>). No conservationally significant or important bird species or locally distinct habitats were observed during the site assessment or are necessarily expected to utilise the additional proposed development area for breeding, foraging and/or persistence purposes.

Due to the presence of the existing township along with the significant continued long-term overgrazing by livestock from the local community, the additional proposed development area is subjected to continued anthropogenic activity and disturbance. It is therefore not anticipated that any large or conservationally significant faunal species would utilise the additional proposed development area for breeding and/or persistence purposes or for that matter, would necessarily have historically utilised the original assessment area. Only common local resident bird species were found to be present.

It is recommended that sufficient grazing management plans and practices must be implemented for livestock of the local community in order to prevent continued significant overgrazing of surrounding undeveloped areas and attempt to improve/restore the ecological condition over time.

It must however again be kept in mind that the existing transformed original assessment area is the only portion which may be applied for and authorised for the proposed development as part of the current NEMA Section 24G process. The additional proposed development area which is still undeveloped, cannot be included into the current NEMA Section 24G process for residential expansion, as the development of such areas will require a separate EIA process.

See photographs below.



Figure 5: Two images illustrating examples of the moderately disturbed and degraded state of the additional proposed development area

8.2.2. Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

The Present Ecological State (PES) of the additional proposed development area is classified as Class C as it is moderately modified. Moderate loss and transformation of natural habitat and biota have occurred mainly due to the presence of the existing surrounding informal residential settlements as well as significant historic and continued long-term overgrazing by livestock from the local community over time. The basic ecosystem functionality has however still remained predominantly unchanged.

The Ecological Importance and Sensitivity (EIS) of the additional proposed development area is classified as Class C (moderate) as this area is viewed as being ecologically important and sensitive on local scale mainly due to them forming part of the broader surface water catchment and drainage towards the water pan to the north-east. Biodiversity is however still relatively ubiquitous.

The additional proposed development area is therefore viewed as being of moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA 2 as well as water catchment and drainage area towards the water pan.

8.3. Water Pan

A significantly sized water pan is present approximately 770 m north-east of the original assessment area. The pan is however located merely approximately 120 m north-east of the additional proposed development area. Access to the pan was not be obtained as the pan is located on private property. At the time of the site assessment, the pan was fully inundated and dominated by aquatic vegetation. It is however anticipated that the pan could potentially dry up during the latter stages of the winter season. The pan appears to be in a relatively healthy and stable ecological condition and supports an important aquatic habitat which is subsequently utilised by a wide variety of waterbirds, amphibian species and aquatic invertebrates for breeding, foraging and persistence purposes.

A defined surface water drainage area feeds into the pan from the south-east. The original assessment area is located a significant distance (≥ 500 m) away from the defined surface water drainage area and therefore does not necessarily impact directly on surface water runoff towards the pan. Although this is the case, the original assessment area still forms part of the broader surface water catchment and drainage towards this pan. It is therefore recommended that development and layout designs for the new residential development should include adequate storm water management measures to ensure that sufficient volumes and quality of surface water runoff from the footprint area is still channelled back towards the pan.

The additional proposed development area is however located merely approximately 20 m away from the defined surface water drainage area, which feeds into the pan. The additional proposed development area will therefore likely impact directly on surface water runoff towards the pan.

In order to preserve the remaining ecological integrity and -functionality of the pan, it is therefore recommended that a minimum 250 m buffer zone be implemented around the entire pan and its defined surface water drainage area. No further future development may take place within the buffered zone.

A very small, confined wetland area has also formed approximately 90 m to the south of the original assessment area and the additional proposed development area. This wetland area has formed due to surface water runoff being channelled from the south through a culvert to the north of the R 719 provincial road, being artificially obstructed by the presence of informal residential infrastructure and a railroad. This very small, confined anthropogenically induced wetland area is therefore not viewed as a true natural wetland and subsequently carries no increased conservational significance relative to any surrounding areas.

Long-term sewage water leaks directly adjacent north and south of the original assessment area and within the additional proposed development area, have also resulted in confined areas surrounding these leaks, possessing certain wetland characteristics. These anthropogenically induced wetland areas are therefore also not viewed as true natural wetlands and subsequently also carry no increased conservational significance relative to any surrounding areas.

See photographs below.



Figure 6: Three images illustrating examples of the presence of the long-term sewage water leaks directly adjacent north and south of the original assessment area which have resulted in confined areas surrounding these leaks, possessing certain anthropogenically induced wetland characteristics

8.4. Ecological Site Sensitivity Map

The site sensitivity map below (see A3 sized map in the Appendices) illustrates the recommended buffer zone to be implemented around the water pan as well as the delineation of the anthropogenically induced wetland areas located directly adjacent north and south of the original assessment area and within the additional proposed development area.

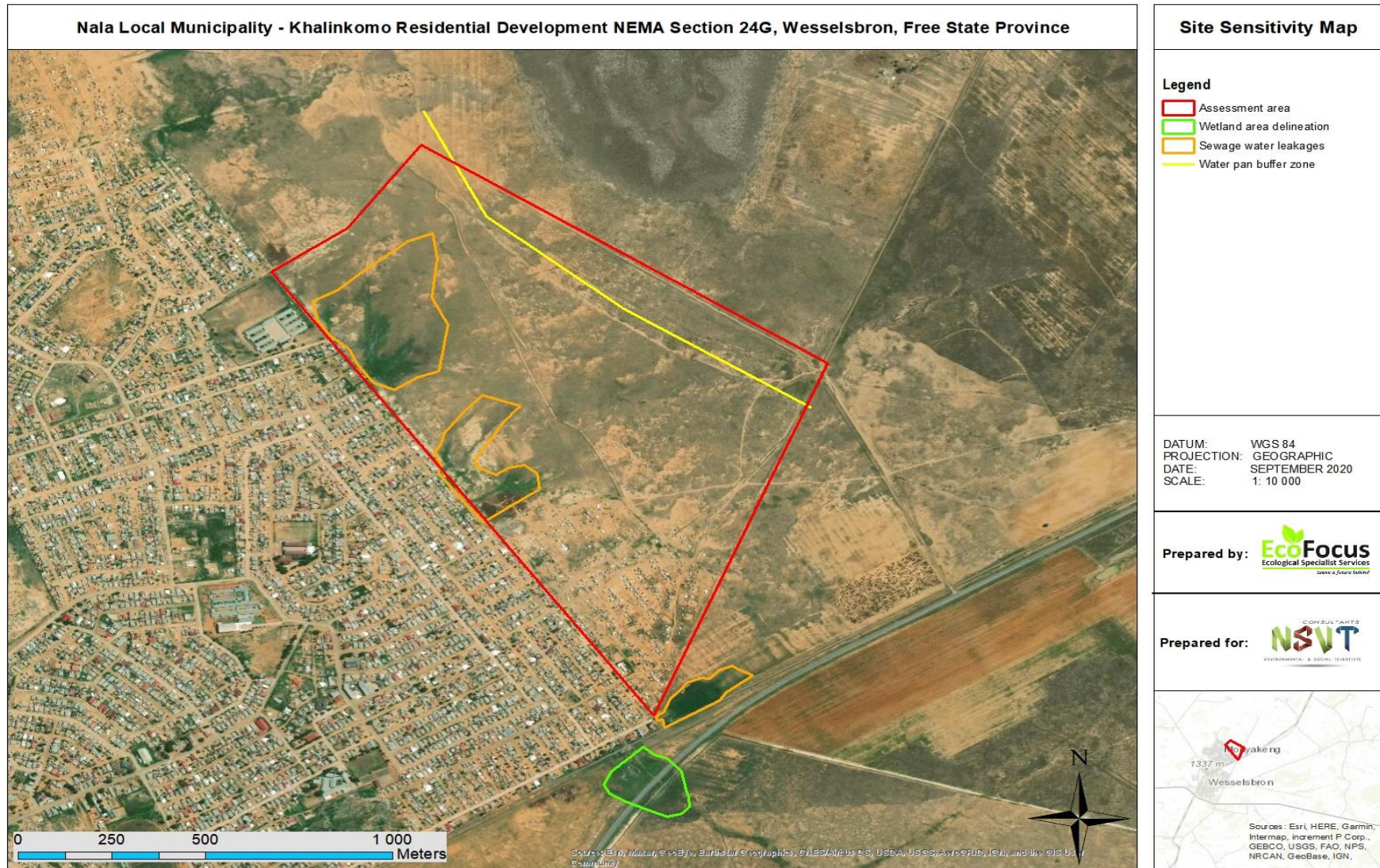


Figure 7: Site sensitivity map illustrating the recommended buffer zone to be implemented around the water pan as well as the delineation of the anthropogenically induced wetland areas located directly adjacent north and south of the original assessment area and within the additional proposed development area

8.5. Species List for the Original Assessment Area and Additional Proposed Development Area

Table 5: Species list for the assessment area and additional proposed development area (Legally declared invasive species highlighted in pink)

Graminoids	Forbs	Shrubs & trees
<i>Aristida congesta</i>	<i>Berkheya onopordifolia</i> ,	<i>Austrocylindropuntia subulata</i>
<i>Chloris virgata</i>	<i>Bulbine narcissifolia</i> ,	<i>Felicia spp.</i>
<i>Cymbopogon pospischilii</i>	<i>Canna indica</i>	<i>Kiggelaria africana</i>
<i>Cynodon dactylon</i>	<i>Colchicum melanthoides</i>	<i>Ligustrum lucidum</i>
<i>Digitaria eriantha</i>	<i>Gazania krebsiana</i>	<i>Lycium cinereum</i>
<i>Eragrostis chloromelas</i>	<i>Geigeria ornativa</i>	<i>Lycium horridum</i>
<i>Eragrostis lehmanniana</i> ,	<i>Hypertelis sp.</i>	<i>Melia azedarach</i>
<i>Eragrostis obtusa</i>	<i>Lessertia pauciflora</i>	<i>Osteospermum leptolobum</i>
<i>Eragrostis plana</i>	<i>Moraea pallida</i>	<i>Prosopis sp.</i>
<i>Eragrostis superba</i>	<i>Nananthus vittatus</i>	<i>Prunus persica</i>
<i>Themeda triandra</i>	<i>Nidorella microcephala</i>	<i>Pteronia sp.</i>
-	<i>Oxalis depressa</i>	<i>Ricinus communis</i>
-	-	<i>Ruschia hamata</i>
-	-	<i>Ruschia spinosa</i>
-	-	<i>Schinus molle</i>

9. Ecological Impact Assessment

The following section identifies the ecological impacts (both positive and negative) caused by the project on the surrounding environment.

Once the ecological impacts are identified, they are assessed by rating their Environmental Risk after which the final Environmental Significance is calculated and rated for each identified ecological impact.

The same Environmental Risk rating process is then followed for each ecological impact to determine the Environmental Significance if the recommended mitigation measures were to be implemented.

The objective of this section is therefore firstly to identify all the ecological impacts caused by the development and secondly to determine the significance of the impacts and how effective the recommended mitigation measures will be able to reduce their significance. The accepted Mitigation Hierarchy for assessing and managing potential ecological impacts as embedded within the principles of Section 2 of NEMA, implies that significant ecological impacts must firstly be avoided/prevented. If this is not entirely possible, ecological impacts must be minimised and then rehabilitated or restored. The ecological impacts which are still rated as highly significant, even after implementation of mitigations, can then be identified in order to specifically focus on implementation of effective management strategies for them.

9.1. Ecological Impacts Caused by the Project

Transformation of terrestrial vegetation on the assessment area associated with the Western Free State Clay Grassland vegetation type (Gh 9)

According to SANBI (2006-2019), the entire original assessment area falls within the Western Free State Clay Grassland vegetation type (Gh 9). This vegetation type is classified as Least Concerned (SANBI, 2006-2019).

The additional proposed development area also falls within the Western Free State Clay Grassland vegetation type (Gh 9).

The entire original assessment area is approximately 20.5 ha in size and is occupied by an existing informal residential settlement which has virtually completely transformed all previously existing natural surface vegetation.

The additional proposed development area is approximately 82.5 ha in size. It is undeveloped but in a moderately disturbed and degraded state which has likely been caused by significant historic and continued long-term overgrazing by livestock from the local community over time. The additional proposed development area is therefore not reminiscent of the natural climactic state of the relevant Western Free State Clay Grassland vegetation type (Gh 9).

The significance of this impact was medium for the original assessment area and will be medium for the additional proposed development area.

Mitigation measures to reduce impacts are recommended under heading 9.3.

Transformation of an Ecological Support Area two (ESA 2) associated with the assessment area

The northern portion of the original assessment area is categorised as an Ecological Support Area two (ESA 2) in accordance with the Free State Provincial Spatial Biodiversity Plan 2017, which sets out biodiversity priority areas in the province.

The entire original assessment area is approximately 20.5 ha in size and is occupied by an existing informal residential settlement which has virtually completely transformed all previously existing natural surface vegetation.

The majority of the additional proposed development area is categorised as an Ecological Support Area two (ESA 2) in accordance with the Free State Provincial Spatial Biodiversity Plan 2017.

The additional proposed development area is approximately 82.5 ha in size. It is undeveloped but in a moderately disturbed and degraded state which has likely been caused by significant historic and continued long-term overgrazing by livestock from the local community over time. The additional proposed development area is therefore not reminiscent of the natural climactic state of the relevant Western Free State Clay Grassland vegetation type (Gh 9).

The pan situated to the north-east appears to be in a relatively healthy and stable ecological condition and supports important aquatic habitat which is subsequently utilised by a wide variety of waterbirds, amphibian species and aquatic invertebrates for breeding, foraging and persistence purposes.

A defined surface water drainage area feeds into the pan from the south-east. The original assessment area is located a significant distance (≥ 500 m) away from the defined surface water drainage area and therefore does not necessarily impact directly on surface water runoff towards the pan. Although this is the case, the original assessment area still forms part of the broader surface water catchment and drainage towards this pan.

The additional proposed development area is however located merely approximately 20 m away from the defined surface water drainage area, which feeds into the pan. The additional proposed development area will therefore likely impact directly on surface water runoff towards the pan.

The original assessment area would probably have scored a moderate historic Ecological Importance and Sensitivity (EIS) value and would therefore have been viewed as being of low to moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA 2 as well as water catchment and drainage area towards the water pan.

The additional proposed development area scored a moderate Ecological Importance and Sensitivity (EIS) value and is therefore viewed as being of moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem,

broader vegetation type, ESA 2 as well as water catchment and drainage area towards the water pan.

The significance of this impact was low for the original assessment area and will be medium for the additional proposed development area.

Mitigation measures to reduce impacts are recommended under heading 9.3.

Destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment area

The entire original assessment area is approximately 20.5 ha in size and is occupied by an existing informal residential settlement which has virtually completely transformed all previously existing natural surface vegetation.

No Red Data Listed-, provincially- or nationally protected species or any other species of conservational significance were found to be present within the original assessment area.

The additional proposed development area is approximately 82.5 ha in size. It is undeveloped but in a moderately disturbed and degraded state which has likely been caused by significant historic and continued long-term overgrazing by livestock from the local community over time. The additional proposed development area is therefore not reminiscent of the natural climactic state of the relevant Western Free State Clay Grassland vegetation type (Gh 9).

No Red Data Listed-, provincially- or nationally protected species or any other species of conservational significance were found to be present within the additional proposed development area. It is therefore also not anticipated that the original assessment area would necessarily have housed large numbers of any species of conservational significance. It must however be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals.

The additional proposed development area does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website (<https://www.birdlife.org.za/what-we-do/important-bird-and-biodiversity-areas/media-and-resources/#1553597171790-6f83422a-a731>).

No conservationally significant or important bird species or locally distinct habitats were observed

during the site assessment or are necessarily expected to utilise the additional proposed development area for breeding, foraging and/or persistence purposes.

Due to the presence of the existing township along with the significant continued long-term overgrazing by livestock from the local community, the additional proposed development area is subjected to continued anthropogenic activity and disturbance. It is therefore not anticipated that any large or conservationally significant faunal species would utilise the additional proposed development area for breeding and/or persistence purposes or for that matter, would necessarily have historically utilised the original assessment area. Only common local resident bird species were found to be present.

The pan situated to the north-east appears to be in a relatively healthy and stable ecological condition and supports important aquatic habitat which is subsequently utilised by a wide variety of waterbirds, amphibian species and aquatic invertebrates for breeding, foraging and persistence purposes.

The significance of this impact was low for the original assessment area and will be medium for the additional proposed development area.

Mitigation measures to reduce impacts are recommended under heading 9.3.

Terrestrial alien invasive species establishment

The entire original assessment area is approximately 20.5 ha in size and is occupied by an existing informal residential settlement which has virtually completely transformed all previously existing natural surface vegetation.

The remaining sparse vegetation present on most of the informal residential properties within the original assessment area mainly consists of exotic and/or legally declared alien invasive species which serve ornamental, consumption and/or shading purposes. Such species include *Prunus persica* (exotic), *Ligustrum lucidum* (Category 3), *Schinus molle* (exotic), *Melia azedarach* (Category 3), *Ricinus communis* (Category 2), *Prosopis sp.* (Category 1b), *Kiggelaria africana* (indigenous) & *Canna indica* (Category 1b). All of these individuals will in fact be removed during the new construction phase which will prove to be beneficial to the environment.

The additional proposed development area is approximately 82.5 ha in size. It is undeveloped but in a moderately disturbed and degraded state which has likely been caused by significant historic and continued long-term overgrazing by livestock from the local community over time. The additional proposed development area is therefore not reminiscent of the natural climactic state of the relevant Western Free State Clay Grassland vegetation type (Gh 9).

No significant alien invasive species establishments were found to be present within or around the additional proposed development area or the water pans. Merely a single individual of the legally declared invasive species *Austrocylindropuntia subulata* (Category 1b) was found to be present within the additional proposed development area.

The original assessment area and additional proposed development area could however potentially be prone to significant alien invasive species establishment due to surface disturbances and vegetation clearance caused by new construction activities.

The significance of this impact was low for the original assessment area and will be low for the additional proposed development area.

Mitigation measures to reduce impacts are recommended under heading 9.3.

Surface material erosion

No significant soil erosion is currently evident within or around the original assessment area or additional proposed development area. The original assessment area or additional proposed development area are flat to slightly sloping and form part of the broader surface water catchment and drainage towards the pan situated to the north-east. The areas could therefore be prone to slight soil erosion due to the loosening of materials and vegetation clearance caused by new construction activities.

The significance of this impact was low for the original assessment area and will be low for the additional proposed development area.

Mitigation measures to reduce impacts are recommended under heading 9.3.

Dust generation and emissions

No signs of significant dust pollution are currently evident within or around the original assessment area or additional proposed development area. The new construction activities associated with the development could however potentially result in significant fugitive dust emissions due to vegetation clearance and movement of machinery and equipment. Generated dust could spread into- and contaminate the surrounding undeveloped areas and pan situated to the north-east.

The significance of this impact was low for the original assessment area and will be medium for the additional proposed development area.

Mitigation measures to reduce impacts are recommended under heading 9.3.

Impeding and contamination of the water drainage area's flow regime and subsequent decrease in ecological integrity and -functionality of the pan

The pan situated to the north-east appears to be in a relatively healthy and stable ecological condition and supports important aquatic habitat which is subsequently utilised by a wide variety of waterbirds, amphibian species and aquatic invertebrates for breeding, foraging and persistence purposes.

A defined surface water drainage area feeds into the pan from the south-east. The original assessment area is located a significant distance (≥ 500 m) away from the defined surface water drainage area and therefore does not necessarily impact directly on surface water runoff towards the pan. Although this is the case, the original assessment area still forms part of the broader surface water catchment and drainage towards this pan.

The additional proposed development area is however located merely approximately 20 m away from the defined surface water drainage area, which feeds into the pan. The additional proposed development area will therefore likely impact directly on surface water runoff towards the pan.

The activities associated with the new construction phase could therefore potentially impede on the flow regime of the surface water catchment and drainage towards the pan, due to artificial obstruction of natural surface water flow during rainfall events. New construction activities could also result in contamination of natural surface water flow into the surface water catchment and

drainage towards the pan due to surface material erosion and hydrocarbon or other chemical spills by machinery and equipment.

Continued contamination of natural surface water flow towards the pan during the operational phase, once the residential settlement has been established, could also occur due to continued residential activities. This could result in gradual deterioration of the ecological integrity and - functionality of the pan over time.

The significance of this impact was low for the original assessment area and will be medium-high for the additional proposed development area.

Mitigation measures to reduce impacts are recommended under heading 9.3.

Over-utilisation of potable water by the residential development

The established residential development will require significant volumes of potable water for domestic use. In accordance with the information received from the EAP, the development will tie into the existing municipal water, sewage and electrical infrastructure. The municipality has confirmed that sufficient capacity is available.

The significance of this potential impact will be zero.

Mitigation measures to reduce impacts are recommended under heading 9.3.

Sewage contamination of soil and groundwater

In accordance with the information received from the EAP, the development will tie into the existing municipal water, sewage and electrical infrastructure. The municipality has confirmed that sufficient capacity is available.

The significance of this potential impact will be zero.

Mitigation measures to reduce impacts are recommended under heading 9.3.

Contamination of the surrounding natural areas through domestic garbage/waste dumping

Disposing of domestic garbage/waste into the surrounding undeveloped areas, by occupants of the existing township, currently takes place extensively. Such continued anthropogenic activities tend to cause an ecological 'edge effect', which negatively impacts on the urban/rural interface area and the integrity of the surrounding undeveloped areas by expanding the negative anthropogenic footprint.

The new residential development could result in significant continued disposal and dumping of domestic waste/garbage into the surrounding undeveloped areas outside the residential footprint, which could potentially have a slight to moderate negative impact on the ecological integrity and - functionality of the pan over time.

The significance of this impact was low for the original assessment area and will be medium for the additional proposed development area.

Mitigation measures to reduce impacts are recommended under heading 9.3.

9.2. Cumulative Impacts

The entire original assessment area is approximately 20.5 ha in size and is occupied by an existing informal residential settlement which has virtually completely transformed all previously existing natural surface vegetation.

The additional proposed development area is approximately 82.5 ha in size. It is undeveloped but in a moderately disturbed and degraded state which has likely been caused by significant historic and continued long-term overgrazing by livestock from the local community over time. The additional proposed development area is therefore not reminiscent of the natural climactic state of the relevant Western Free State Clay Grassland vegetation type (Gh 9).

The extensive presence of existing agricultural and residential developments within the local and broader area, have resulted in significant cumulative loss of natural vegetation as well as faunal and avifaunal habitat associated with the relevant vegetation type. Due to the small relative size of the assessment area as well as the existing disturbed and degraded state, the proposed development will not necessarily added any significant additional residual cumulative ecological impact to the transformation of the broader region and relevant vegetation type.

The pan situated to the north-east appears to be in a relatively healthy and stable ecological condition and supports important aquatic habitat which is subsequently utilised by a wide variety of waterbirds, amphibian species and aquatic invertebrates for breeding, foraging and persistence purposes.

A defined surface water drainage area feeds into the pan from the south-east. The original assessment area is located a significant distance (≥ 500 m) away from the defined surface water drainage area and therefore does not necessarily impact directly on surface water runoff towards the pan. Although this is the case, the original assessment area still forms part of the broader surface water catchment and drainage towards this pan.

The additional proposed development area is however located merely approximately 20 m away from the defined surface water drainage area, which feeds into the pan. The additional proposed development area will therefore likely impact directly on surface water runoff towards the pan.

The transformation of an Ecological Support Area two (ESA 2) associated with the assessment area as well as the impeding and contamination of the water drainage area's flow regime and subsequent decrease in ecological integrity and -functionality of the pan, were identified and addressed during the construction phase as the only significant potential long-term ecological impacts, associated with the proposed development. These impacts could however merely add a slight cumulative impact to existing negative impacts caused by the existing township and agricultural developments within the broader landscape.

It is the opinion of the specialist, by application of the NEMA Mitigation Hierarchy, that these potential cumulative ecological impacts associated with the proposed development, can be suitably reduced and mitigated to within acceptable residual levels by implementation of the recommended mitigation measures.

It is therefore not anticipated that the proposed development will necessarily add any significant residual cumulative ecological impacts to the surrounding environment if all recommended mitigations measures as per this ecological report are adequately implemented and managed for both the construction and operational phases of the proposed development. All necessary authorisations, permits and licenses must also be obtained prior to the commencement of any construction.

9.3. Risk Ratings of Potential Impacts

The following section provides the Environmental Risk as well as the Environmental Significance Ratings for the ecological impacts caused by the development both before and after implementation of the recommended mitigation measures.

Table 6: Environmental Risk and Significance Ratings

	Original Assessment Area	Additional Proposed Development Area
Identified Environmental Impact	Transformation of terrestrial vegetation on the assessment area associated with the Western Free State Clay Grassland vegetation type (Gh 9)	
Magnitude of Negative or Positive Impact	Very low (2)	Low (4)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Local (2)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Low (2)	Low (2)
Reversibility of Impact	Irreversible (5)	Low (4)
Probability of Impact Occurrence	High (4)	High (4)
Cumulative Impact Rating prior to mitigation	Medium	Medium
Environmental Significance Score and Rating prior to mitigation	Medium (60)	Medium (64)

Mitigation Measures to be implemented

The virtually complete loss and transformation of natural habitat, biota and basic ecosystem functionality within the original assessment area is deemed irreversible. Sufficient ecological restoration of the relevant vegetation type and its functionality within the original assessment area, will therefore not be practicably feasible.

The existing transformed original assessment area is the only portion which may be applied for and authorised for the proposed development as part of the current NEMA Section 24G process. The additional proposed development area which is still undeveloped, cannot be included into the current NEMA Section 24G process for residential expansion, as the development of such areas will require a separate EIA process.

In order to preserve the remaining ecological integrity and -functionality of the water pan to the north-east, it is recommended that a minimum 250 m buffer zone be implemented around the entire pan and its defined surface water drainage area. No further future development may take place within the buffered zone.

The new development construction footprint must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.

No site construction camps to be established within the surrounding undeveloped areas to the north, east and south outside the development footprint area. If site camps are required outside the development area, they must be set up in the adjacently located existing informal residential settlement to the west so as not to impact on the surrounding natural vegetation.

	<p>Adequately cordon off the construction area and ensure that no construction activities, machinery or equipment operate or impact within the undeveloped surrounding areas outside the cordoned off area.</p> <p>Adequate operational procedures for machinery and equipment must be developed in order to strictly govern movement of machinery only within project footprint area and ensure environmentally responsible construction practices and activities.</p> <p>Existing roads and farm tracks in close proximity to the development area must be used during construction. No new roads or tracks to be constructed or implemented outside the footprint areas of the development.</p> <p>Areas surrounding the construction footprint must be adequately rehabilitated as soon as practically possible after construction.</p> <p>It is recommended that sufficient grazing management plans and practices must be implemented for livestock of the local community in order to prevent continued significant overgrazing of surrounding undeveloped areas and attempt to improve/restore the ecological condition over time.</p>	
<p>Cumulative Impact Rating after mitigation implementation</p>	<p>Low</p>	<p>Low</p>
<p>Environmental Significance Score and Rating after mitigation implementation</p>	<p>Low (42)</p>	<p>Low (45)</p>

	Original Assessment Area	Additional Proposed Development Area
Identified Environmental Impact	Transformation of an Ecological Support Area two (ESA 2) associated with the assessment area	
Magnitude of Negative or Positive Impact	Very low (2)	Low (4)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Regional (3)	Regional (3)
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	Moderate (3)
Reversibility of Impact	Low (4)	Low (4)
Probability of Impact Occurrence	Medium (3)	High (4)
Cumulative Impact Rating prior to mitigation	Low	Medium
Environmental Significance Score and Rating prior to mitigation	Low (48)	Medium (72)
Mitigation Measures to be implemented	The virtually complete loss and transformation of natural habitat, biota and basic ecosystem functionality within the assessment area is deemed irreversible. Sufficient ecological restoration of the relevant vegetation type and its functionality within the assessment area, will therefore not be practicably feasible.	

The existing transformed original assessment area is the only portion which may be applied for and authorised for the proposed development as part of the current NEMA Section 24G process. The additional proposed development area which is still undeveloped, cannot be included into the current NEMA Section 24G process for residential expansion, as the development of such areas will require a separate EIA process.

In order to preserve the remaining ecological integrity and -functionality of the water pan to the north-east, it is recommended that a minimum 250 m buffer zone be implemented around the entire pan and its defined surface water drainage area. No further future development may take place within the buffered zone.

It is also recommended that development and layout designs for the new residential development should include adequate storm water management measures to ensure that sufficient volumes and quality of surface water runoff from the footprint area is still channelled back into the water drainage area towards the pan.

The new development construction footprint must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the surrounding areas may take place.

No site construction camps to be established within the surrounding undeveloped areas to the north, east and south outside the development footprint area. If site camps are required outside the development area, they must be set up in the adjacently located existing informal residential settlement to the west so as not to impact on the surrounding natural vegetation.

	<p>Adequately cordon off the construction area and ensure that no construction activities, machinery or equipment operate or impact within the undeveloped surrounding areas outside the cordoned off area.</p> <p>Adequate operational procedures for machinery and equipment must be developed in order to strictly govern movement of machinery only within project footprint area and ensure environmentally responsible construction practices and activities.</p> <p>Existing roads and farm tracks in close proximity to the development area must be used during construction. No new roads or tracks to be constructed or implemented outside the footprint areas of the development.</p> <p>Areas surrounding the construction footprint must be adequately rehabilitated as soon as practically possible after construction.</p> <p>It is recommended that sufficient grazing management plans and practices must be implemented for livestock of the local community in order to prevent continued significant overgrazing of surrounding undeveloped areas and attempt to improve/restore the ecological condition over time.</p>	
Cumulative Impact Rating after mitigation implementation	<p>Low</p>	<p>Low</p>
Environmental Significance Score and Rating after mitigation implementation	<p>Low (28)</p>	<p>Low (28)</p>

	Original Assessment Area	Additional Proposed Development Area
Identified Environmental Impact	Destruction of-/damage to Red Data Listed, nationally or provincially protected species individuals/habitats associated with the assessment area	
Magnitude of Negative or Positive Impact	Very low (2)	Low (4)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Local (2)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	Moderate (3)
Reversibility of Impact	Irreversible (5)	Low (4)
Probability of Impact Occurrence	Medium (3)	Medium (3)
Cumulative Impact Rating prior to mitigation	Low	Low
Environmental Significance Score and Rating prior to mitigation	Low (48)	Medium (51)
Mitigation Measures to be implemented	It is recommended that an additional ecological walkthrough be conducted prior to commencement of the project during the flowering period of underground bulbous plant species, if deemed necessary by the	

	<p>competent authority. This will ensure that no provincially protected or significant species have potentially been omitted.</p> <p>The existing transformed original assessment area is the only portion which may be applied for and authorised for the proposed development as part of the current NEMA Section 24G process. The additional proposed development area which is still undeveloped, cannot be included into the current NEMA Section 24G process for residential expansion, as the development of such areas will require a separate EIA process.</p> <p>In order to preserve the remaining ecological integrity and -functionality of the water pan to the north-east, it is recommended that a minimum 250 m buffer zone be implemented around the entire pan and its defined surface water drainage area. No further future development may take place within the buffered zone.</p> <p>It is also recommended that development and layout designs for the new residential development should include adequate storm water management measures to ensure that sufficient volumes and quality of surface water runoff from the footprint area is still channelled back into the water drainage area towards the pan.</p> <p>It is recommended that sufficient grazing management plans and practices must be implemented for livestock of the local community in order to prevent continued significant overgrazing of surrounding undeveloped areas and attempt to improve/restore the ecological condition over time.</p>	
	<p>Cumulative Impact Rating after mitigation implementation</p>	<p>Low</p>

Environmental Significance Score and Rating after mitigation implementation	Low (15)	Low (28)
	Original Assessment Area	Additional Proposed Development Area
Identified Environmental Impact	Terrestrial alien invasive species establishment	
Magnitude of Negative or Positive Impact	Low (4)	Medium (6)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Local (2)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Low (2)	Low (2)
Reversibility of Impact	High (2)	High (2)
Probability of Impact Occurrence	Medium (3)	Medium (3)
Cumulative Impact Rating prior to mitigation	Low	Low

Environmental Significance Score and Rating prior to mitigation	Low (42)	Low (48)
Mitigation Measures to be implemented	<p>All Category 1b and 2 alien invasive species individuals currently within the project area, must be actively eradicated and adequately disposed of in accordance with the National Environmental Management: Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014.</p> <p>If any Category 2 species are however to be left in situ, alien invasive species permits must be obtained from the competent authority in accordance with the above-mentioned regulations.</p> <p>Category 3 species may remain in prescribed areas and provinces but further planting, propagation and/or trade is prohibited.</p> <p>Implement an adequate Alien Invasive Species Establishment Management and Prevention Plan during the construction and operational phases. Such a management plan must be compiled by a suitably qualified and experienced ecologist.</p> <p>Areas surrounding the construction footprint must be adequately rehabilitated as soon as practically possible after construction in order to prevent significant alien invasive species establishment.</p>	
Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (22)	Low (26)

	Original Assessment Area	Additional Proposed Development Area
Identified Environmental Impact	Surface material erosion	
Magnitude of Negative or Positive Impact	Very low (2)	Low (4)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Local (2)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Low (2)	Low (2)
Reversibility of Impact	High (2)	High (2)
Probability of Impact Occurrence	Medium (3)	Medium (3)
Cumulative Impact Rating prior to mitigation	Low	Low
Environmental Significance Score and Rating prior to mitigation	Low (36)	Low (42)
Mitigation Measures to be implemented	Adequate stormwater and erosion management measures must be implemented for the entire assessment area during the new construction and operational phases. This must be done in order to sufficiently manage storm water runoff and clean/dirty water separation in order to prevent any significant erosion from occurring.	

	<p>It is also recommended that development and layout designs for the new residential development should include adequate storm water management measures to ensure that sufficient volumes and quality of surface water runoff from the footprint area is still channelled back into the water drainage area towards the pan.</p> <p>Areas surrounding the construction footprint must be adequately rehabilitated as soon as practically possible after construction in order to prevent significant erosion from occurring.</p>	
Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (11)	Low (22)
	Original Assessment Area	Additional Proposed Development Area
Identified Environmental Impact	Dust generation and emissions	
Magnitude of Negative or Positive Impact	Low (4)	Medium (6)
Duration of Negative or Positive Impact	Short term (2)	Short term (2)

Extent of Positive or Negative Impact	Local (2)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	Moderate (3)
Reversibility of Impact	Moderate (3)	Moderate (3)
Probability of Impact Occurrence	Medium (3)	High (4)
Cumulative Impact Rating prior to mitigation	Low	Medium
Environmental Significance Score and Rating prior to mitigation	Low (42)	Medium (64)
Mitigation Measures to be implemented	<p>Implement suitable dust management and prevention measures during the construction phase.</p> <p>Construction areas and –roads to be sufficiently wetted down during the new construction phase in order to prevent significant fugitive dust emissions.</p> <p>Adequate operational procedures for machinery and equipment must be developed in order to strictly govern and restrict movement of machinery in order to avoid unnecessary fugitive dust emissions and ensure environmentally responsible construction practices and activities.</p>	

	Areas surrounding the construction footprint must be adequately rehabilitated as soon as practically possible after construction in order to prevent significant dust emissions from occurring.	
Cumulative Impact Rating after mitigation implementation	Low	-
Environmental Significance Score and Rating after mitigation implementation	Low (11)	-
	Original Assessment Area	Additional Proposed Development Area
Identified Environmental Impact	Impeding and contamination of the water drainage area's flow regime and subsequent decrease in ecological integrity and -functionality of the pan	
Magnitude of Negative or Positive Impact	Very Low (2)	Medium (6)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Regional (3)	Regional (3)
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	Moderate (3)

Reversibility of Impact	Low (4)	Low (4)
Probability of Impact Occurrence	Medium (3)	High (4)
Cumulative Impact Rating prior to mitigation	Low	Medium
Environmental Significance Score and Rating prior to mitigation	Low (48)	Medium-High (80)
Mitigation Measures to be implemented	<p>The existing transformed original assessment area is the only portion which may be applied for and authorised for the proposed development as part of the current NEMA Section 24G process. The additional proposed development area which is still undeveloped, cannot be included into the current NEMA Section 24G process for residential expansion, as the development of such areas will require a separate EIA process.</p> <p>In order to preserve the remaining ecological integrity and -functionality of the water pan to the north-east, it is recommended that a minimum 250 m buffer zone be implemented around the entire pan and its defined surface water drainage area. No further future development may take place within the buffered zone.</p> <p>It is also recommended that development and layout designs for the new residential development should include adequate storm water management measures to ensure that sufficient volumes and quality of surface water runoff from the footprint area is still channelled back into the water drainage area towards the pan.</p> <p>Adequate stormwater and erosion management measures must be implemented for the entire assessment area during the new construction and operational phases. This must be done in order to sufficiently manage storm water runoff and clean/dirty water separation in order to prevent any significant contamination from occurring.</p>	

The storm water management measures incorporated into the development and layout designs should be inspected on a biannual basis (twice a year). They must be adequately maintained to ensure that sufficient volumes and quality of surface water runoff from the footprint area is still channelled back into the water drainage area towards the pan in order to maintain its ecological functionality and integrity over time.

If hydrocarbons or other chemicals are to be stored on site during the new construction phase, the storage areas must be situated as far away as practicably possible from the water drainage area and pan. It is recommended that hydrocarbons be stored in the south-western portion of the assessment area.

Hydrocarbon and other chemical storage areas must be adequately bunded in order to be able to contain a minimum of 150 % of the capacity of storage tanks/units.

Adequate hydrocarbon and other chemical storage, handling, usage and spillage clean-up procedures must be developed and all relevant construction personnel must be sufficiently trained on- and apply these procedures during the entire new construction phase.

A comprehensive pan health assessment and aquatic bio-monitoring assessment must be conducted prior to commencement of the construction phase. This information will serve as baseline pan health data to be used for subsequent monitoring assessments to be conducted. Such an assessment must be conducted by a suitably qualified and experienced ecologist.

A comprehensive pan health assessment and aquatic bio-monitoring assessment must then be conducted on a minimum annual basis in order to ensure that the ecological functionality and integrity of the pan is maintained over time. This information must then be compared to the baseline data collected during the initial assessment prior to the commencement of the construction phase. Such an assessment must be conducted by a suitably

	<p>qualified and experienced ecologist.</p> <p>Water samples of the pan must be collected directly downstream of the assessment area prior to commencement of the construction phase. The quality of these samples must be chemically and biologically analysed by an accredited laboratory in order to serve as baseline water quality data to be used for subsequent monitoring assessments to be conducted.</p> <p>Water samples of the pan must then be collected directly downstream of the proposed project area on a minimum annual basis. The quality of these samples must be chemically and biologically analysed by an accredited laboratory and compared to the baseline data collected during the initial assessment prior to the commencement of the construction phase.</p> <p>If any reduction in pan health or chemical and biological water quality is determined due to the project, the competent authority must immediately be notified and the necessary steps must be followed by the applicant to locate and remediate the source of contamination/health reduction as soon as practicably possible.</p>	
<p>Cumulative Impact Rating after mitigation implementation</p>	<p>Low</p>	<p>Low</p>
<p>Environmental Significance Score and Rating after mitigation implementation</p>	<p>Low (14)</p>	<p>Low (32)</p>

	Original Assessment Area	Additional Proposed Development Area
Identified Environmental Impact	Over-utilisation of potable water by the residential development	
Mitigation Measures to be implemented	<p>A Water Use License Application (WULA) must be submitted to the Department of Water and Sanitation in accordance with the National Water Act (Act 36 of 1998).</p> <p>Only the allotted water quantities as per the approved Water Use License are to be extracted.</p> <p>A flow meter is to be installed in order to enable monitoring and management water consumption.</p> <p>Water consumption figures must be submitted to the Department of Water and Sanitation (DWS) on a regular basis in order to ensure compliance with the allotted water quantities as per the approved Water Use License.</p> <p>Water saving initiatives must be implemented for the residential development.</p> <p>Environmentally responsible water use practices and activities must be adopted for the residential development.</p> <p>Provide training interventions for the local community on the correct environmentally responsible water use practices and activities within the residential settlement.</p>	

	Original Assessment Area	Additional Proposed Development Area
Identified Environmental Impact	Sewage contamination of soil and groundwater	
Mitigation Measures to be implemented	<p>An adequate sewage management system must be installed for the proposed development within the assessment area.</p> <p>Adequate leakage detection and prevention systems must be installed into the sewage management system in order to detect any potential leakages and subsequent contamination of underground water.</p> <p>If any leakages or overflows of the sewage management system occur, the competent authority must immediately be notified and the necessary steps must be followed by the applicant to locate and remediate the source of contamination and surrounding area, as soon as practicably possible.</p>	
	Original Assessment Area	Additional Proposed Development Area
Identified Environmental Impact	Contamination of the surrounding natural areas through domestic garbage/waste dumping	
Magnitude of Negative or Positive Impact	Low (4)	Medium (6)
Duration of Negative or Positive Impact	Medium term (3)	Medium term (3)

Extent of Positive or Negative Impact	Local (2)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	Moderate (3)
Reversibility of Impact	High (2)	High (2)
Probability of Impact Occurrence	High (4)	High (4)
Cumulative Impact Rating prior to mitigation	Medium	Medium
Environmental Significance Score and Rating prior to mitigation	Medium (56)	Medium (64)
Mitigation Measures to be implemented	<p>An active community waste clean-up initiative will have to be implemented in order to attempt to remove and adequately dispose of existing domestic garbage/waste scattered throughout the surrounding undeveloped areas.</p> <p>Continued domestic garbage/waste dumping within the surrounding undeveloped areas must be prevented. Implement adequate waste collection and disposal management measures and services for the new residential development in order to prevent undesired disposal/dumping into the surrounding undeveloped areas.</p> <p>Provide training interventions for the local community on the correct management of domestic waste/garbage within the existing residential settlement.</p>	

Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (11)	Low (11)

10. Summary and Conclusion

Original Assessment Area

The entire original assessment area is approximately 20.5 ha in size and is occupied by an existing informal residential settlement which has virtually completely transformed all previously existing natural surface vegetation. The area is also completely isolated to the west by the existing Monyakeng township.

No Red Data Listed-, provincially- or nationally protected species or any other species of conservational significance were found to be present within the original assessment area.

The virtually complete loss and transformation of natural habitat, biota and basic ecosystem functionality within the original assessment area is deemed irreversible. Sufficient ecological restoration of the relevant vegetation type and its functionality within the original assessment area, will therefore not be practicably feasible.

The original assessment area would probably have scored a moderate historic Ecological Importance and Sensitivity (EIS) value and would therefore have been viewed as being of low to moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA 2 as well as water catchment and drainage area towards the water pan.

It must be kept in mind that this existing transformed original assessment area is the only portion which may be applied for and authorised for the proposed development as part of the current NEMA Section 24G process. The additional proposed development area which is still undeveloped, cannot be included into the current NEMA Section 24G process for residential expansion, as the development of such areas will require a separate EIA process.

Additional proposed development area

The additional proposed development area is is approximately 82.5 ha in size. It is undeveloped but in a moderately disturbed and degraded state which has likely been caused by significant historic and continued long-term overgrazing by livestock from the local community over time. The additional proposed development area constitutes flat to slightly sloping low growing grassland with a well-represented dwarf karroid shrub layer. This grassland has been subjected to significant historic and continued long-term overgrazing by livestock from the local community over time. The

grass layer therefore mainly constitutes a low growing grass 'carpet' and a virtual complete lack of well-represented grass tufting is evident. The additional proposed development area is therefore not reminiscent of the natural climactic state of the relevant Western Free State Clay Grassland vegetation type (Gh 9).

No Red Data Listed-, provincially- or nationally protected species or any other species of conservational significance were found to be present within the additional proposed development area. It is therefore also not anticipated that the original assessment area would necessarily have housed large numbers of any species of conservational significance. It must however be noted that the time of the assessment was not necessarily favourable for successful identification of all plant species individuals. It is therefore recommended that an additional ecological walkthrough be conducted prior to commencement of the project during the flowering period of underground bulbous plant species, if deemed necessary by the competent authority. This will ensure that no provincially protected or significant species have potentially been omitted.

The additional proposed development area does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website (<https://www.birdlife.org.za/what-we-do/important-bird-and-biodiversity-areas/media-and-resources/#1553597171790-6f83422a-a731>). No conservationally significant or important bird species or locally distinct habitats were observed during the site assessment or are necessarily expected to utilise the additional proposed development area for breeding, foraging and/or persistence purposes.

Due to the presence of the existing township along with the significant continued long-term overgrazing by livestock from the local community, the additional proposed development area is subjected to continued anthropogenic activity and disturbance. It is therefore not anticipated that any large or conservationally significant faunal species would utilise the additional proposed development area for breeding and/or persistence purposes or for that matter, would necessarily have historically utilised the original assessment area. Only common local resident bird species were found to be present.

It is recommended that sufficient grazing management plans and practices must be implemented for livestock of the local community in order to prevent continued significant overgrazing of surrounding undeveloped areas and attempt to improve/restore the ecological condition over time.

The additional proposed development area scored a moderate Ecological Importance and Sensitivity (EIS) value and is therefore viewed as being of moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, ESA 2 as well as water catchment and drainage area towards the water pan.

It must however again be kept in mind that the existing transformed original assessment area is the only portion which may be applied for and authorised for the proposed development as part of the current NEMA Section 24G process. The additional proposed development area which is still undeveloped, cannot be included into the current NEMA Section 24G process for residential expansion, as the development of such areas will require a separate EIA process.

Water Pan

A significantly sized water pan is present approximately 770 m north-east of the original assessment area. The pan is however located merely approximately 120 m north-east of the additional proposed development area. The pan appears to be in a relatively healthy and stable ecological condition and supports an important aquatic habitat which is subsequently utilised by a wide variety of waterbirds, amphibian species and aquatic invertebrates for breeding, foraging and persistence purposes.

A defined surface water drainage area feeds into the pan from the south-east. The original assessment area is located a significant distance (≥ 500 m) away from the defined surface water drainage area and therefore does not necessarily impact directly on surface water runoff towards the pan. Although this is the case, the original assessment area still forms part of the broader surface water catchment and drainage towards this pan. It is therefore recommended that development and layout designs for the new residential development should include adequate storm water management measures to ensure that sufficient volumes and quality of surface water runoff from the footprint area is still channelled back towards the pan.

The additional proposed development area is however located merely approximately 20 m away from the defined surface water drainage area, which feeds into the pan. The additional proposed development area will therefore likely impact directly on surface water runoff towards the pan.

In order to preserve the remaining ecological integrity and -functionality of the pan, it is therefore recommended that a minimum 250 m buffer zone be implemented around the entire pan and its defined surface water drainage area. No further future development may take place within the buffered zone.

Conclusion

The transformation of an Ecological Support Area two (ESA 2) associated with the assessment area as well as the impeding and contamination of the water drainage area's flow regime and subsequent decrease in ecological integrity and -functionality of the pan, were identified and addressed during the construction phase as the only significant potential long-term ecological impacts, associated with the proposed development. These impacts could however merely add a slight cumulative impact to existing negative impacts caused by the existing township and agricultural developments within the broader landscape.

It is the opinion of the specialist, by application of the NEMA Mitigation Hierarchy, that all the potential ecological impacts associated with the proposed development, can be suitably reduced and mitigated to within acceptable residual levels by implementation of the recommended mitigation measures.

The proposed development of the assessment area should therefore be considered by the competent authority for Environmental Authorisation and approval. **It is however recommended that only the original assessment area be considered for the proposed development.** All recommended mitigation measures as per this ecological report must however be adequately implemented and managed for both the construction and operational phases of the proposed development. All necessary authorisations, permits and licenses must also be obtained prior to the commencement of any construction.

11. References

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12. Details of the Specialist

Adriaan Johannes Hendrikus Lamprecht (Pr.Sci.Nat)

M.Env.Sci. Ecological remediation and sustainable utilisation (NWU: Potchefstroom)

South African Council for Natural Scientific Professions (SACNASP): Professional Ecological Scientist
(No 115601)

EcoFocus Consulting (Pty) Ltd

Physical Address: Edenglen number 7
 Waterberg Street
 Langenhovenpark
 Bloemfontein, 9330

Mobile Phone: 072 230 9598

Email Address: ajhlamprecht@gmail.com

Abbreviated Curriculum Vitae

Qualifications

- M.Env.Sci Ecological Remediation and Sustainable Utilisation/Vegetation Ecology
 - 2010 - North West University Potchefstroom
- B.Sc Botany and Zoology (Cum Laude)
 - 2008 - North West University Potchefstroom

Accredited courses completed

- Implementing Environmental Management Systems ISO 14001
 - 2011 - North West University Potchefstroom
- Environmental Law for Environmental Managers
 - 2011 - North West University Potchefstroom
- SASS 5 Aquatic Biomonitoring Training Course
 - 2017 – GroundTruth Consulting

Professional registrations

- South African Council for Natural Scientific Professions (**SACNASP**)
 - Professional Ecological Scientist Registration number 115601

Leave a future behind

EcoFocus Consulting (Pty) Ltd

Registration : 2017/223847/07

7 Edenglen, Waterberg Street, Langenhovenpark, Bloemfontein, 9330

T 072 230 9598

E ajhlamprecht@gmail.com

- International Association for Impact Assessment (**IAIA**)
 - Registration number 5232
- South African Green Industries Council (**SAGIC**) Invasive Species training
 - Registration number 2405/2459

Employment and Experience Background

Upon completion of his studies, Rikus started his career in 2011 as an **Environmental Professional in Training (PIT) at Anglo American Thermal Coal: Environmental Services**. He received environmental training and practical implementation experience in all environmental facets of the mining industry with the focus on: Environmental rehabilitation, land management (biodiversity and invasive species eradication), waste & water-, air quality-, game reserve-, environmental management and legislation, as well as corporate reporting. He was also appointed as the Biodiversity management custodian at Anglo American Thermal Coal collieries.

He was subsequently employed by **Fraser Alexander Tailings from October 2011 to the end of November 2015 as an Environmental Contracts Manager**, where he was responsible for the technical and operational management of all Fraser Alexander Tailings' mining environmental rehabilitation work. He was responsible for all facets of project management, as well as implementation of rehabilitation and environmental strategies, by planning activities, organising physical, financial and human resources, delegating task responsibilities, leading people, controlling risks and providing technical support.

He conducted a significant amount of quantitative and qualitative ecological vegetation monitoring during his employment period with the company. Such monitoring mainly included environmentally rehabilitated mining areas in the open-cast coal-, gold-, platinum- and chrome mining industries situated in the Free State, Gauteng, Mpumalanga, North-West and Limpopo Provinces. He was involved with analysis, processing and interpretation of environmental monitoring data and compilation of high quality technical/scientific environmental monitoring reports for clients. He was subsequently further involved with providing adequate ecological management and maintenance recommendations for rehabilitated areas. He also provided technical/scientific environmental rehabilitation support to mining clients, with regards to sufficient soil preparation and amelioration, grassing processes, as well as grass species mixtures and ratios.

He was then employed by **Enviroworks Consulting from January 2016 to the end of May 2017 as a Senior Ecological Specialist** where he was responsible for virtually all Ecological, Aquatic and Wetland specialist assessments and reporting related to Environmental Impact Assessment (EIA) and Basic Assessment (BA) projects. He also completed numerous EIA and BA projects as the main project Environmental Assessment Practitioner (EAP).

Rikus then subsequently established the company EcoFocus Consulting (Pty) Ltd, which provides high quality professional environmental and ecological specialist services and solutions to the industrial development-, construction-, mining-, agricultural and other sectors, at the end of May 2017.

He possesses significant qualifications, vast knowledge, skills and practical experience in the specialist field of ecological and environmental management. This, coupled with his disciplined, determined and goal-driven mind-set, as well as his high level of personal standards, ensure high quality, timely and outcomes based outputs and service delivery relating to any project.

Ecological Specialist Report Completion

2019

- Completion of a Water Use License Application (WULA) Risk Assessment for a proposed Kopanong Local Municipality Bridge Upgrading development project in Philippolis, Free State Province.
- Completion of a specialist ecological assessment and report for a proposed 4.9 ha Royal Vision Developments Gravel Quarry development project outside Kroonstad, Free State Province.
- Completion of a specialist ecological assessment and report for a proposed 1262.7 ha Paul de Villiers NEMA Section 24G agricultural development project outside Douglas, Northern Cape Province.
- Completion of a specialist ecological assessment and report for a proposed 53 ha Arborlane Estates (Pty) Ltd agricultural development project outside Augrabies, Northern Cape Province.
- Completion of a specialist ecological assessment and report for a proposed 42.7 ha Arborlane Estates (Pty) Ltd NEMA Section 24G agricultural development project outside Augrabies, Northern Cape Province.
- Completion of a Water Use License Application (WULA) Risk Assessment for a proposed 53 ha Arborlane Estates (Pty) Ltd agricultural development project outside Augrabies, Northern Cape Province.

- Completion of a specialist ecological assessment and report for a proposed 20.2 km Water Pipeline Development from Lindley to Arlington, Free State Province.
- Completion of a specialist watercourse delineation and report for a proposed 5.36 ha Filling Station and Shopping Centre Development project in Thaba Nchu, Free State Province.
- Completion of a Water Use License Application (WULA) Risk Assessment for a proposed 20.2 km Water Pipeline Development from Lindley to Arlington, Free State Province.
- Completion of a specialist Grazing and Invasive Species Management Plan for the Farm Driefontein no 274, outside Ficksburg, Free State Province.
- Completion of a Water Use License Application (WULA) Risk Assessment for a proposed 1262.7 ha Paul de Villiers NEMA Section 24G agricultural development project outside Douglas, Northern Cape Province.
- Completion of a Rehabilitation and Alien Invasive Species Management Plan for a proposed 1262.7 ha Paul de Villiers NEMA Section 24G agricultural development project outside Douglas, Northern Cape Province.
- Completion of a Protected Species Relocation Management Plan for a proposed 1262.7 ha Paul de Villiers NEMA Section 24G agricultural development project outside Douglas, Northern Cape Province.
- Completion of a GIS Master Layout Plan for a proposed 1262.7 ha Paul de Villiers NEMA Section 24G agricultural development project outside Douglas, Northern Cape Province.
- Completion of a specialist ecological assessment and report for a proposed 535 ha Farms Bultfontein & Folmink agricultural development project outside Prieska, Northern Cape Province.
- Completion of a specialist ecological assessment and report for the proposed 6.42 ha Phokwane Local Municipality Residential development project in Jan Kempdorp, Northern Cape Province.
- Completion of a Stormwater Management Plan for a proposed 2 ha Chimoio Game Camp Lodging development project outside Kroonstad, Free State Province.
- Completion of a GIS Master Layout Plan for a proposed 2 ha Chimoio Game Camp Lodging development project outside Kroonstad, Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 13.8 ha Phokwane Local Municipality Cemetery expansion project in Jan Kempdorp, Northern Cape Province.
- Completion of a specialist ecological assessment and report for a proposed 19.9 ha Vergenoeg NEMA Section 24G residential development project in Wesselsbron, Free State Province.

2018

- Completion of a specialist ecological assessment and report for the proposed 30 ha Portion 30 of the Farm Lilyvale no 2313 Residential development project in Bloemfontein, Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 20 ha Luckhoff Waste Facility development project in Luckhoff, Free State Province.
- Completion of a specialist ecological assessment and report for a proposed 19 ha agricultural development project outside Griekwastad, Northern Cape Province.
- Completion of a specialist ecological assessment and report for a proposed 135 ha agricultural development project outside Griekwastad, Northern Cape Province.
- Completion of five specialist ecological assessments and reports for the proposed Dawid Kruiper Local Municipality Residential Developments around Upington, Northern Cape Province.
- Completion of a specialist Grazing and Erosion Management Plan for the Retiefs Nek no 123, outside Bethlehem, Free State Province.
- Completion of a specialist Grazing and Erosion Management Plan for the Dekselfontein no 317, outside Bethlehem, Free State Province.
- Completion of a specialist ecological assessment and report for a proposed 12 ha agricultural development project in Petrusville, Northern Cape Province.
- Completion of a specialist ecological and wetland assessment and report for a proposed 270 ha industrial park development project in Secunda, Mpumalanga Province.
- Completion of a specialist ecological and wetland assessment and report for a proposed 233 ha industrial park development project in Sabie, Mpumalanga Province.
- Completion of a specialist ecological assessment and report for the proposed Dawid Kruiper Local Municipality Residential Development around Upington, Northern Cape Province.
- Completion of two specialist ecological assessments and reports for two proposed 15 ha agricultural development projects outside Hopetown, Northern Cape Province.
- Completion of two Alien Invasive Species Management Plans for two proposed 15 ha agricultural development projects outside Hopetown, Northern Cape Province.
- Completion of a Protected Species Relocation Management Plan for a proposed 15 ha agricultural development project outside Hopetown, Northern Cape Province.
- Completion of a specialist ecological and wetland assessment and report for a proposed 169 ha industrial park development project in Sabie, Mpumalanga Province.

- Completion of a specialist Grazing and Erosion Management Plan for the Farm Barnea no 231, outside Bethlehem, Free State Province.
- Compilation of a GIS locality, vegetation and sensitivity map for the proposed 7.13 ha Karoo Hoogland Local Municipality Residential Development project in Sutherland, Northern Cape Province.
- Completion of a specialist Erosion and Rehabilitation Monitoring Report for the Farms Die Kranse no 1174 and De Rotsen no 52 outside Vrede, Free State Province.
- Drafting of an official Environmental Policy for Teambo Facilitators (Pty) Ltd in Bloemfontein, Free State Province.
- Completion of a specialist ecological assessment and report for a proposed 11.6 ha COGHSTA NEMA Section 24G residential development project in Douglas, Northern Cape Province.
- Completion of a specialist ecological assessment and report for a proposed 3.26 ha COGHSTA NEMA Section 24G residential development project in Strydenburg, Northern Cape Province.
- Completion of a specialist ecological assessment and report for a proposed 25.6 ha COGHSTA NEMA Section 24G residential development project in Loxton, Northern Cape Province.
- Completion of a specialist biodiversity offset feasibility assessment and report for a proposed 805 ha agricultural development project outside Douglas, Northern Cape Province.
- Completion of a specialist ecological assessment and report for a proposed 2 ha Rouxville Waste Water Treatment Works expansion project in Rouxville, Free State Province.
- Completion of a specialist ecological exemption letter for the proposed Vanderkloof Tegnologie Chicken Abattoir development project in Petrusville, Northern Cape Province.
- Completion of a Protected Species Relocation Management Plan for a proposed 2 ha Rouxville Waste Water Treatment Works expansion project in Rouxville, Free State Province.
- Completion of a Rehabilitation and Alien Invasive Species Management Plan for a proposed 2 ha Rouxville Waste Water Treatment Works expansion project in Rouxville, Free State Province.
- Completion of a Stormwater and Erosion Management Plan for a proposed 2 ha Rouxville Waste Water Treatment Works expansion project in Rouxville, Free State Province.
- Completion of a Water Use License Application (WULA) Risk Assessment for a proposed 2 ha Rouxville Waste Water Treatment Works expansion project in Rouxville, Free State Province.
- Completion of a revised specialist ecological assessment and report for the proposed 17.7 ha Luckhoff Waste Facility development project in Luckhoff, Free State Province.
- Completion of a specialist ecological assessment and report for a proposed 113.3 ha Dawn Valley Estate development project in Bloemfontein, Free State Province.

- Completion of a specialist Grazing and Invasive Species Management Plan for the Farm Klipfontein no 71, outside Lindley, Free State Province.
- Completion of a specialist Grazing and Invasive Species Management Plan for the Farm Meyerskop no 1801, outside Bethlehem, Free State Province.
- Completion of a specialist ecological assessment and report for a proposed 2.24 ha Mullerstuine Cemetery development project in Vanderbijlpark, Gauteng Province.
- Completion of a specialist Species of Special Concern & Alien Invasive Species assessment and report for all the Transnet Engineering Group 5 Free State Province Sites.
- Completion of a specialist Species of Special Concern & Alien Invasive Species assessment and report for all the Transnet Engineering Group 6 Northern Cape Province Sites.
- Completion of a specialist ecological assessment and report for a proposed 80 ha agricultural development project outside Ritchie, Northern Cape Province.
- Completion of a specialist ecological and wetland assessment and report for a proposed 545 ha residential development project in Leandra, Mpumalanga Province.
- Completion of a specialist ecological assessment and report for a proposed 2 ha Chimoio Game Camp Lodging development project outside Kroonstad, Free State Province.
- Completion of a Water Use License Application (WULA) Risk Assessment for a proposed 2 ha Chimoio Game Camp Lodging development project outside Kroonstad, Free State Province.
- Completion of a Protected Species Relocation Management Plan for a proposed 80 ha agricultural development project outside Ritchie, Northern Cape Province.
- Completion of a Rehabilitation and Alien Invasive Species Management Plan for a proposed 80 ha agricultural development project outside Ritchie, Northern Cape Province.
- Completion of a Water Use License Application (WULA) Risk Assessment for a proposed 80 ha agricultural development project outside Ritchie, Northern Cape Province.
- Completion of a specialist Grazing Management Plan for the Farm Fairdale no 1048, outside Vrede, Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 14.4 ha Frankfort Landfill Site expansion project in Frankfort, Free State Province.

2017

- Completion of a specialist ecological assessment and report for the proposed Phethogo Consulting filling station development project in Bloemfontein, Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 132 kV CENTLEC Harvard transmission line development project in Bloemfontein, Free State Province.

- Completion of a specialist ecological assessment and report for the proposed Zevenfontein filling station development project in Johannesburg, Gauteng Province.
- Completion of a specialist ecological assessment and report for the proposed Olifantsvlei Curro School development project in Johannesburg, Gauteng Province.
- Completion of a specialist ecological assessment and report for the proposed 23 ha Babereki Agricultural development project in Hartswater, Northern Cape Province.
- Completion of a specialist ecological assessment and report for the proposed Eikenhof Curro School development project in Johannesburg, Gauteng Province.
- Completion of a specialist ecological assessment and report for the proposed 40 ha CoGHSTA residential development project in Norvalspont, Northern Cape Province.
- Completion of a specialist ecological assessment and report for the proposed 9 ha CoGHSTA residential development project in Williston, Northern Cape Province.
- Completion of a specialist ecological and wetland assessment and report for the proposed 100 ha Musgrave residential and commercial development in Bloemfontein, Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 15 ha BVI Engineering Waste Water Treatment Works and associated pipeline development project in Britstown, Northern Cape Province.
- Completion of a specialist ecological walkthrough assessment and report and relocation of provincially protected species *Eucomis autumnalis* individuals for the Bloemwater 33.6 km Brandkop Bypass water supply pipeline in Bloemfontein, Free State Province.
- Completion and execution of a Species Relocation and Re-establishment Plan for 13 individuals of the provincially protected species, *Eucomis autumnalis*, for the Bloemwater 33.6 km Brandkop Bypass water supply pipeline in Bloemfontein, Free State Province.
- Completion of a specialist ecological exemption letter for the proposed Siloam Crematorium development in Welkom, Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 0.5 ha Vuna Afrika Agricultural feedmill pelletizing plant development project outside Wepener, Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 0.4 ha Olympic Flame filling station development project in Welkom, Free State Province.
- Completion of a specialist ecological assessment and report for a proposed 3000 ha agricultural development project outside Douglas, Northern Cape Province.
- Completion of a specialist ecological assessment and report for the proposed 46.04 ha University, Industrial and Residential development project in Orania, Northern Cape Province.

- Completion of a specialist ecological assessment and report for a proposed 482 ha Piet Louw NEMA Section 24G agricultural development project outside Hopetown, Northern Cape Province.
- Completion of a specialist ecological assessment for a proposed 500 ha Wolfkop Valley Estate development project outside Bloemfontein, Free State Cape Province.
- Completion of a specialist Erosion and Rehabilitation Management Plan for the Farms Die Kranse no 1174 and De Rotsen no 52 outside Vrede, Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 4.1 ha Plot 31 Spitskop Residential development project in Bloemfontein, Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 26.8 ha Oxidation Dam development project in Orania, Northern Cape Province.

2016

- Completion of a specialist ecological assessment and report for the proposed 3 km Olifantshoek Bulk Water Supply and reservoir development project in Olifantshoek, Northern Cape Province.
- Completion of two specialist ecological and wetland assessments and reports for the proposed respective 16 ha and 6 ha N8 highway gravel quarries development project near Ladybrand, Free State Province.
- Completion of a specialist ecological assessment and report for the proposed 100 ha De Eelt vineyard development project near Prieska, Northern Cape Province.
- Completion of two specialist ecological and wetland assessments and reports for the Lafarge cement production facility and quarry, respectively near Lichtenburg, North-West Province.
- Completion of a specialist ecological assessment and report for the proposed 12 ha Nooitgedacht Retirement Estate development project near Nelspruit, Mpumalanga Province.
- Completion of a specialist ecological assessment and report for the proposed 42 km Ventersburg Bulk Water Supply and reservoir development project between Ventersburg and Riebeeckstad, Free State Province.