
APPENDIX F: SPECIALIST STUDIES

- Biodiversity Study
- HIA
- Paleontological Exemption Letter
- Aquatic Biodiversity Compliance Statement
- Plant, Animal and Avifauna Compliance Statement
- Landscape/Visual SSVR
- Socio-Economic SSVR
- Financial Provision



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**TERRESTRIAL BIODIVERSITY ASSESSMENT AS PART OF
THE ENVIRONMENTAL AUTHORISATION PROCESS FOR
THE PROPOSED EXPANSION OF A PARKING AREA AT
THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE,
NORTH WEST PROVINCE**

Prepared for

SLR Consulting (Africa) (Pty) Ltd

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SAS Environmental Group of Companies

EXECUTIVE SUMMARY

Scientific Terrestrial Services CC (STS) was appointed to conduct a terrestrial biodiversity assessment as part of the Environmental Authorisation (EA) process for the proposed expansion of the parking area at the Shaft 16 Complex, Impala Platinum Mine, near Rustenburg in the North West Province. The site where the proposed parking and drop-off is located (adjacent to the Impala Platinum 16 Shaft) will hereafter be referred to as the “study area”.

The data presented in this report are based on one site visit, undertaken on the 26th of May 2021 (autumn season). A more comprehensive assessment would require that assessments take place in all seasons of the year. However, on-site data were augmented with all available desktop data. Together with project experience in the area, the findings of this assessment are considered an accurate reflection of the ecological characteristics of the study area.

Following the field assessment, two habitat units could be distinguished for the study area. The habitat units were determined based on species composition, vegetation structure, ecological function, biophysical environment, and habitat condition.

- 1) Transformed Areas: A small section of the study area includes current built-up or transformed habitat associated with the main road leading to the Shaft 16 Complex as well as heavily modified land where little to no indigenous vegetation remains; and
- 2) Secondary Marikana Thornveld Habitat Unit: This habitat unit includes areas that are currently vegetated and that comprises indigenous vegetation; however, due to significant historic transformation of this area (long-term cultivation since at least 1955), with no rehabilitation efforts, the vegetation is homogenous and species diversity poor from both a faunal and floral perspective.

Although the study area is located within the vulnerable Marikana Thornveld, the study area is no longer representative of this vegetation type given the long-term, historic association with cultivation that the study area has experienced. The initial cause of degradation (i.e., historic cultivation) has been removed from the study area since 2004, yet the habitat has been unable to recover to a representative state, i.e., it is no longer transformed but a significant loss of function, structure, and species composition has occurred. The historic cause of degradation is now replaced by more subtle impacts, such as edge effects from alien and invasive plants (AIPs), fragmentation of the habitat, and removal of natural grazers and fire regimes. For this purpose, the habitat is considered severely degraded.

Floral species of conservation concern (SCC), i.e., Red Data Listed (RDL) species, National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) Threatened or Protected Species (TOPS), and provincially protected species, were not noted within the floral or faunal component. The RDL species with known distributions intersecting that of the study area is not anticipated to be overlooked due to season of assessment (autumn); instead, the lack of suitable habitat and conditions are the main cause for the exclusion of such species from the site. Provincially protected species protected under the TNCO, i.e., Specially Protected Species (Schedule 12) (Section 86 (1) (b) of the TNCO) and Protected Species (Schedule 11) (Section 86 (1) (a) of the TNCO), were not present on site during the time of assessment. With the exception of common and wide-ranged species from the *Gladiolus* and *Crinum* genera, it is highly unlikely that such species will be present within such a homogenous landscape where a strong anthropogenic presence was evident. Despite the lack of provincially protected species from the study area, it is recommended that a site walkdown be undertaken after the area has received adequate rain and prior to the clearing of vegetation to determine the presence of provincially protected species that may require permit applications (these are not RDL species). Due to the survey taking place within autumn as opposed to summer, some provincially protected bulbous species could have been missed as they go dormant within the winter months.



Permits from the Department of Rural, Environment and Agricultural Development (DREAD) would need to be obtained to remove, cut, or destroy the above-mentioned protected species before any vegetation clearing may take place.

No faunal SCC were observed within the study area. The largely anthropogenic landscape, lack of suitable habitat and the level of transformation within and surrounding the study area have resulted in the exclusion of faunal SCC from the study area. Although it is unlikely that any faunal SCC will permanently reside within the study area, it is possible that such species are present within the surrounding natural habitat – albeit only temporarily for foraging purposes.

The findings of the biodiversity assessment concluded that the study area is of low (Transformed Areas) to moderately low (Secondary Marikana Thornveld) ecological importance and sensitivity.

The direct impact of the proposed parking expansion on the floral and faunal ecology of the study area is not anticipated to be detrimental. With mitigation measures fully implemented, the impact significance on faunal habitat and diversity can be lowered to **low and insignificant** levels. For floral habitat and diversity, impact significance post implementation of mitigation measures, can be reduced to **very low** levels, apart from the construction phase where impacts are anticipated to be of **low** significance due to the direct loss of floral species.

For floral and faunal SCC, where mitigation measures are fully implemented, the impact significance can be lowered to an **insignificant** impact significance for fauna and a **very low** impact significance for flora.

It is the opinion of the ecologists that this study provides the relevant information required to implement Integrated Environmental Management (IEM) and to ensure that the best long-term use of the ecological resources in the study area will be made in support of the principle of sustainable development.



DOCUMENT GUIDE

The table below provides a guide to the reporting of biodiversity impacts as they relate to 1) Government Notice No. 320 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on **Terrestrial Biodiversity** as published in Government Gazette 43110 dated 20 March 2020, and 2) Government Notice No. 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on **Terrestrial Plant and Animal Species** as published in Government Gazette 43855 dated 30 October 2020.

Theme-Specific Requirements as per Government Notice No. 320		
Terrestrial Biodiversity Theme – Very High Sensitivity Rating as per Screening Tool Output		
No.	SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS	Section in report/Notes
2	Terrestrial Biodiversity Specialist Assessment	
2.1	The assessment must be prepared by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with expertise in the field of terrestrial biodiversity.	Appendix I
2.2	The assessment must be undertaken on the preferred site and within the proposed development footprint.	Section 1
2.3	The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:	
2.3.1	A description of the ecological drivers or processes of the system and how the proposed development will impact these;	Section 4
2.3.2	Ecological functioning and ecological processes (e.g., fire, migration, pollination, etc.) that operate within the preferred site;	Section 4
2.3.3	The ecological corridors that the proposed development would impede including migration and movement of flora and fauna;	Section 4
2.3.4	The description of any significant terrestrial landscape features (including rare or important flora-faunal associations, presence of Strategic Water Source Areas (SWSAs) or Freshwater Ecosystem Priority Area sub catchments;	Section 4
2.3.5	A description of terrestrial biodiversity and ecosystems on the preferred site, including: <ul style="list-style-type: none"> a) main vegetation types; b) threatened ecosystems, including listed ecosystems as well as locally important habitat types identified; c) ecological connectivity, habitat fragmentation, ecological processes and fine scale habitats; and d) species, distribution, important habitats (e.g. feeding grounds, nesting sites, etc.) and movement patterns identified; 	Section 3 (desktop analysis)
2.3.6	The assessment must identify any alternative development footprints within the preferred site which would be of a “low” sensitivity as identified by the screening tool and verified through the site sensitivity verification; and	Not Applicable.
2.3.7	The assessment must be based on the results of a site inspection undertaken on the preferred site and must identify:	
2.3.7.1	Terrestrial Critical Biodiversity Areas (CBAs), including: <ul style="list-style-type: none"> a) the reasons why an area has been identified as a CBA; b) an indication of whether or not the proposed development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation; c) the impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to the remaining extent of the ecosystem type(s); d) the impact on ecosystem threat status; e) the impact on explicit subtypes in the vegetation; f) the impact on overall species and ecosystem diversity of the site; and g) the impact on any changes to threat status of populations of species of conservation concern in the CBA; 	Section 3 (desktop analysis) and 4
2.3.7.2	Terrestrial Ecological Support Areas (ESAs), including:	



	<ul style="list-style-type: none"> a) <i>the impact on the ecological processes that operate within or across the site;</i> b) <i>the extent the proposed development will impact on the functionality of the ESA; and</i> c) <i>loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna;</i> 	
2.3.7.3	Protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including- <ul style="list-style-type: none"> a) <i>an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area management plan;</i> 	Section 3 (desktop analysis)
2.3.7.4	Priority areas for protected area expansion, including- <ul style="list-style-type: none"> a) <i>the way in which the proposed development will compromise or contribute to the expansion of the protected area network;</i> 	Section 3 (desktop analysis)
2.3.7.5	SWSAs including: <ul style="list-style-type: none"> a) <i>the impact(s) on the terrestrial habitat of a SWSA; and</i> b) <i>the impacts of the proposed development on the SWSA water quality and quantity (e.g., describing potential increased runoff leading to increased sediment load in water courses);</i> 	Section 3 (desktop analysis)
2.3.7.6	FEPA sub catchments, including- <ul style="list-style-type: none"> a) <i>the impacts of the proposed development on habitat condition and species in the FEPA sub catchment;</i> 	Not Applicable
2.3.7.7	Indigenous forests, including: <ul style="list-style-type: none"> a) <i>impact on the ecological integrity of the forest; and</i> b) <i>percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.</i> 	Not Applicable
2.4	The findings of the assessment must be written up in a Terrestrial Biodiversity Specialist Assessment Report.	
	Results of the Floral Assessment as well as conclusions on Terrestrial Biodiversity as it relates to vegetation communities and the results of the Faunal Assessment as well as conclusions on Terrestrial Biodiversity as it relates to faunal communities are in Sections 4 – 6 .	
3	Terrestrial Biodiversity Specialist Assessment Report	
3.1	The Terrestrial Biodiversity Specialist Assessment Report must contain, as a minimum, the following information:	
3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Appendix I
3.1.2	A signed statement of independence by the specialist;	Appendix I
3.1.3	A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 1.2
3.1.4	A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Section 2 Appendices C, D & D
3.1.5	A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 1.2
3.1.6	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 5
	Impact Assessment Requirements <ul style="list-style-type: none"> 3.1.7 Additional environmental impacts expected from the proposed development; 3.1.8 Any direct, indirect and cumulative impacts of the proposed development; 3.1.9 The degree to which impacts and risks can be mitigated; 3.1.10 The degree to which the impacts and risks can be reversed; 3.1.11 The degree to which the impacts and risks can cause loss of irreplaceable resources; 	Section 6



	3.1.12 Proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	
3.1.13	A motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a “low” terrestrial biodiversity sensitivity and that were not considered appropriate;	Not Applicable to this report
3.1.14	A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Executive Summary & Section 7
3.1.15	Any conditions to which this statement is subjected.	Section 5 & 6
3.2	The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.	Not Applicable to this report
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	Not Applicable to this report



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GLOSSARY OF TERMS

Most definitions are based on terms and concepts elaborated by Richardson *et al.* (2011), Hui and Richardson (2017) and Wilson *et al.* (2017), with consideration to their applicability in the South African context, especially South African legislation [notably the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA), and the associated Alien and Invasive Species Regulations, 2020].

Alien species (syn. exotic species; non-native species)	A species that is present in a region outside its natural range due to human actions (intentional or accidental) that have enabled it to overcome biogeographic barriers.
Biological diversity or Biodiversity (as per the definition in NEM:BA)	The variability among living organisms from all sources including, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.
Biome - as per Mucina and Rutherford (2006); after Low and Rebelo (1998).	A broad ecological spatial unit representing major life zones of large natural areas – defined mainly by vegetation structure, climate, and major large-scale disturbance factors (such as fires).
Bioregion (as per the definition in NEM:BA)	A geographic region which has in terms of section 40(1) been determined as a bioregion for the purposes of this Act;
Critical Biodiversity Area (CBA)	A CBA is an area considered important for the survival of threatened species and includes valuable ecosystems such as wetlands, untransformed vegetation, and ridges.
Corridor	A dispersal route or a physical connection of suitable habitats linking previously unconnected regions.
Disturbance	A temporal change, either regular or irregular (uncertain), in the environmental conditions that can trigger population fluctuations and secondary succession. Disturbance is an important driver of biological invasions.
Ecoregion	An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region".
Endangered	Organisms in danger of extinction if causal factors continue to operate.
Endemic species	Species that are only found within a pre-defined area. There can therefore be sub-continental (e.g., southern Africa), national (South Africa), provincial, regional, or even within a particular mountain range.
Ecological Support Area (ESA)	An ESA provides connectivity and important ecological processes between CBAs and is therefore important in terms of habitat conservation.
Ground-truth	Ground truth is a term used in various fields to refer to information provided by direct observation (i.e., empirical evidence) as opposed to information provided by inference.
Habitat (as per the definition in NEM:BA)	A place where a species or ecological community naturally occurs.
Important Bird and Biodiversity Area (IBA)	The IBA Programme identifies and works to conserve a network of sites critical for the long-term survival of bird species that: are globally threatened, have a restricted range, are restricted to specific biomes/vegetation types or sites that have significant populations.
Indigenous vegetation (as per the definition in NEMA)	Vegetation occurring naturally within a defined area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Integrity (ecological)	The integrity of an ecosystem refers to its functional completeness, including its components (species) its patterns (distribution) and its processes.
Invasive species	Alien species that sustain self-replacing populations over several life cycles, produce reproductive offspring, often in very large numbers at considerable distances from the parent and/or site of introduction, and have the potential to spread over long distances.
Listed alien species	All alien species that are regulated in South Africa under the NEM:BA, Alien and Invasive Species Regulations, 2020.
Least Threatened	Least threatened ecosystems are still largely intact.
Native species (syn. indigenous species)	Species that are found within their natural range where they have evolved without human intervention (intentional or accidental). Also includes species that have expanded their range as a result of human modification of the environment that does



	not directly impact dispersal (e.g., species are still native if they increase their range as a result of watered gardens but are alien if they increase their range as a result of spread along human-created corridors linking previously separate biogeographic regions).
Red Data listed (RDL) species	According to the Red List of South African plants (http://redlist.sanbi.org/) and the International Union for Conservation of Nature (IUCN), organisms that fall into the Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU) categories of ecological status.
Species of Conservation Concern (SCC)	The term SCC in the context of this report refers to all RDL and IUCN listed threatened species as well as protected species of relevance to the project.



LIST OF ACRONYMS

AIP	Alien and Invasive Plant
BGIS	Biodiversity Geographic Information Systems
BODATSA	Botanical Database of Southern Africa
CARA	Conservation of Agricultural Resources Act, 1983 [Act No. 43 of 1983]
CBA	Critical Biodiversity Area
CR	Critically Endangered
DEA	Department of Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
DREAD	Department of Rural, Environment and Agricultural Development
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
E-GIS	Environmental Geographical Information Systems
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme
EN	Endangered
ESA	Ecological Support Area
EW	Extinct in the Wild
GIS	Geographic Information System
GN	Government Notice
GPS	Global Positioning System
Ha	Hectares
IBA	Important Bird and Biodiversity Area
IEM	Integrated Environmental Management
IUCN	International Union for Conservation of Nature
MAMSL	Meters Above Mean Sea Level
MAP	Mean annual precipitation
MAPE	Mean Annual Potential Evaporation
MASMS	Mean Annual Soil Moisture Stress
MAT	Mean Annual Temperature
MFD	Mean Frost Days
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act, 1998 [Act No. 107 of 1998]
NEM:BA	National Environmental Management: Biodiversity Act, 2004 [Act No. 10 of 2004]
NFA	National Forest Act, 1998 [Act No. 84 of 1998]
NPAES	National Protected Area Expansion Strategy
NT	Near Threatened
NWBMA	North West Biodiversity Management Act, 2016 (Act No. 4 of 2016)
NYBA	Not yet Been Assessed
PES	Present Ecological State
POC	Probability of Occurrence
QDS	Quarter Degree Square
RDL	Red Data Listed
SABAP 2	South African Bird Atlas Project 2
SACAD	South African Conservation Areas Database
SACNASP	Professional member of the South African Council for Natural Scientific Professions
SANBI	South African National Biodiversity Institute
SanParks	South African National Parks
SAPAD	South African Protected Areas Database
SCC	Species of Conservation Concern
SLR	SLR Consulting (Africa) (Pty) Ltd
STS	Scientific Terrestrial Services



SWSA	Strategic Water Source Area
TNCO	Transvaal Nature Conservation Ordinance, 1983 (Ordinance No. 12 of 1983)
TOPS	Threatened or Protected Species
TSP	Threatened Species Programme
VEGMAP	National Vegetation Map Project
VU	Vulnerable



1. INTRODUCTION

Scientific Terrestrial Services CC (STS) was appointed by SLR Consulting (Africa) (Pty) Ltd (SLR) to conduct a terrestrial biodiversity assessment as part of the Environmental Authorisation (EA) process for the proposed construction of an additional parking area for the Impala Platinum Mine, near Rustenburg in the North West Province. The site where the proposed parking and drop-off is located (adjacent to the Impala Platinum 16 Shaft) will hereafter be referred to as the “study area” (indicated in Figures 1 and 2). The layout of the proposed parking and drop-off is depicted in Figure 3.

This report, after consideration of the description of the ecological integrity of the study area, must guide the Environmental Assessment Practitioner (EAP), the regulatory authorities and the developing proponent, by means of the presentation of results and recommendations as to the viability of the proposed development activities from a biodiversity resource management perspective.





Figure 1: Digital Satellite image depicting the location of the study area in relation to surrounding areas.



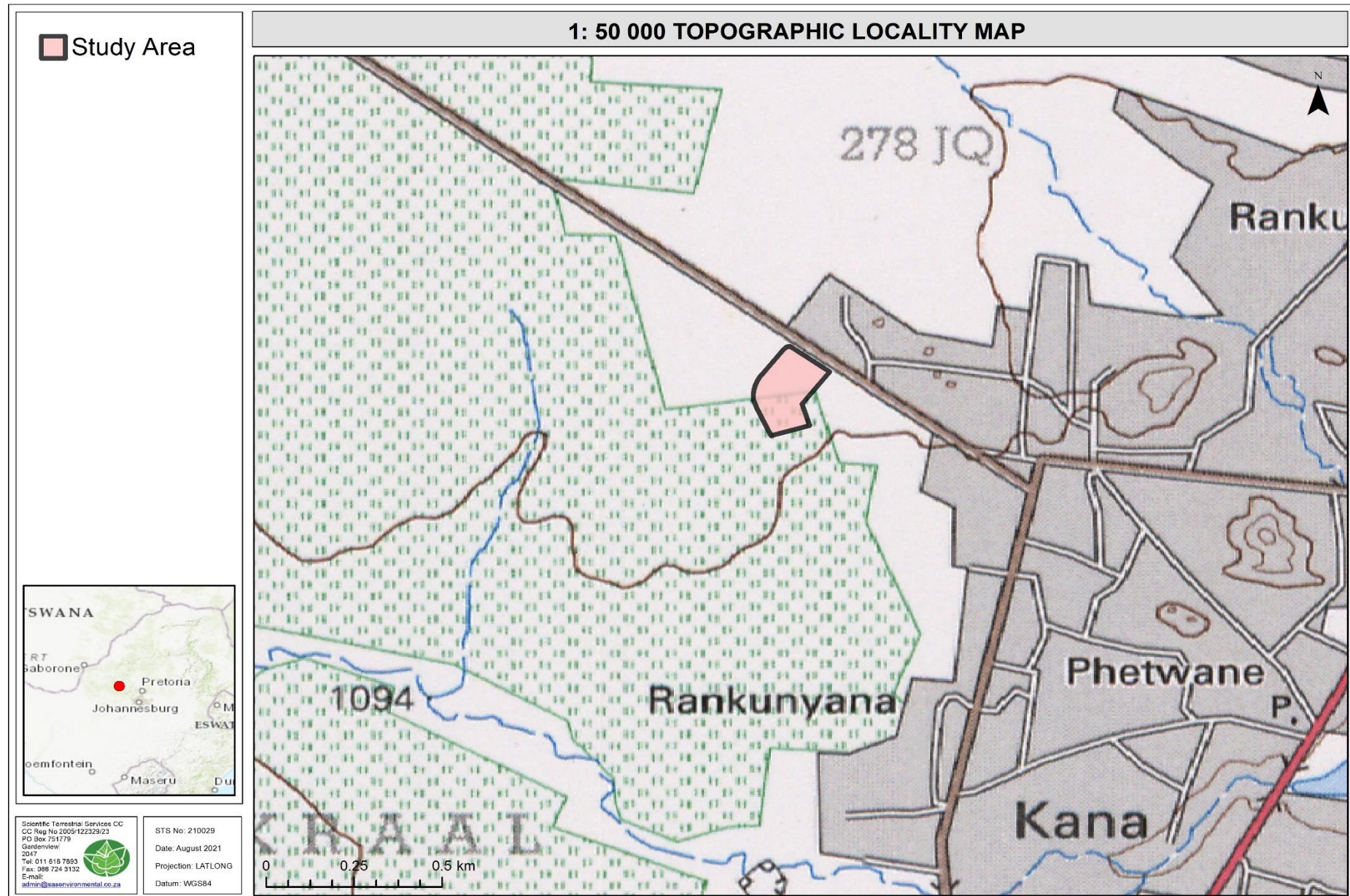


Figure 2: The study area depicted on a 1:50 000 topographical map in relation to the surrounding area.



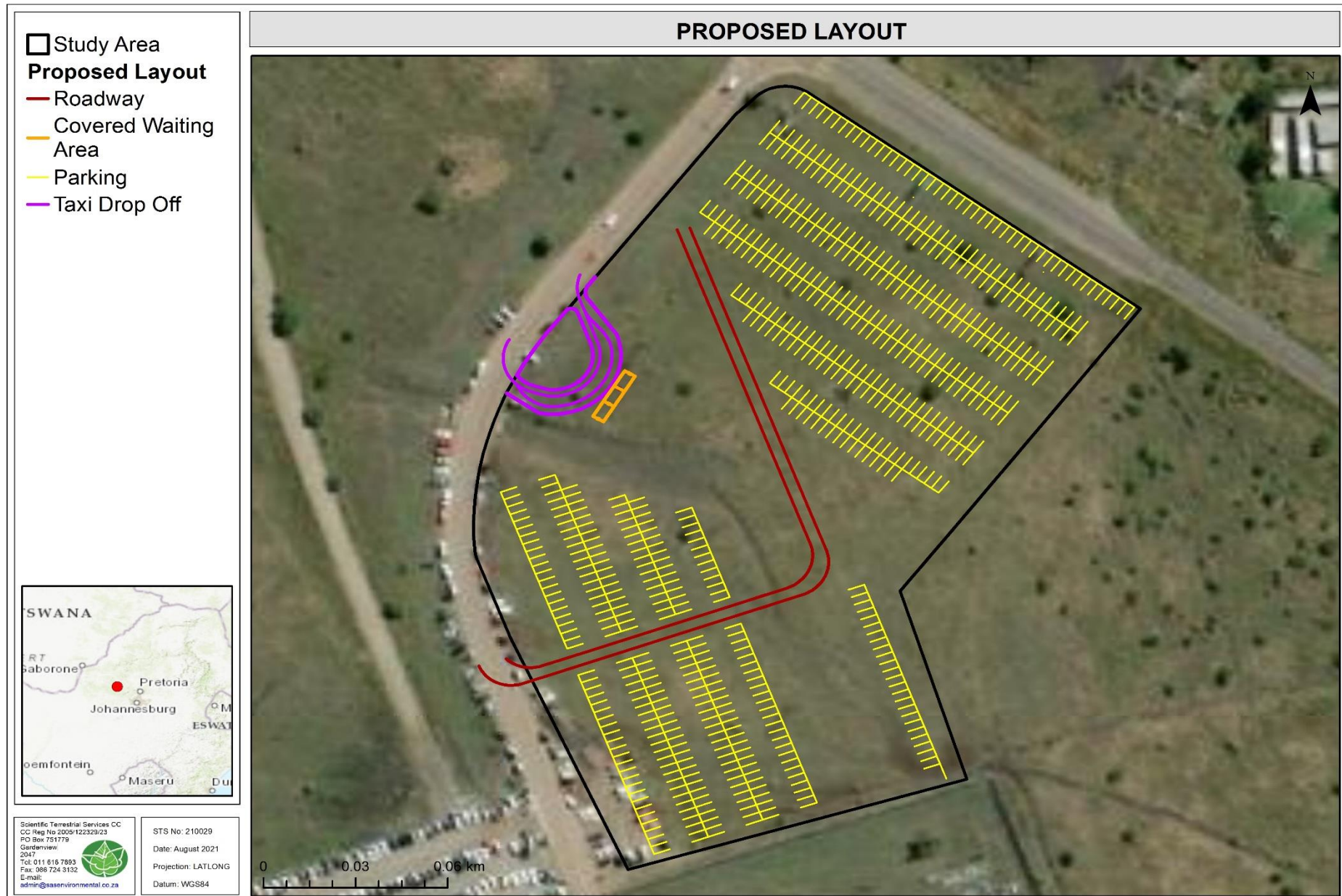


Figure 3: Visual representation of the proposed layout superimposed onto digital satellite imagery.



1.1 Project Scope

Specific outcomes in terms of this report are outlined below:

- To state the indemnity and terms of use of this report (Appendix A) as well as to provide the details of the specialists who prepared the reports (Appendix E);
- To outline the legislative requirements that were considered for the assessment (Appendix B of this report);
- To provide the methodologies followed relating to the impact assessment (for the impact assessment phase of the study) and development of the mitigation measures (Appendix C) that was applied in the floral and faunal assessments (Part B and Part C);
- To define the Present Ecological State (PES) of the biodiversity of the study area;
- To determine and describe habitats, communities and the ecological state of the study area;
- To conduct a faunal and floral Species of Conservation Concern (SCC) assessment, including the potential of suitable habitat to occur within the study area for SCC;
- To identify and consider all sensitive landscapes including rocky ridges, wetlands or any other special features such as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs);
- To determine the environmental impacts that the construction of the proposed parking infrastructure might have on the biodiversity associated with the study area; and
- To develop mitigation and management measures for all phases of the development.

1.2 Assumptions and Limitations

The following assumptions and limitations apply to this report:

- The biodiversity assessment was confined to the study area and did not include the neighbouring and adjacent properties. These were considered as part of the desktop assessment (Section 3);
- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most floral and faunal communities have been accurately assessed and considered. Relevant online sources and background information were further accessed to improve on the overall understanding of the study area's ecology;
- Due to most faunal taxa's nature and habits, it is unlikely that all species would have been observed during a field assessment of limited duration. Due to the locality of the study area (peri-urban area), continuous anthropogenic activities, the cyclical nature



of many species' life stages, as well as the season of the assessment, few faunal species were observed during the site visit. As such, background data (desktop) and literature studies (previous studies undertaken in the immediate area) were used to further infer faunal species composition and sensitivities in relation to the available habitat;

- Sampling, by its nature, means that not all individuals are assessed and identified. Some species and taxa associated with the study area may have been missed during the assessment; and
- The data presented in this report are based on one site visit, undertaken on the 26th of May 2021 (autumn season). A more comprehensive assessment would require that assessments take place in all seasons of the year. However, on-site data were augmented with all available desktop data. Together with project experience in the area, the findings of this assessment are considered an accurate reflection of the ecological characteristics of the study area.

1.3 Legislative Requirements

The following legislative requirements were considered during the assessment:

- The Constitution of the Republic of South Africa, 1996¹;
- The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA);
 - Government Notice (GN) number R.1020: Alien and Invasive Species Regulations, 2020, in Government Gazette 43735 dated 25 September 2020 as it relates to the NEM:BA;
 - Government Notice number 1003: Alien and Invasive Species Lists, 2020, in Government Gazette 43726 dated 18 September 2020;
- Government Gazette 45421 dated 10 May 2019 as it relates to the Department of Forestry, Fisheries and the Environment (DFFE)'s (previously the Department of Environmental Affairs (DEA)) national environmental screening report required with an application for EA as identified in regulation 16(1)(v) of Environmental Impact Assessment (EIA) Regulations, 2014, as amended:

¹ Since 1996, the Constitution has been amended by seventeen amendments acts. The Constitution is formally entitled the 'Constitution of the Republic of South Africa, 1996'. It was previously also numbered as if it were an Act of Parliament – Act No. 108 of 1996 – but since the passage of the Citation of Constitutional Laws Act, neither it nor the acts amending it are allocated act numbers.



- GN No. 320 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity as published in Government Gazette 43110 dated 20 March 2020; and
- GN No. 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant and Terrestrial Animal Species as published in Government Gazette 43855 dated 30 October 2020.
- The Transvaal Nature Conservation Ordinance, 1983 (Ordinance No. 12 of 1983) (TNCO); and
- The North West Biodiversity Management Act, 2016 (Act No. 4 of 2016) (NWBMA).

The details of each of the above, as they pertain to this study, are provided in Appendix B of this report.

2. ASSESSMENT APPROACH

2.1 Desktop Research Approach

Maps and digital satellite images were generated prior to the field assessment in order to determine broad habitats, vegetation types and potentially sensitive sites. The biodiversity desktop assessment is confined to the study area and does not include the neighbouring and adjacent properties, although the sensitivity of surrounding areas is included on the respective maps. Relevant databases and documentation that were considered during the assessment of the study area included ²:

- 2010 National Protected Area Expansion Strategy (NPAES) (Government of South Africa, 2010; DEA & SANBI, 2009), including the below-listed vector datasets:
 - NPAES Focus Areas 2010: National Protected Areas Expansion Strategy: Focus areas for protected area expansion (South African National Parks (SanParks), 2010);
 - NPAES Formal: Polygons of formal protected national parks areas in South Africa (SANParks/SANBI, 2013); and

² Datasets obtained from:

- SANBI BGIS (2019). The South African National Biodiversity Institute - Biodiversity GIS (BGIS) [online]. URL: <http://bgis.sanbi.org> as retrieved in 2019; and
- Department of Environmental Affairs (DEA) Environmental Geographical Information Systems (E-GIS) website. URL: <https://egis.environment.gov.za/>



- NPAES Protected Areas – Informal: Informal conservation areas in South Africa (SANParks/SANBI, 2012).
- The South African Conservation Areas Database, Quarter 3 (SACAD, 2020);
- The South African Protected Areas Database, Quarter 3 (SAPAD, 2020);
- The 2015 North West Biodiversity Sector Plan including the below-listed vector dataset:
 - 2015 North West Terrestrial Critical Biodiversity Areas (North West Province of READ, 2015).
- The National Vegetation Map Project (VEGMAP), with the below vector dataset used for information on Biomes, Bioregions and Vegetation Type(s):
 - 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018a).
- The National List of Threatened Ecosystems 2011 (SANBI 2011; South Africa, 2011);
- From the National Biodiversity Assessment (NBA, 2018) Terrestrial Assessment project (Skowno et al., 2019):
 - 2018 Terrestrial ecosystem threat status and protection level - remaining extent (SANBI, 2018b); and
 - 2018 Terrestrial ecosystem threat status and protection level layer (SANBI, 2018c).
- The Important Bird and Biodiversity Areas (IBA) Programme and vector dataset (BirdLife South Africa, 2015; Marnewick et al., 2015a and 2015b), in conjunction with the South African Bird Atlas Project 2 (SABAP 2);
- The International Union for Conservation of Nature (IUCN);
- The National Web-Based Environmental Screening Tool (accessed 2021); and
- From the 2017 Strategic Water Source Areas (SWSA) project:
 - 2017 SWSA **Surface water** (Water Research Commission, 2017).

The field assessment to determine the ecological status of the study area and to “ground-truth” the results of the desktop assessment was undertaken on 26th May 2021 (autumn season). Results of the field assessment is presented in Section 4.

2.2 General Approach

An on-site visual assessment of the subject property was conducted to confirm the assumptions made during the consultation of the background maps and to determine whether the ecological status of the habitat associated with the study area has changed.



The vegetation surveys are based on the subjective sampling method which is a technique where the specialist chooses specific sample sites within the area of interest, based on their professional experience and background research done for the site, to allow representative recordings of floral communities and optimal detection of SCC (**Appendix C**).

For the faunal field surveys, a reconnaissance ‘walkabout’ was undertaken to confirm habitat types and to consider whether the areas are representative of these habitats, with special emphasis being placed on areas that may potentially support faunal Species of Conservation Concern (SCC). Sites were investigated on foot to identify and define the faunal assemblage within the footprint area. A detailed explanation of the method of assessment is provided in **Appendix D** of this report. The faunal categories covered in this assessment include mammals, avifauna, herpetofauna and general invertebrates.

The below list includes the steps followed during the preparation for, and the undertaking of, the field assessments:

- To guide the selection of appropriate sample sites, background data and digital satellite images were consulted before going to site, during which broad habitats, vegetation types and potentially sensitive sites were identified. The results of these analyses were then used to focus the fieldwork on specific areas of concern and to identify areas where targeted investigations were required (e.g., for SCC detection and within the direct footprint of the proposed parking infrastructure area);
- Databases used for background information include the South African National Biodiversity Institute (SANBI) Threatened Species Programme (TSP), the NBA (2018), National Threatened Ecosystems (2011), SAPAD & SACAD (Quarter 3, 2020), NPAES (2011), and International Union for Conservation of Nature (IUCN);
- The subjective sampling method requires that field assessment take place on foot. Based on the broad habitat units delineated before going to site, and points of interest recorded, which is updated based on on-site observations, the selected sample areas were surveyed on foot, following subjective transects, to identify the occurrence of the dominant plant species and habitat diversities, but also to detect SCC which tend to be sparsely distributed; and
- Photographs were taken of each vegetation community that are representative of typical vegetation structure of that community, as well as photos of all detected SCC (where applicable).

For the methodologies relating to the impact assessment and development of the mitigation measures, please refer to **Appendix E** of this report.



2.3 Sensitivity Mapping

All the ecological features associated with the study area were considered, and sensitive areas were delineated using a Global Positioning System (GPS). A Geographic Information System (GIS) was used to project these features onto satellite imagery.

3. RESULTS OF THE DESKTOP ANALYSIS

3.1 Conservation Characteristics of the Study Area

The following table contains data accessed as part of the desktop assessment. It is important to note, that although all data sources used provide useful and often verifiable high-quality data, the various databases do not always provide an entirely accurate indication of the area's actual biodiversity characteristics, and as such require ground truthing.



Table 1: Summary of the terrestrial conservation characteristics for the study area (Quarter Degree Square (QDS) 2527CB)

CONSERVATION DETAILS PERTAINING TO THE STUDY AREA (VARIOUS DATABASES)		DETAILS OF THE MARIKANA THORNVELD IN TERMS OF MUCINA & RUTHERFORD (2006)				
NBA (2018): 1) Ecosystem Threat Status 2) Ecosystem Protection Level	<p>NBA 2018 dataset: The study area is located within the Marikana Thornveld which is considered an Endangered ecosystem and is currently Poorly Protected. However, the area has been significantly transformed and is not regarded by the NBA 2018 database to be areas representative of the Marikana Thornveld.</p> <p>Ecosystem types are categorised³ as “not protected”, “poorly protected”, “moderately protected” and “well protected” based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act No. 57 of 2003), and compared with the biodiversity target for that ecosystem type.</p>	Biome	The study area is situated within the Savanna Biome .			
		Bioregion	The study area is located within the Central Bushveld Bioregion .			
		Vegetation Type	The study area is situated within the Marikana Thornveld (SVcb 6) .			
		Climate	Summer rainfall with very dry winters			
			MAP* (mm)	MAT* (°C)	MFD* (Days)	MAPE* (mm)
			654	17.6	21	2284
National Threatened Ecosystems (2011) Figure 4	<p>The majority of the study area is located within an ecosystem that is currently considered to be Vulnerable (VU) which is the Marikana Thornveld (Figure 4).</p> <p>According to the description in GN 1002, the Marikana Thornveld falls under Criterion A1, which identifies ecosystems that have undergone loss of natural habitat, impacting on their structure, function, and composition. Loss of natural habitat includes outright loss, for example the removal of natural habitat for cultivation, building of infrastructure, mining etc., as well as severe degradation. An ecosystem is categorised as vulnerable if the extent of remaining natural habitat in the ecosystem is less than or equal to 60% of the original extent of the ecosystem. For this purpose, habitat is considered severely degraded if it would be unable to recover to a natural or near-natural state following</p>	Altitude (m)	1050 – 1450			
		Distribution	North-West and Gauteng Provinces. Occurs on plains from the Rustenburg area in the west, through Marikana and Brits to the Pretoria area in the east.			
		Conservation	Endangered . Target 19%. Less than 1% statutorily conserved in, for example, Magaliesberg Nature Area. More conserved in addition in other reserves, mainly in De Onderstepoort Nature Reserve. Considerably impacted, with 48% transformed, mainly cultivated and urban or built-up areas. Most agricultural development of this unit is in the western regions towards Rustenburg, while in the east (near Pretoria) industrial development is a greater threat of land transformation. Erosion is very low to moderate. Alien invasive plants occur localised in high densities, especially along the drainage lines.			
		Geology & Soils	Most of the area is underlain by the mafic intrusive rocks of the Rustenburg Layered Suite of the Bushveld Igneous Complex. Rocks include gabbro, norite, pyroxenite and anorthosite. The shales and quartzites of the Pretoria Group (Transvaal Supergroup) also contribute. Mainly vertic melanic clays with some dystrophic or mesotrophic plinthic catenas and some freely drained, deep soils. Land types mainly Ea, Ba and Ae.			
		Vegetation & landscape features (Appendix F)	Open <i>Vachellia karroo</i> woodland, occurring in valleys and slightly undulating plains, and some lowland hills. Shrubs are denser along drainage lines, on termitaria and rocky outcrops or in other habitat protected from fire.			

³ The ecosystem protection level status is assigned using the following criteria:

- If an ecosystem type has more than 100% of its biodiversity target protected in a formal protected area either A or B, it is classified as Well Protected;
- When less than 100% of the biodiversity target is met in formal A or B protected areas it is classified it as Moderately Protected;
- If less than 50% of the biodiversity target is met, it is classified it as Poorly Protected; and
- If less than 5% it is Hardly Protected.



	the removal of the cause of the degradation (e.g., invasive aliens, over-grazing), even after very long time periods.	CONSERVATION DETAILS PERTAINING TO THE STUDY AREA (VARIOUS DATABASES CONTINUED)	
	For EIAs, the 2011 National list of Threatened Ecosystems remains the trigger for a Basic Assessment in terms of Listing Notice 3 of the EIA Regulations published under the NEMA.	SAPAD (2020, Q3); SACAD (2020, Q3); NPAES (2010). Figure 5	The SAPAD (2020), the SACAD (2020), and the NPAES (2010) indicate that there are no formally or informally protected areas within a 10 km radius of the study area. According to NPAES (2010), the North-West/Gauteng Focus Area is located approximately 1,8 km north of the study area.
		IBA (2015)	There are no IBAs located within a 10 km radius of the study area.
NORTH WEST BIODIVERSITY SECTOR PLAN (2015)			
Terrestrial Ecosystems	The study area does not fall within a CBA or ESA.		
STRATEGIC WATER SOURCE AREAS FOR SURFACE WATER (2017)			
Surface Water Source Areas (SWSAs) are defined as areas of land that supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size. They include transboundary areas that extend into Lesotho and Swaziland. The sub-national Water Source Areas (WSAs) are not nationally strategic as defined in the report but were included to provide a complete coverage.			
NAME & CRITERIA	The study area is not within 10 km of a Strategic Water Source Area for Surface Water.		
NATIONAL WEB-BASED ENVIRONMENTAL SCREENING TOOL (2021)			
<p>The screening tool is intended to allow for pre-screening of sensitivities in the landscape to be assessed within the environmental authorisation process. This assists with implementing the mitigation hierarchy by allowing developers to adjust their proposed development footprint to avoid sensitive areas. The different sensitivity ratings pertaining to the plant [and animal] protocols are described below:</p> <ul style="list-style-type: none">➤ <u>Very high</u>: habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km² are considered critical habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under critically CR, EN, or VU criteria of the IUCN or species listed as critically/ extremely rare under south africa's national red list criteria. For each species reliant on a critical habitat, all remaining suitable habitat has been manually mapped at a fine scale.➤ <u>High</u>: recent occurrence records for all threatened (CR, EN, VU) and/or rare endemic species are included in the high sensitivity level.➤ <u>Medium</u>: model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level.➤ <u>Low</u>: areas where no SCC are known or expected to occur.			
Animal Species	For the Animal Species theme, the entire study area is considered to have a Low Sensitivity		
Plant Species	For the Plant Species theme, the entire study area is considered to have a Low Sensitivity where no Red Data Listed (RDL) plant taxa are anticipated to occur due to unsuitable habitat conditions.		
Terrestrial Sensitivity	The Terrestrial Sensitivity for the entire study area is considered to have a Very High Sensitivity . The triggered sensitivity feature is the VU ecosystem (i.e., Marikana Thornveld).		

NBA = National Biodiversity Assessment; SAPAD = South African Protected Areas Database; SACAD = South African Conservation Areas Database; NPAES = National Protected Areas Expansion Strategy; IBA = Important Bird Area; MAP = Mean annual precipitation; MAT = Mean annual temperature; MAPE = Mean annual potential evaporation; MFD = Mean Frost Days; MASMS = Mean annual soil moisture stress (% of days when evaporative demand was more than double the soil moisture supply); CBA = Critical Biodiversity Areas; ESA = Ecological Support Areas.





Figure 4: The remaining extent of the Marikana Thornveld (VU) ecosystem according to the National Threatened Ecosystems (2011) in relation to the study area.



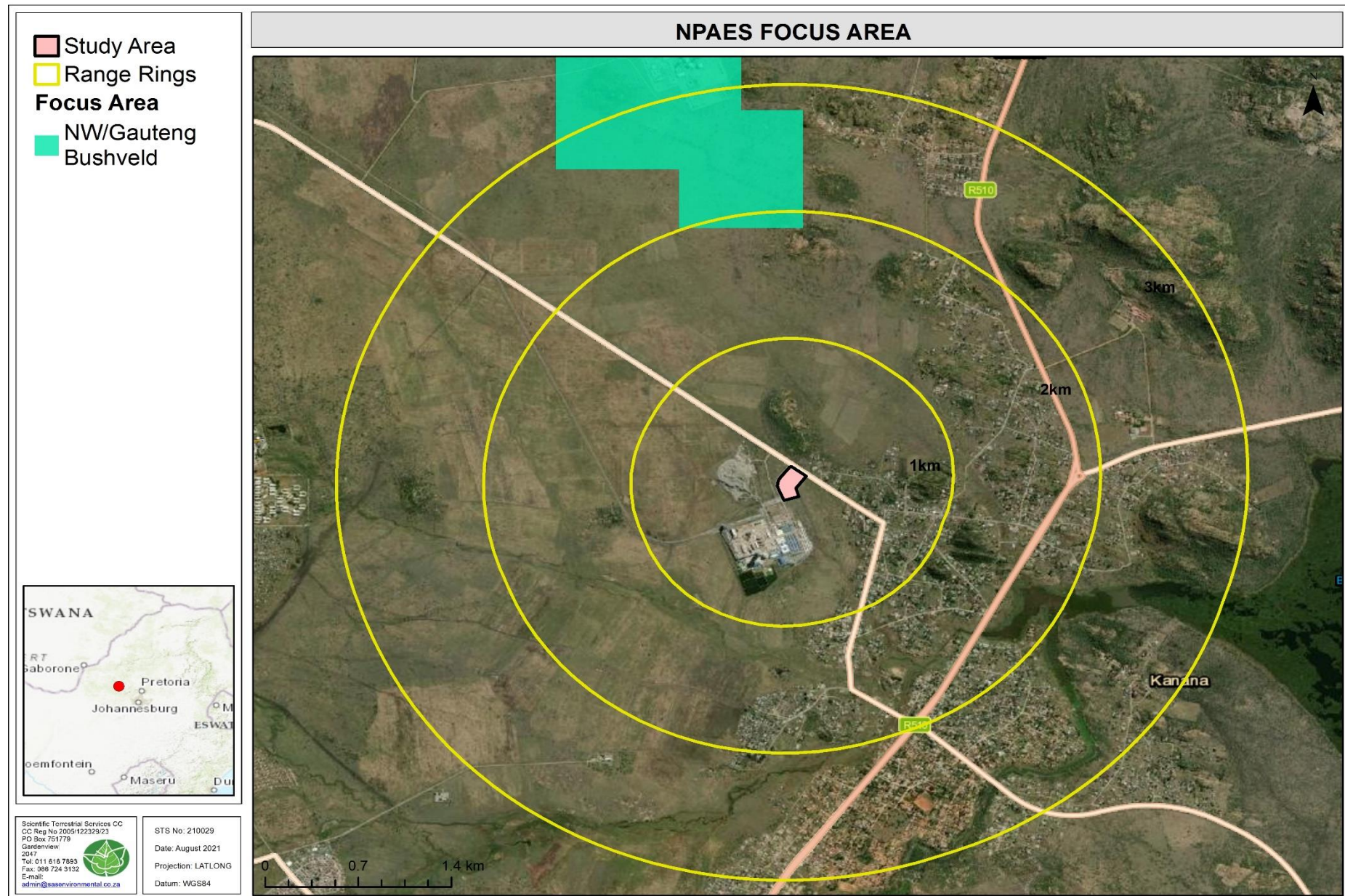


Figure 5: The NPAES Focus Area located 1,8 km north of the study area, according to NPAES (2010).



4. BIODIVERSITY ASSESSMENT RESULTS

According to the updated 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018a), the study area is situated within the EN **Marikana Thornveld** vegetation type – used as the reference vegetation type for the study area.

Historic aerial photography⁴ (Sourced from the Chief Directorate: National Geo-spatial Information) for 1955, 1962 and 1975 all indicate that the entire study has been cultivated (and hence, significantly transformed) historically (Figure 6 below), which has resulted in a significant alteration in vegetation structure, floral species composition and the ability of the habitat to support a high diversity of faunal species. Much of the study area has been left to recover post-cultivation for at least two decades (seemingly without any rehabilitation efforts), apart from the southern section of the study area. Available Digital Satellite Imagery indicate that the southern section was cultivated in 2004 and has thus had less time to recover than the remaining sections of the study area. After the establishment of the mine, cultivation ceased for the area. With the establishment of the mine and the expansion of anthropogenic activities and livelihoods in the areas surrounding the study area, faunal activity has consequently shifted and decreased, with the habitat now utilised by smaller, more common species (e.g., the Crowned Lapwing, Hadada Ibis, Scrub Hare), whereas larger species or habitat specialists have moved out of this area.

⁴ <http://www.cdngportal.co.za/cdngportal/>



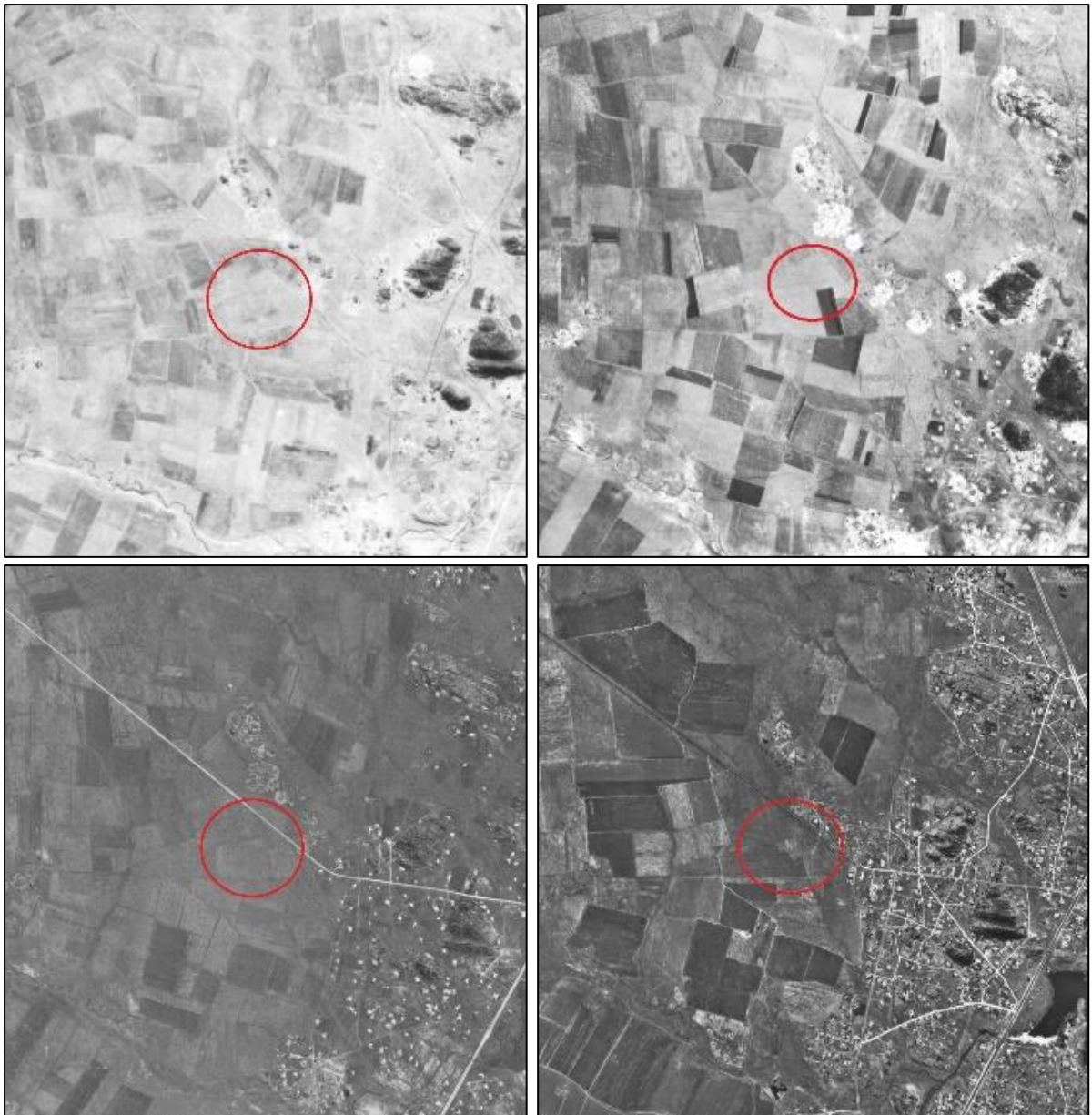


Figure 6: Historic aerial photography for the study area. Images display the year 1955 (top left), 1962 (top right), 1975 (bottom left) and 2004 (bottom right). Approximate locality of the study area is indicated by the red circle.



Following the field assessment, two habitat units could be distinguished for the study area (Figure 7). The habitat units were determined based on species composition, vegetation structure, ecological function, biophysical environment, and habitat condition.

The two habitat units include:

- 1) Transformed Areas: These areas include current built-up or transformed areas associated with the main road leading to the Shaft 16 Complex as well as heavily modified land where little to no indigenous vegetation remains; and
- 2) Secondary Marikana Thornveld Habitat Unit: This habitat unit includes areas that are currently vegetated and that comprises indigenous vegetation⁵; however, due to significant historic transformation of this area (long-term cultivation), with no rehabilitation efforts, the vegetation is species poor from both a faunal and floral perspective.

⁵ **Indigenous vegetation is defined as follows** (LNs): "Indigenous vegetation: refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years.



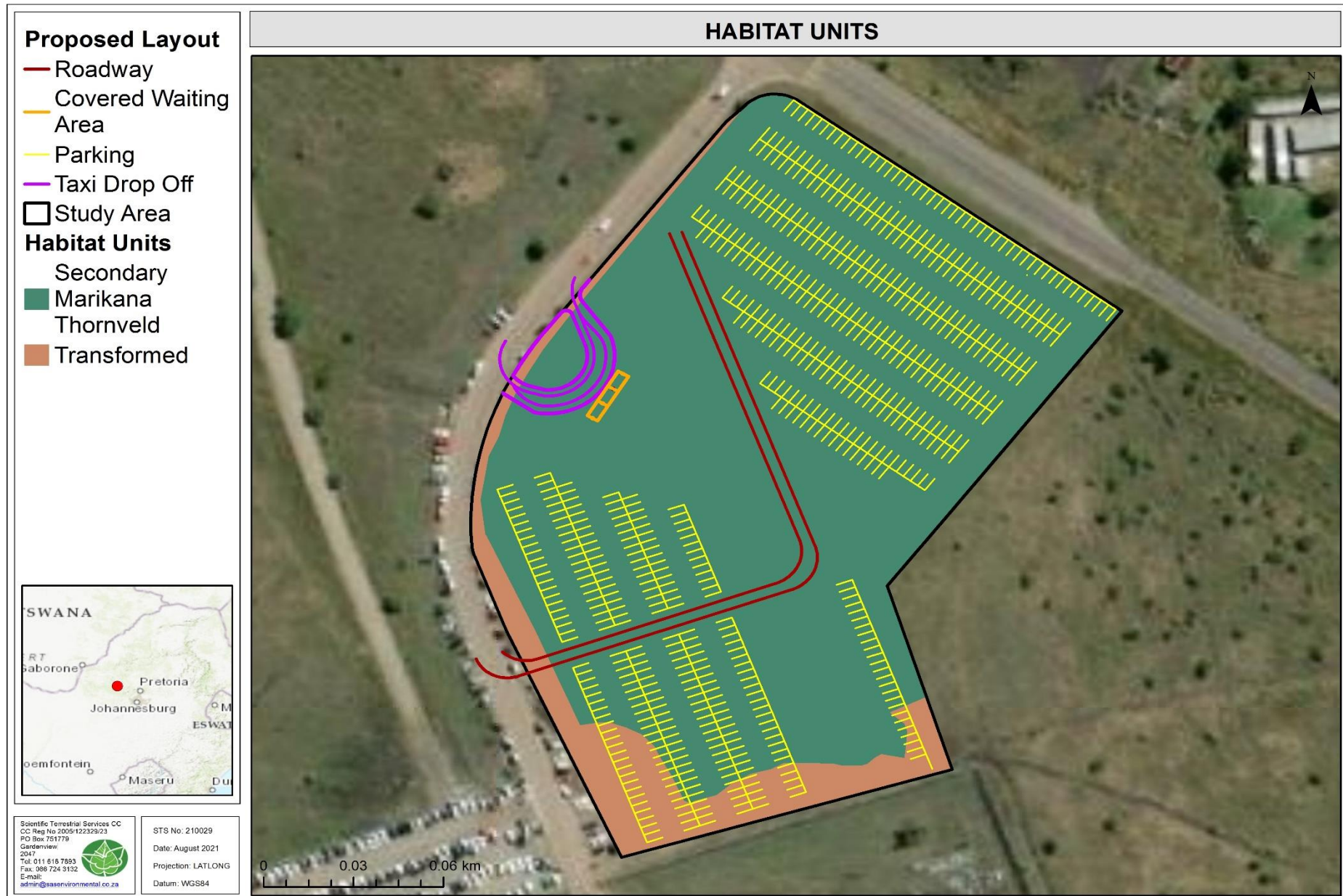



Figure 7: Habitat units encountered in the study area.



4.1 Floral Assessment Results

Reference photos	 <p>Transformed Areas (left photo) is characterised by a lack of vegetation, whereas the Secondary Marikana thornveld (central and right photographs) comprised a predominant grass layer with scattered woody species from the Fabaceae family.</p>
Habitat Overview	<p>The Secondary Marikana Thornveld is associated with a lack of floral heterogeneity resulting from long-term historic cultivation and more recent fragmentation from surrounding natural areas. Forb species was poorly represented and graminoid species dominated within the study area (albeit only of moderate diversity), which is not uncharacteristic of the reference state. However, the main contributing factor that indicated a significant shift from the reference Marikana Thornveld was the lack of a diverse woody component. As such the habitat is considered to have low levels of integrity and is not representative of the reference state as species composition and vegetation structure have been altered.</p> <p>The study area is bordered by actively used roads along its western and northern boundary, with an informal gravel road and pedestrian walkway more recently constructed to the south of the study area. As such, the Secondary Marikana Thornveld is fragmented from larger, intact habitat, thus altering natural ecological corridors on site which reduces dispersal abilities of floral species and reduces the diversification potential of floral communities. There are clear signs of edge effect impacts on this habitat stemming from these bordering roads where alien vegetation and disturbance grasses such as <i>Heteropogon contortus</i> were noticeably more abundant than within areas further away from these linear features.</p> <p>Natural ecological processes and drivers within the study area have been modified due to the historic and current association with anthropogenic influences.</p> <p><u>Vegetation structure:</u> No clear vegetation structure can be linked to the Transformed Areas as these areas lack natural vegetation. The Secondary Marikana thornveld can be described as sparse shrubland with a low diversity of woody species.</p>
Species Overview	<p>Floral communities in the study area are considered species poor and characterised by a dominance of graminoids, scattered woody species and a general lack of herbaceous species (see Appendix G for a complete species list).</p> <ul style="list-style-type: none"> - Dominant graminoid species included <i>Aristida bipartita</i>, <i>Cynodon dactylon</i>, <i>Dichanthium annulatum</i>, <i>Heteropogon contortus</i> and <i>Ischaemum afrum</i>. - The dominant woody species included the commonly occurring and widespread <i>Diospyros lycioides</i> subsp. <i>guerkei</i>, <i>Senegalia mellifera</i> subsp. <i>detinens</i>, <i>Vachellia nilotica</i> subsp. <i>kraussiana</i> and <i>Vachellia tortilis</i> subsp. <i>tortilis</i>. - Forbs were not dominant within the study area but included species such as <i>Crabbea hirsuta</i>, <i>Hermannia depressa</i>, <i>Hermannia transvaalensis</i>, <i>Jamesbrittenia aurantiaca</i>, <i>Polygala hottentotta</i> and <i>Rhynchosia monophylla</i> – a collection of forbs that are often associated with disturbed habitat.



<p>Species Conservation Concern</p>	<p>of</p> <p>As the natural floral community structure and composition have been altered, floral SCC are unlikely to establish viable populations, especially within areas that have been completely transformed. Overall, the study area is of low sensitivity in terms of floral SCC conservation.</p> <p>No nationally threatened⁶ SCC (i.e., RDL plants), in terms of the NEM:BA Section 56, were observed during the site assessment, nor were any species observed from the NEM:BA Threatened or Protected Species (TOPS) list for the North West Province. No suitable habitat is present for these species on site.</p> <p>Provincially protected species, listed on the TNCO⁷ Schedule 11 - Protected Plants (Section 86 (1) (a)), were also not observed within the study area. Most of the species on this list will not occur within the study area; however, species from the <i>Gladiolus</i> and <i>Crinum</i> genera could survive within the largely degraded habitat of the study area. Permits from Department of Rural, Environment and Agricultural Development (DREAD) would need to be obtained to remove, cut, or destroy the above-mentioned protected species before any vegetation clearing may take place.</p> <p>The online National Web based Environmental Screening Tool also indicated the study area to be in a Low Sensitivity area, which aligns with the findings of the site inspection. Refer also to the Plant Species Compliance statement (STS 210029, 2021).</p> <p>Refer to Appendix H for the complete SCC assessment results.</p>	<p>Presence Unique Landscapes</p> <p>of</p>	<p>The study area is not located within any CBAs or ESAs.</p> <p>Although the study area is located within the VU Marikana Thornveld, the study area is no longer representative of this vegetation type given the long-term, historic association with cultivation that the study area has experienced. The initial cause of degradation (i.e., historic cultivation) has been removed from the study area since 2004, yet the habitat has been unable to recover to a representative state, i.e., it is no longer transformed but a significant loss of function, structure, and species composition has occurred. The historic cause of degradation is now replaced by more subtle impacts, such as edge effects from AIPs, fragmentation of the habitat, and removal of natural grazers and fire regimes. For this purpose, the habitat is considered severely degraded.</p> <p>Although degraded and not considered sensitive, the Secondary Marikana Thornveld meets the definition of Indigenous Vegetation⁸.</p> <p>Presence of unique habitat from a floral habitat is largely lacking within the study area.</p>
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⁶ NEM:BA 56. Listing of species that are threatened or in need of national protection

1) The Minister may, by notice in the Gazette, publish a list of-

- a. **critically endangered (CR)** species, being any indigenous species facing an extremely high risk of extinction in the wild in the immediate future;
- b. **endangered (EN)** species, being any indigenous species facing a high risk of extinction in the wild in the near future, although they are not a critically endangered species;
- c. **vulnerable (VU)** species, being any indigenous species facing an extremely high risk of extinction in the wild in the medium-term, although they are not a critically endangered species or an endangered species; and
- d. **protected (P)** species, being any species which are of high conservation value or national importance or require regulation in order to ensure that the species are managed in an ecologically sustainable manner.

⁷ This Ordinance will be repealed in as far as it relates to the North West Province when the North West Biodiversity Management Act, 2017 comes into force, and in so far as it applies to Gauteng if the Draft Gauteng Nature Conservation Bill, 2014 is passed.

⁸ Indigenous vegetation (as per the definition in NEMA Listing Notices): Vegetation occurring naturally within a defined area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.



Reference Floral Photographs



From left to right: *Crabbea hirsuta* (one of the few forbs remaining in the study area); a single individual of the listed invasive plant *Opuntia ficus-indica*; scattered individuals of the listed invasive plant *Solanum sisymbriifolium*; and the indigenous *Asparagus suaveolens* growing in the shade of the *Vachellia* and *Senegalia* trees on site.

Concluding Remarks

This habitat unit is of **low** (Transformed Areas) to **moderately low** (Secondary Marikana Thornveld) ecological importance and sensitivity (refer also to Section 5 of this report). No significant biodiversity features are associated with the study area, with a low probability of floral SCC establishing on site. This can be attributed to the extent of habitat degradation, the long-term association with historic cultivation, and fragmentation of the study area from larger, ecologically functioning natural areas.

In terms of the National Web-based Environmental Screening Tool outcome, these areas match the Low Sensitivity assigned to the Plant Species Theme, but do not align with the Very High Sensitivity assigned to the Terrestrial Biodiversity Theme. Development in these the study area is unlikely to have any long-term ecological impacts, provided that edge effect impacts are managed.

Important recommendations:

- Alien vegetation control must be implemented as part of maintenance activities to prevent the spread of such species to neighbouring areas.
- All the natural areas outside of the authorised footprint must be demarcated as “no-go” areas to ensure no footprint creep takes place.



4.2 Faunal Assessment Results

Selected examples of fauna species recorded within the Study Area



From left to right: Brown Armoured Corncricket (*Acanthopplus discoidalis*), Summit disease (*Entomophaga fungi*) on *Acrididae* grasshopper, *Uraeginthus* sp within the *Vachellia* trees, Scrub Hare scatt (*Lepus saxatilis*), and Praying mantis *Ootheca* (egg sac).

Faunal Habitat Overview

Faunal diversity within the study area was low at the time of assessment. Species observed were limited to common and widely occurring species known to survive in areas of decreased sensitivity and that have integrated well into anthropogenic settings.

The study area is fragmented and isolated from surrounding natural habitat via man-made barriers, with roads being the immediate barrier and built-up areas (Shaft 16 Complex and township) forming additional barriers in the larger, local landscape. These barriers influence the presence of expected fauna – although this applies largely to megaherbivores and large predators which are completely absent from the study area (apart from domestic cattle). Smaller mammals can more readily move through, and potentially utilise, the habitat within the Secondary Marikana Thornveld Habitat Unit, e.g., Scrub Hare scatt was noted. Mammal species also likely to utilise the study area for foraging include *Herpestes sanguinea* (Slender Mongoose) and small rodents.

The Secondary Marikana Thornveld provides some suitable habitat for invertebrates, but invertebrate diversity is not anticipated to be high in the study area. Species recorded on site included Lepidopterans such as *Danaus chrysippus* (African Monarch), *Belenois aurota* (Brown-veined White) and *Junonia hierta* (Yellow Pansy), as well as Orthopterans such as *Acanthopplus discoidalis* (Brown Armoured Corncricket) and *Acanthacris ruficornisi* (Garden Locust). Whilst no arachnid species were observed during the field assessment, it is expected that the study area will support a moderately low diversity as there is some suitable habitat and food resources available. The study area is also expected to harbour a low diversity of common reptilian species. Reptile species that may occur within the study area are likely to be the more common, non-threatened species that are mobile enough to migrate to more suitable refugia within areas surrounding the study area or which are well adapted to inhabiting anthropogenic and disturbed landscapes. No amphibian species were encountered during the field assessment, due to the lack of any wetland or riparian habitat within the study area.

Avifaunal species were the most abundant species noted within the study area and immediate surrounding. Species observed on site were common species with broad habitat requirements capable of utilising anthropogenically modified landscapes. It should be noted that very few avifauna observed on site are considered to utilise the habitat for nesting; instead, these species more likely use the site for foraging. Observed Avifauna species included *Acridotheres myna* (Common Myna), *Bostrychia hagedash* (Hadedda), *Streptopelia capicola* (Cape turtle-dove), *Vanellus coronatus* (Crowned Lapwing) and *Passer domesticus* (House sparrow). Avifauna are less restricted in terms of barriers to movement (roads etc), as such they will readily move between the study area and any adjacent locations.

The species and signs thereof observed were largely limited to common and widely occurring species known to survive in areas of decreased sensitivity and that have integrated well or adapted into peri-urban settings. Historically the study area would likely have had a much higher diversity of faunal species but following the fragmentation resulting from anthropogenic activities of the



surrounding areas and the inherent disturbance of the habitat, this has been impacted upon. Overall, the study area is largely isolated from surrounding natural habitat via man-made barriers and development which has impacted upon habitat utilisation by faunal species. The study area has almost no value in terms of its faunal composition and therefore offers little potential for conservation.

Species of Conservation Concern Discussion

During field assessments, it is not always possible to identify or observe all species within an area, largely due to the secretive nature of many faunal species, possible low population numbers or varying habits of species. As such, and to specifically assess an area for faunal SCC, a Probability of Occurrence (POC) matrix is used, utilising a number of factors to determine the probability of faunal SCC occurrence within the study area. Species listed in Appendix I whose known distribution ranges and habitat preferences include the study area were taken into consideration.

No faunal SCC were encountered during the field assessment, and the probability of any such species utilising the study area is highly unlikely as habitat within the study area does not provide suitable food resources or shelter to support faunal SCC. The study area is fragmented from the surrounding natural areas where suitable habitat could occur, thereby limiting the potential for these species to utilise the study area. The National Web-based Environmental Screening Tool further indicated the study area to be located within a **Low Sensitivity area**, which is an area where no SCC is expected.

Although unlikely, there is always a possibility that faunal SCC, as listed in Appendix I of this report, may occur on site or move through the site. As such, it is recommended that a biodiversity specialist undertake a walkdown of the site prior to construction activities commencing to ensure these species can safely be relocated prior to construction.

Concluding Remarks

Faunal diversity within the study area is considered moderately low, with no faunal SCC anticipated to occur within this small, disturbed area. The study area is bordered by actively used roads along its western and northern boundary, along with the Shaft 16 Complex to the south and the Kanana township to the north-east and east of the study area. This fragmented nature of the study area and relatively homogenous structure and composition of the vegetation reduces its appeal to SCC who will readily favour neighbouring intact habitats where there is a less prominent anthropogenic presence.

It is unlikely that faunal SCC will utilise this habitat for breeding, though it is always possible that such species will cross through the study area for foraging purposes - thus the development will not reduce breeding productivity or potential of SCC populations. Development within this habitat unit is not expected to have a significant negative impact on the local or regional faunal ecology of the area, provided mitigation measures are adhered to.



4.1 Alien and Invasive Plant (AIP) Species

South Africa is home to an estimated 759 naturalised or invasive terrestrial plant species (Richardson et al., 2020), with 327 plant species, most of which are invasive, listed in national legislation⁹. Many introduced species are beneficial, e.g., almost all agriculture and forestry production are based on alien species, with alien species also widely used in industries such as horticulture. However, some of these species manage to “escape” from their original locations, spread and become invasive. Although only a small proportion of introduced species become invasive (~0.1–10%), those that do proceed to impact negatively on biodiversity and the services that South Africa’s diverse natural ecosystems provide (from ecotourism to harvesting food, cut flowers, and medicinal products) (van Wilgen and Wilson, 2018).

4.1.1 Legal Context

South Africa has released several Acts legislating the control of alien species. Currently, invasive species are controlled by the NEM:BA – Alien and Invasive Species Regulations, 2020, in Government Gazette 43735 dated 25 September 2020. AIP species defined in terms of NEM:BA are assigned a category and listed within the NEM:BA List of Alien and Invasive Species (2020) in accordance with Section 70(1)(a) of the NEM:BA:

- **Category 1a** species are those targeted for urgent national eradication;
- **Category 1b** species must be controlled as part of a national management programme, and cannot be traded or otherwise allowed to spread;
- **Category 2** species are the same as category 1b species, except that permits can be issued for their usage (e.g., invasive tree species can still be used in commercial forestry, providing a permit is issued that specifies where they may be grown and that permit holders “*Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to Regulation 3*”); and
- **Category 3** are listed invasive species that can be kept without permits, although they may not be traded or further propagated, and must be considered a Category 1b species if they occur in riparian zones.

⁹ Government Notice number 1003: Alien and Invasive Species Lists, 2020, in Government Gazette 43726 dated 18 September 2020, as it relates to the National Environmental Management Biodiversity Act, 2004 (Act No 10 of 2004).



Duty of care related to listed invasive species are referred to in NEM:BA Section 73¹⁰. The motivation for this duty of care is both environmentally and economically driven. Management of alien species in South Africa is estimated to cost at least ZAR 2 billion (US\$142 million) each year - this being the amount currently spent by the national government's DFFE - i.e. the Working for Water programme (van Wilgen, 2020). Managing AIPs early on will reduce clearing costs in the long run.

4.1.2 Site Results

The study area was not associated with an abundance of AIPs and generally these were recorded in close proximity to areas of increased disturbance (e.g., adjacent to the Transformed Habitat and roads). Of the AIPs recorded during the field assessment, two species are listed under NEM:BA Category 1b, of which *Solanum sisymbriifolium* had an intermediate diversity on site, with only one individual of *Opuntia ficus-indica* encountered. The remaining six species are not listed in the NEM:BA – Alien and Invasive Species Lists, 2020 but species such as *Bidens pilosa* and *Tagetes minuta* are considered problem plants that typically have negative impacts on indigenous floral communities if their numbers are not controlled.

Refer to Table 2 below for more information on the AIPs recorded on site.

An AIP Management and Control Plan is required to manage the spread of AIPs to areas outside of the proposed development. Despite low abundances of AIPs on site, the disturbances caused by construction of the proposed development, as well as foreign material brought in for the construction of the proposed development, has the potential to introduce AIPs and contribute to their spread in the surrounding natural environments. If there is an existing plan, the study area should be incorporated into this plan and it must be ensured that the AIP Management and Control Plan meets the requirements of the updated NEM:BA – Alien and Invasive Species Regulations, 2020, and is relevant to the updated NEM:BA – Alien and Invasive Species Lists, 2020.

¹⁰ Section 73(2): A person who is the owner of land on which a listed invasive species occurs must-

- a) notify any relevant competent authority, in writing, of the listed invasive species occurring on that land;
- b) take steps to control and eradicate the listed invasive species and to prevent it from spreading; and
- c) take all the required steps to prevent or minimise harm to biodiversity.



Table 2: Alien and invasive alien species associated with the study area.

Scientific name	Common Name	Country of Origin	Invasive Status	Transformed Habitat	Secondary Marikana Thornveld
Woody species					
* <i>Sesbania cf. bispinosa</i>	Prickly Sesban	Asia and North Africa	Not Listed		x
Herbaceous species					
* <i>Bidens pilosa</i>	Common Blackjack	South America	Not Listed		x
* <i>Erigeron sp.</i>	Fleabane	N/A	Not Listed		x
* <i>Schkuhria pinnata</i>	Dwarf marigold	South America	Not Listed		x
* <i>Solanum sisymbriifolium</i>	Wild tomato, Dense-thorned bitter apple	South America, from Ecuador to Argentina	NEM:BA 1b		x
* <i>Tagetes minuta</i>	Khaki bush	South America	Not Listed	x	x
* <i>Zinnia peruviana</i>	Peruvian zinnia	America including Mexico and Ecuador	Not Listed		x
Succulent species					
* <i>Opuntia ficus-indica</i>	Mission prickly pear, Sweet prickly pear	South America	NEM:BA 1b		x

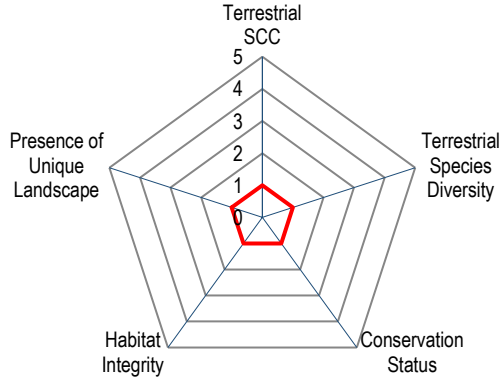
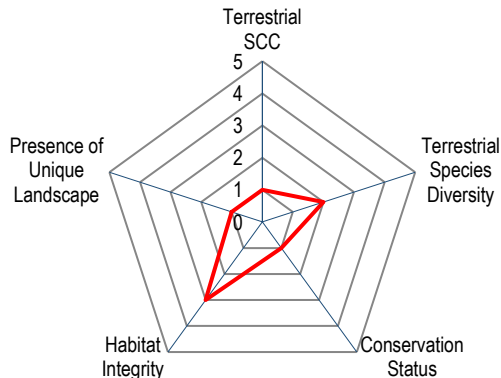
5. SENSITIVITY MAPPING

The Screening Tool identified the study area to be in a **Low Sensitivity** area for the Plant and Animal Species Themes and a **Very High Sensitivity** for the Terrestrial Biodiversity Theme. Based on the *ground-truthed* results of the site visit, Table 3 below presents the sensitivity of each identified habitat unit for both flora fauna along with an associated conservation objective and implications for development.

Figure 8 conceptually illustrates areas of ecological sensitivity – depicting the combined sensitivity for flora and fauna. The study area is depicted according to its sensitivity in terms of the presence or potential for SCC, habitat integrity and levels of disturbance, threat status of the habitat type, the presence of unique landscapes and overall levels of diversity.



Table 3: A summary of the Floral and Faunal sensitivity of each habitat unit and implications for development.

Habitat Sensitivity	Conservation objective	Habitat Unit	Key habitat characteristics
<p>Low</p> 	Optimise development potential.	Transformed Habitat Unit	<ul style="list-style-type: none"> - Indigenous vegetation lacking. - No Floral or Faunal SCC were recorded in this habitat unit and no habitat is present to support such species.
<p>Moderately low</p> 	Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects.	Secondary Marikana Thornveld	<ul style="list-style-type: none"> - Habitat has been degraded due to historic disturbances (e.g., historic cultivation). Furthermore, the habitat is largely fragmented from surrounding source pools. - The floral community within this habitat unit have shifted away from the reference vegetation type. Floral species diversity is moderately low. - This Habitat Unit is likely to provide marginally higher levels of food resources. Faunal species diversity is moderately low. - No Floral or Faunal SCC were recorded in this habitat unit and no habitat is present to support such species.



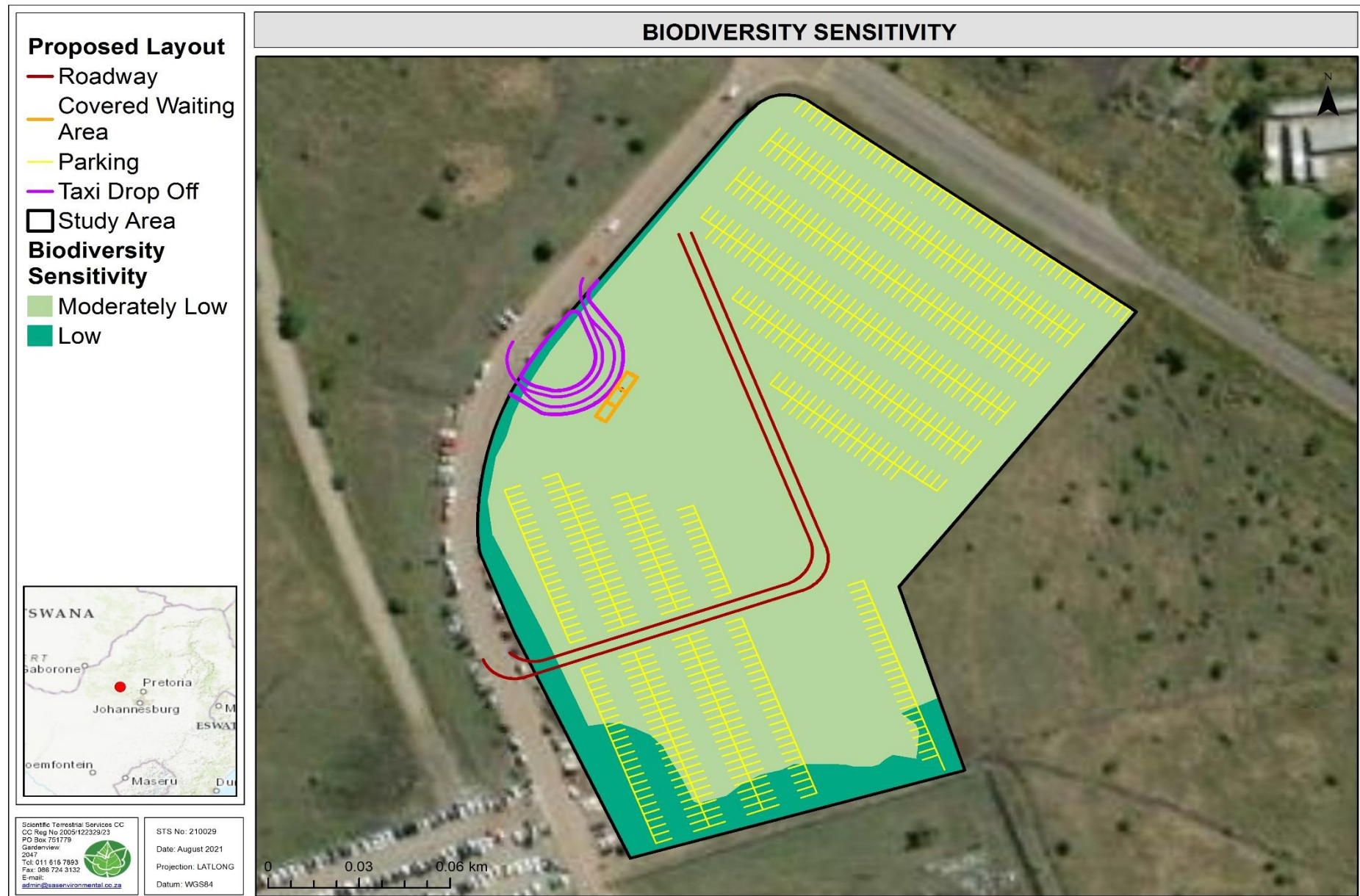


Figure 8: Combined biodiversity sensitivity map of the study area.



6. IMPACT ASSESSMENT

The tables below serve to summarise the significance of perceived impacts on the terrestrial ecology of the study area, according to the method described in Appendix E (SLR's Impact Methodology).

An impact discussion and assessment of all potential pre-construction, construction, operational and maintenance phase impacts are provided in Section 6.1 and 6.2. All mitigatory measures required to minimise the perceived impacts are presented in Section 6.3.

Activities and aspects register

The table below indicates the perceived risks to floral species associated with the activities pertaining to the proposed parking expansion.

Table 4: Activities and Aspects likely to impact on the terrestrial biodiversity resources of the subject property.

ACTIVITIES AND ASPECTS REGISTER	
Pre-Construction Phase	
-	Potential inconsiderate planning of infrastructure placement and design, leading to the loss of sensitive floral and faunal species and/or habitat for such species, as well as unnecessary edge effect impacts on areas outside of the proposed development footprint.
-	Impact: Degradation and modification of the receiving environment, loss of faunal and floral habitat.
-	Potential failure to design and implement an AIP Management/Control plan, or to incorporate the study area within an existing AIP Management/Control plan, to be implemented throughout all phases of the project, resulting in the spread of AIPs from the development footprint to surrounding natural habitat.
-	Impact: Spreads of AIPs, leading to potential loss of floral species diversity from surrounding natural habitat.
Construction Phase	
-	Site clearing and the removal of vegetation.
-	Impact: Loss of faunal and floral habitat and diversity.
-	Proliferation of AIP species that colonise in areas of increased disturbances and that outcompete native species, including the further transformation of adjacent natural habitat.
-	Impact: Loss of favourable faunal and floral habitat outside of the direct development footprint, including a decrease in species diversity and a potential loss of faunal and floral SCC.
-	Potential dumping of construction material within areas where no construction is planned, thereby leading to further habitat disturbance - allowing the establishment and spread of AIPs.
-	Impact: Loss of preferred faunal and floral habitat, diversity and SCC as AIPs outcome and replace these species.
-	Potential overexploitation through the trapping and/or hunting of faunal species, including faunal SCC, beyond the direct footprint area.
-	Impact: Local loss of faunal abundance and diversity.
-	Potentially poorly managed edge effects: <ul style="list-style-type: none"> • Ineffective rehabilitation of compacted areas, bare soils, or eroded areas leading to continual proliferation of AIP species in disturbed areas and subsequent spread to surrounding natural areas altering the floral habitat; and • Compaction of soils outside of the study area due to indiscriminate driving of construction vehicles through natural vegetation.
-	Impact: Loss of floral habitat, diversity and SCC within the direct footprint of the proposed development. Loss of surrounding floral diversity and floral SCC through the displacement of indigenous flora by AIP species - especially in response to disturbance in natural areas.



ACTIVITIES AND ASPECTS REGISTER	
-	Possible increased fire frequency during construction.
-	Impact: Loss or alteration of floral and faunal habitat and species diversity.
-	Dust generated during construction and operational activities accumulating on the surrounding floral individuals, altering the photosynthetic ability of plants ¹¹ and potentially further decreasing optimal growing/re-establishing conditions.
-	Impact: Declines in plant functioning leading to loss of floral species and habitat for optimal growth.
Operational and Maintenance Phases	
-	Increased introduction and proliferation of alien plant species due to a lack of maintenance activities, or poorly implemented and monitored AIP Management programme, leading to ongoing displacement of natural vegetation outside of the footprint area.
-	Impact: Ongoing or permanent loss of faunal and floral habitat, diversity and potential SCC.
-	Increased human presence in the area once operational, potentially leading to illegal harvesting/ collection of medicinal plants, the persecution of fauna in the adjacent natural habitat, or an increased risk of fire frequency impacting on floral and faunal communities outside of the development footprint.
-	Impact: Loss of faunal and floral habitat, medicinal flora and SCC, as well as overall species diversity within the local area.

6.1 Impact Assessment Tables

The below section provides the findings of the impact assessment undertaken with reference to the perceived impacts prior to the implementation of mitigation measures and following the implementation of mitigation measures. The mitigated results of the impact assessment have been calculated on the premise that all mitigation measures as stipulated in this report are adhered to and implemented (**Section 6.3**). Should such actions not be adhered to, it is highly likely that post-mitigation impact scores will increase.

The below tables (Tables 5 and 6) provide the results of the terrestrial biodiversity impact assessment. Flora and fauna were considered in a combined fashion as they are dependent on one-another and therefore the impacts can be considered similar. A discussion is provided for flora and fauna separately in **Sections 6.2.1** and **6.2.2** respectively.

¹¹ Sett, R. (2017). Responses in plants exposed to dust pollution. Horticulture International Journal, 1(2), 00010.).



Table 5: Summary of the Impact Assessment of the Pre-Construction, Construction, and Operational and Maintenance Phases of the proposed parking expansion for flora.

Activity	UNMANAGED						MANAGED					
	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE
PRE-CONSTRUCTION PHASE												
Impact on Floral Habitat and Diversity												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	M	VL	M	L	H	Low	M	VL	M	L	M	Very Low
Impact on Floral SCC												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	M	VL	L	L	L	Very Low	M	VL	L	L	VL	Insignificant
CONSTRUCTION PHASE												
Impact on Floral Habitat and Diversity												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	M	L	M	M	VH	Medium	L	L	L	L	VH	Low
Impact on Floral SCC												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	M	L	VL	L	H	Low	M	L	VL	L	L	Very Low
OPERATIONAL AND MAINTENANCE PHASES												
Impact on Floral Habitat and Diversity												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	M	H	M	M	M	Low	L	H	M	M	L	Very Low
Impact on Floral SCC												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	M	H	M	M	L	Very Low	M	H	M	M	VL	Very Low

Table 6: Summary of the Impact Assessment of the Pre-Construction, Construction, and Operational and Maintenance Phases of the proposed parking expansion for fauna.

Activity	UNMANAGED						MANAGED					
	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE
PRE-CONSTRUCTION PHASE												



Activity	UNMANAGED						MANAGED					
	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	INTENSITY	DURATION	EXTENT	CONSEQUENCE	PROBABILITY	SIGNIFICANCE
Impact on Faunal Habitat and Diversity												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	L	VL	L	VL	M	Very Low	VL	VL	L	VL	L	Insignificant
Impact on Faunal SCC												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	L	VL	L	VL	M	Very Low	VL	VL	L	VL	L	Insignificant
CONSTRUCTION PHASE												
Impact on Faunal Habitat and Diversity												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	M	L	M	M	VH	Medium	L	L	L	L	VH	Low
Impact on Faunal SCC												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	VL	VL	L	VL	M	Very Low	VL	VL	L	VL	VL	Insignificant
OPERATIONAL AND MAINTENANCE PHASES												
Impact on Faunal Habitat and Diversity												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	M	H	M	M	H	Medium	L	H	M	M	M	Low
Impact on Faunal SCC												
PROPOSED EXPANSION OF A PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE	L	H	L	M	M	Low	VL	H	L	L	VL	Insignificant

6.2 Impact Discussion

The direct impact of the proposed parking expansion on the floral and faunal ecology of the study area is not anticipated to be detrimental, with impact significance varying between medium and low for the Secondary Marikana Thornveld prior to mitigation measures implemented, whereas the impact significance for the Transformed Habitat was insignificant. With mitigation measures implemented, the direct and indirect impacts on the floral and faunal ecology for the entire study area can largely be reduced to low and very-low levels, with impact on floral and faunal SCC considered to be low to insignificant prior to and post mitigation.



Due to the study area being bordered by actively used roads along its western and northern boundary, with an informal gravel road and walkways more recently constructed to the south of the study area, the surrounding natural vegetation within the local region is unlikely to be impacted by the proposed development. As part of the rehabilitation actions, disturbed areas not within the development footprint must be rehabilitated appropriately and AIP establishment controlled within such areas.

6.2.1 Impact on Floral Ecology

Impact on Floral Habitat and Diversity

Floral communities within the study area were species poor, homogenous, and a poor representation of the reference Marikana Thornveld vegetation type – the consequent outcome of several decades of habitat transformation from agricultural activities. The close proximity to anthropogenic activities and the fragmented nature of the study area leaves minimal potential for floral communities to recover to a pre-cultivation state. Ecological drivers and corridors are altered and have resulted in reduced dispersal abilities of floral species and reduced potential for floral communities to diversify.

The proposed parking expansion is not anticipated to significantly impact on floral communities within the local region, with the impact highly likely to be restricted to the footprint area given that mitigation measures are implemented.

Impact on Floral Species of Conservation Concern

No floral SCC were recorded within the study area. Suitable habitat was not present for species from the list of RDL species and NEM:BA TOPS list. The RDL species with known distributions intersecting that of the study area is not anticipated to be overlooked due to season of assessment (autumn); instead, the lack of suitable habitat and conditions are the main cause for the exclusion of such species from the site.

Provincially protected species protected under the TNCO, i.e., Specially Protected Species (Schedule 12) (Section 86 (1) (b) of the TNCO) and Protected Species (Schedule 11) (Section 86 (1) (a) of the TNCO), were not present on site during the time of assessment. With the exception of common and wide-ranged species from the *Gladiolus* and *Crinum* genera, it is highly unlikely that such species will be present within such a homogenous landscape where a strong anthropogenic presence was evident. Despite the lack of provincially protected species from the study area, it is recommended that a site walkdown be undertaken after the area has received adequate rain and prior to the clearing of vegetation to determine the



presence of provincially protected species that may require permit applications (these are not RDL species). Due to the survey taking place within autumn as opposed to summer, some provincially protected bulbous species could have been missed as they go dormant within the winter months. Permits from the DREAD would need to be obtained to remove, cut, or destroy the above-mentioned protected species before any vegetation clearing may take place.

Impact on CBAs, ESAs, Threatened Vegetation and Protected Areas

The study area is not within CBAs, ESAs or protected areas. The vegetation is further no longer a decent representative of the threatened Marikana Thornveld. The proposed parking expansion is not anticipated to impact on the above-mentioned significant features.

Probable Residual Impacts

Even with extensive mitigation, residual impacts on the receiving floral ecological environment are deemed likely. The following points highlight the key latent impacts that have been identified:

- Further loss of floral habitat outside of the footprint area;
- Loss and alteration of floral species diversity outside of the footprint area; and
- Continued AIP proliferation to adjacent natural vegetation communities.

Cumulative Impacts

The greatest threat to the floral ecology within the study area and the local region is the ongoing expansion of anthropogenic developments (be it mining, or housing related). The ongoing proliferation of poorly managed AIP species can result in an overall cumulative loss of native floral communities within the local area.

6.2.2 Impact on Faunal Ecology

Loss of Faunal Habitat and Ecological Structure

The proposed development footprint is approximately 3 ha and is anticipated to have a limited impact on faunal communities. The habitat integrity of most of the study area has been degraded, or completely lost, and only a few, commonly occurring faunal species were observed utilising the habitat. Even with the fragmented nature of the study area, the Secondary Marikana Thornveld still provides habitat for common and widespread faunal species that have integrated well into the anthropogenically influenced landscape.



The proposed development will result in a localised loss of faunal habitat from the area; however, the study area is associated with a moderately low diversity of fauna and no SCC were recorded. As such, the proposed parking expansion area is unlikely to have a significant negative impact on faunal communities. Mitigation efforts should be aimed at limiting edge effects from construction activities to the surrounding areas and implementing strict AIP management to ensure no further loss of habitat outside of the approved development footprint. Despite the current low abundances of AIPs on site, the disturbances caused by construction of the proposed development, as well as foreign material brought in for the construction of the proposed development, has the potential to introduce AIPs and contribute to their spread in the surrounding natural environments.

Impact on Important Faunal SCC

No faunal SCC were observed within the study area. The largely anthropogenic landscape, lack of suitable habitat and the level of transformation within and surrounding the study area have resulted in the exclusion of faunal SCC from the study area. Although it is unlikely that any faunal SCC will permanently reside within the study area, it is possible that such species are present within the surrounding natural habitat – albeit only temporarily for foraging purposes.

The impact significance on faunal SCC within the study area is considered to be very low.

Probable Residual Impacts

Even with extensive mitigation, residual impacts on the receiving faunal ecological environment are deemed likely. The following points highlight the key residual impacts that have been identified:

- Continued loss of faunal habitat; and
- Continued loss of and altered faunal species diversity.

Possible cumulative Impacts

Much of the study area and surrounds has already been disturbed, fragmented from nearby natural habitat and is associated with high levels of anthropogenic activities. The proposed development will result in the clearance of vegetated areas and further isolation and displacement of faunal species within the local area.



Ineffective control and monitoring of edge effects can result in the spread of AIP species to the surrounding natural areas, which will further alter faunal habitat and subsequently faunal diversity within this area.

Due to the limited development footprint of the study area, it is highly unlikely that the proposed development will impact conservation targets for sensitive faunal species.

6.3 Integrated Impact Mitigation

The table below highlights the key, general integrated mitigation measures that are applicable to the proposed development in order to suitably manage and mitigate the ecological impacts that are associated with all phases of the proposed development.

Provided that all management and mitigation measures are implemented, as stipulated in this report, the overall risk to floral and faunal diversity, habitat and SCC can be mitigated and minimised.

Table 7: A summary of the mitigatory requirements for floral and faunal resources.

Project phase	Pre-construction Phase
Impact Summary	Loss of floral and faunal habitat, species, and SCC
Proposed mitigation and management measures:	
Floral and Faunal Habitat and Diversity	
<ul style="list-style-type: none"> Minimise loss of indigenous vegetation where possible through planning and where necessary by incorporating the sensitivity of the biodiversity report as well as any other specialist studies; Prior to the commencement of construction activities, an AIP Management and Control Plan should be compiled for implementation to manage the spread of AIPs to areas outside of the proposed development. If there is an existing plan (a standard requirement for all mines), the study area should be incorporated into this plan and it must be ensured that the AIP Management/Control Plan meets the requirements of the updated NEM:BA – Alien and Invasive Species Regulations, 2020, and is relevant to the updated NEM:BA – Alien and Invasive Species Lists, 2020. A walkdown of the footprint area is required before vegetation clearance commences (taking place after adequate rains so that bulbous species can be detected) where all potentially occurring protected floral species are searched and marked for relocation and/or destruction so that all necessary permits can be obtained from the DREAD. 	
Project phase	Construction Phase
Impact Summary	Loss of floral and faunal habitat, species, and SCC
Proposed mitigation and management measures:	
Development footprint	
<ul style="list-style-type: none"> The construction footprint must be kept as small as possible to minimise impact on the surrounding environment (edge effect management); Removal of vegetation must be restricted to what is absolutely necessary and should remain within the approved development footprint. Where possible/ feasible, any remaining natural areas should be utilised as part of the landscaping of the proposed development; Clearing of vegetation should take place in a phased manner. This will allow for faunal species within the study area to flee and avoid harm; Smaller species that are not as readily able to move out of an area ahead of ground clearing activities such as scorpions and reptiles will be less mobile during rainfall events and cold days (winter). As such should any be observed in the construction site during clearing and construction activities, they are to be carefully and safely moved to an area of similar habitat outside of the disturbance footprint. Construction personnel are to be educated about these species and instructed not to kill them. Smaller scorpion species and harmless reptiles (that may occur within the study area) should be carefully relocated by a suitably nominated construction person to the surrounding natural veld. For larger 	



<p>venomous snakes, a suitably trained specialist, or on-site personnel, should be contacted to carry out the relocation of the species, should it not move off on its own;</p> <ul style="list-style-type: none"> • Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities. Additional road construction should be limited to what is absolutely necessary, and the footprint thereof kept to a minimal; • No collection of floral SCC must be allowed by construction personnel; • No hunting or trapping of faunal species is to be allowed by construction personnel; • Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed; • Care should be taken during the construction and operation of the proposed development to limit edge effects to surrounding natural habitat. This can be achieved by: <ul style="list-style-type: none"> - Demarcating all footprint areas during construction activities; - No construction rubble or cleared AIPs are to be disposed of outside of demarcated areas, and should be taken to a registered waste disposal facility; - All soils compacted as a result of construction activities should be ripped and profiled and reseeded; and - Manage the spread of AIP species, which may affect remaining natural habitat within surrounding areas. • Appropriate sanitary facilities must be provided during the construction of the development and must be removed to an appropriate waste disposal site; • No dumping of litter, rubble or cleared vegetation on site should be allowed. Infrastructure and rubble removed because of the construction activities should be disposed of at an appropriate registered dump site away from the development footprint. No temporary dump sites should be allowed in areas with natural vegetation. It is advised that waste disposal containers and bins be provided during the construction phase for all construction rubble and general waste. Vegetation cuttings must be carefully collected and disposed of at a separate waste facility; • If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder floral rehabilitation later down the line. Spill kits should be kept on-site within workshops. In the event of a breakdown, maintenance of vehicles must take place with care, and the recollection of spillage should be practised, preventing the ingress of hydrocarbons into the topsoil; and • Upon completion of construction activities, it must be ensured that no bare areas remain, and that indigenous species be used to revegetate the disturbed area. 	
Alien Vegetation	
<ul style="list-style-type: none"> • Edge effects arising from the proposed development, such as erosion and AIP species proliferation, which may affect adjacent natural areas, need to be strictly managed. Specific mention in this regard is made of Category 1b AIP species (as listed in the NEM:BA Alien species lists, 2020), in line with the NEM:BA Alien and Invasive Species Regulations (2020) (Section 4.1.2 of this report); • Ongoing AIP monitoring and clearing/control should take place throughout the construction and operational phase of the development, and a 30 m buffer surrounding the study area should be regularly checked for AIP proliferation and to prevent spread into surrounding natural areas; • Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility which complies with legal standards; and • Where chemical control of AIPs is deemed necessary, no uncertified chemical control may take place. Only trained personnel to handle chemical clearing of AIPs. 	
Project phase	Operational and Maintenance Phase
Impact Summary	Loss of floral and faunal habitat, species, and SCC
Proposed mitigation and management measures:	
Development footprint	
<ul style="list-style-type: none"> • Where formal landscaped gardens are envisioned, use should be made of indigenous species or ornamental alien species that are not listed within the NEM:BA Alien Species List (2020). 	
Alien Vegetation	
<ul style="list-style-type: none"> • Edge effects arising from the proposed development, such as erosion and AIP species proliferation, which may affect adjacent natural areas, need to be strictly managed. Specific mention in this regard is made of Category 1b AIP species (as listed in the NEM:BA Alien species lists, 2020), in line with the NEM:BA Alien and Invasive Species Regulations (2020) (Section 4.1.2 of this report); • Ongoing AIP monitoring and clearing/control should take place throughout the operational phase, and the project perimeters should be regularly checked for AIP establishment to prevent spread into surrounding natural areas; and 	



- Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility, which complies with legal standards.
- Where chemical control of AIPs is deemed necessary, no uncertified chemical control may take place. Only trained personnel to handle chemical clearing of AIPs.

7. CONCLUSION

STS was appointed by SLR to conduct a terrestrial biodiversity assessment as part of the EA process for the proposed expansion of a parking area at the Shaft 16 Complex, Impala Platinum Mine, near Rustenburg in the North West Province.

Following the field assessment, two habitat units could be distinguished for the study area. The habitat units were determined based on species composition, vegetation structure, ecological function, biophysical environment, and habitat condition.

- 1) Transformed Areas: A small section of the study area includes current built-up or transformed habitat associated with the main road leading to the Impala Platinum Mine as well as heavily modified land where little to no indigenous vegetation remains; and
- 2) Secondary Marikana Thornveld Habitat Unit: This habitat unit includes areas that are currently vegetated and that comprises indigenous vegetation; however, due to significant historic transformation of this area (long-term cultivation since at least 1955), with no rehabilitation efforts, the vegetation is homogenous and species diversity poor from both a faunal and floral perspective.

The study area is fragmented and isolated from surrounding natural habitat via man-made barriers, with roads being the immediate barrier and built-up areas (mine and township) forming additional barriers in the larger, local landscape. The fragmented landscape and association with a rather strong anthropogenic presence have altered the natural ecological corridors on site which reduces dispersal abilities of floral species and reduces the diversification potential of floral communities. With a lack of suitable habitat and somewhat impeded movement corridors, the presence of expected fauna has shifted to a lack of megaherbivores and predators, with only widespread and commonly occurring fauna currently utilising the study area.

Although the study area is located within the VU Marikana Thornveld, the study area is no longer representative of this vegetation type given the long-term, historic association with cultivation that the study area has experienced. The initial cause of degradation (i.e., historic cultivation) has been removed from the study area since 2004, yet the habitat has been unable to recover to a representative state, i.e., it is no longer transformed but a significant loss of



function, structure, and species composition has occurred. The historic cause of degradation is now replaced by more subtle impacts, such as edge effects from AIPs, fragmentation of the habitat, and removal of natural grazers and fire regimes. For this purpose, the habitat is considered severely degraded.

SCC (RDL species, NEM:BA TOPS, and provincially protected species) were not noted within the floral or faunal component. The habitat is also not deemed suitable to sustain viable populations of such species - with the exception of common and wide-ranged species from the *Gladiolus* and *Crinum* genera (Protected Species (Schedule 11) (Section 86 (1) (a) from the TNCO). Despite the lack of floral SCC from the study area, along with a lack of suitable conditions for such species, it is recommended that a site walkdown be undertaken after the area has received adequate rain and prior to the clearing of vegetation. Although it is unlikely that any faunal SCC will permanently reside within the study area, it is possible that such species may be present within the surrounding natural habitat – albeit only temporarily for foraging purposes.

The findings of the biodiversity assessment concluded that the study area is of **low** (Transformed Areas) to **moderately low** (Secondary Marikana Thornveld) ecological importance and sensitivity. The direct impact of the proposed parking expansion on the floral and faunal ecology of the study area is not anticipated to be detrimental, with impact significance varying between **medium** and **very low** for faunal diversity and habitat prior to mitigation measures implemented, with impact significance varying between **medium and low** for floral diversity and habitat prior to mitigation measures implemented. With mitigation measures fully implemented, the impact significance on faunal habitat and diversity can be lowered to **low and insignificant** levels. For floral habitat and diversity, impact significance post implementation of mitigation measures, can be reduced to **very low** levels, apart from the construction phase where impacts will be of **low** significance due to the direct loss of floral species. Impact on floral and faunal SCC prior to mitigation measures implemented, varied between low and very low levels of significance. With mitigation measures fully implemented, impact significance can be lowered to an **insignificant** impact significance for fauna and a **very low** impact significance for flora.

It is the opinion of the ecologists that this study provides the relevant information required in order to implement Integrated Environmental Management (IEM) and to ensure that the best long-term use of the ecological resources in the study area will be made in support of the principle of sustainable development.



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APPENDIX A: Indemnity and Terms of Use of this Report

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by seasonality, time and budgetary constraints relevant to the type and level of investigation undertaken as well as the project program and STS CC and its staff, at their sole discretion, reserve the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field or pertaining to this investigation.

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This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.



APPENDIX B: Legislative Requirements

CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, 1996 (ACT 108 OF 1996)

The environment and the health and well-being of people are safeguarded under the Constitution of the Republic of South Africa, 1996 by way of section 24. Section 24(a) guarantees a right to an environment that is not harmful to human health or well-being and to environmental protection for the benefit of present and future generations. Section 24(b) directs the state to take reasonable legislative and other measures to prevent pollution, promote conservation, and secure the ecologically sustainable development and use of natural resources (including water and mineral resources) while promoting justifiable economic and social development. Section 27 guarantees every person the right of access to sufficient water, and the state is obliged to take reasonable legislative and other measures within its available resources to achieve the progressive realisation of this right. Section 27 is defined as a socio-economic right and not an environmental right. However, read with section 24 it requires of the state to ensure that water is conserved and protected and that sufficient access to the resource is provided. Water regulation in South Africa places a great emphasis on protecting the resource and on providing access to water for everyone.

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998) (NEMA)

The National Environmental Management Act (NEMA; Act 107 of 1998) and the associated Environmental Impact Assessment (EIA) Regulations (GN R982 of 2014) and well as listing notices 1, 2 and 3 (GN R983, R984 and R985 of 2014), state that prior to any development taking place which triggers any activity as listed within the abovementioned regulations, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment process or the EIA process depending on the nature of the activity and scale of the impact.

NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT, 2004 (ACT 10 OF 2004) (NEM:BA)

The objectives of this act are (within the framework of NEMA) to provide for:

- The management and conservation of biological diversity within the Republic of South Africa and of the components of such diversity;
- The use of indigenous biological resources in a sustainable manner;
- The fair and equitable sharing among stakeholders of the benefits arising from bio prospecting involving indigenous biological resources;
- To give effect to ratify international agreements relating to biodiversity which are binding to the Republic;
- To provide for cooperative governance in biodiversity management and conservation; and
- To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

This act alludes to the fact that management of biodiversity must take place to ensure that the biodiversity of the surrounding areas are not negatively impacted upon, by any activity being undertaken, in order to ensure the fair and equitable sharing among stakeholders of the benefits arising from indigenous biological resources.

Furthermore, a person may not carry out a restricted activity involving either:

- a) A specimen of a listed threatened or protected species;
- b) Specimens of an alien species; or
- c) A specimen of a listed invasive species without a permit.



GOVERNMENT NOTICE NUMBER R.1020: ALIEN AND INVASIVE SPECIES REGULATIONS, 2020 (IN GOVERNMENT GAZETTE 43735), INCLUDING GOVERNMENT NOTICE NUMBER 1003: ALIEN AND INVASIVE SPECIES LISTS, 2020 (IN GOVERNMENT GAZETTE 43726) AS IT RELATES TO THE NEM:BA

NEM:BA is administered by the Department of Environmental Affairs and aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA. In terms of alien and invasive species. This act in terms of alien and invasive species aims to:

- Prevent the unauthorized introduction and spread of alien and invasive species to ecosystems and habitats where they do not naturally occur,
- Manage and control alien and invasive species, to prevent or minimize harm to the environment and biodiversity; and
- Eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.

Alien species are defined, in terms of the National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004) as:

- (a) A species that is not an indigenous species; or
- (b) An indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.

Categories according to NEM:BA (Alien and Invasive Species Regulations, 2020):

- **Category 1a:** Invasive species that require compulsory control;
- **Category 1b:** Invasive species that require control by means of an invasive species management programme;
- **Category 2:** Commercially used plants that may be grown in demarcated areas, provided that there is a permit and that steps are taken to prevent their spread; and
- **Category 3:** Ornamentally used plants that may no longer be planted.

CONSERVATION OF AGRICULTURAL RESOURCES ACT, 1983 (ACT 43 OF 1983) (CARA)

Removal of the alien and weed species encountered in the application area must take place in order to comply with existing legislation (amendments to the regulations under the CARA, 1983 and Section 28 of the NEMA, 1998). Removal of species should take place throughout the construction and operation, phases.

TRANSVAAL NATURE CONSERVATION ORDINANCE, 1983 (ORDINANCE 12 OF 1983) (TNCO)

This Ordinance will be repealed in as far as it relates to the North West Province when the North West Biodiversity Management Act, 2017 comes into force.

Applicable Legislation and Guidelines used to Compile the Report

FAUNA AND FLORA SCHEDULES IN THE ORDINANCE

- Schedule 2: Protected game
- Schedule 2A: Specially protected game
- Schedule 4: Protected wild animals
- Schedule 7: Invertebrata
- Schedule 11: Protected plants
- Schedule 12: Specially protected plants

Subject to the provisions of this Ordinance, no person shall pick a protected plant. Unless he is the holder of a permit which authorises him to do so. Subject to the provisions of this Ordinance, no person shall hunt protected game: Provided that upon the written application of the owner of land a permit may be issued. Any person who contravenes or fails to comply with subsection (1) shall be guilty of an offence.



CHAPTER VIII - ENDANGERED AND RARE SPECIES OF FAUNA AND FLORA [Section 97(1)]

Every species of fauna and flora referred to in -

- a. Appendix I;
 - b. Appendix II;
- to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington DC 1973), as amended up to 6 June 1981, and any readily recognisable part or derivative thereof, shall be an endangered species or a rare species of fauna and flora respectively.

Contravention of this declaration is regarded as a first category offence that may result in a person who is found guilty of being sentenced to a fine or imprisonment for a period up to three years, or both a fine and imprisonment.

NORTH WEST BIODIVERSITY MANAGEMENT ACT, 2016 (ACT NO. 4 OF 2016) (NWBMA)

***The North West Biodiversity Management Act was published on 3 January 2017 but has not yet come into force.*

The purpose of this Act will be:

- To provide for the management and conservation of the North West Province's biophysical environment and protected areas within the framework of the NEMA;
- To provide for the protection of species and ecological-systems that warrant provincial protection;
- To provide for the sustainable use of indigenous biological resources; and
- To provide for matters connected therewith.

Applicable sections

CHAPTER 4 - Protection of Species

Applicable Legislation and Guidelines used to Compile the Report

Applicable Notices:

Schedule 2: List of Specially Protected Species



APPENDIX C: Floral Method of Assessment

Floral Species of Conservation Concern Assessment

Prior to the site visit, a record of floral SCC and their habitat requirements was developed for the study area, which includes consulting the National Web-based Environmental Screening Tool. Because not all SCC have been included in the Screening Tool layers (e.g., NT and DD taxa), it remains important for the specialist to be on the lookout for additional SCC. For this study, two primary sources were consulted and are described below.

The National Web-Based Environmental Screening Tool

The Screening Tool was accessed to obtain a list of potentially occurring species of conservation concern for the study area. Each of the themes in the Screening Tool consists of theme-specific spatial datasets which have been assigned a sensitivity level namely, “*low*”, “*medium*”, “*high*” and “*very high*” sensitivity. The four levels of sensitivity are derived and identified in different ways, e.g. for **confirmed** areas of occupied habitat for SCC a Very High and High Sensitivity is assigned and for areas of suitable habitat where SCC may occur based on spatial models only, a Medium Sensitivity is assigned. The different sensitivity ratings pertaining to the Plant [and Animal] Protocols are described below¹²:

- **Very High:** Habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km² are considered Critical Habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) D criteria of the IUCN or species listed as Critically/ Extremely Rare under South Africa’s National Red List Criteria. For each species reliant on a Critical Habitat, all remaining suitable habitat has been manually mapped at a fine scale.
- **High:** Recent occurrence records for all threatened (CR, EN, VU) and/or rare endemic species are included in the high sensitivity level. Spatial polygons of suitable habitat have been produced for each species by intersecting recently collected occurrence records (those collected since the year 2000) that have a spatial confidence level of less than 250 m with segments of remaining natural habitat.
- **Medium:** Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. Two types of spatial models have been included. The first is a simple rule-based habitat suitability model where habitat attributes such as vegetation type and altitude are selected for all areas where a species has been recorded to occur. The second is a species distribution model which uses species occurrence records combined with multiple environmental variables to quantify and predict areas of suitable habitat. The models provide a probability-based distribution indicating a continuous range of habitat suitability across areas that have not been previously surveyed. A probability threshold of 75% for suitable habitat has been used to convert the modelled probability surface and reduce it into a single spatial area which defines areas that fall within the medium sensitivity level.
- **Low:** Areas where no SCC are known or expected to occur.

BRAHMS Online Website

The Botanical Database of Southern Africa (BODATSA) is accessed to obtain plant names and floristic details (<http://posa.sanbi.org/>) for species of conservation concern within a selected boundary;

- This website provides access to South African plant names (taxa), specimens (herbarium sheets) and observations of plants made in the field (botanical records). Data is obtained from the BODATSA, which contains records from the National Herbarium in Pretoria (PRE), the

¹² More details on the use of the Screening Tool for Species of Conservation Concern can be found in the below resources:

- South African National Biodiversity Institute (SANBI). 2020. Draft Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 1.0.
- The National Web based Environmental Screening Tool website:
<https://screening.environment.gov.za/screeningtool/#/pages/welcome>



Compton Herbarium in Cape Town (NBG & SAM) and the KwaZulu-Natal Herbarium in Durban (NH).

- Information on habitat requirements etc. is obtained from the SANBI Red List of South African Plants website (<http://redlist.sanbi.org/>).
- Typically, data is extracted for the Quarter Degree Square (QDS) in which the study area is situated but where it is deemed appropriate, a larger area can be included.

NEM:BA TOPS Species

The Threatened or Protected Species (TOPS) Regulations (R 152 of 2007) under Section 56(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA), were taken into consideration.

Specially Protected and Protected Species

The Transvaal Nature Conservation Ordinance, 1983 (Ordinance 12 of 1983) (TNCO) provides a list of Specially Protected Species (Schedule 12) (Section 86 (1) (b) of the TNCO) and Protected Species (Schedule 11) (Section 86 (1) (a) of the TNCO) for the North West Province. These species formed part of the SCC assessment.

Throughout the floral assessment, special attention was paid to the identification of any of these SCC as well as the identification of suitable habitat that could potentially support these species.

The Probability of Occurrence (POC) for each floral SCC is described:

- **“Confirmed”**: if observed during the survey;
- **“High”**: if within the species’ known distribution range and suitable habitat is available;
- **“Medium”**: if either within the known distribution range of the species or if suitable habitat is present; or
- **“Low”**: if the habitat is not suitable and falls outside the distribution range of the species.

Low POC	Medium POC	High POC	Confirmed
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The accuracy of the POC is based on the available knowledge about the species in question, with many of the species lacking in-depth habitat research.

Vegetation Surveys

When planning the timing of a floristic survey, it is important to remember that the primary objective is not an exhaustive species list but rather to ensure that sufficient data are collected to describe all the vegetation communities present in the area of interest, to optimise the detection of SCC and to assess habitat suitability for other potentially occurring SCC (SANBI, 2020).

The vegetation survey incorporates the subjective (or stratified) sampling method. Subjective sampling is a sampling technique in which the specialist relies on his or her own professional experience when choosing sample sites within the study area. This allows representative recordings of floral communities and optimal detection of SCC. Subjective sampling is used to consider different areas (or habitat units) which are identified within the main body of a habitat/study area.

One of the problems with random sampling, another popular sampling method, is that random samples may not cover all areas of a study area equally and thus increase the potential to miss floral SCC. Random sampling methods also tend to require more time in the field to locate the amount of SCC that can be detected using subjective sampling methods - In the context of an EIA where time constraints are often restrictive, priority needs to be given to collecting data in the shortest time possible without compromising the efficiency of locating SCC (SANBI, 2020).

Vegetation structure has been described following the guideline in Edwards (1983). Refer to Figure C1 below:



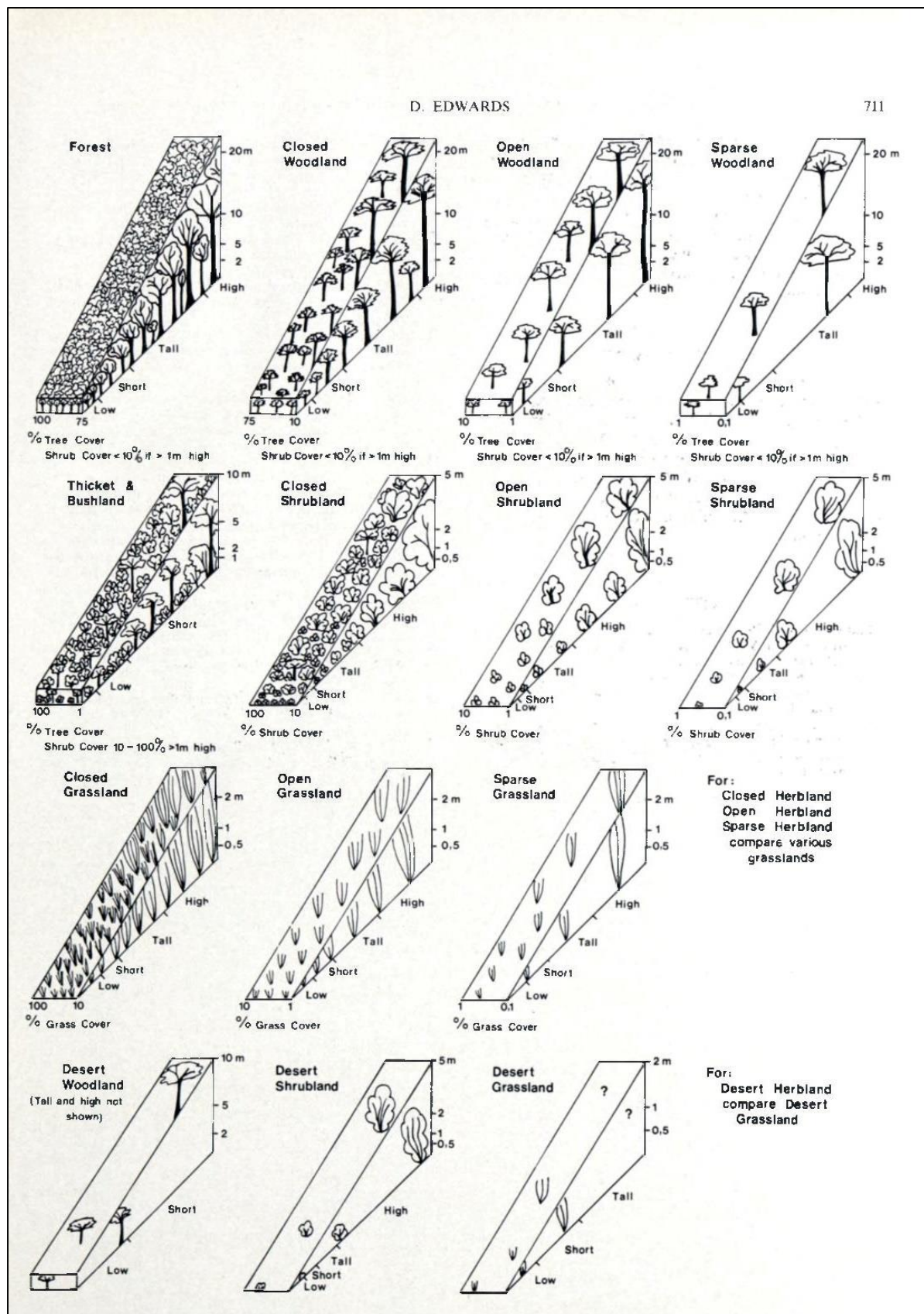


Figure C1: Diagrammatic representation of structural groups and formation classes. Only dominant growth forms are shown.



Floral Habitat Sensitivity

The floral habitat sensitivity of each habitat unit was determined by calculating the mean of five different parameters which influence floral communities and provide an indication of the overall floristic ecological integrity, importance, and sensitivity of the habitat unit. Each of the following parameters are subjectively rated on a scale of 1 to 5 (1 = lowest and 5 = highest):

- **Floral SCC:** The confirmed presence or potential for floral SCC or any other significant species, such as endemics, to occur within the habitat unit;
- **Unique Landscapes:** The presence of unique landscapes or the presence of an ecologically intact habitat unit in a transformed region;
- **Conservation Status:** The conservation status of the ecosystem or vegetation type in which the habitat unit is situated based on local, regional and national databases. Whether the habitat is representative of a Critical Biodiversity Area or forms part of an Ecological Support Area is also taken into consideration;
- **Floral Diversity:** The recorded floral diversity compared to a suitable reference condition such as surrounding natural areas or available floristic databases; and
- **Habitat Integrity:** The degree to which the habitat unit is transformed based on observed disturbances which may affect habitat integrity.

Each of these values contribute equally to the mean score, which determines the floral habitat sensitivity class in which each habitat unit falls. A conservation and land-use objective is also assigned to each sensitivity class which aims to guide the responsible and sustainable utilization of the habitat unit in question. To present the results use is made of spider diagrams to depict the significance of each aspect of floral ecology for each vegetation type. The different classes and land-use objectives are presented in the table below:

Table C1: Floral habitat sensitivity rankings and associated land-use objectives.

Score	Rating significance	Conservation objective
1 < 1.5	Low	Optimise development potential.
≥1.5 <2.5	Moderately low	Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects.
≥2.5 <3.5	Intermediate	Preserve and enhance biodiversity of the habitat unit and surrounds while optimizing development potential.
≥3.5 <4.5	Moderately high	Preserve and enhance the biodiversity of the habitat unit, limit development and disturbance.
≥4.5 ≤5.0	High	Preserve and enhance the biodiversity of the habitat unit, no-go alternative must be considered.



APPENDIX D: Faunal Method of Assessment

It is important to note that due to the nature and habits of fauna, varied stages of life cycles, seasonal and temporal fluctuations along with other external factors, it is unlikely that all faunal species will have been recorded during the site assessment. The presence of human habitation nearby the focus area and the associated anthropogenic activities may have an impact on faunal behaviour and in turn the rate of observations.

Mammals

Mammal species were recorded during the field assessment with the use of visual identification, spoor, call, and dung. Specific attention was paid to mammal SCC as listed by the IUCN, 2015.

Avifauna

The Southern African Bird Atlas Project 2 database (<http://sabap2.adu.org.za/>) was compared with the recent field survey of avifaunal species identified on the focus area. Field surveys were undertaken utilising visual observation and bird call identification techniques in order to accurately identify avifaunal species. Specific attention was given to avifaunal SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).

Reptiles

During the field assessment, suitable applicable habitat areas (rocky outcrops and fallen dead trees) were inspected for the presence of reptiles, and any individuals encountered were identified. The data gathered during the assessment along with the habitat analysis provided an accurate indication of which reptile species are likely to occur on the focus area. Specific attention was given to reptile SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).

Amphibians

Identifying amphibian species is done using direct visual identification along with call identification technique. Amphibian species flourish in and around wetland, riparian and moist grassland areas. It is unlikely that all amphibian species will have been recorded during the site assessment, due to their cryptic nature and habits, varied stages of life cycles and seasonal and temporal fluctuations within the environment. The data gathered during the assessment along with the habitat analysis provided an accurate indication of which amphibian species are likely to occur within the focus area as well as the surrounding area. Specific attention was given to amphibian SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).

Invertebrates

Whilst conducting transects through the focus area, all insect species visually observed were identified, and where possible photographs taken.

It must be noted however that due to the cryptic nature and habits of insects, varied stages of life cycles and seasonal and temporal fluctuations within the environment, it is unlikely that all insect species will have been recorded during the site assessment period. Nevertheless, the data gathered during the assessment along with the habitat analysis provided an accurate indication of which species are likely to occur in the focus area at the time of survey. Specific attention was given to insect SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).



Arachnids

Suitable applicable habitat areas (rocky outcrops, sandy areas and fallen dead trees) where spiders and scorpions are likely to reside were searched. Rocks were overturned and inspected for signs of these species. Specific attention was paid to searching for Mygalomorphae arachnids (Trapdoor and Baboon spiders) as well as potential SCC species within the focus area.

Faunal Species of Conservational Concern Assessment

The Probability of Occurrence (POC) for each faunal SCC is described:

- **“Confirmed”**: if observed during the survey;
- **“High”**: if within the species’ known distribution range and suitable habitat is available;
- **“Medium”**: if either within the known distribution range of the species or if suitable habitat is present; or
- **“Low”**: if the habitat is not suitable and falls outside the distribution range of the species.

The accuracy of the POC is based on the available knowledge about the species in question, with many of the species lacking in-depth habitat research.

Faunal Habitat Sensitivity

The sensitivity of the focus area for each faunal class (i.e. mammals, birds, reptiles, amphibians and invertebrates) was determined by calculating the mean of five different parameters which influence each faunal class and provide an indication of the overall faunal ecological integrity, importance and sensitivity of the focus area for each class. Each of the following parameters are subjectively rated on a scale of 1 to 5 (1 = lowest and 5 = highest):

- **Faunal SCC**: The confirmed presence or potential for faunal SCC or any other significant species, such as endemics, to occur within the habitat unit;
- **Habitat Availability**: The presence of suitable habitat for each class;
- **Food Availability**: The availability of food within the focus area for each faunal class;
- **Faunal Diversity**: The recorded faunal diversity compared to a suitable reference condition such as surrounding natural areas or available faunal databases; and
- **Habitat Integrity**: The degree to which the habitat is transformed based on observed disturbances which may affect habitat integrity.

Each of these values contributes equally to the mean score, which determines the suitability and sensitivity of the focus area for each faunal class. A conservation and land-use objective is also assigned to each sensitivity class which aims to guide the responsible and sustainable utilisation of the focus area in relation to each faunal class. The different classes and land-use objectives are presented in the table below:

Table D1: Faunal habitat sensitivity rankings and associated land-use objectives.

Score	Rating significance	Conservation objective
1.0 < 1.5	Low	Optimise development potential.
≥1.5 <2.5	Moderately low	Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects.
≥2.5 <3.5	Intermediate	Preserve and enhance biodiversity of the habitat unit and surrounds while optimising development potential.
≥3.5 <4.5	Moderately high	Preserve and enhance the biodiversity of the habitat unit, limit development and disturbance.
≥4.5 ≤ 5.0	High	Preserve and enhance the biodiversity of the habitat unit, no-go alternative must be considered.



APPENDIX E: Impact Assessment Methodology

Ecological Impact Assessment Method as provided by SLR Consulting (South Africa) (Pty) Ltd

The method to be used for assessing risks/impacts is outlined in the sections below.

PART A: DEFINITIONS AND CRITERIA*		
Definition of SIGNIFICANCE	Significance = consequence x probability	
Definition of CONSEQUENCE	Consequence is a function of intensity, spatial extent and duration	
Criteria for ranking of the INTENSITY of environmental impacts	VH	Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilization against project can be expected. May result in legal action if impact occurs.
	H	Prominent change, disturbance or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place.
	M	Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected.
	L	Minor (Slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected.
	VL	Negligible change, disturbance or nuisance. Associated with very minor consequences or deterioration. Targets, limits and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated.
	VL+	Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range.
	L+	Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits.
	M+	Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits.
	H+	Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support.
	VH+	Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected.
Criteria for ranking the DURATION of impacts	VL	Very short, always less than a year. Quickly reversible
	L	Short-term, occurs for more than 1 but less than 5 years. Reversible over time.
	M	Medium-term, 5 to 10 years.
	H	Long term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity)
	VH	Very long, permanent, +20 years (Irreversible. Beyond closure)
Criteria for ranking the EXTENT of impacts	VL	A part of the site/property.
	L	Whole site.
	M	Beyond the site boundary, affecting immediate neighbours
	H	Local area, extending far beyond site boundary.
	VH	Regional/National



PART B: DETERMINING CONSEQUENCE							
INTENSITY = Very Low							
DURATION	Very long	VH	Low	Low	Medium	Medium	High
	Long term	H	Low	Low	Low	Medium	Medium
	Medium term	M	Very Low	Low	Low	Low	Medium
	Short term	L	Very low	Very Low	Low	Low	Low
	Very short	VL	Very low	Very Low	Very Low	Low	Low
INTENSITY = Low							
DURATION	Very long	VH	Medium	Medium	Medium	High	High
	Long term	H	Low	Medium	Medium	Medium	High
	Medium term	M	Low	Low	Medium	Medium	Medium
	Short term	L	Low	Low	Low	Medium	Medium
	Very short	VL	Very low	Low	Low	Low	Medium
INTENSITY = Medium							
DURATION	Very long	VH	Medium	High	High	High	Very High
	Long term	H	Medium	Medium	Medium	High	High
	Medium term	M	Medium	Medium	Medium	High	High
	Short term	L	Low	Medium	Medium	Medium	High
	Very short	VL	Low	Low	Low	Medium	Medium
INTENSITY = High							
DURATION	Very long	VH	High	High	High	Very High	Very High
	Long term	H	Medium	High	High	High	Very High
	Medium term	M	Medium	Medium	High	High	High
	Short term	L	Medium	Medium	Medium	High	High
	Very short	VL	Low	Medium	Medium	Medium	High
INTENSITY = Very High							
DURATION	Very long	VH	High	High	Very High	Very High	Very High
	Long term	H	High	High	High	Very High	Very High
	Medium term	M	Medium	High	High	High	Very High
	Short term	L	Medium	Medium	High	High	High
	Very short	VL	Low	Medium	Medium	High	High

Very Low	Low	Medium	High	Very High
A part of the site/ property	Whole site	Beyond the site, affecting neighbours	Extending far beyond site but localised	Regional/ National
EXTENT				



PART C: DETERMINING SIGNIFICANCE							
PROBABILITY (of exposure to impacts)	Definite/ Continuous	VH	Very Low	Low	Medium	High	Very High
	Probable	H	Very Low	Low	Medium	High	Very High
	Possible/ frequent	M	Very Low	Very Low	Low	Medium	High
	Conceivable	L	Insignificant	Very Low	Low	Medium	High
	Unlikely/ improbable	VL	Insignificant	Insignificant	Very Low	Low	Medium
			VL	L	M	H	VH
CONSEQUENCE							

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	Decision guideline
Very High	Potential fatal flaw unless mitigated to lower significance.
High	It must have an influence on the decision. Substantial mitigation will be required.
Medium	It should have an influence on the decision. Mitigation will be required.
Low	Unlikely that it will have a real influence on the decision. Limited mitigation is likely required.
Very Low	It will not have an influence on the decision. Does not require any mitigation
Insignificant	Inconsequential, not requiring any consideration.

*VH = very high, H = high, M= medium, L= low and VL= very low and + denotes a positive impact.

Mitigation measure development

The following points present the key concepts considered in the development of mitigation measures for the proposed development.

- *Mitigation and performance improvement measures* and actions that address the risks and impacts¹³ are identified and described in as much detail as possible.
- Measures and actions to address negative impacts will favour avoidance and prevention over minimisation, mitigation or compensation.
- Desired outcomes are defined, and have been developed in such a way as to be *measurable events with performance indicators, targets and acceptable criteria* that can be tracked over *defined periods*, with estimates of the *resources* (including human resource and training requirements) and *responsibilities for implementation*.

Recommendations

Recommendations were developed to address and mitigate impacts associated with the proposed development. These recommendations also include general management measures which apply to the proposed development as a whole. Mitigation measures have been developed to address issues in all phases throughout the life of the operation from planning, through to construction and operation.

¹³ Mitigation measures should address both positive and negative impacts



APPENDIX F: Vegetation Type(s)

Marikana Thornveld (SVcb 6)



Figure D1: SVcb 6 Marikana Thornveld: *Vachellia nilotica* dominated clay thornveld north of Pretoria (near Ga-Rankuwa, Gauteng) after recent fire. Image by L. Mucina, pg. 464.

Table F1: Floristic species of *The Marikana Thornveld* (Mucina & Rutherford, 2006).

Plant Community	Species
Dominant and typical floristic species	
Woody Layer	
Trees	Small Tree: <i>Vachellia caffra</i> (d), <i>V. gerrardii</i> (d), <i>V. karroo</i> (d), <i>Combretum molle</i> (d), <i>Rhus lancea</i> (d), <i>Ziziphus mucronata</i> (d), <i>Vachellia nilotica</i> , <i>V. tortilis</i> subsp. <i>heteracantha</i> , <i>Celtis africana</i> , <i>Dombeya rotundifolia</i> , <i>Pappea capensis</i> , <i>Peltophorum africanum</i> , <i>Terminalia sericea</i> . Tall Tree: <i>Vachellia berkei</i>
Shrubs	Tall Shrubs: <i>Euclea crispa</i> subsp. <i>crispa</i> (d), <i>Olea europaea</i> subsp. <i>africana</i> (d), <i>Rhus pyroides</i> var. <i>pyroides</i> (d), <i>Diospyros lycioides</i> subsp. <i>guerkei</i> , <i>Ehretia rigida</i> subsp. <i>rigida</i> , <i>Euclea undulata</i> , <i>Grewia flava</i> , <i>Pavetta gardeniifolia</i> Low Shrubs: <i>Asparagus cooperi</i> (d), <i>Rhynchosia nitens</i> (d), <i>Indigofera zeyheri</i> , <i>Justicia flava</i> . Woody Climbers: <i>Clematis brachiata</i> (d), <i>Helinus integrifolius</i> .
Forb layer	
Herbs	<i>Hermannia depressa</i> (d), <i>Ipomoea obscura</i> (d), <i>Barleria macrostegia</i> , <i>Dianthus mooiensis</i> subsp. <i>mooiensis</i> , <i>Ipomoea oblongata</i> , <i>Hilliardiella aristata</i> .
Herbaceous Climbers	<i>Pentarrhinum insipidum</i> (d), <i>Cyphostemma cirrhosum</i>
Geophytic Herbs	<i>Ledebouria revoluta</i> , <i>Ornithogalum tenuifolium</i> , <i>Sansevieria aethiopica</i> .
Graminoid layer	
Graminoids	<i>Elionurus muticus</i> (d), <i>Eragrostis lehmanniana</i> (d), <i>Setaria sphacelata</i> (d), <i>Themeda triandra</i> (d), <i>Aristida scabrivalvis</i> subsp. <i>scabrivalvis</i> , <i>Fingerhuthia africana</i> , <i>Heteropogon contortus</i> , <i>Hyperthelia dissoluta</i> , <i>Melinis nerviglumis</i> , <i>Pogonarthria squarrosa</i> .

*(d) is for dominant



APPENDIX G: Species List

Observed and Expected Floral Species

Table G1: Dominant floral species encountered in the study area. Alien species are indicated with an asterisk (*).

Scientific name	Transformed Habitat	Secondary Marikana Thornveld
WOODY SPECIES		
* <i>Sesbania cf. bispinosa</i>		X
<i>Asparagus suaveolens</i>		X
<i>Diospyros lycioides subsp. guerkei</i>		X
<i>Senegalia mellifera subsp. detinens</i>		X
<i>Vachellia nilotica subsp. kraussiana</i>		X
<i>Vachellia tortilis subsp. tortilis</i>		X
FORB SPECIES		
* <i>Bidens pilosa</i>		X
* <i>Erigeron sp.</i>		X
* <i>Schkuhria pinnata</i>		X
* <i>Solanum sisymbriifolium</i>		X
* <i>Tagetes minuta</i>	X	X
* <i>Zinnia peruviana</i>		X
<i>Albica sp.</i>		X
<i>Crabbea hirsuta</i>		X
<i>Gladiolus sp.</i>		X
<i>Hermannia depressa</i>		X
<i>Hermannia transvaalensis</i>		X
<i>Hypoxis rigidula</i>		X
<i>Indigofera cf. comosa</i>		X
<i>Jamesbrittenia aurantiaca</i>		X
<i>Kyphocarpa angustifolia</i>		X
<i>Nidorella anomala</i>		X
<i>Polygala hottentotta</i>		X
<i>Rhynchosia monophylla</i>		X
<i>Sida dregei</i>	X	X
SUCCULENT SPECIES		
* <i>Opuntia ficus-indica</i>		X
GRAMINOID SPECIES		
<i>Aristida bipartita</i>		XX
<i>Brachiaria cf. serrata</i>		X
<i>Cenchrus ciliaris</i>		X
<i>Cymbopogon caecius</i>		X
<i>Cynodon dactylon</i>		XX
<i>Dichanthium annulatum</i>		X
<i>Enneapogon cenchroides</i>		X
<i>Eragrostis chloromelas</i>		X
<i>Eragrostis sp.</i>		X
<i>Heteropogon contortus</i>		XX
<i>Ischaemum afrum</i>		XX
<i>Melinis repens</i>	X	X
<i>Setaria cf. incrassata</i>		X
<i>Setaria sp.</i>		X
<i>Sporobolus africanus</i>	X	X
<i>Sporobolus stapfianus</i>		X
<i>Themeda triandra</i>		X

Observed and Expected Faunal Species



Table G2: Mammal species observed and expected to either temporarily utilise or move through the study area.

Scientific name	Common Name	IUCN Status
<i>Lepus saxatilis</i>	Scrub Hare	LC
<i>Herpestes sanguinea</i>	Slender Mongoose	LC

LC = Least Concern,

Table G3: Avifaunal species observed.

Scientific name	Common Name	IUCN Status
<i>Acridotheres tristis</i>	Common Myna	LC
<i>Bostrychia hagedash</i>	Hadedda Ibis	LC
<i>Corythaixoides concolor</i>	Grey Go-away Bird	LC
<i>Streptopelia capicola</i>	Cape turtle-dove	LC
<i>Trachyphonus vaillantii</i>	Crested Barbet	LC
<i>Vanellus coronatus</i>	Crowned Lapwing	LC
<i>Passer domesticus</i>	House sparrow	LC

LC = Least concerned

Table G4: Amphibian species observed.

Scientific name	IUCN Status
None observed on site	

Table G5: Insect species observed.

Scientific Name	Common Name	IUCN Status
<i>Acanthopplus discoidalis</i>	Brown Armoured Corncricket	NYBA
<i>Acanthacris ruficornis</i>	Garden Locust	NYBA
Acrididae grasshopper	-	-
<i>Belenois aurota</i>	Brown-veined White	NYBA
<i>Danaus chrysippus</i>	African Monarch	NYBA
<i>Junonia hierta</i>	Yellow Pansy	LC
Mantodea	-	-

NYBA = Not Yet Been Assessed, LC = Least Concern

Table G6: Reptile species observed.

Scientific Name	Common Name	IUCN Red List Status
<i>Gerrhosaurus</i>	Typical Plated Lizard	LC

LC = Least Concern

Table G7: Arachnid species observed.

Scientific Name	Common Name	IUCN Status
None observed on site		



APPENDIX H: Floral SCC

South Africa uses the internationally endorsed [IUCN Red List Categories and Criteria](#) in the Red List of South African plants. This scientific system is designed to measure species' risk of extinction. The purpose of this system is to highlight those species that are most urgently in need of conservation action. Due to its strong focus on determining risk of extinction, the IUCN system does not highlight species that are at low risk of extinction but may nonetheless be of high conservation importance. Because the Red List of South African plants is used widely in South African conservation practices such as systematic conservation planning or protected area expansion, we use an amended system of categories designed to highlight those species that are at low risk of extinction but of conservation concern.

Definitions of the national Red List categories

Categories marked with ^N are non-IUCN, national Red List categories for species not in danger of extinction but considered of conservation concern. The IUCN equivalent of these categories is Least Concern (LC).

- **Extinct (EX)** A species is Extinct when there is no reasonable doubt that the last individual has died. Species should be classified as Extinct only once exhaustive surveys throughout the species' known range have failed to record an individual.
- **Extinct in the Wild (EW)** A species is Extinct in the Wild when it is known to survive only in cultivation or as a naturalized population (or populations) well outside the past range.
- **Regionally Extinct (RE)** A species is Regionally Extinct when it is extinct within the region assessed (in this case South Africa), but wild populations can still be found in areas outside the region.
- **Critically Endangered, Possibly Extinct (CR PE)** Possibly Extinct is a special tag associated with the category Critically Endangered, indicating species that are highly likely to be extinct, but the exhaustive surveys required for classifying the species as Extinct has not yet been completed. A small chance remains that such species may still be rediscovered.
- **Critically Endangered (CR)** A species is Critically Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Critically Endangered, indicating that the species is facing an extremely high risk of extinction.
- **Endangered (EN)** A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction.
- **Vulnerable (VU)** A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction.
- **Near Threatened (NT)** A species is Near Threatened when available evidence indicates that it nearly meets any of the IUCN criteria for Vulnerable and is therefore likely to become at risk of extinction in the near future.
- ^N**Critically Rare** A species is Critically Rare when it is known to occur at a single site but is not exposed to any direct or plausible potential threat and does not otherwise qualify for a category of threat according to one of the five IUCN criteria.
- ^N**Rare** A species is Rare when it meets at least one of four South African criteria for rarity but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to one of the five IUCN criteria. The four criteria are as follows:
 - Restricted range: Extent of Occurrence (EOO) <500 km², OR
 - Habitat specialist: Species is restricted to a specialized microhabitat so that it has a very small Area of Occupancy (AOO), typically smaller than 20 km², OR
 - Low densities of individuals: Species always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area, OR
 - Small global population: Less than 10 000 mature individuals.
- **Least Concern** A species is Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category.



- **Data Deficient - Insufficient Information (DDD)** A species is DDD when there is inadequate information to make an assessment of its risk of extinction, but the species is well defined. Listing of species in this category indicates that more information is required, and that future research could show that a threatened classification is appropriate.
- **Data Deficient - Taxonomically Problematic (DDT)** A species is DDT when taxonomic problems hinder the distribution range and habitat from being well defined, so that an assessment of risk of extinction is not possible.
- **Not Evaluated (NE)** A species is Not Evaluated when it has not been evaluated against the criteria. The national Red List of South African plants is a comprehensive assessment of all South African indigenous plants, and therefore all species are assessed and given a national Red List status. However, some species included in [Plants of southern Africa: an online checklist](#) are species that do not qualify for national listing because they are naturalized exotics, hybrids (natural or cultivated), or synonyms. These species are given the status Not Evaluated and the reasons why they have not been assessed are included in the assessment justification.

The following list of potential plant SCC for the QDS 2527CB was derived from current literature for vegetation found in the area as well as the international IUCN Red Data list, the South African Red Data List, the Botanical Database of Southern Africa (BODATSA; <http://posa.sanbi.org/>), NFA protected trees, and the NWBMA (Act No. 4 of 2016) Schedule 2: Protected species list. The results are summarised in Table H1 below.

Table H1: Floral SCC expected to occur within the QDS 2527CB in which the study area is located. Additional information on species threat status as defined in The Red List of South African Plants (<http://redlist.sanbi.org/index.php>) is presented.

Species	POC	Habitat	National status
<i>Stenostelma umbelluliferum</i>	Low	Range: Pretoria North and adjacent areas in North West Province Major habitats: Savanna Description: Deep black turf in open woodland mainly in the vicinity of drainage lines. Population trend: Decreasing	NT

NT = Near Threatened.



APPENDIX I: Faunal SCC

Below are tables illustrating Faunal SCC that have the potential to be located within the focus area.

Table I1: Mammal species of conservation concern in the North West Province (NWBSP, 2015).

Scientific Name	Common Name	Friedmann & Daly (2004)	IUCN Status
<i>Acinonyx jubatus</i>	Cheetah	VU	VU
<i>Atelerix frontalis</i>	African Hedgehog	NT	LC
<i>Ceratotherium simum</i>	White Rhino	LC	NT
<i>Chrysospalax villosus</i> *	Rough-haired golden mole*	CR	VU
<i>Cloeotis percivali</i>	Short-eared trident bat	CR	LC
<i>Crocuta</i>	Spotted Hyena	NT	LC
<i>Damaliscus lunatus</i>	Tsessebe	EN	LC
<i>Dasymsus incomtus</i>	African Marsh Rat	NT	LC
<i>Diceros bicornis minor</i>	Black Rhinoceros	CR	CR
<i>Eidolon helvum</i>	Straw-Coloured Fruit Bat	NT	NT
<i>Felis nigripes</i>	Black-Footed Cat	LC	VU
<i>Felis silvestris</i>	African Wild Cat	LC	LC
<i>Hippopotamus amphibius</i>	Hippo	LC	VU
<i>Hippotragus equinus</i>	Roan Antelope	VU	LC
<i>Hippotragus niger</i>	Sable Antelope	VU	LC
<i>Hyaena brunnea</i>	Brown Hyena	NT	NT
<i>Leptailurus seval</i>	Serval	NT	LC
<i>Loxodonta africana</i>	African Savanna Elephant	LC	VU
<i>Lutra (Hydriactis) maculicollis</i>	Spotted-necked otter	NT	NT
<i>Lycaon pictus</i>	African Wild dog	EN	EN
<i>Mellivora capensis</i>	Honey Badger	NT	LC
<i>Miniopterus schreibersii</i>	Shreibers' Long-Fingered Bat	NT	NT
<i>Myotis tricolor</i>	Temminck's Hairy Bat	NT	LC
<i>Mystromys albicaudatus</i>	White-tailed mouse	EN	EN
<i>Ourebia ourebi</i>	Oribi	EN	LC
<i>Panthera leo</i>	Lion	LC	VU
<i>Panthera pardus</i>	Leopard	LC	VU
<i>Pelea capreolus</i>	Grey Rhebok	LC	LC
<i>Pipistrellus rusticus</i>	Rusty Pipistrelle	NT	LC
<i>Poecilogale albinucha</i>	African Striped Weasel	DD	LC
<i>Redunca arundinum</i>	Southern reedbuck	LC	LC
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	NT	LC
<i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	NT	LC
<i>Rhinolophus denti</i>	Dent's Horseshoe Bat	NT	LC
<i>Smutsia temminckii</i>	Ground Pangolin	VU	VU
<i>Thallomys nigricauda</i>	Black-Tailed Tree Rat	LC	LC

CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened, DD = Data Deficient; LC = Least Concern

* This species was previously listed in the North West Province Environmental Outlook Report of 2008 (NW DACE, 2008). The NWBSP states that an on the ground effort is required to determine whether any golden moles are present within the province.



Table I2: Avifaunal species of conservation concern in the North West Province (NW BSP, 2015).

Scientific name	Common name	Provincial (2012)	National (Taylor <i>et al.</i> , 2015)	IUCN Status
<i>Alcedo semitorquata</i>	Half-collared Kingfisher	NT	NT	LC
<i>Anastomus lamelligerus</i>	African Openbill Stork	NT	LC	LC
<i>Anthropoides paradiseus</i>	Blue Crane	VU	NT	VU
<i>Aquila rapax</i>	Tawny Eagle	VU	EN	LC
<i>Ardeotis kori</i>	Kori Bustard	VU	NT	NT
<i>Buphagus erythrorhynchus</i>	Red-billed Oxpecker	NT	LC	LC
<i>Certhilauda chuana</i>	Short-clawed Lark	NT	NT	LC
<i>Charadrius pallidus</i>	Chestnut-banded Plover	NT	NT	NT
<i>Ciconia nigra</i>	Black Stork	NT	VU	LC
<i>Circus macrourus</i>	Pallid Harrier	NT	NT	NT
<i>Circus maurus</i>	Black Harrier	NT	EN	VU
<i>Circus ranivorus</i>	African Marsh Harrier	VU	EN	LC
<i>Ephippiorhynchus senegalensis</i>	Saddle-billed Stork	EN	EN	LC
<i>Eupodotis cafra (senegalensis)</i>	White-bellied Korhaan	VU	VU	LC
<i>Falco biarmicus</i>	Lanner Falcon	NT	VU	LC
<i>Falco naumanni</i>	Lesser kestrel	VU	LC	LC
<i>Falco peregrinus</i>	Peregrine Falcon	NT	LC	LC
<i>Glareola nordmanni</i>	Black-winged Pratincole	NT	NT	NT
<i>Gorsachius leuconotus</i>	White-backed Night Heron	VU	VU	LC
<i>Gyps africanus</i>	African White-backed Vulture	VU	CR	CR
<i>Gyps coprotheres</i>	Cape Vulture	VU	EN	EN
<i>Hieraaetus ayresii</i>	Ayres's Eagle	NT	LC	LC
<i>Leptoptilos crumeniferus</i>	Marabou Stork	NT	NT	LC
<i>Mirafra cheniana</i>	Melodious Lark	NT	LC	NT
<i>Mycteria ibis</i>	Yellow-billed Stork.	NT	EN	LC
<i>Neotis denhami</i>	Denhams Bustard	VU	VU	NT
<i>Pelecanus onocrotalus</i>	Great White Pelican	NT	VU	LC
<i>Pelicanus rufescens</i>	Pink-backed Pelican	VU	VU	LC
<i>Phoenicopterus minor</i>	Lesser Flamingo	NT	NT	NT
<i>Phoenicopterus ruber</i>	Greater Flamingo	NT	NT	LC
<i>Podica senegalensis</i>	African Finfoot	VU	VU	LC
<i>Polemaetus bellicosus</i>	Martial Eagle	VU	EN	VU
<i>Pterocles gutturalis</i>	Yellow-throated Sandgrouse	NT	NT	LC
<i>Rostratula benghalensis</i>	Greater Painted Snipe	NT	NT	LC



Scientific name	Common name	Provincial (2012)	National (Taylor <i>et al.</i> , 2015)	IUCN Status
<i>Rynchops flavirostris</i>	African Skimmer	Regionally EX		NT
<i>Sagittarius serpentarius</i>	Secretarybird	NT	VU	VU
<i>Sterna caspia</i>	Caspian Tern	NT	VU	LC
<i>Terathopius ecaudatus</i>	Bataleur	VU	EN	NT
<i>Torgos tracheliotus</i>	Lappet-faced Vulture	VU	EN	EN
<i>Tyto capensis</i>	African Grass Owl	VU	VU	LC

CR = Critically endangered; EN = Endangered; VU = Vulnerable, NT = Near Threatened, EX = Extinct, LC = Least concern,

Table I3: Reptile species of conservation concern in the North West Province (NWBSP, 2015).

Scientific name	Common name	Power & Verbugt (2014)	IUCN Status
<i>Chamaesaura aenea</i>	Coppery Grass Lizard	NT	NYBA
<i>Crocodylus niloticus</i>	Nile Crocodile	VU	LC
<i>Homoroselaps dorsalis</i>	Striped Harlequin snake	NT	NT
<i>Python natalensis</i>	Southern African Python	LC	NYBA

NT = Near Threatened, VU = Vulnerable; NYBA= Not Yet Been Assessed, LC = Least Concern

Table I4: Amphibian species of conservation concern in the North West Province (NWBSP, 2015).

Scientific Name	Common Name	Power & Verbugt (2014)	IUCN Status
<i>Pyxicephalus adspersus</i>	African Giant Bullfrog	NT	LC

NT = Near Threatened, LC = Least Concern

Table I5: Arachnid species of conservation concern in the North West Province (NWBSP, 2015).

Scientific name	Common Name	IUCN Status
<i>Aelurillus cristatopalpus</i>	Jumping Spiders	NYBA
<i>Fromarengo bimaculata</i>	Jumping Spiders	NYBA
<i>Ariadna similis</i>	Jack-in-a-box Spiders	NYBA
<i>Austrachelas merwei</i>	Corrinid Sac Spider	NYBA
<i>Cyatholipus isolatus</i>	Spotted Tree Sheet-web Spiders	NYBA
<i>Diores femoralis</i>	Zodariid Ground Spiders	NYBA
<i>Diphya simoni</i>	Long-jawed Orb Weavers	NYBA
<i>Eusparassus borakalalo</i>	Huntsman Spiders	NYBA
<i>Evarcha flagellaris</i>	Jumping Spiders	NYBA
<i>Galeosoma coronatum</i>	Armoured Trapdoor Spiders	NYBA
<i>Galeosoma crinitum</i>	Armoured Trapdoor Spiders	NYBA
<i>Galeosoma scutatum</i>	Armoured Trapdoor Spiders	NYBA
<i>Idiops pallus</i>	Armoured Trapdoor Spiders	NYBA
<i>Langona manicata</i>	Jumping Spiders	NYBA
<i>Pseudicius gracilis</i>	Jumping Spiders	NYBA
<i>Rhene konradi</i>	Jumping Spiders	NYBA
<i>Setaphis sexmaculata</i>	Ground Spiders	NYBA

NYBA= Not Yet Been Assessed



Table 16: Threatened invertebrate species of North West Province (NW DACE, 2008).

Scientific name	Common Name	NW Status 2008	IUCN Status
<i>Metisella meninx</i>	Marsh Sylph	VU	NYBA
<i>Lepidochrysops praeterita</i>	Highveld Blue	EN	NYBA
<i>Platylesches dolomitica</i>	Hilltop Hopper	VU	NYBA
<i>Lepidochrysops hypopolia</i>	Morant's blue	EX	EX

EN = Endangered, VU = Vulnerable, EX=Extinct, NYBA= Not Yet Been Assessed

South African Bird Atlas Project 2 list for quadrant QDS 2527CB

Table 17: Avifaunal Species for the pentads 2530_2715.

Pentads	Link to pentad summary on the South African Bird Atlas Project 2 web page
2530_2715	http://sabap2.adu.org.za/coverage/pentad/2530_2715



APPENDIX J: Declaration and Specialists CV's

1. (a) (i) Details of the specialist who prepared the report

Christien Steyn	MSc Plant Science (University of Pretoria)
Nelanie Cloete	MSc Botany and Environmental Management (University of Johannesburg)
Christopher Hooton	BTech Nature Conservation (Tshwane University of Technology)

1. (A). (ii) The expertise of that specialist to compile a specialist report including a curriculum vitae

Company of Specialist:	Scientific Terrestrial Services		
Name / Contact person:	Nelanie Cloete		
Postal address:	PO. Box 751779, Gardenvue		
Postal code:	2047	Cell:	084 311 4878
Telephone:	011 616 7893	Fax:	086 724 3132
E-mail:	Nelanie@sasenvgroup.co.za		
Qualifications	MSc Environmental Management (University of Johannesburg) MSc Botany (University of Johannesburg) BSc (Hons) Botany (University of Johannesburg) BSc (Botany and Zoology) (Rand Afrikaans University)		
Registration / Associations	Professional member of the South African Council for Natural Scientific Professions (SACNASP) Member of the South African Association of Botanists (SAAB) Member of the International Affiliation for Impact Assessments (IAIASa) South Africa group Member of the Grassland Society of South Africa (GSSA)		

1. (b) a declaration that the specialist is independent in a form as may be specified by the competent authority

I, Christien Steyn, declare that -

- I act as the **independent specialist** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct



Signature of the Specialist



I, Christopher Hooton, declare that -

- I act as the **independent specialist (reviewer)** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Specialist Signature

I, Nelanie Cloete, declare that -

- I act as the **independent specialist (reviewer)** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct



Signature of the Specialist





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF **CHRISTIEN STEYN**

PERSONAL DETAILS

Position in Company	Floral Ecologist
Joined SAS Environmental Group of Companies	2018

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Member of the South African Council for Natural Scientific Professions (SACNASP)
 Member of the South African Association of Botanists (SAAB)
 Member of the Botanical Society of South Africa (BotSoc)

EDUCATION

Qualifications

MSc (Plant Science) (University of Pretoria)	2017
BSc (Hons) Plant Science (Invasion Biology) (University of Pretoria)	2014
BSc Environmental Science (University of Pretoria)	2013

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Northern Cape, Free State

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

Terrestrial Ecological and Biodiversity Scoping Assessments
 Terrestrial Ecological and Biodiversity Screening Assessments
 Floral Assessments
 Input into Terrestrial Rehabilitation Plan design with the focus on the re-establishment of vegetation
 Floral Rescue and Relocation Plans
 Alien and Invasive Control Plan (AICP)
 Alien and Invasive Plant Identification and awareness training
 Terrestrial Monitoring
 Protected Tree and Floral Marking and Reporting
 Desktop Studies, Mapping and Background Information Research

Training

Advanced Grass Identification Course
 Practical Plant Identification, including Herbarium Usage and Protocols
 Vegetation Classification and Mapping: Use of Geographic Information System for understanding vegetation pattern and biodiversity conservation.
 Introduction to Statistics for Biologists: Applications of plant ecology principles in plant conservation, i.e., species distribution modelling, alien plant invasions, conservation planning
 Plant Functional Trait Course: Hands-on, field-based exploration of plant functional traits, along with experience in the usage of plant traits data in climate-change research and ecosystem ecology





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF **NELANIE CLOETE**

PERSONAL DETAILS

Position in Company	Senior Scientist, Member Botanical Science and Terrestrial Ecology
Joined SAS Environmental Group of Companies	2011

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions (SACNASP – Reg No. 400503/14)
 Member of the South African Association of Botanists (SAAB)
 Member of the International Affiliation for Impact Assessments (IAIAsa) South Africa group
 Member of the Grassland Society of South Africa (GSSA)
 Member of the Botanical Society of South Africa (BotSoc)
 Member of the Gauteng Wetland Forum (GWF)

EDUCATION

Qualifications

MSc Environmental Management (University of Johannesburg)	2013
MSc Botany (University of Johannesburg)	2007
BSc (Hons) Botany (University of Johannesburg)	2005
BSc (Botany and Zoology) (Rand Afrikaans University)	2004

Short Courses

Certificate – Department of Environmental Science in Legal context of Environmental Management, Compliance and Enforcement (UNISA)	2009
Introduction to Project Management - Online course by the University of Adelaide	2016
Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Northern Cape, Eastern Cape, Free State

Africa - Democratic Republic of the Congo (DRC)

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Terrestrial Monitoring
- Protected Tree and Floral Marking and Reporting
- Biodiversity Offset Plan

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Plant species and Landscape Plan

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF **CHRISTOPHER HOOTON**

PERSONAL DETAILS

Position in Company	Senior Scientist, Member Biodiversity Specialist
Joined SAS Environmental Group of Companies	2013

EDUCATION

Qualifications

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National Diploma Nature Conservation (Tshwane University of Technology)	2008

Short Courses

Certificate – Department of Environmental Science in Legal context of Environmental Management, Compliance and Enforcement (UNISA)	2009
Introduction to Project Management - Online course by the University of Adelaide	2016
Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Eastern Cape, Western Cape, Northern Cape, Free State
Africa - Zimbabwe, Sierra Leone

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Faunal Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Protected Tree and Floral Marking and Reporting
- Biodiversity Offset Plan

Freshwater Assessments

- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning



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**A PHASE I HERITAGE IMPACT ASSESSMENT (HIA) STUDY FOR
IMPALA PLATINUM'S PROPOSED NEW PARKING AREA AT
THE IMPALA SHAFT 16 COMPLEX IN RUSTENBURG IN THE
NORTH-WEST PROVINCE**

Prepared by:

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Archaeologist and Heritage Consultant

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April 2021

EXECUTIVE SUMMARY

Impala Platinum Limited (Impala) proposes to expand the parking area at the Shaft 16 Complex in Rustenburg in the North-West Province. The construction of the proposed new parking area may have an influence on any of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (NHRA) (No. 25 of 1999) which may occur in the proposed new parking area (referred to as the project area). Therefore, SLR Consulting (Africa) (Pty) (Ltd) (SLR), in accordance with Section 38 of the NHRA (No 25 of 1999), commissioned the author to undertake a Phase I Heritage Impact Assessment (HIA) for the project area.

The aims of the heritage survey and impact assessment for the proposed new parking area therefore were the following:

- To establish whether any of the types and ranges of heritage resources as outlined in Section 38 of the NHRA do occur in the project area.
- To establish the significance of these heritage resources in the project area as well as the level of significance of any possible impact on these heritage resources.
- To propose mitigation measures for those types and ranges of heritage resources that may be affected by the construction of the proposed parking areas.

The Phase I HIA study for the project area revealed none of the types and ranges of heritage resources as outlined in Section 3 of the NHRA.

There is consequently no impact on any heritage resources and no reason from a heritage point of view why the proposed project should not proceed if the chance-find procedures which were outlined are followed.

It is possible that this Phase I HIA study may have missed heritage resources in the project area due to reasons such as tall grass or the possibility that heritage resources including graves may occur below the surface of the earth and may only be exposed once development commences. Heritage resources may also have been missed because of human failure to recognise them.

If any heritage resources of significance are exposed during the development of the proposed parking area the chance-find procedures must be implemented.

Disclaimer:

It is possible that this Phase I HIA study may have missed heritage resources in the project area because of tall grass or other invader vegetation covering unmarked or inconspicuous graves. It is also possible that heritage resources may also occur below the surface of the earth and may only be exposed once development commences. Heritage resources may also have been missed because of human failure to recognise them.

If any heritage resources of significance are exposed during the development of the proposed parking area, the South African Heritage Resources Agency (SAHRA) should be notified immediately, all activities must stop, and the chance-find procedures must be implemented.

ACRONYMS AND ABBREVIATIONS

ASAPA	Association of South African Professional Archaeologists
BP	Before Present
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIA	Early Iron Age
EMPr	Environmental Management Programme
EO	Environmental Officer
ESA	Early Stone Age
GPS	Global Positioning System
GY	Graveyard
HIA	Heritage Impact Assessment
HS	Health and Safety
Impala	Impala Platinum Limited
LIA	Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MPRDA	Mineral and Petroleum Resources Development Act, Act No 28 of 2002
MSA	Middle Stone Age
NEMA	National Environmental Management Act, Act No 107 of 1998
NEM: WA	National Environmental Management: Waste Act, Act No 59 of 2008
NHRA	National Heritage Resources Act, Act No 25 of 1999
No	Number
NWA	National Water Act, Act No 36 of 1998
PHRA	Provincial Heritage Resource Agency
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAPS	South African Police Service
SLR	SLR Consulting (Africa) (Pty) Ltd
ToR	Terms of Reference

TERMINOLOGY

Terms that may be used in this report are briefly outlined below:

- **Conservation:** The act of maintaining all or part of a resource (whether renewable or non-renewable) in its present condition in order to provide for its continued or future use. Conservation includes sustainable use, protection, maintenance, rehabilitation, restoration and enhancement of the natural and cultural environment.
- **Cultural resource management:** A process that consists of a range of interventions and provides a framework for informed and value-based decision-making. It integrates professional, technical and administrative functions and interventions that impact on cultural resources. Activities include planning, policy development, monitoring and assessment, auditing, implementation, maintenance, communication, and many others. All these activities are (or will be) based on sound research.
- **Cultural resources:** A broad, generic term covering any physical, natural and spiritual properties and features adapted, used and created by humans in the past and present. Cultural resources are the result of continuing human cultural activity and embody a range of community values and meanings. These resources are non-renewable and finite. Cultural resources include traditional systems of cultural practice, belief or social interaction. They can be, but are not necessarily identified with defined locations.
- **Heritage resources:** The various natural and cultural assets that collectively form the heritage. These assets are also known as cultural and natural resources. Heritage resources (cultural resources) include all human-made phenomena and intangible products that are the result of the human mind. Natural, technological or industrial features may also be part of heritage resources, as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa.

- **In-Situ Conservation:** The conservation and maintenance of ecosystems, natural habitats and cultural resources in their natural and original surroundings.
- **Iron Age:** Refers to the last two millennia and 'Early Iron Age' to the first thousand years AD. 'Late Iron Age' refers to the period between the 16th century and the 19th century and can therefore include the Historical Period.
- **Maintenance:** Keeping something in good health or repair.
- **Pre-historical:** Refers to the time before any historical documents were written or any written language developed in a particular area or region of the world. The historical period and historical remains refer, for the Project Area, to the first appearance or use of 'modern' Western writing brought to the Eastern Highveld by the first Colonists who settled here from the 1840's onwards.
- **Preservation:** Conservation activities that consolidate and maintain the existing form, material and integrity of a cultural resource.
- **Recent past:** Refers to the 20th century. Remains from this period are not necessarily older than sixty years and therefore may not qualify as archaeological or historical remains. Some of these remains, however, may be close to sixty years of age and may, in the near future, qualify as heritage resources.
- **Protected area:** A geographically defined area designated and managed to achieve specific conservation objectives. Protected areas are dedicated primarily to the protection and enjoyment of natural or cultural heritage, to the maintenance of biodiversity, and to the maintenance of life-support systems. Various types of protected areas occur in South Africa.
- **Reconstruction:** Re-erecting a structure on its original site using original components.

- **Replication:** The act or process of reproducing by new construction the exact form and detail of a vanished building, structure, object, or a part thereof, as it appeared at a specific period.
- **Restoration:** Returning the existing fabric of a place to a known earlier state by removing additions or by reassembling existing components.
- **Stone Age:** Refers to the prehistoric past, although Late Stone Age people lived in South Africa well into the Historical Period. The Stone Age is divided into an Earlier Stone Age (3 million years to 150 000 thousand years ago) the Middle Stone Age (150 000 years to 40 000 years ago) and the Late Stone Age (40 000 years to 200 years ago).
- **Sustainability:** The ability of an activity to continue indefinitely, at current and projected levels, without depleting social, financial, physical and other resources required to produce the expected benefits.
- **Translocation:** Dismantling a structure and re-erecting it on a new site using original components.
- **Project Area:** refers to the area (footprint) where the developer wants to focus its development activities.
- **Phase I archaeological studies** refer to surveys using various sources of data in order to establish the presence of all possible types and ranges of heritage resources in any given Project Area (excluding paleontological remains as these studies are done by registered and accredited palaeontologists).
- **Phase II studies** include in-depth cultural heritage studies such as archaeological mapping, excavating and sometimes laboratory work. Phase II work may include the documenting of rock art, engraving or historical sites and dwellings; the sampling of archaeological sites or shipwrecks; extended excavations of archaeological sites; the exhumation of human remains and the relocation of

graveyards, etc. Phase II work involves permitting processes, requires the input of different specialists and the co-operation and approval of the SAHRA.

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1 INTRODUCTION

1.1 Background and context

This document contains the report on the results of a Phase I Heritage Impact Assessment (HIA) study which was done for Impala Platinum Limited's (Impala) proposed new parking area at the Shaft 16 Complex on the farm Reinkoyalskraal 278 JQ in Rustenburg in the Bojanala District Municipality in the Central Bankeveld in the North-West Province.

The Central Bankeveld is located, ecologically speaking, between the Bushveld (to the north) and the Highveld (to the south). The Central Bankeveld and the Bojanala District Municipality, in particular, has a rich heritage comprised of remains dating from the prehistoric and the historical (or colonial) periods of South Africa. Prehistoric and historical remains in the Central Bankeveld form a record of the cultural heritage of most groups living in South Africa today. Various types and ranges of heritage resources as outlined in the National Heritage Resources Act (NHRA) (Act No 25 of 1999) occur in this region (see Box 1).

Consequently, SLR Consulting (Africa) (Pty) Ltd (SLR) who was appointed by Impala to manage the environmental authorisation process for the proposed project, commissioned the author to undertake a Phase I HIA study for Impala's proposed parking area.

Box 1: Types and ranges of heritage resources (the national estate) as outlined in Section 3 of the National Heritage Resources Act, 1999 (No 25 of 1999).

The National Heritage Resources Act (Act No 25 of 1999, Art 3) outlines the following types and ranges of heritage resources that qualify as part of the National Estate, namely:

- (a) places, buildings structures and equipment of cultural significance;
- (b) places to which oral traditions are attached or which are associated with living heritage;
- (c) historical settlements and townscapes;
- (d) landscapes and natural features of cultural significance;
- (e) geological sites of scientific or cultural importance;
- (f) archaeological and palaeontological sites;
- (g) graves and burial grounds including-
 - (i) ancestral graves;
 - (ii) royal graves and graves of traditional leaders;
 - (iii) graves of victims of conflict;(iv) graves of individuals designated by the Minister by notice in the Gazette;
 - (v) historical graves and cemeteries; and
 - (vi) other human remains which are not covered by in terms of the Human Tissues Act, 1983 (Act No 65 of 1983);
- (h) sites of significance relating to the history of slavery in South Africa;
- (i) movable objects, including -
- (i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
- (ii) objects to which oral traditions are attached or which are associated with living heritage;
- (iii) ethnographic art and objects;
- (iv) military objects;
- (v) objects of decorative or fine art;
- (vi) objects of scientific or technological interest; and
- (vii) books, records, documents, photographs, positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No 43 of 1996).

The National Heritage Resources Act (Act No 25 of 1999, Art 3) also distinguishes nine criteria for places and objects to qualify as 'part of the national estate if they have cultural significance or other special value ...'. These criteria are the following:

- (a) its importance in the community, or pattern of South Africa's history;
- (a) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- (b) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- (c) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- (e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- (f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- (g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons; (h)
- (h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- (i) sites of significance relating to the history of slavery in South Africa.

1.2 Aim of this report

Impala intends to establish a new parking area (hereafter referred to as the proposed project) adjacent to the Shaft 16 Complex on part of the farm Reinkoyalskraal 278 JQ in Rustenburg in the Bojanala District Municipality in the Central Bankeveld in the North-West Province. In order to comply with legislation, Impala requires knowledge of the presence, relevance and the significance of any heritage resources that may occur in the project area in order to take pro-active measures with regard to any heritage remains that may be affected, damaged or destroyed when the proposed new parking areas are developed. SLR and Impala therefore commissioned the author to undertake a Phase I HIA study for the proposed project.

The aims of the heritage survey and impact assessment for the proposed new parking area therefore were the following:

- To establish whether any of the types and ranges of heritage resources as outlined in Section 38 of the NHRA do occur in the project area.
- To establish the significance of these heritage resources in the project area as well as the level of significance of any possible impact on these heritage resources.
- To propose mitigation measures for those types and ranges of heritage resources that may be affected by the construction of the proposed parking areas.

1.3 Assumptions and limitations

The findings, observations, conclusions and recommendations reached in this report are based on the author's best scientific and professional knowledge, available information and his ability to keep up with the physical challenges that the project commanded. The project area was surveyed on several former occasions in the past when various heritage surveys were done for Impala (See Part 11, 'Bibliography relating to heritage studies').

The report's findings are based on accepted archaeological survey and assessment techniques and methodologies. However, the author preserves the right to modify aspects of the report including the recommendations if and when new information

becomes available particularly if this information may have an influence on the reports final results and recommendations. This in particular applies to the uncovering of graves as these may have been missed during the survey as a result of various reasons.

The heritage survey may also have missed other heritage resources as these may be located below the surface of the earth and may be exposed as a result of future developmental activities such as the construction of the parking areas. It is also possible that heritage resources simply may have been missed as a result of human failure to observe or to recognise them.

2 DETAILS OF THE SPECIALIST

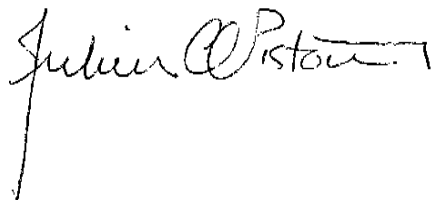
Profession	Archaeologist, Museologist (Museum Scientists), Lecturer, Heritage Guide Trainer and Heritage Consultant
Qualifications:	<ul style="list-style-type: none"> • BA (Archaeology, Anthropology and Psychology) (UP, 1976) • BA (Hons) Archaeology (distinction) (UP, 1979) • MA Archaeology (distinction) (UP, 1985) • D Phil Archaeology (UP, 1989) • Post Graduate Diploma in Museology (Museum Sciences) (UP, 1981)
Work experience:	<ul style="list-style-type: none"> • Museum curator and archaeologist for the Rustenburg and Phalaborwa Town Councils (1980-1984) • Head of the Department of Archaeology, National Cultural History Museum in Pretoria (1988-1989) • Lecturer and Senior lecturer Department of Anthropology and Archaeology, University of Pretoria (1990-2003) • Independent Archaeologist and Heritage Consultant (2003-)
Accreditation:	Member of the Association for Southern African Professional Archaeologists. (ASAPA)
Summary:	<p>Julius Pistorius is a qualified archaeologist and heritage specialist with extensive experience as a university lecturer, museum scientist, researcher and heritage consultant. His research focussed on the Late Iron Age Tswana and Lowveld-Sotho (particularly the Bamalatji of Phalaborwa). He has published a book on early Tswana settlement in the North-West Province and has completed an unpublished manuscript on the rise of Bamalatji metal workings spheres in Phalaborwa during the last 1 200 years. He has excavated more than twenty LIA settlements in North-West and twelve IA settlements in the Lowveld and has mapped hundreds of stone walled sites in the North-West. He has written a guide for Eskom's field personnel on heritage management. He has published twenty scientific papers in academic journals and several popular articles on archaeology and heritage matters. He collaborated with environmental companies in compiling State of the Environmental Reports for Ekurhuleni, Hartbeespoort and heritage management plans for the Magaliesberg and Waterberg. Since acting as an independent consultant he has done approximately</p>

	<p>800 large to small heritage impact assessment reports. He has a longstanding working relationship with Eskom, Rio Tinto (PMC), Rio Tinto (EXP), Impala Platinum, Angloplats (Rustenburg), Lonmin, Sasol, PMC, Foskor, Kudu and Kelgran Granite, Bafokeng Royal Resources, Pilanesberg Platinum Mine (PPM) etc. as well as with several environmental companies.</p>
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3 DECLARATION OF INDEPENDENCE

I, **Dr Julius CC Pistorius**, declare the following:

- I act as an independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even, if this result in views and findings that are not favourable for the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialists report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the applications;
- I will comply with the Act, Regulations and other applicable legislation;
- I will consider, to the extent possible, the matters listed in Regulation 13;
- I understand to disclose to the applicant and the competent authority all material information in my possession;
- All the particulars furnished by me in this form are true and correct that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



30 April 2021

4 LEGAL FRAMEWORK

South Africa's heritage resources ('national estate') are protected by international, national, provincial and local legislation which provides regulations, policies and guidelines for the protection, management, promotion and utilization of heritage resources. South Africa's 'national estate' includes a wide range of various types of heritage resources as outlined in Section 3 of the NHRA (refer to Box 1).

At a national level, heritage resources are dealt with by the National Heritage Council Act (Act No 11 of 1999) and the NHRA. According to the NHRA, heritage resources are categorized using a three-tier system, namely Grade I (national), Grade II (provincial) and Grade III (local) heritage resources.

At the provincial level, heritage legislation is implemented by Provincial Heritage Resources Agencies (PHRA's) which apply the NHRA together with provincial government guidelines and strategic frameworks. Metropolitan or Municipal (local) policy regarding the protection of cultural heritage resources is also linked to national and provincial acts and is implemented by the South African Heritage Resources Agency (SAHRA) and the PHRA's.

4.1 Legislation relevant to heritage resources

Legislation relevant to South Africa's national estate includes the following:

- National Environmental Management Act (NEMA), Act No 107 of 1998
- Minerals and Petroleum Resources Development Act (MPRDA), Act No 28 of 2002
- National Heritage Resources Act (NHRA), Act No 25 of 1999.

4.1.1 NEMA

The NEMA stipulates under Section 2(4)(a) that sustainable development requires the consideration of all relevant factors including (iii) the disturbance of landscapes and sites that constitute the nation's cultural heritage must be avoided, or where it cannot be altogether avoided, is minimised and remedied. Heritage assessments are

implemented in terms of the NEMA Section 24 in order to give effect to the general objectives. Procedures considering heritage resource management in terms of the NEMA are summarised under Section 24(4) as amended in 2008. In addition to the NEMA, the National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003) may also be applicable. This act applies to protected areas and world heritage sites, declared as such in terms of the World Heritage Convention Act, 1999 (Act No 49 of 1999).

4.1.2 MPRDA

The MPRDA stipulates under Section 5(4) no person may prospect for or remove, mine, conduct technical co-operation operations, reconnaissance operations, explore for and produce any mineral or petroleum or commence with any work incidental thereto on any area without (a) an approved environmental management programme or approved environmental management plan, as the case may be.

4.1.3 NHRA

According to Section 3 of the NHRA the 'national estate' comprises a wide range and various types of heritage resources (refer to Box 1).

4.1.3.1 Heritage Impact Assessment studies

According to Section 38 of the NHRA, a HIA process must be followed under the following circumstances:

- The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length;
- The construction of a bridge or similar structure exceeding 50m in length;
- **Any development or activity that will change the character of a site and which exceeds 5 000 m² or which involve three or more existing erven or subdivisions thereof;**
- Re-zoning of a site exceeding 10 000 m²; and
- Any other category provided for in the regulations of SAHRA, a provincial or local heritage authority or any other legislation such as NEMA, MPRDA, etc.

The proposed project entails the development of a parking area of approximately 25 000 m² (i.e. exceeding 5 000 m²). In this regard, an HIA must be undertaken.

4.1.3.2 Section 34 (Buildings and structures)

Section 34 of the NHRA provides for general protection of structures older than 60 years. According to Section 34(1) no person may alter (demolish) any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or any other facility made by people and which is fixed to land and which includes fixtures, fittings and equipment associated with such structures.

Alter means any action which affects the structure, appearance or physical properties of a place or object, whether by way of structural or any other works such as painting, plastering, decorating, etc.

Most importantly, Section 34(1) clearly states that no structure or part thereof may be altered or demolished without a permit issued by the relevant PHRA. These permits will not be granted without a HIA being completed. A destruction permit will thus be required before any removal and/or demolition may take place, unless exempted by the PHRA according to Section 34(2) of the NHRA.

4.1.3.3 Section 35 (Archaeological and palaeontological resources and meteorites)

Section 35 of the NHRA provides for the general protection of archaeological and palaeontological resources, and meteorites. In the event that archaeological resources are discovered during the course of development, Section 38(3) specifically requires that the discovery must immediately be reported to the PHRA, or local authority or museum who must notify the PHRA. Furthermore, no person may without permits issued by the responsible heritage resources authority:

- destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;

- destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;
- trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or paleontological material or object, or any meteorite; or bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and paleontological material or objects, or use such equipment for the recovery of meteorites; and
- alter or demolish any structure or part of a structure which is older than 60 years.

Heritage resources may only be disturbed or moved by an archaeologist after being issued with a permit received from SAHRA. In order to demolish heritage resources, the developer has to acquire a destruction permit from SAHRA.

4.1.3.4 Section 36 (Burial grounds and graves)

Section 36 of the NHRA allows for the general protection of burial grounds and graves. Should burial grounds or graves be found during the course of development, Section 36(6) stipulates that such activities must immediately cease, and the discovery reported to the responsible heritage resources authority and the South African Police Service (SAPS). Section 36 also stipulates that no person without a permit issued by the relevant heritage resources authority may:

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- (b) destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- (c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Section 36 of the NHRA divides graves and burial grounds into the following categories:

- a. ancestral graves;
- b. royal graves and graves of traditional leaders;
- c. graves of victims of conflict;
- d. graves designated by the Minister;
- e. historical graves and cemeteries; or
- f. human remains

Human remains less than 60 years old are subject to provisions of the National Health Act, 2003 (Act No 61 of 2003), Ordinance 12 of 1980 (Exhumation Ordinance) and Ordinance No 7 of 1925 (Graves and dead bodies Ordinance, repealed by Mpumalanga). Municipal bylaws with regard to graves and graveyards may differ. Professionals involved with the exhumation and relocation of graves and graveyards must establish whether such bylaws exist and must adhere to these laws.

Unidentified graves are handled as if they are older than 60 years until proven otherwise.

Permission for the exhumation and relocation of graves older than sixty years must also be gained from descendants of the deceased (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated) before exhumation can take place.

Human remains can only be handled by a registered undertaker or an institution declared under the Human Tissues Act (Act No 65 of 1983 as amended).

4.1.3.5 Section 37 (Public monuments and memorials)

Section 37 makes provision for the protection of all public monuments and memorials in the same manner as places which are entered in a heritage register referred to in Section 30 of the NHRA.

4.1.3.6 Section 38 (Heritage Resource Management)

Section 38 (8): The provisions of this section do not apply to a development as described in Section 38 (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act No 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No 50 of 1991), or any other legislation. Section 38(8) ensures cooperative governance between all responsible authorities through ensuring that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of Subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.

4.2 NEMA (Appendix 6 requirements)

NEMA Environmental Impact Assessment (EIA) Regulations, 2014, as amended.	Location in the report
Details of the specialist who prepared the report and the expertise of that person to compile a specialist report including a curriculum vitae	Part 2. Details of the specialist
A declaration that the person is independent in a form as may be specified by the competent authority	Part 3. Declaration of independence
An indication of the scope of, and the purpose for which the report was prepared	<ul style="list-style-type: none">• Part 1. Introduction• Part 1.2. Aims with this report
An indication of the quality and age of base data used for the specialist report	Part 7. Approach and Methodology
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	<ul style="list-style-type: none">• Part 7. Approach and Methodology• Part 7.1. Field survey
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Part 7. Approach and Methodology
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or	<ul style="list-style-type: none">• Part 8. Heritage survey• Part 8.1. Field survey

activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives	
An identification of any areas to be avoided, including buffers	<ul style="list-style-type: none"> • Part 8.2 Summary • Part 9. Conclusion and recommendations
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 1
A description of any assumptions made and any uncertainties or gaps in knowledge;	Part 1.3. Assumptions and limitations
A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Part 9 Conclusion and recommendations
Any mitigation measures for inclusion in the Environmental Management Programme (EMPr)	<ul style="list-style-type: none"> • Part 8.2 Summary • Part 8.3 Chance-find procedures • Part 9 Conclusion and recommendations
Any conditions for inclusion in the environmental authorisation	<ul style="list-style-type: none"> • Disclaimer • Part 8.3 Chance-find procedures • Part 9. Conclusion and recommendations
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	N/A
<p>A reasoned opinion –</p> <ul style="list-style-type: none"> • whether the proposed activity, activities or portions thereof should be authorised; • regarding the acceptability of the proposed activity or activities; and <p>if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr.</p>	Part 10 Conclusion and recommendations
A description of any consultation process that was undertaken during the course of preparing the specialist report	Part 7.4 Consultation process undertaken and comments received from stakeholders

A summary and copies if any comments that were received during any consultation process	Part 7.4 Consultation process undertaken and comments received from stakeholders
Any other information requested by the competent authority.	None

5 THE PROJECT AREA

5.1 Location

Impala's proposed new parking area will be established next to the Shaft 16 Complex on the farm Reinkoyalskraal 278 JQ near the village of Kanana in Rustenburg. The area falls under the Bojanala District Municipality in the North-West province of South Africa. Impala's Shaft 16 Complex and proposed parking area is bordered by numerous towns such as Serutube, Mafika, Setlhokwe and Rankunyana to the north, Phetwane and Freedom Park to the west and Kanana and Matalaneng to the south (Figure 1).

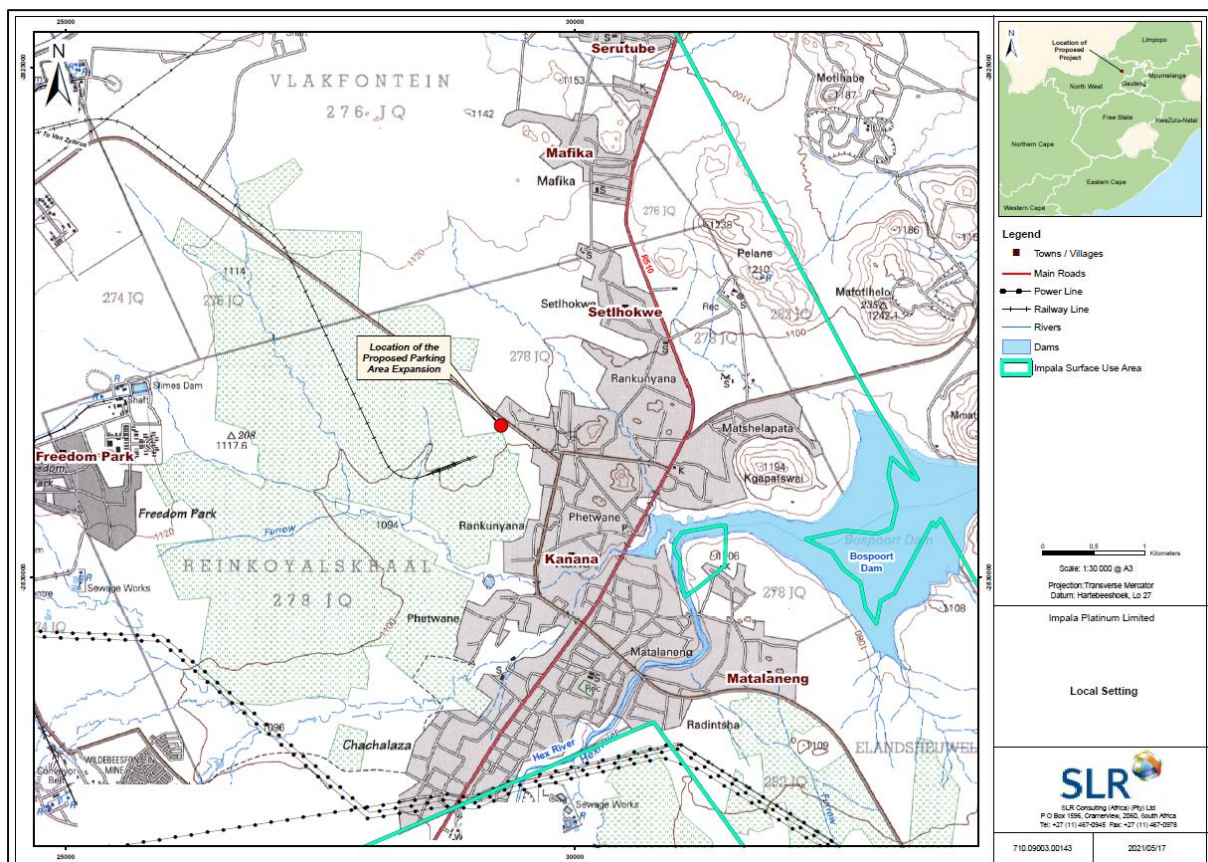


Figure 1: Locality Map

Other prominent beacons in the area include the Boschpoortdam east of the study area, large mountains such as Malejane to the east, Mmatshetshela along the banks of the Boschpoortdam, Motlhabe where granite is mined and Mafotihelo along the road leading to Beestekraal.

5.2 The altered state of the study area

Parts of the wider study area have long been utilised for agricultural activities such as dry land agriculture and limited citrus farming. However, the nature and character of the larger area has also been scarred by younger development activities such as the building of several mining shafts and other mine infrastructure, as well as residential development including the construction of tar roads, power lines, laying of pipelines and the construction of other infrastructure. These development activities have changed the indigenous vegetation, landscape and appearance of the study area so that it cannot be described as a pristine piece of land anymore.

5.3 Earlier heritage studies

A considerable number of heritage studies have been conducted during the last two to three decades for different developments in close proximity to the study area. A number of these studies are referenced in this report (see Part 11, Bibliography relating to earlier heritage studies').

These studies have pointed out that the main types and ranges of heritage resources in the area comprise stone walled sites dating from the Late Iron Age. These sites are limited to the presence of outcrops of syenite as these sites were constructed with the stone from these kopjes. The sites are mainly small and do not cover extensive surface areas as contemporary stone walled sites elsewhere in the Central Bankeveld. Other heritage resources which may occur include houses which are older than sixty years and which are confined to the suburbs surrounding Impala's mine shafts. Very few informal graveyards or graves were recorded as burials mostly occur in formalised graveyards located in the various suburbs.

6 CONTEXTUALISING THE PROJECT AREA

The project area is located to the north of the Magaliesberg in the Rustenburg (Bafokeng) District of the North-West province. This region is known for its rich and diverse range of heritage resources. A broad outline of the historical context of this region is provided below.

6.1 Pre-historical context

Stone Age sites are scattered along the Magaliesberg and are also found in caves and rock shelters in the mountain. Rock engraving sites are located further towards Maanhaarrand and to the west of the Magaliesberg. The most abundant heritage resources in the Central Bankeveld are those that date from the Late Iron Age and which are associated with the numerous Tswana chiefdoms who occupied this region during the last four centuries. This proto-historical period therefore is associated with the ancestors of the Tswana and more particularly the Fokeng who lived in the general area where the Impala Shaft 16 Complex is currently located.

6.2 Proto-historical context

The interaction between the climate, geology, topography, and the fauna and flora of the Central Bankeveld established a milieu in which the first Tswana found a suitable living environment in order to practise herding, agriculture, metal working and trading. It was here that their chiefdoms flourished during AD1600 to 1840.

The settlements of these early Tswana chiefdoms are characterised by an impressive and elaborate stone-built tradition. Hundreds and perhaps thousands of sites were built along the bases of the granite hills. The most formidable of these chiefdoms were the Kwenā Mōgōpa and the Kwenā Mōgale (Bapō) between Brits and Marikana. Further to the west, closer to Rustenburg, was the Fōkeng chiefdom while several Kgatla spheres of influence emerged further to the east near Brits. The Kgatla were subjected by Mzilikazi and were used as labourers to build one of the Ndebele's villages, probably known as emHlalandlela.

The Bapô, a people whose earliest ancestors were descended from the Amambô Nguni from Kwa-Zulu Natal, arrived in the Magaliesberg during the 16th or 17th centuries. They established a sphere of influence close to Segwalane and Makolokwe. One of their capitals was Tlhôgôkgôlô (Wolhuterskop). Several of the chiefs of this clan were known by the name of Môgale. The name of the Magalies Mountains (Magaliesberg) was derived from the name Môgale.

Numerous *difaqane* wars were fought during the last quarter of the 18th century and during the first quarter of the 19th century in the Central Bankeveld. These wars led to the displacement of large numbers of Tswana in the Central Bankeveld. The *difaqane* wars were caused by the Ndebele (Matabele) of Mzilikazi who arrived from the Vaal River region to occupy the Central Bankeveld in August 1827. The Ndebele destroyed the Kwenâ Môgôpa, the Kgatla and what had remained of the Bapô after an earlier defeat by the Pedi of Thulare. These wars exacerbated the havoc started earlier in the Central Bankeveld and gradually became a characteristic feature of historical events in this region during the early 19th century.

The Ndebele established several settlement complexes in the Central Bankeveld from whence they maintained their grip on the indigenous population. Four of these Zulu/Nguni residences (*imisi*) and military kraals (*amakhanda*) have been discovered during the course of archaeological surveys.

Internal strife between the various Tswana chiefdoms also seems to have been on the increase from the latter half of the 18th century onwards. Paternal relatives fought against each other to attain the chieftaincy of the various Tswana chiefdoms. Succession disputes also led to the splintering of the existing chiefdoms into a growing number of independent spheres of influence in the Central Bankeveld.

During the early 19th century travellers, traders and missionaries visited the Central Bankeveld where they encountered the devastated Tswana chiefdoms. They also mentioned that numerous Tswana tribes were displaced. These travellers included the traders Robert Schoon and William McLuckie in August 1829. They were soon followed by the missionary Robert Moffat who visited Mzilikazi in an *umuzi* near what is today Pretoria. In June 1835, Charles Bell and other members of Andrew Smith's expedition,

visited a Ndebele village near Rustenburg which Bell subsequently painted. One year later, in December 1836, Cornwallis Harris also visited the Central Bankeveld where he painted emHlalandlela near Brits.

The Central Bankeveld was rich in fauna which attracted the Griqua and the first white hunters to the region. Ivory was plentiful, with herds of elephants roaming the area. Ivory and the skins of the wide variety of fauna were sought after as precious trade commodities. Although the Tswana hunted the fauna of the Central Bankeveld, they were more renowned as agriculturists and cattle herders, than as hunters.

Complex causes led to the unfolding of the numerous Tswana chiefdoms and their spheres of influence throughout the Central Bankeveld during the last decades of the 18th century and during the first decades of the 19th century. These causes were multidimensional and included the ecological potential of the region, the social and political formation and expansion of different spheres of influence, the establishment of short and long distance trade relations and local and regional wars. These causes and historical events were complex and are not fully recorded in oral traditions or in any other records.

6.3 Fokeng oral tradition

There is no evidence to dispute the narrative that the series of hills running between Marikana and Rustenburg (referred to as the Thaba-ea-Maralla or the Thaba-ea-Nape range of mountains) is associated with ancestral rulers of the Fokeng people. According to oral tradition different branches (clans) of the Fokeng settled from the north to the south along the Thaba-ea-Maralla range of mountains. The places of settlement were: Seruthube, Marekana, Tsitsing (Kanana), Thekoane (Thekwana) and Photsaneng (Bleskop). The Impala Shaft 16 Complex is located close to Seruthube and therefore may have fallen under the jurisdiction of an important ruler who controlled this area during the Late Iron Age.

It is neither possible nor necessary to describe the origins and the history of the Fokeng here in great detail. Only a broad outline of the genealogy of Fokeng rulers, from Nape (AD1700) to Môkgatle (AD1835) is outlined. Settlements that were associated with some

of the Fokeng rulers, although only a few are mentioned in oral tradition, are also indicated.

The oldest legends state that the Fokeng entered the Transvaal through Tweedepoort, under the leadership of Nape, the earliest known Fokeng chief. This was before c. 1700 AD. The group moved south-eastwards and settled on the banks of the Elands River (Kgetleng). Three Fokeng groups detached them from the main branch and moved southwards on different occasions. The Fokeng are therefore spread over the Orange Free State, Lesotho and even the former homeland of Transkei. The Fokeng are, next to the San people, the oldest inhabitants of the Orange Free State.

The domain under Fokeng control during the last two centuries was the following: the northern border was the Kgetleng River (and the Tlôkwa and Kgatla Kgafêla); the western boundary was the Kwena Modimosana and the southern boundary the Magaliesberg. The eastern boundary was the Kwena Môgôpa and the Kwena Mogale.

The history of the chiefdom begins with Sekete III (Maleriba) who probably ruled in c. 1700 AD. He had three sons Kgantsi, Pitswe and Diale. (The last two had the same mother). Kgantsi was born from a Hurutshe father after the Hurutshe abducted his mother. (Controversy surrounded Sekete's III position until his death, although he was the oldest son).

Diale succeeded Sekete III and his reign probably began in c. 1720 AD. His sons were Mokuru, Mogotsi, Ramarwa, Ramogase, Tlase and Ntê. (The first two died young). Diale's sons rid the Fokeng from the Hurutshe's custom to castrate the Fokeng's bulls, an act considered offensive to the Fokeng and indicating the Huruthse's seniority. This put an end to the Huruthse's domination of the Fokeng.

With the exception of Ramorwa all the known sons of Diale became leaders of *dikgoro*, Ntê, the progenitor of the *kgoro* Seloko, Tlase, of Mathebetswaane and Ramogware of Metlapeng.

Ramorwa succeeded Diale as chief and had four sons: Mmutle, Sekete, Katane and Mpie.

Sekete succeeded Ramorwa in about 1790 AD. He was a formidable warrior and is remembered as one of the greatest Fokeng chiefs. The following individuals were sons of Sekete: Thete, Nameng, Nôge, Mogotsi, Molefe, Pitswe, Ramarue, Mohue, Manaana, Rantsogwana and Marahtsane (more can be added). Important individuals were Thete, Nameng and Nôge.

Katane, or Raikane acted as regent for Thethe (also known as Mmakgongwana) who became the next chief. He had the following sons: Diale, Mokgatle, Molotlegi, Molefe, Liphatse and Pogwe. (The first, third and fifth died young). Môkgatle, Molefe and Pogwe played important parts in the next phase of Fokeng history.

Thethe was very fond of his two younger brothers, Namemg and Nôge. The two brothers, however, turned against him. (The main concentration point in Thethe's time was at Makotshaneng (Makojaneng), east of Rustenburg near the Hex River). Thethe fled with his followers and took refuge with the Modimosana Mmatau. The Fokeng accepted Nameng as chief.

Nameng reigned for only eight months after the enforced departure of Thethe as he was killed by the doings of Nôge, who now became chief.

Nôge's rule commenced in about 1820 and ended when he was ousted in 1829 to 1830. Nôge's reign represents a stormy period in Fokeng history. Thethe invited the Pedi to attack the Fokeng whereupon Malekutu destroyed the Fokeng in 1823 to 1824. The devastation caused by the Pedi accounts for the fact that Mzilikazi amassed very little from the Fokeng's territory in 1826 to 1829.

Nôge killed Ndebele visitors to his village. He occupied the summit of Ntlhane, a 'hillock near Malejane', with his followers and bolstered the foot and slopes with wooden stockades. The Fokeng pounded the Ndebele with stones forcing them to retreat.

Nôge became unpopular and fled to Moshoeshoe in the Orange Free State.

Môkgatle's accession was somewhere between 1834 and 1836. His reign had hardly begun when the Voortrekkers drove the Ndebele out of the Transvaal. He remained in

office until his death in 1891 when he was about eighty years old. His principal village was named Mmakgongwana (after Thethe), today located in Rustenburg and partly on Paardekraal. Dirêpotsana Hill, where Phokeng now stands, was also re-occupied as residential area in Mokgatlé's time.

6.4 Historical context

The first immigrant Boers established themselves to the north of the Magaliesberg in the late 1840's. Colonial farmsteads were established along the southern and the northern foot of the Magaliesberg. Early colonial farm homesteads also arose near Marikana (Schaapkraal), in the Selons River valley to the west of Rustenburg and at Tierpoort and Garsfontein near Pretoria. Some of the earliest Voortrekkers who moved into the Rustenburg and Phokeng areas, close to the Impala Shaft 16 Complex, established themselves on the farms Kafferskraal and Witpensfontein (today Rustenburg) and Schaapkraal, to the east of the study area.

During the Second/Anglo Transvaal Boer War (1899-1902) British blockhouses were built along the ridge of the Magaliesberg, from Pretoria in the east to Rustenburg in the west. Several of these structures are located in Kommandonek and in Pampoennek in the Magaliesberg, south of the current project area.

Since the second half of the 19th century, farmers and workers have occupied the Rustenburg District (including the Mooiooi, Marikana, Hartebeespoort and Brits areas). Tobacco and citrus farming, together with cattle herding, became a subsistence pattern that has lasted to this day. Old farm homesteads, agricultural implements and other infrastructure such as tobacco drying sheds may still exist on farms adjacent to the project area.

After the discovery of the Merensky Reef in 1929, the economy of the area was gradually changed from farming into platinum and chrome mining. Farmers, farmworkers and, more recently, mine workers have therefore occupied the area without interruption for more than a hundred and fifty years. Remains dating from this historical (colonial and modern) period and from the relatively recent past therefore exist in or near the project area.

7 APPROACH AND METHODOLOGY

This heritage survey and impact assessment study was conducted by means of the following:

7.1 Field survey

A field survey for Impala's proposed new parking area was conducted on 5 May 2021 (see Figure 2). Earlier heritage surveys for Impala's Shaft 16 Complex, as well as for numerous other mining and development projects were undertaken during the past two decades many of which the author was involved in (see Part 11, 'Bibliography for heritage studies').



Figure 2: The GPS track log which the surveyor followed (red line) when covering the project area¹.

Google Earth imagery was used as a supplementary source (*prior* and after fieldwork) to establish the presence of any possible heritage resources in the proposed new parking areas. A track that was followed during the survey was logged on a Google Earth image (Figure 2).

At the time of the survey, vegetation such as grass, weeds and other intruder plants had reached a climax. However, part of the project area has been cleared from

¹ The trajectory extends beyond the limits of the proposed parking area.

vegetation. Google Earth's historical imagery confirmed that no heritage resources are visible on the surface of the proposed project area.

All coordinates for heritage resources recorded by the author were done with a Garmin Etrex hand set Global Positioning System (instrument) with an accuracy of < 15m.

The nature and character of the project area has further been illuminated with descriptions and photographs (see Part 8, 'The Phase I heritage survey').

7.2 Databases, literature surveys and maps

Databases kept and maintained at institutions such as the PHRA, the Archaeological Data Recording Centre at the National Flagship Institute (Museum Africa) in Pretoria and SAHRA's national archive (referred to as the South African Heritage Resources Information System, (SAHRIS) were consulted to determine whether any heritage resources of significance had been identified during earlier heritage surveys in or near the project area. The larger project area has been subjected to several heritage assessments studies in the past (see Part 12, 'Bibliography relating to heritage studies').

Literature relating to the pre-historical and the historical unfolding of the region where the project area is located was reviewed (see Part 6, 'Contextualising the Project Area' and Part 10, 'Select Bibliography').

7.3 Consultation process undertaken and comments received from stakeholders

No specific consultation process was undertaken for the purposes of the heritage study as the stakeholder consultation for the project is being done by SLR as part of their environmental authorisation process.

7.4 Significance ratings

The method used for the assessment of environmental issues is set out in **Error! Reference source not found.**¹. This assessment methodology enables the

assessment of environmental issues including cumulative impacts, the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

As no heritage resources were recorded in the proposed developmental area no assessment of the significance of any impacts were made.

Note: Part A provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.

PART A: DEFINITION AND CRITERIA*					
Definition of SIGNIFICANCE		Significance = consequence x probability			
Definition of CONSEQUENCE		Consequence is a function of severity, spatial extent and duration			
Criteria for ranking of the SEVERITY of environmental impacts	H	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.			
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.			
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.			
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.			
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.			
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.			
Criteria for ranking the DURATION of impacts	L	Quickly reversible. Less than the project life. Short term			
	M	Reversible over time. Life of the project. Medium term			
	H	Permanent. Beyond closure. Long term.			
Criteria for ranking the SPATIAL SCALE of impacts	L	Localised - Within the site boundary.			
	M	Fairly widespread – Beyond the site boundary. Local			
	H	Widespread – Far beyond site boundary. Regional/ national			
PART B: DETERMINING CONSEQUENCE					
SEVERITY = L					
DURATION	Long term	H	Medium	Medium	Medium
	Medium term	M	Low	Low	Medium
	Short term	L	Low	Low	Medium

SEVERITY = M					
DURATION	Long term	H	Medium	High	High
	Medium term	M	Medium	Medium	High
	Short term	L	Low	Medium	Medium

SEVERITY = H					
DURATION	Long term	H	High	High	High
	Medium term	M	Medium	Medium	High
	Short term	L	Medium	Medium	High

			L	M	H
			Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/ national

PART C: DETERMINING SIGNIFICANCE					
PROBABILITY (of exposure to impacts)	Definite/ Continuous	H	Medium	Medium	High
	Possible/ frequent	M	Medium	Medium	High
	Unlikely/ seldom	L	Low	Low	Medium
			L	M	H
CONSEQUENCE					

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	Decision guideline
High	It would influence the decision regardless of any possible mitigation.
Medium	It should have an influence on the decision unless it is mitigated.
Low	It will not have an influence on the decision.

*H = high, M= medium and L= low and + denotes a positive impact.

8 THE PHASE I HERITAGE SURVEY

8.1 The field survey

The project area is located on a level stretch of turf veld next to the existing Impala Shaft 16 Complex and several houses belonging to the neighbouring suburb of Kanana. Site photographs are provided below (See Figure 3 – 7).



Figure 3: The Impala Shaft 16 Complex in the background with the proposed new parking area in the foreground.



Figure 4: The proposed parking area has largely been cleared from vegetation whilst the remaining grass has been mowed with a lawn mower. No heritage resources of significance were observed.



Figure 5: Part of the proposed parking area has also been cleared from vegetation.



Figure 6: The proposed parking area is covered with short grass and no heritage resources were observed.



Figure 7: The proposed parking area borders on the Kanana residential area where no heritage resources were observed.

8.2 Summary

The Phase I HIA study for the project area revealed none of the types and ranges of heritage resources as outlined in Section 3 of the NHRA.

There is consequently no reason from a heritage point of view why the proposed project should not proceed.

8.3 Chance-find procedures

It is likely that the heritage survey may have missed heritage resources due to various reasons outlined in the report. Therefore chance-find procedures have to be implemented during the during the construction, operation or closure phases of the project. The chance-find procedures apply to all contractors, subcontractors, subsidiaries or service providers. If any of these institutions' employees find any heritage resources during any developmental activity all work at the site must be stopped and kept on hold. Chance-finds must be reported to supervisors and through supervisors to the senior manager on site. Chance-find procedures are summarized for heritage resources and graveyards.

8.3.1 Chance-find Procedures for heritage resources

The initial procedure to follow whenever heritage resources are uncovered during development is aimed at avoiding any further possible damage to the heritage resources, namely:

- The person or group (identifier) who identified or exposed the heritage resource or graves must cease all activity in the immediate vicinity of the site.
- The identifier must immediately inform the senior on-site manager of the discovery.
- The senior on-site manager must make an initial assessment of the extent of the find and confirm that further work has stopped and ensure that the site is secured, and that controlled access is implemented.
- The senior on-site manager will inform the Environmental Officer (EO) and Health and Safety (HS) officers of the chance-find and its immediate impact on the project. The EO will then contact the project archaeologist.
- The project archaeologist will do a site inspection and confirm the significance of the discovery, recommend appropriate mitigation measures and notify the relevant authorities.
- Based on the comments received from the authorities the project archaeologist will provide the mine with a Terms of References Report and associated costs if mitigation measures must be implemented.

8.3.2 Chance-find Procedures for graves

If previously unidentified graves are uncovered and/or exposed during any of the developmental phases of the project the following steps must be implemented subsequent too those outlined above:

- The project archaeologist must confirm the presence of graveyards and graves and follow the following procedures.
- Inform the local SAPS and traditional authority.
- The project archaeologist in conjunction with the SAPS and traditional authority will inspect the possible graves and make an informed decision whether the remains are of forensic, recent, cultural-historical or of archaeological significance.

- Should it be concluded that the find is of heritage significance and therefore protected in terms of heritage legislation the project archaeologist will notify the relevant authorities.
- The project archaeologist will provide advice with mitigation measures for the graveyards and graves.

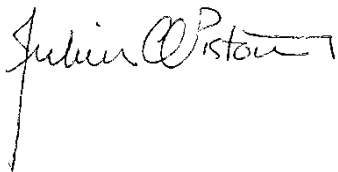
9 CONCLUSION AND RECOMMENDATIONS

The Phase I HIA study for the project area revealed none of the types and ranges of heritage resources as outlined in Section 3 of the NHRA.

There is consequently no impact on any heritage resources and no reason from a heritage point of view why the proposed project should not proceed if the chance-find procedures which were outlined are followed.

It is possible that this Phase I HIA study may have missed heritage resources in the project area due to reasons such as tall grass or the possibility that heritage resources including graves may occur below the surface of the earth and may only be exposed once development commences. Heritage resources may also have been missed because of human failure to recognise them.

If any heritage resources of significance are exposed during the development of the proposed parking area the chance-find procedures must be implemented.

A handwritten signature in black ink, appearing to read 'Julius CC Pistorius', with a long vertical line extending downwards from the end of the signature.

DR JULIUS CC PISTORIUS
Member ASAPA

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Marion.bamford@wits.ac.za

19 August 2021

Dr Ragna Redelstorff
Heritage Officer Archaeology, Palaeontology & Meteorites Unit
South African Heritage Resources Agency
111 Harrington Street
Cape Town 8001

Dear Dr Redelstorff

RE: Request for Exemption of any Palaeontological Impact Assessment for the proposed Parking Phase 1 for Impala Platinum Limited, Shaft 16 Complex, Rustenburg Operation, North West Province

In my capacity as a professional palaeontologist, I am requesting exemption for palaeontological impact assessment in terms of the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998) which requires that the proposed development must be preceded by the relevant impact assessment, in this case for palaeontology.

Impala Platinum Limited proposes to expand the parking area in one phase, to the east of the mine buildings at Shaft 16, Rustenburg Operation, just west of Kanana village, north of Rustenburg (Figure 1). The whole area lies on the Pyramid Gabbro-Norite that is an intrusive igneous rock type. The rocks are about 2200 – 2050 million years old and enriched with the platinum group elements (Cawthorn et al., 2006). They form the Main Zone of the Rustenburg Layered Suite of the Bushveld Igneous Complex.

Since the rocks are intrusive igneous rocks they do not preserve any fossils at all. The surface is overlain by modern soils and alluvium that too do not preserve any fossils. This is confirmed by the grey coloration (insignificant to zero) in the SAHRIS Palaeosensitivity map (South African Heritage Resources Agency; Figure 3). Therefore, we request that no palaeontological impact assessment be required, and as far as the palaeontology is concerned, the project may proceed.

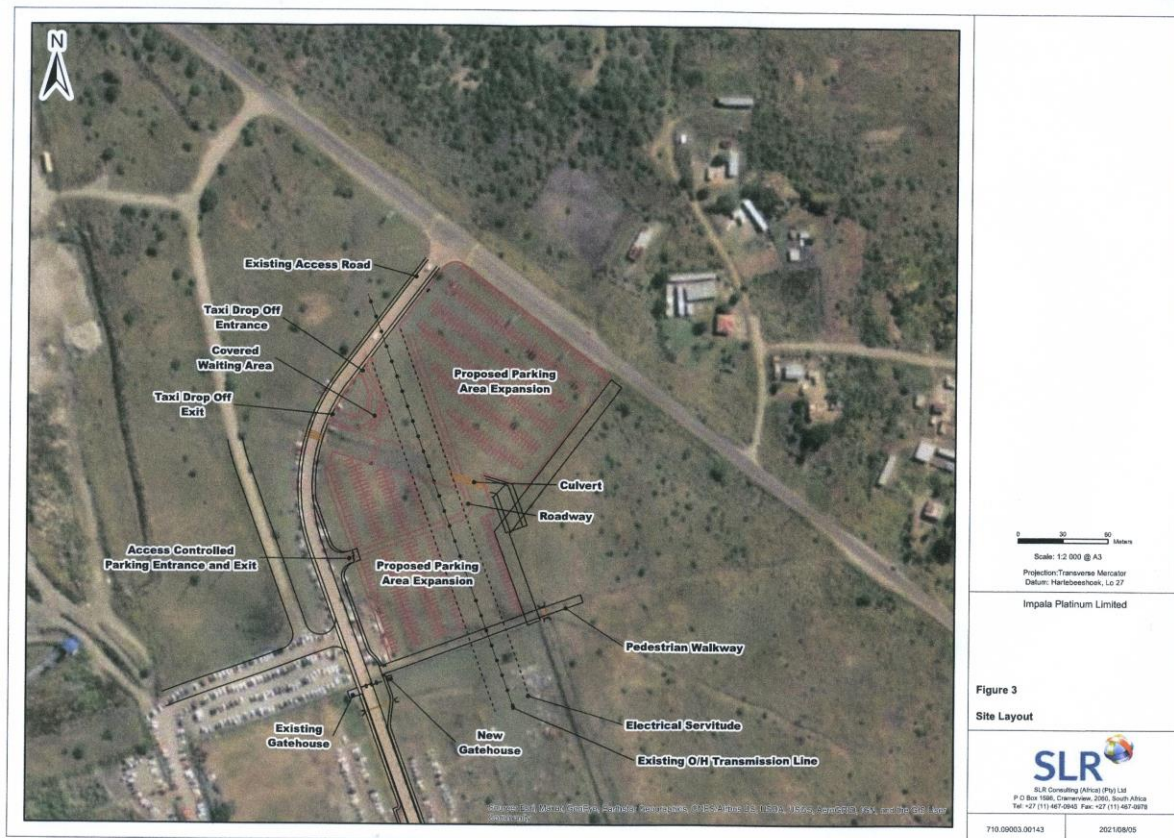


Figure 1: Google Earth site map of the proposed parking extension, phase 1 for the Shaft 16 Complex.



Figure 2: Geological map of the area around the Shaft 16 section of Impala Platinum mine with the proposed project is indicated within the yellow rectangle. Abbreviations

of the rock types are: Vg = Pyramid Gabbro-norite; di = diabase. Map enlarged from the Geological Survey 1: 250 000 map 2526 Rustenburg.



Figure 3: SAHRIS palaeosensitivity map for the site for the proposed Shaft 16 parking area shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

Yours faithfully

Prof Marion Bamford
Palaeobotanist; PhD (Wits 1990)

Reference cited:

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Declaration of Independence

This letter has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by SLR Consulting (Johannesburg Office), South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the Project.

Specialist: Prof Marion Bamford

Signature: 



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SLR Consulting (Africa) (Pty) Ltd

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Attention: Ms. Rizqah Baker

FRESHWATER ECOSYSTEM IMPACT AND COMPLIANCE STATEMENT CONSIDERING THE PROPOSED EXPANSION OF THE PARKING AREA AT THE SHAFT 16 COMPLEX, AT IMPALA PLATINUM MINE, NEAR RUSTENBURG, NORTH WEST PROVINCE.

1. INTRODUCTION AND BACKGROUND SETTING

Scientific Aquatic Services (SAS) was appointed by SLR Consulting (Africa) (Pty) Ltd to consider the freshwater ecosystems and, if appropriate, prepare a freshwater ecosystem impact and compliance statement as part of the Environmental Authorisation (EA) process for the proposed expansion of the parking area for the Impala Platinum Mine Shaft 16 Complex, near Rustenburg in the North West Province. The site where the proposed parking area and drop-off is located will hereafter be referred to as the “study area” (indicated in Appendix A, Figure A1 and A2). A 500 m “zone of investigation” around the study area, (in accordance with General Notice (GN) 509 of 2016 (as it relates to the National Water Act (NWA) (Act No. 36 of 1998)), will be referred to as the “investigation area”. (Appendix A, Figures A1 and A2).

SAS was required to report on aspects of the freshwater ecosystem biodiversity and provide input into any development constraints or Enviro-Legal constraints that may arise for the proposed parking expansion area within the study area in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the NWA 1998 (Act No. 36 of 1998). SAS was required to, if necessary, assess the risk that the parking expansion area poses to the freshwater ecosystem biodiversity within the receiving environment.

2. APPLICATION OF THE DEPARTMENT OF ENVIRONMENTAL AFFAIRS (DEA) SCREENING TOOL.

The protocol for the assessment of freshwater and aquatic biodiversity prepared in support of the Department of Forestry, Fisheries and Environment (DFFE) (previously the Department of Environmental Affairs (DEA)) national web based environmental screening tool, provides the criteria for the assessment and reporting of impacts on aquatic/freshwater biodiversity for activities requiring EA. For the aquatic/freshwater biodiversity theme, the requirements are for sites which support various levels of biodiversity. The relevant aquatic/freshwater biodiversity theme in the national web based environmental screening tool has been provided by the South African National Biodiversity Institute (SANBI). Based on the sensitivity rating, a suitably qualified specialist must prepare the relevant report or opinion memo which is to be submitted as part of the EA application.

As part of the process of initiating the EA process, SLR Consulting (Africa) (Pty) Ltd applied the DFFE (previously DEA) screening tool to the study area. According to the guidelines, an applicant intending to undertake an activity on a site identified as being of “very high sensitivity” for an aquatic biodiversity theme must submit an Aquatic Biodiversity Impact Assessment or if the area is identified as being of “low sensitivity” then an Aquatic Biodiversity Compliance Statement must be compiled and submitted to the competent authority. It is noted, however, that during a site survey undertaken by a suitably qualified freshwater ecologist should the sensitivity be determined different from that assigned by the screening tool (i.e. that a high risk to the regional aquatic biodiversity or freshwater ecosystems in the area is likely even though it is assigned as a “low” sensitivity, or if it is assigned a high sensitivity, however, the proposed develop risk are deemed low) then the relevant assessment approach must be followed based on the site survey results and not the DFFE screening tool allocation. According to the national web based environmental screening tool, the study area is located within an area of **low aquatic/ freshwater biodiversity significance**.

3. DEFINITIONS AND LEGISLATIVE REQUIREMENTS

The legislation considered during this investigation included the following:

- The Constitution of the Republic of South Africa, 1996¹;
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The National Water Act (NWA), 1998 (Act No. 36 of 1998); and
- Government Notice 509 (GN 509) as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act (NWA), 1998 (Act No. 36 of 1998).

¹ Since 1996, the Constitution has been amended by seventeen amendments acts. The Constitution is formally entitled the ‘Constitution of the Republic of South Africa, 1996’. It was previously also numbered as if it were an Act of Parliament – Act No. 108 of 1996 – but since the passage of the Citation of Constitutional Laws Act, neither it nor the acts amending it are allocated act numbers.

3.1 Freshwater Ecosystem Definition

The NWA, 1998 (Act No. 36 of 1998) is aimed at the protection of the country's water resources, defined in the Act as "a watercourse, surface water, estuary or aquifer". According to the NWA, 1998 (Act No. 36 of 1998) a watercourse means:

- (a) a river or spring;
- (b) a natural channel in which water flows regularly or intermittently;
- (c) a wetland, lake or dam into which, or from which, water flows; and
- (d) any collection of water which the Minister may, by notice in the Gazette, declare a watercourse.

The Act further provides definitions of wetland and riparian habitats as follows:

Wetland habitat is "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 land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."

Riparian habitat includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent area.

Thus, for the purposes of this site survey, the definition of a freshwater ecosystem is considered to be synonymous with the definition of a watercourse as per the NWA 1998 (Act No. 36 of 1998).

The freshwater ecosystem delineation took place, as far as possible, according to the method presented in the "Updated manual for the identification and delineation of wetland and riparian resources" (DWAF, 2008). The foundation of the method is based on that freshwater ecosystem have several distinguishing factors including the following:

- Landscape position;
- The presence of water at or near the ground surface;
- Distinctive hydromorphic soils; and
- Vegetation adapted to saturated soils.

During the site assessment, the presence of any freshwater ecosystem characteristics as defined by DWAF (2008) and by the NWA, 1998 (Act No. 36 of 1998), were noted.

4. DESKTOP INVESTIGATION FINDINGS

A background study of relevant national, provincial and municipal datasets (such as the National Freshwater Ecosystem Priority Areas [NFEPA] 2011 database; the Department of Water and Sanitation Research Quality Information Services [DWS RQIS PES/EIS], 2014 database, and National Biodiversity Assessment (NBA) 2018, the North West Biodiversity Sector Plan (NW BSP, 2015) was undertaken to aid in defining presence of any freshwater ecosystems prior to the site survey of the study area (see Appendix A, Table 1) as well as the associated 500 m investigation area.

The results are summarised in the points below with the relevant maps presented in Appendix A.

- According to the NFEPA (2011) and the NBA (2018) databases, there are no wetlands nor rivers within the study and investigation areas. The NFEPA database indicates an unchannelled valley bottom (UCVB) wetland located 1.4 km downgradient of the study area while the NBA (2018) indicates a seep wetland located 1.3 km downgradient of the study area; and
- According the NFEPA database, the UCVB is considered in a largely modified ecological condition (WETCON C) while NBA (2018) database indicates that the seep wetland was classified to be in a largely to seriously modified (WETCON D/E/F) ecological condition.

5. SITE SURVEY RESULTS

A site investigation of the study area was undertaken on the 26th of May 2021, using visual assessment methods as well as digital satellite imagery. In addition, a bucket soil auger was used to verify soil characteristics that may indicate the presence, or lack thereof of any potential wetland/riparian features on the footprint of the proposed development area (study area) and associated investigation area. The development area and general site conditions where the proposed parking expansion area is located is shown Figure 1 below.

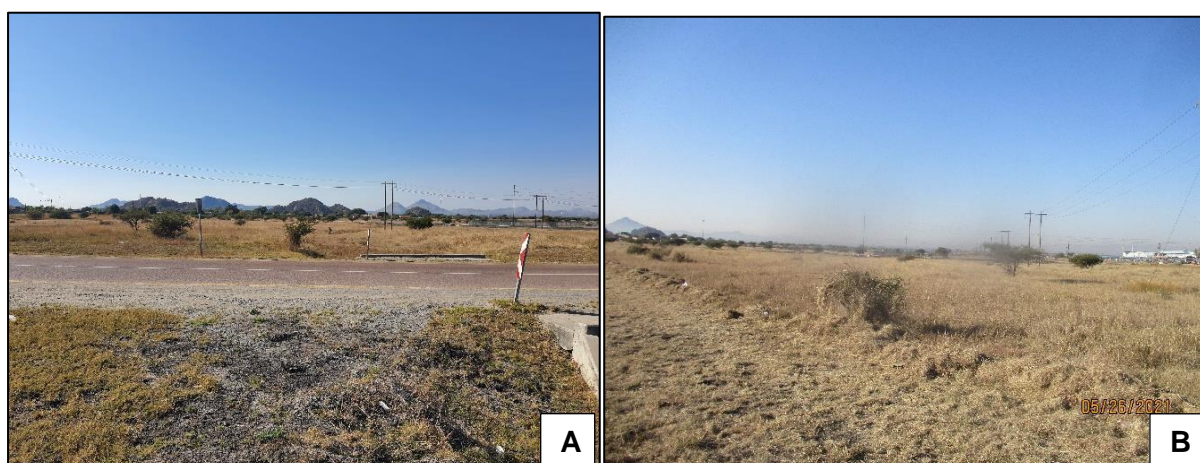


Figure 1: Representative photographs of the development area where the proposed expansion of the parking area at Shaft 16 will be located.

Upon investigation of the soil by means of hand auguring, the soil in the study area was assessed to indicate high clay content which inhibits vertical movement of water and promotes surface flow once cracks have filled with water. In addition, the soil was not observed to show characteristics of mottling which is an indicator of fluctuating water table associated with wetlands conditions (Figure 2).

The vegetation composition within the study area was largely dominated by short grasses and sporadic woody species low in density. The dominant grasses found within the study area include *Eragrostis bipartita*, *Ischaemum afrum*, *Dichanthium annalatum* and *Heteropogon contortus*. These grasses according to van Oudtshoorn (2020) share a common characteristic of growing within clay soil.

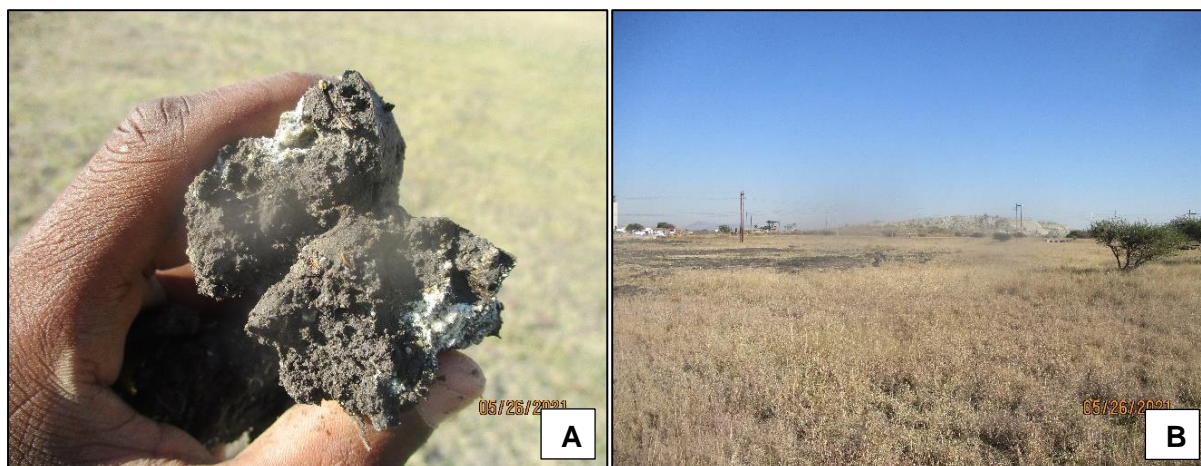


Figure 2: Soil and vegetation characteristics within the study area.

In addition to occurring within clayey soil, some of the grasses within the study area commonly grow within damp areas where water often collects. During the field assessment, a stormwater culvert was observed to the west of the study area (Figure 3) and given the hardened surfaces (roads) around the study area, it is expected that water often collects in parts of the study area. This water is likely to stagnate due to the flat topography and clay soil in the area forming a sealed surface when saturated and can only be lost via evaporation.



Figure 3: Stormwater culvert located to the west of the study area.

No watercourses nor wetlands were observed within the study area during the site investigation and within 500m thereof. It is noted that although there is stormwater ingress entering the study area, it has not formed a wet response area that is commensurate with a freshwater ecosystem and this wet response already is driven by stormwater and would likely not occur naturally. Since there are no freshwater ecosystems within the proposed development area and 500 m of the study area, no impacts related to watercourses for the proposed parking expansion area were assessed.

6. BUSINESS CASE, OPPORTUNITIES AND CONSTRAINTS APPLICABLE TO THE PROPOSED DEVELOPMENT OF THE SUBJECT PROPERTY.

A site investigation considering the development area and 500 m investigation area was undertaken on the 26th of May 2021, using visual assessment methods as well as digital satellite imagery. In addition, a bucket soil auger was used to verify soil characteristics that may indicate the presence, or lack thereof of any potential wetland/riparian features on the footprint of the study area.

During the field assessment, no freshwater ecosystems were identified within the study area and the 500m investigation area. The desktop assessment also indicated no freshwater ecosystems within the study and 500m investigation area. As a result, from a freshwater ecosystem resource management perspective, no development constraints are considered applicable for the proposed expansion of the parking area.

The study area is not subject to any applicable zones of regulations given the absence of any freshwater ecosystems. The proposed parking expansion area associated with Impala Platinum Mine Shaft 16 Complex is therefore considered acceptable from a freshwater ecosystem resource management perspective. This compliance statement must be submitted to the relevant competent authority for consideration as part of the approval process prior to commencement of the proposed parking area within the study area.

7. GENERAL GOOD HOUSEKEEPING AND MITIGATION MEASURES

Given the location of the wetlands identified in the NFEPA (2011) and NBA (2018) databases in relation to the study area where the proposed parking area will be located, there will be no direct impacts and edge effects on these freshwater ecosystems are considered negligible. In terms of changes to hydrological flow, pattern and timing, the clay soils in the area form a sealed surface when saturated (following rainfall events) and promote surface flow. The parking area operation to a degree mimics these characteristics (but changes the pattern quantity and timing of water in the landscape) due to the increased extent of the sealed surface. Ensuring inclusion of structures developed by means of soft engineering approaches such as swales, to spread, and attenuate flow and to trap sediment within the design of the parking area will ensure flow pattern and timing within the study area are not impacted post development of the parking area.

In addition to the above, general mitigation measures that are to be implemented during construction within the study area include the following:

- All development footprint area should remain as small as possible and the boundaries of footprint area, must be clearly defined and it should be ensured that all activities remain within defined footprint area;
- Existing roads must be utilised by construction vehicles during the construction phase of the project;
- All waste management should take place according to best practice guidelines and principles;

- All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into the topsoil; and
- Any sheet runoff from compacted area should be slowed down by the strategic placement of berms.

Yours Faithfully,

Stephen van Staden²
SACNASP REG.NO: 400134/05 (Ecology)

Declaration of independence and CV included in Appendix B and C respectively

² Co-authored by N. Lushozi and peer reviewed by K. Marais (Pr. Sci. Nat)

8. REFERENCES

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APPENDIX A- DASHBOARD AND PROJECT MAPS

Table 1: Desktop data relating to the characteristics of the freshwater ecosystems associated with the study and investigation area.

Aquatic ecoregion and sub-regions in which the study area is located		Detail of the study area in terms of the National Freshwater Ecosystem Priority Area (NFEPA) (2011) database	
Ecoregion	Western Bankenveld	FEPACODE	The study area is situated within in an area currently not considered important in terms of an upstream management area.
Catchment	Limpopo		
Quaternary Catchment	A22H		
WMA	Crocodile (West) and Marico	NFEPA Wetlands	According to the NFEPA Database there are no wetlands within the study and investigation area. The NFEPA database indicates an unchannelled valley bottom (UCVB) wetland located 1.4 km downgradient of the study area. The UCVB is considered to be in a largely modified ecological condition (WETCON C)
subWMA	Elands		
Dominant characteristics of the Western Bankenveld (7.04)			
Level II	Western Bankenveld (7.04)	Wetland Vegetation Type	The study and investigation areas fall within the Central Bushveld Group 2 Wetland Vegetation Type which is considered to be vulnerable according to Mbona <i>et al.</i> (2015).
Dominant primary terrain morphology	Lowlands; Mountains; Moderate to high relief		
Dominant primary vegetation types	Mix Bushveld		
Altitude (m a.m.s.l)	900 to 1700	NFEPA Rivers	According to the NFEPA Database, there are no rivers within the study and investigation areas.
MAP (mm)	400 to 700		
Coefficient of Variation (% of MAP)	25 to 35		
Rainfall concentration index	60 to 64	National Biodiversity Assessment (2018): South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (National Wetland Map 5 is included in the NBA)	
Rainfall seasonality	Early to mid-summer	According to the NBA 2018: SAIIAE there are no wetlands or rivers within the study and investigation areas. The NBA (2018) indicates a seep wetland located 1.3 km downgradient of the study area. The seep wetland was classified to be in a largely to seriously modified (WETCON D/E/F) ecological condition.	
Mean annual temp. (°C)	16 to 20		
Winter temperature (July)	0 to 22		
Summer temperature (Feb)	16 to 32		
Median annual simulated runoff (mm)	20 to 100		
Detail of the study area in terms of North-West Biodiversity Sector Plan (NWBSP, 2015).			
There are no Aquatic Ecological Support Areas (ESAs) nor Critical Biodiversity Areas (CBAs) associated with the study and investigation area.			
National Web Based Environmental Screening Tool (2020)			
The screening tool is intended for pre-screening of sensitivities in the landscape to be assessed within the EIA process. This assists with implementing the mitigation hierarchy by allowing developers to adjust their proposed development footprint to avoid sensitive areas.		The overall aquatic sensitivity for the study and investigation areas has a low sensitivity.	

CBA = Critical Biodiversity Area; DWS = Department of Water and Sanitation; EI = Ecological Importance; ES = Ecological Sensitivity; EPL = Ecosystem Protection Level; ESA = Ecological Support Area; ETS = Ecosystem Threat Status; m.a.m.s.l = Metres Above Mean Sea Level; MAP = Mean Annual Precipitation; NBA = National Biodiversity Assessment; NFEPA = National Freshwater Ecosystem Priority Areas; PES = Present Ecological State; SAIIAE = South African Inventory of Inland Aquatic Ecosystems; WMA = Water Management Area.



Figure A1: A digital satellite image depicting the location of the study area and associated investigation area in relation to the surrounding area.

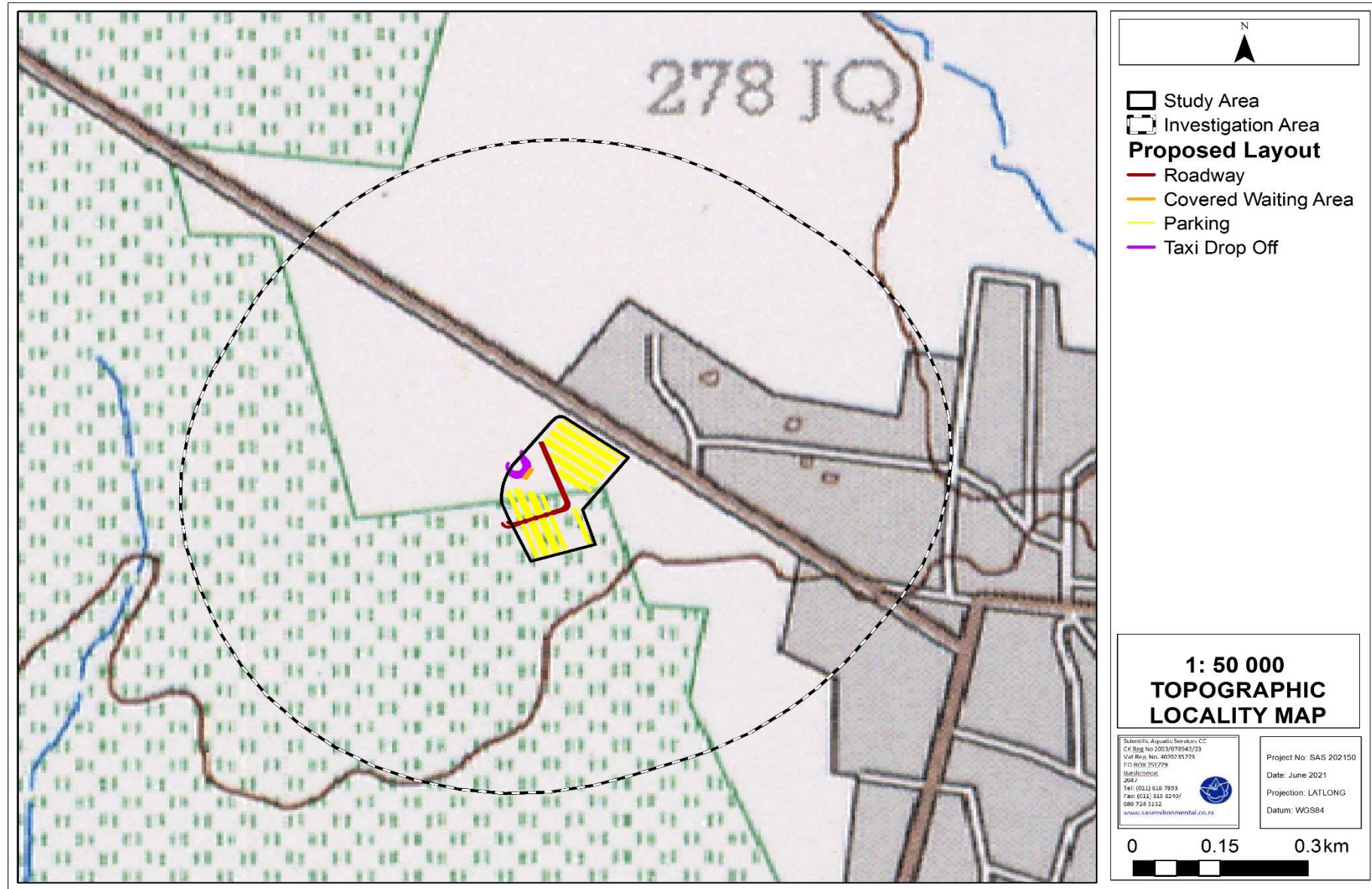


Figure A2: The proposed parking area within the study area and associated investigation area depicted on a 1:50 000 topographical map in relation to the surrounding area.



Figure A3: A digital satellite image depicting the overall layout associated with the proposed additional parking area in relation to the surrounding area.

APPENDIX B - DECLARATION OF INDEPENDENCE

DETAILS, EXPERTISE AND CURRICULUM VITAE OF SPECIALISTS

1. (a) (i) Details of the specialist who prepared the report

Stephen van Staden	MSc (Environmental Management) (University of Johannesburg)
Kim Marais	BSc Hons (Zoology) (University of Witwatersrand)
Nqobile Lushozi	MSc (Geoinformatics) (Stellenbosch University)

1. (a). (ii) The expertise of that specialist to compile a specialist report including a curriculum vitae

Company of Specialist:	Scientific Aquatic Services		
Name / Contact person:	Stephen van Staden		
Postal address:	29 Arterial Road West, Oriel, Bedfordview		
Postal code:	1401	Cell:	083 415 2356
Telephone:	011 616 7893	Fax:	011 615 6240/ 086 724 3132
E-mail:	stephen@sasenvgroup.co.za		
Qualifications	MSc (Environmental Management) (University of Johannesburg) BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg) BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)		
Registration / Associations	Registered Professional Natural Scientist at South African Council for Natural Scientific Professions (SACNASP) Accredited River Health Practitioner by the South African River Health Program (RHP) Member of the South African Soil Surveyors Association (SASSO) Member of the Gauteng Wetland Forum		

1. (b) a declaration that the specialist is independent in a form as may be specified by the competent authority.

I, Stephen van Staden, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Signature of the Specialist

I, Kim Marais, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Signature of the Specialist

I, Nqobile Lushozi, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Signature of the Specialist

APPENDIX C- CV OF SPECIALISTS



SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION CURRICULUM VITAE OF **STEPHEN VAN STADEN**

PERSONAL DETAILS

Position in Company	Group CEO, Water Resource Discipline Lead, Managing Member, Ecologist, Aquatic Ecologist
Joined SAS Environmental Group of Companies	2003 (year of establishment)

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP)
Accredited River Health Practitioner by the South African River Health Program (RHP)
Member of the South African Soil Surveyors Association (SASSO) Member of the Gauteng Wetland Forum
Member of the Gauteng Wetland Forum
Member of International Association of Impact Assessors (IAIA) South Africa;
Member of the Land Rehabilitation Society of South Africa (LaRSSA)

EDUCATION

Qualifications

MSc Environmental Management (University of Johannesburg)	2003
BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg)	2001
BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)	2000

Short Courses

Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017
Tools for Wetland Assessment (Rhodes University)	2017
Legal liability training course (Legricon Pty Ltd)	2018
Hazard identification and risk assessment training course (Legricon Pty Ltd)	2018
Wetland Management: Introduction and Delineation (WLID1502S) (University of the Free State)	2018
Hydropedology and Wetland Functioning (TerraSoil Science and Water Business Academy)	2018

AREAS OF WORK EXPERIENCE

South Africa – All Provinces
Southern Africa – Lesotho, Botswana, Mozambique, Zimbabwe Zambia
Eastern Africa – Tanzania Mauritius
West Africa – Ghana, Liberia, Angola, Guinea Bissau, Nigeria, Sierra Leona
Central Africa – Democratic Republic of the Congo

DEVELOPMENT SECTORS OF EXPERIENCE

1. Mining: Coal, chrome, Platinum Group Metals (PGMs), mineral sands, gold, phosphate, river sand, clay, fluorspar
2. Linear developments (energy transmission, telecommunication, pipelines, roads)
3. Minerals beneficiation
4. Renewable energy (Hydro, wind and solar)
5. Commercial development
6. Residential development
7. Agriculture
8. Industrial/chemical

KEY SPECIALIST DISCIPLINES**Legislative Requirements, Processes and Assessments**

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions

Freshwater Assessments

- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Maintenance and Management Plans
- Plant Species and Landscape Plans
- Freshwater Offset Plans
- Hydropedological Assessment
- Pit Closure Analysis

Aquatic Ecological Assessment and Water Quality Studies

- Habitat Assessment Indices (IHAS, HRC, IHIA & RHAM)
- Aquatic Macro-Invertebrates (SASS5 & MIRAI)
- Fish Assemblage Integrity Index (FRAI)
- Fish Health Assessments
- Riparian Vegetation Integrity (VEGRAI)
- Toxicological Analysis
- Water quality Monitoring
- Screening Test
- Riverine Rehabilitation Plans

Biodiversity Assessments

- Floral Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Terrestrial Monitoring
- Biodiversity Offset Plan

Soil and Land Capability Assessment

- Soil and Land Capability Assessment
- Hydropedological Assessment

Visual Impact Assessment

- Visual Baseline and Impact Assessments
- Visual Impact Peer Review Assessments



SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF **KIM MARAIS**

PERSONAL DETAILS

Position in Company	Senior Scientist
	Water Resource Manager
Joined SAS Environmental Group of Companies	2015

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions
(SACNASP – Reg No. 117137/17)
Member of the Western Cape Wetland Forum (WCWF)

EDUCATION

Qualifications

BSc (Hons) Zoology (University of the Witwatersrand)	2012
BSc (Zoology and Conservation) (University of the Witwatersrand)	2011

Short Courses

Aquatic and Wetland Plant Identification (Crispis Environment)	2019
Tools for Wetland Assessment (Rhodes University)	2018
Certificate in Environmental Law for Environmental Managers (CEM)	2014
Certificate for Introduction to Environmental Management (CEM)	2013

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, KwaZulu-Natal, Northern Cape, Eastern Cape,
Africa - Uganda

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Biodiversity Action Plans (BAP)
- Alien and Invasive Control Plans (AICP)
- Faunal Eco Scans
- Faunal Impact Assessments

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Watercourse Maintenance and Management Plans
- Freshwater Offset Plan

Aquatic Ecological Assessment and Water Quality Studies

- Riparian Vegetation Integrity (VEGRAI)
- Water quality Monitoring
- Riverine Rehabilitation Plans

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions
- Public Participation processes



SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF **NQOBILE LUSHOZI**

PERSONAL DETAILS

Position in Company	Junior Ecologist
Joined SAS Environmental Group of Companies	2019

MEMBERSHIP IN PROFESSIONAL SOCIETIES

South African Wetland Society (SAWS)
International Associated for Impact Assessment South Africa (IAIAsa)

EDUCATION

Qualifications

MSc (Geoinformatics) (Stellenbosch University)	2019
BSc (Hons) (Environmental Sciences) (University of KwaZulu-Natal)	2016
BSc (Environmental Sciences) (University of KwaZulu-Natal)	2014

SHORT COURSES

Additional Training

Advanced Grass Identification Course	(2021)
Tools for Wetland Assessments	(2020)
Wetland Back-2Basics Course	(2019)

AREAS OF WORK EXPERIENCE

South Africa – KwaZulu-Natal, Gauteng, Mpumalanga, Free-State, Limpopo

KEY SPECIALIST DISCIPLINES

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning

Aquatic Ecological Assessment and Water Quality Studies

- Habitat Assessment Indices (IHAS, IHIA)
- Toxicological Analysis
- Water quality Monitoring
- Mass and Salt Balance Determination Studies



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Name: Christien Steyn

Nelanie Cloete

Date: Tuesday, 17 August 2021

Ref: STS 210029

SLR Consulting (Africa) (Pty) Ltd

PO Box 1596,

Cramerview,

2060

Tel: 011 467 0945

Email: rbaker@slrconsulting.com

Attention: Mrs. Rizqah Baker

PLANT SPECIES, ANIMAL SPECIES AND AVIFAUNAL COMPLIANCE STATEMENTS FOR THE PROPOSED EXPANSION OF THE PARKING AREA AT THE SHAFT 16 COMPLEX OF THE IMPALA PLATINUM MINE, NEAR RUSTENBURG, NORTH WEST PROVINCE.

1 INTRODUCTION AND BACKGROUND SETTING

Scientific Terrestrial Services (STS) was appointed by SLR Consulting (Africa) (Pty) Ltd to consider the plant species, animal species and avifauna and, if appropriate, prepare a Compliance Statement as part of the Environmental Assessment (EA) for the proposed expansion of the parking area at the Shaft 16 Complex of the Impala Platinum Mine, near Rustenburg in the North West Province. A Terrestrial Biodiversity Compliance Statement was not prepared, as a separate full Terrestrial Biodiversity Specialist Assessment was undertaken (refer to STS 210029, 2021). The site where the proposed parking and drop-off is located adjacent to the Impala Platinum 16 Shaft will hereafter be referred to as the “**study area**” (3.087 hectares) (indicated in Appendix 1: Figures A1 and A2). The layout of the proposed parking is depicted in Appendix 1: Figure A3.

STS was requested to report on aspects of Avifaunal Species, Animal Species, and Plant Species Sensitivity themes, as per the Screening Tool outcome and to provide input into any development constraints this may have for the proposed parking expansion within the study area in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

This compliance statement will follow the requirements as stated in the procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of Sections 24(5)(A) and (H) and 44 of NEMA.

The outcome of the site sensitivity verification will be recorded in the form of a Compliance Statement that:

- **Confirms or disputes** the current use of the land and the environmental sensitivity as identified by the Department of Forestry, Fisheries and the Environment's (DFFE) (previously the Department of Environmental Affairs (DEA)) online Screening Tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;
- Contains a **motivation and evidence** (e.g., photographs) of either the verified or different use of the land and environmental sensitivity; and
- **Does not include results of a full terrestrial biodiversity assessment.** Sensitivities provided in this report only confirm or dispute the Screening Tool outcomes. If a "Very High" sensitivity is confirmed, the requirements must be followed as outlined in the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) and 44 of the NEMA, when applying for EA:
 - For the [Terrestrial Biodiversity Theme](#): Published in Government Notice No. 320, Government Gazette 43110 (20 March 2020).
 - For [Animal](#) and [Plant](#) Species Themes: Published in Government Notice No. 1150, Government Gazette 43855 (30 October 2020).

2 DEFINITIONS AND LEGISLATIVE REQUIREMENTS

The legislation considered during this investigation included the following:

- The Constitution of the Republic of South Africa, 1996¹;
- The NEMA; and
- The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA).

3 OUTCOMES OF THE APPLICATION OF THE NATIONAL WEB-BASED SCREENING TOOL

As part of the procedure of initiating the EA process, SLR Consulting (Africa) (Pty) Ltd applied the Screening Tool to the study area. The protocol for the assessment of terrestrial biodiversity, terrestrial animals and terrestrial plants prepared in support of the Screening Tool provides the criteria for the assessment and reporting of impacts on biodiversity for activities requiring EA. The assessment requirements of this protocol are associated with a level of environmental sensitivity determined by the Screening Tool². For all terrestrial themes, the biodiversity assessment requirements pertain to landscapes and/or sites which support various levels of threatened or unique biodiversity.

The study area has been identified by the Screening Tool as having **Very High Sensitivity** in terms of a terrestrial theme and as such SLR Consulting (Africa) (Pty) Ltd requested a Terrestrial Biodiversity Specialist Assessment be conducted for the study area (please refer to STS 210029. 2021). For the Plant and Animal themes, a **Low Sensitivity** was triggered (Table 1 below; Appendix A: Figures 4 & 5). Given the outcome of the Screening Tool for the Plant and Animal Species themes, a Plant Species Compliance Statement and an Animal Species Compliance Statement is required. It should be noted that the Screening Tool does not have a specific theme for avifauna, but it was deemed necessary to confirm the sensitivity of the site for avifauna. However, based on the level of sensitivity, an Avifaunal Compliance Statement was deemed appropriate to meet the requirements of the guidelines.

¹ Since 1996, the Constitution has been amended by seventeen amendments acts. The Constitution is formally entitled the 'Constitution of the Republic of South Africa, 1996'. It was previously also numbered as if it were an Act of Parliament – Act No. 108 of 1996 – but since the passage of the Citation of Constitutional Laws Act, neither it nor the acts amending it are allocated act numbers.

² <https://screening.environment.gov.za/screeningtool/#/pages/welcome>

Table 1: Results of the National Web-based Environmental Screening Tool for the study area.

NATIONAL WEB-BASED ENVIRONMENTAL SCREENING TOOL (2021)	
<p>The screening tool is intended to allow for pre-screening of sensitivities in the landscape to be assessed within the EA process. This assists with implementing the mitigation hierarchy by allowing developers to adjust their proposed development footprint to avoid sensitive areas. The different sensitivity ratings pertaining to the plant [and animal] protocols are described below:</p> <ul style="list-style-type: none"> ➤ <u>Very high</u>: habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km² are considered critical habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under critically endangered (CR), endangered (EN), or vulnerable (VU) criteria of the IUCN or species listed as critically/ extremely rare under South Africa's National Red List criteria. For each species reliant on a critical habitat, all remaining suitable habitat has been manually mapped at a fine scale. ➤ <u>High</u>: recent occurrence records for all threatened (CR, EN, VU) and/or rare endemic species are included in the high sensitivity level. ➤ <u>Medium</u>: model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. ➤ <u>Low</u>: areas where no Species of Conservation Concern (SCC) are known or expected to occur. 	
Animal Species (Appendix A: Figure A4)	<p>For the Animal Species theme, the entire study area is considered to have a Low Sensitivity.</p> <p>Screening Tool Requirement: An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of “low” sensitivity for terrestrial animal species must submit a Terrestrial Animal Species Compliance Statement.</p>
Plant Species (Appendix A: Figure A5)	<p>For the Plant Species theme, the entire study area is considered to have a Low Sensitivity where no Red Data Listed (RDL) plant taxa are anticipated to occur due to unsuitable habitat conditions.</p> <p>Screening Tool Requirement: An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of “low” sensitivity for terrestrial plant species, must submit a Terrestrial Plant Species Compliance Statement.</p>
Terrestrial Sensitivity	<p>The Terrestrial Sensitivity for the entire study area is considered to have a Very High Sensitivity. The triggered sensitivity feature is the Vulnerable ecosystem (i.e., the vulnerable Marikana Thornveld).</p> <p>Screening Tool Requirement: An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being of “very high sensitivity” for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment.</p> <p>Refer to STS 210029 (2021) for the Terrestrial Biodiversity Specialist Assessment.</p>

4 INVESTIGATION FINDINGS

4.1 Desktop assessment results

The results of the database review and desktop assessment undertaken for the study area are presented in Appendix A (Maps) and B (Background information – Table 2). The below points serve to highlight important findings relevant to the EA process from the desktop analysis.

Study Area (refer to Table 2 for more details):

- The study area is located within the Marikana Thornveld **vegetation type** which is considered EN and is currently Poorly Protected (National Biodiversity Assessment (NBA) 2018 database) (SANBI, 2018b). However, the area has been significantly transformed and the (NBA) 2018 database indicates that the study area falls outside of the remaining extent of this vegetation

type. **Not to be confused with** the National Threatened Ecosystems (2011) database which does not pertain to vegetation types alone (which the NBA does) but provides a threat status based on an entire ecosystem (i.e., presence of or habitat for threatened animals and threatened plants, as well as the presence of threatened vegetation types etc.).

- Most of the study area is located within an **ecosystem** that is currently considered to be VU (Figure A6), namely the Marikana Thornveld ecosystem (SANBI 2011; South Africa, 2011). According to the description in Government Notice (GN) 1002 in term of NEMBA, the Marikana Thornveld falls under Criterion A1, which identifies ecosystems that have undergone loss of natural habitat, impacting on their structure, function, and composition. Loss of natural habitat includes outright loss, for example the removal of natural habitat for cultivation, building of infrastructure, mining etc., as well as severe degradation.
- The South African Protected Areas Database (SAPAD, 2020), the South African Conservation Areas Database (SACAD, 2020), and the National Protected Areas Expansion Strategy (NPAES, 2010) indicate that there are no formally or informally protected areas within a 10 km radius of the study area. According to NPAES (2010), the North-West/Gauteng Focus Area is located approximately 1,8 km north of the study area (Figure A7).
- The study area does not fall within a Critical Biodiversity Area (CBA) or Ecological Support Area (ESA) (North West Province of READ, 2015).

4.2 Field assessment results

A field assessment to ground-truth the desktop findings was undertaken on the 26th of May 2021. During the field investigation reconnaissance, a 'walkabout' survey was conducted to determine the general habitat types found throughout the study area, as well as to identify important biodiversity features, including plant, animal and avifaunal communities.

Historic aerial photography³ retrieved from the Chief Directorate: National Geo-spatial Information for 1955, 1962 and 1975 all indicate that the entire study has been cultivated (and hence, significantly transformed) historically (Figure 1 below), which has resulted in a significant alteration in vegetation structure, floral species composition and the ability of the habitat to support a high diversity of faunal species. Much of the study area has been left to recover post-cultivation for at least two decades (seemingly without any rehabilitation efforts), apart from the southern section of the study area. Available Digital Satellite Imagery indicate that the southern section was cultivated in 2004 and has thus had less time to recover than the remaining sections of the study area. After the establishment of the Shaft 16 Complex, cultivation ceased for the study area. With the establishment of the Shaft 16 Complex and the expansion of anthropogenic activities and livelihoods in the areas surrounding the study area, faunal activity has consequently shifted, with the habitat now utilised by smaller, more common species (e.g., the Crowned Lapwing, Hadada ibis, Scrub Hare), whereas larger species or habitat specialists have moved out of this area.

³ <http://www.cdngiportal.co.za/cdngiportal/>

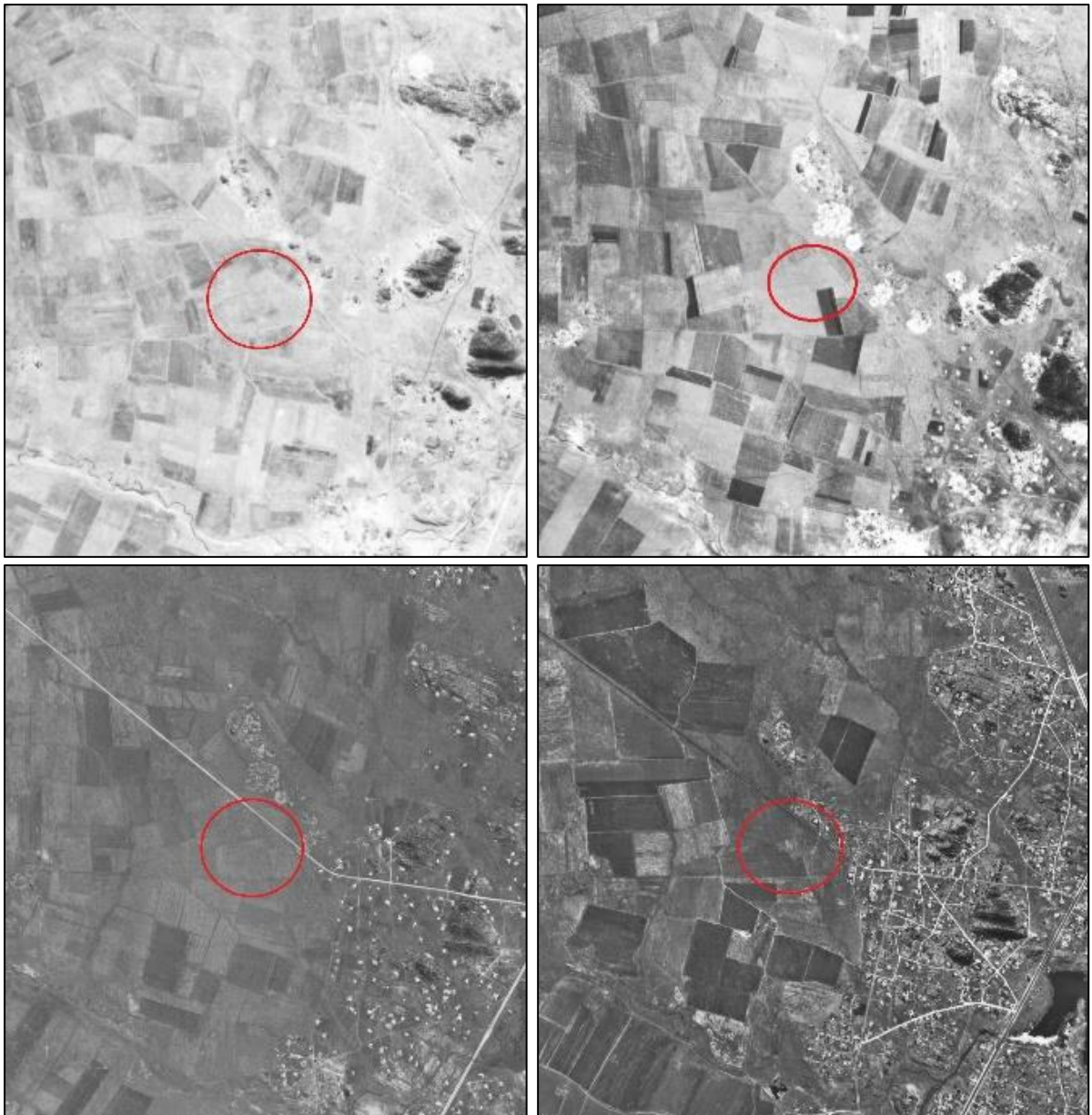


Figure 1: Historic aerial photography for the study area. Images display the year 1955 (top left), 1962 (top right), 1975 (bottom left) and 2004 (bottom right). Approximate locality of the study area is indicated by the red circle.

The study area is fragmented and isolated from surrounding natural habitat via man-made barriers, with roads being the immediate barrier and built-up areas (Shaft 16 Complex and township) forming additional barriers in the larger, local landscape. The fragmented landscape and association with a rather strong anthropogenic presence have altered the natural ecological corridors on site which reduces dispersal abilities of floral species and reduces the diversification potential of floral communities. With a lack of suitable habitat and somewhat impeded movement corridors, the presence of expected fauna has shifted to a lack of megaherbivores and predators, with only widespread and commonly occurring fauna currently utilising the study area.

Figure 2 below provides a depiction of the study area.



Figure 2: Habitat associated with the study area. Images a) and b) depict the anthropogenic influences in the immediate surroundings, such as the main road leading to the Impala Platinum Mine Shaft 16 Complex, as well as areas where significant vegetation disturbance has occurred. Images c) and d) depict areas where natural vegetation remains; however, the floral communities were found to be homogenous and species poor, with very few fauna (or signs of habitat utilisation by fauna) noted.

4.2.1 Plant Species Compliance Statement

The findings of the site inspection confirm the Screening Tool outcome of a **Low Sensitivity** for the Plant Species Theme.

The vegetation was homogenous and species poor due to exposure to long-term, historic agricultural practices. No floral SCC (i.e., RDL species) were noted on site, nor was suitable habitat for such species present. As the natural floral community structure and composition have been significantly altered, floral SCC are unlikely to establish viable populations within the study area.

Overall, the study area is confirmed to be of low sensitivity for floral SCC and because no SCC were noted on site, the assessment of the impacts according to SLR's methodology is not applicable.

4.2.2 Animal Species Compliance Statement

The findings of the site inspection confirm the Screening Tool outcome of a **Low Sensitivity** for the Animal Species Theme.

The study area is fragmented and isolated from surrounding natural habitat via man-made barriers, with roads being the immediate barrier and built-up areas (mine and township) forming additional barriers in the larger, local landscape. As such, faunal species diversity within the study area was low at the time of assessment. Species observed were limited to common and widely occurring species known to survive in areas of decreased sensitivity and that have integrated well into anthropogenic settings.

No faunal SCC were encountered during the site inspection, and the probability of any such species utilising the study area is highly unlikely as habitat within the study area does not provide suitable food resources or shelter to support faunal SCC. As such, the assessment of the impacts according to SLR's methodology is not applicable.

4.2.3 Avifaunal Species Compliance Statement

The findings of the site inspection confirm the Screening Tool outcome of a **Low Sensitivity** for the Animal Species Theme and hence for the avifauna for the area.

Avifaunal species were the most abundant species noted within the study area and immediate surroundings during the site inspection. Still, the avifauna were deemed of moderately low diversity and the species observed on site were common species with broad habitat requirements capable of utilising anthropogenically modified landscapes. It should be noted that the few avifauna observed during the site inspection are not considered to utilise the habitat for nesting; instead, these species more likely use the site for foraging. Observed Avifauna species included *Acridotheres myna* (Common Myna), *Bostrychia hagadash* (Hadedda), *Streptopelia capicola* (Cape turtle-dove), *Vanellus coronatus* (Crowned Lapwing) and *Passer domesticus* (House sparrow).

No avifauna of conservation concern were noted for the study area or immediate surroundings which can be attributed to a lack of both nesting and foraging availability. Moreover, the study area and immediate surrounds are frequented by a moderately high anthropogenic presence, further decreasing the likelihood of avifauna SCC to be present. Avifauna are less restricted in terms of barriers to movement (roads etc), as such they will readily move between the study area and any adjacent locations. Given the above, the assessment of the impacts according to SLR's methodology is not applicable.

5 GENERAL GOOD HOUSEKEEPING AND MITIGATION MEASURES

No national RDL or provincially protected floral or faunal species were recorded during the field assessment. Given the overall low sensitivity of the study area from a floral, faunal and avifaunal perspective, the direct impacts and associated edge effects arising from the proposed parking expansion is anticipated to be low. Despite this, general mitigation measures that are to be implemented during construction within the study area include the following:

- The floral SCC/RDL species with known distributions intersecting that of the study area is not anticipated to be overlooked due to season of assessment (autumn); instead, the lack of suitable habitat and conditions are the main cause for the exclusion of such species from the site;
- It is recommended that a site walkdown be undertaken after the area has received adequate rain and prior to the clearing of vegetation to determine the presence of provincially protected species that may require permit applications (these are not RDL species), i.e., the Transvaal Nature Conservation Ordinance, 1983 (Ordinance 12 of 1983) (TNCO) provides a list of Specially Protected Species (Schedule 12) (Section 86 (1) (b) of the TNCO) and Protected Species (Schedule 11) (Section 86 (1) (a) of the TNCO) for the North West Province. Permits from the Department of Rural, Environment and Agricultural Development (DREAD) would need to be obtained to remove, cut, or destroy the above-mentioned protected species before any vegetation clearing may take place. Due to the survey taking place within autumn as opposed to summer, some of these provincially protected species, especially bulbous species, may have been missed as they go dormant within the winter months, e.g., the common and wide-ranged species from the *Gladiolus* and *Crinum* genera;

- Edge effects arising from the proposed parking expansion, such as soil compaction, erosion and alien plant species proliferation, which may affect adjacent natural areas, need to be strictly managed. Specific mention in this regard is made of listed invasive species as per the National NEMBA Alien species lists, 2020, in line with the NEMBA Alien and Invasive Species Regulations (2020). Ongoing alien and invasive plant monitoring and clearing/control should take place throughout the construction of the parking expansion, and a buffer surrounding the study area (e.g., 30 m) should be regularly checked for alien and invasive plant (AIP) proliferation and to prevent spread into surrounding natural areas during the operational and maintenance phases;
- Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility which complies with legal standards;
- If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder floral rehabilitation later down the line. Spill kits should be kept on-site within workshops. In the event of a breakdown, maintenance of vehicles must take place with care, and the recollection of spillage should be practised, preventing the ingress of hydrocarbons into the topsoil;
- No dumping of litter, rubble or cleared vegetation on site should be allowed;
- Infrastructure and rubble removed as a result of the construction activities should be disposed of at an appropriate registered dump site away from the development footprint;
- No temporary dump sites should be allowed in areas with natural vegetation;
- Waste disposal containers and bins should be provided during the construction phase for all construction rubble and general waste;
- All soils compacted or exposed as a result of construction activities should be ripped and profiled and reseeded;
- All footprint areas should remain as small as possible and the boundaries of footprint areas, must be clearly defined and it should be ensured that all activities remain within defined footprint areas;
- Planning of temporary roads and access routes should be restricted to existing roads;
- It must be ensured that an adequate number of waste and "spill" bins are provided will also prevent litter and ensure the proper disposal of waste and spills;
- All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into the topsoil; and
- Any sheet runoff from compacted areas should be slowed down by the strategic placement of berms.

6 BUSINESS CASE, OPPORTUNITIES AND CONSTRAINTS APPLICABLE TO THE PROPOSED DEVELOPMENT OF THE SUBJECT PROPERTY.

The study area is of low to moderately low ecological importance and sensitivity. No significant biodiversity features are associated with the study area, with a low probability of floral and faunal SCC establishing viable populations on site. This can be attributed to the extent of habitat degradation, the long-term association with historic cultivation, and fragmentation of the study area from larger, ecologically functioning natural areas.

Based on the findings of both the desktop and field assessment, STS confirms the designation of the study area as having a low sensitivity for the Animal Species (including Avifauna Species) and Plant Species Themes as provided by the National Web-based Screening Tool outcome. A Terrestrial Biodiversity Compliance Statement was not prepared, as a separate, full Terrestrial Biodiversity Specialist Assessment was undertaken (refer to STS 210029, 2021).

We trust that we have interpreted your requirements correctly. Please do not hesitate to contact us if there are any aspects of this memorandum that you would like to discuss.

Yours Faithfully,

Christien Steyn
SACNASP REG.NO: 127823/21 (Botanical Science)

Nelanie Cloete
SACNASP REG.NO: 400503/14 (Botanical Science)

Declaration of independence and CV included in Appendix B and C, respectively

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APPENDIX A: PROJECT MAPS

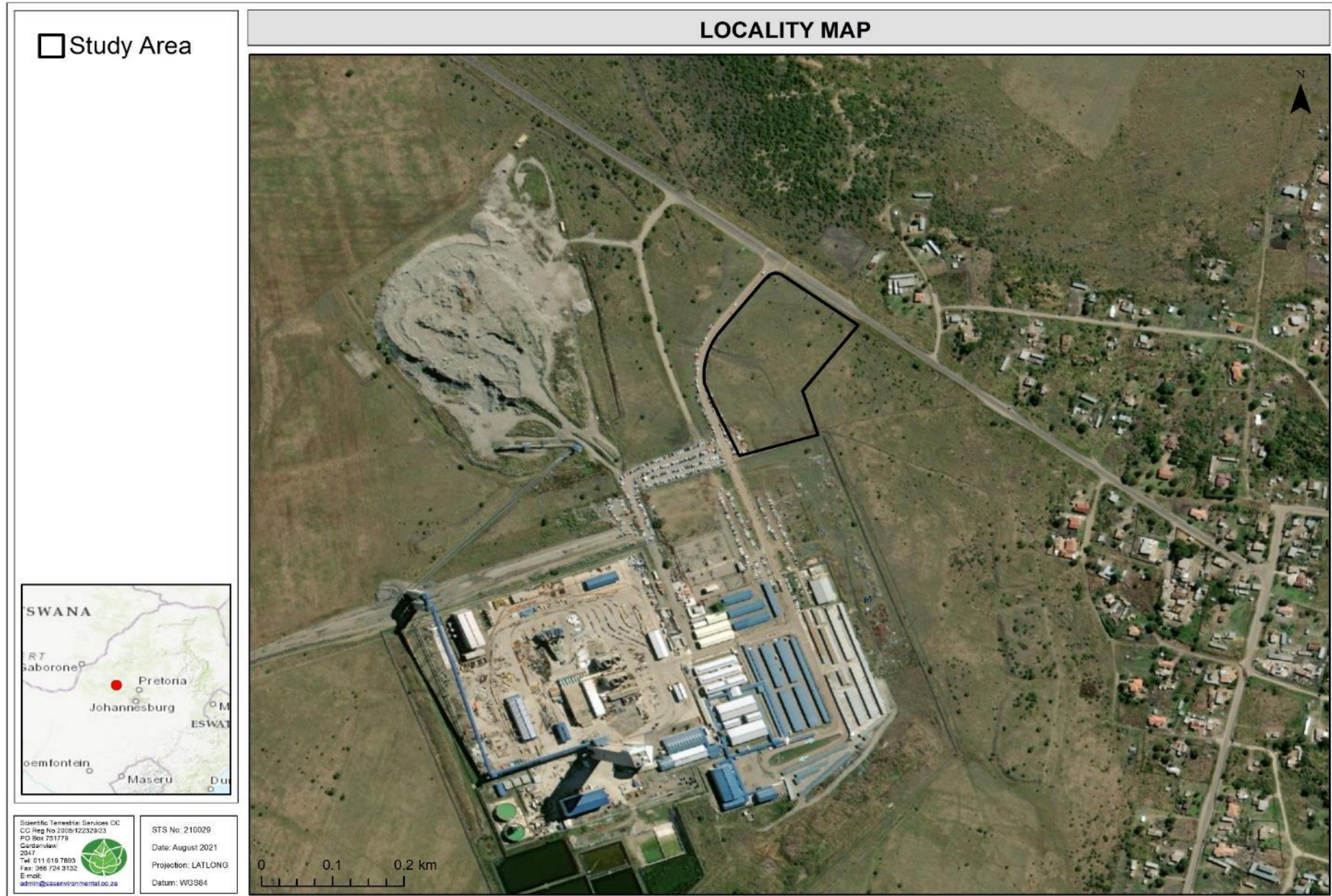


Figure A1: The locality of the study area in relation to the surrounding areas.

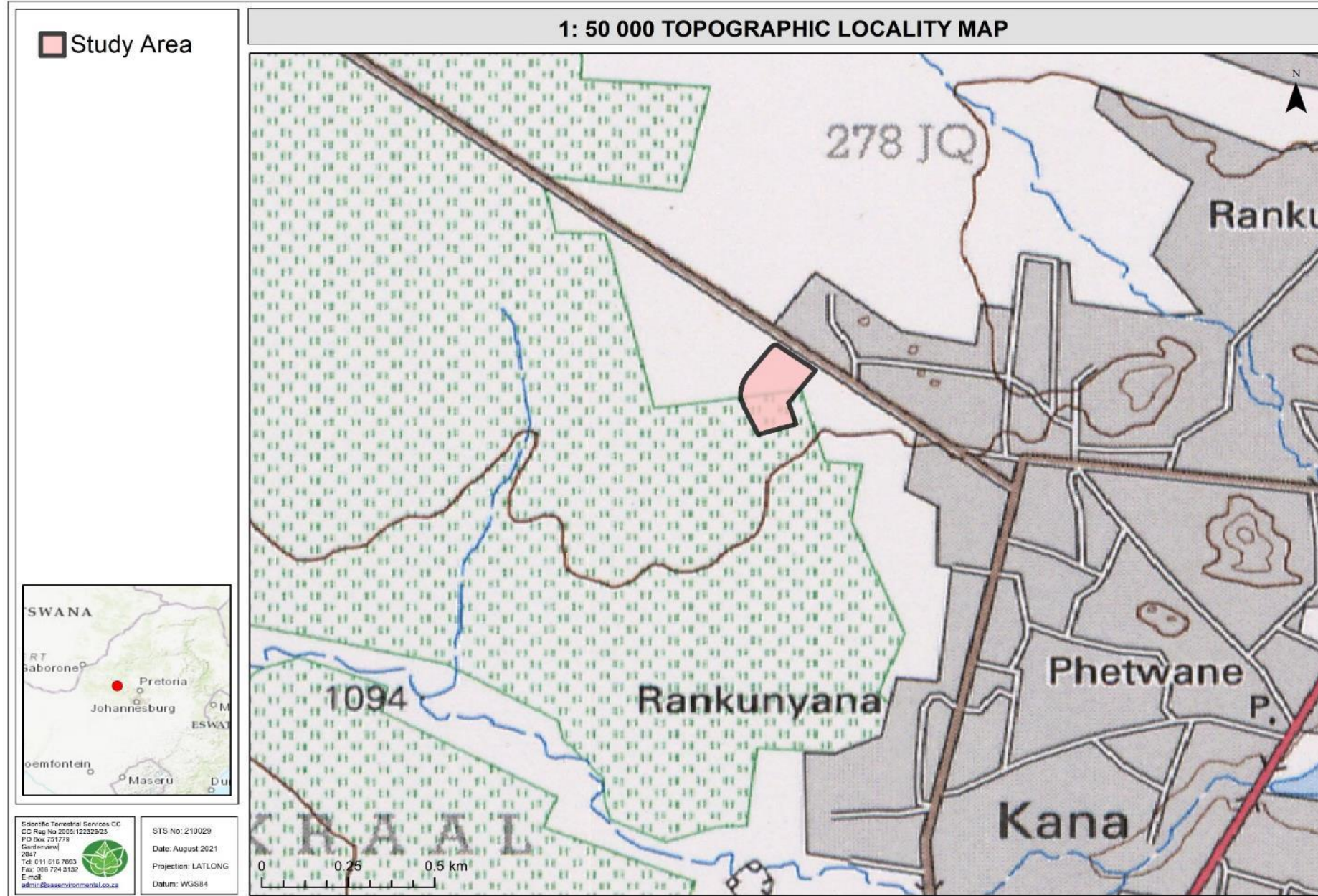


Figure A2: The study area depicted on a 1: 50 000 Topographic map in relation to the surrounding areas.

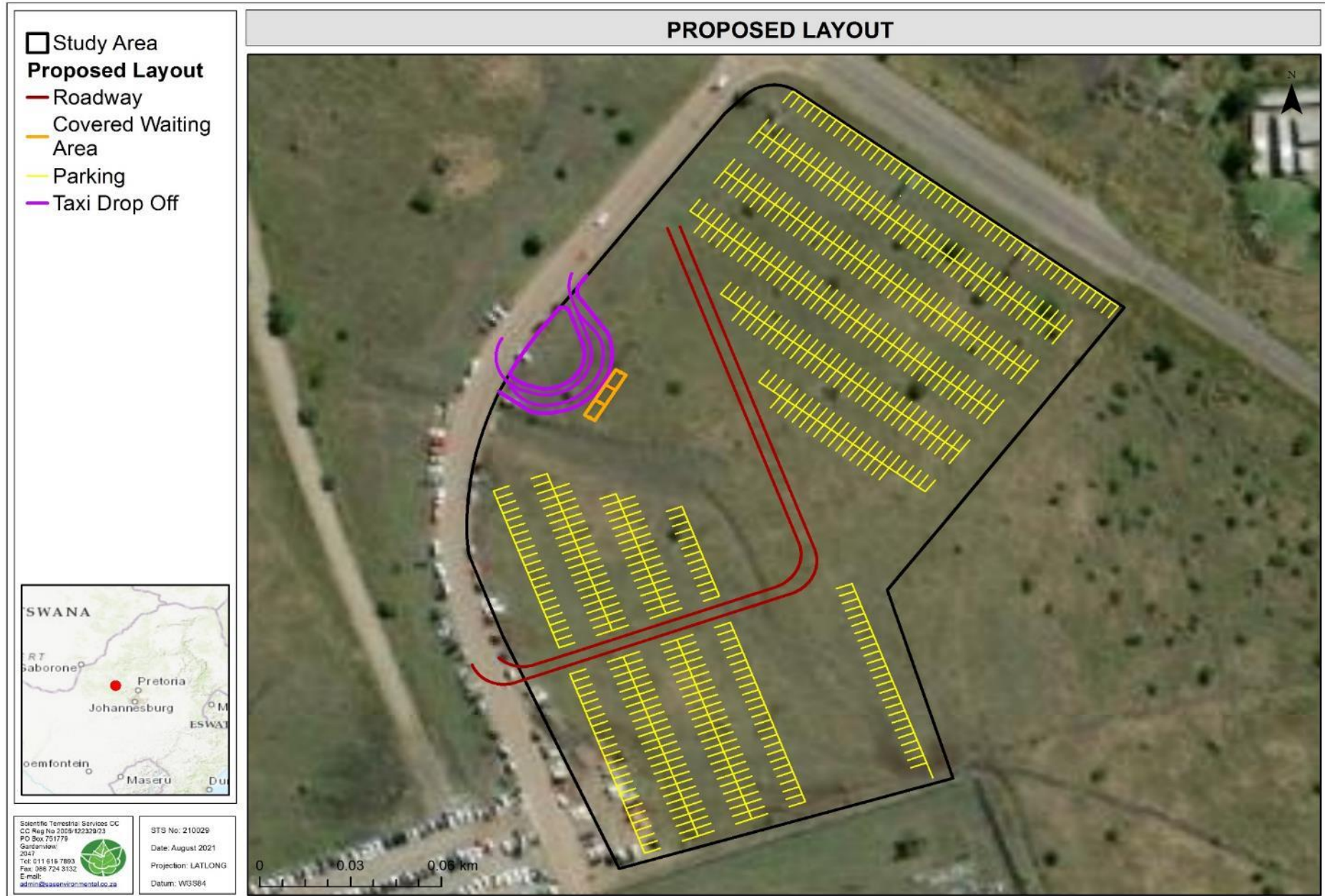


Figure A3: The proposed layout of the parking lot expansion depicted on digital satellite imagery.

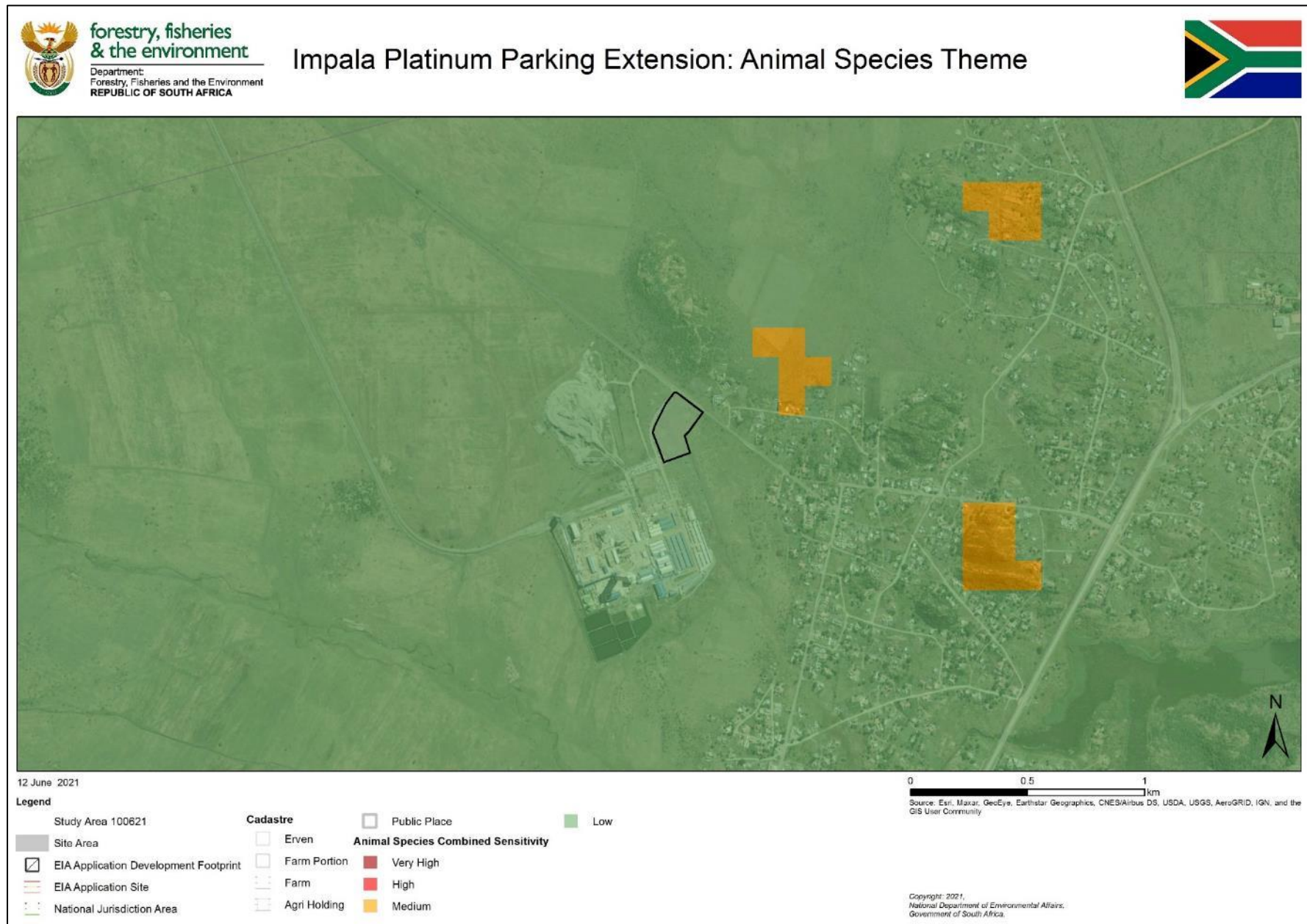


Figure A4: Screening Tool outcome for the Animal Species Theme depicting a “Low Sensitivity” for the study area.



Figure A4: Screening Tool outcome for the Plant Species Theme depicting a “Low Sensitivity” for the study area.



Figure A6: The remaining extent of the Marikana Thornveld (VU) according to the National Threatened Ecosystems database (2011).

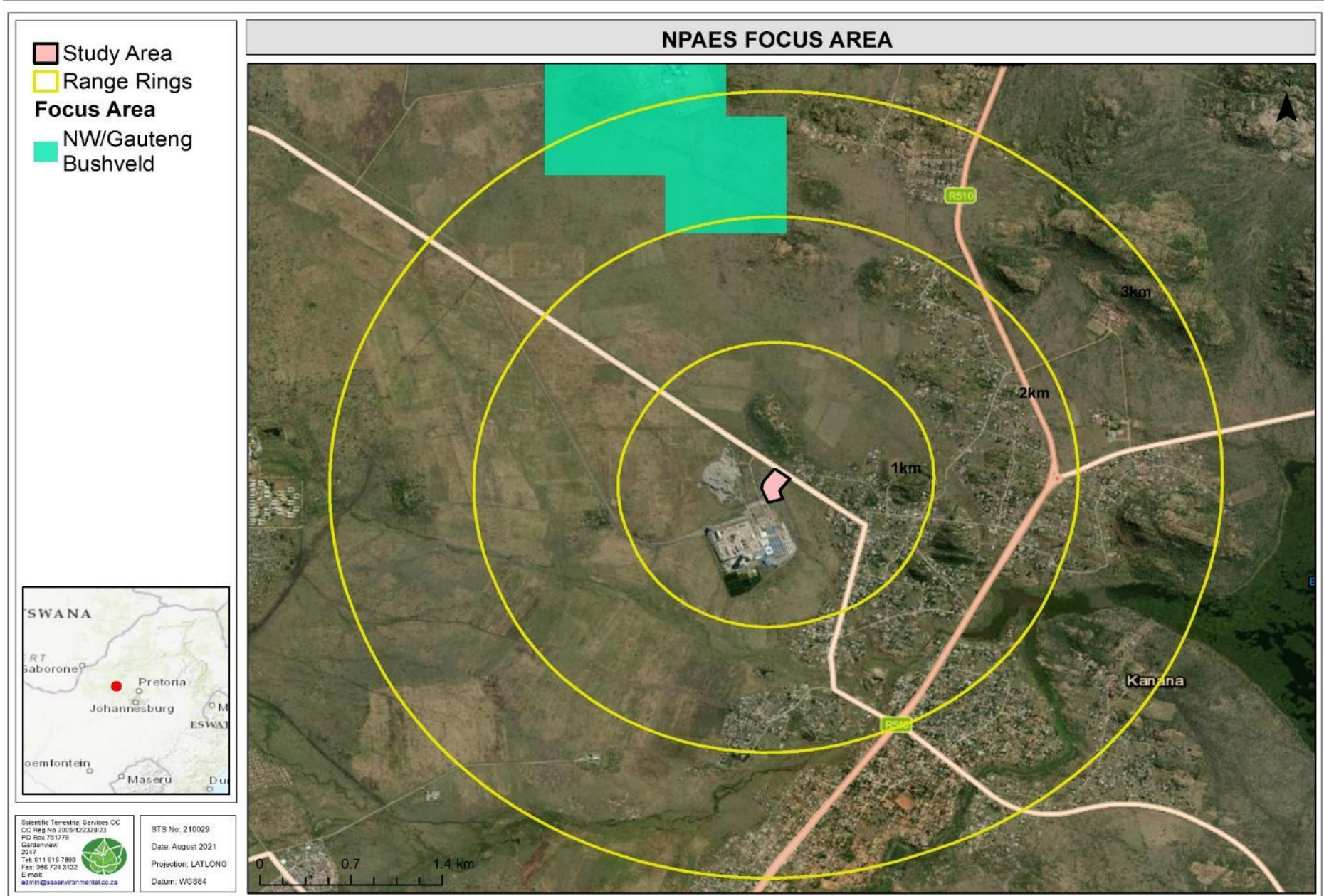


Figure A7: Conservation areas within a 10km radius of the study area as identified by the NPAES (2010).

APPENDIX B: BACKGROUND INFORMATION

Table 2: Summary of the terrestrial conservation characteristics for the study area (Quarter Degree Square (QDS) 2527CB)

CONSERVATION DETAILS PERTAINING TO THE STUDY AREA (VARIOUS DATABASES)		DETAILS OF THE STUDY AREA IN TERMS OF MUCINA & RUTHERFORD (2006, 2018)					
NBA (2018): 1) Ecosystem Threat Status 2) Ecosystem Protection Level	NBA 2018 dataset: The study area is located within the Marikana Thornveld which is considered an Endangered ecosystem and is currently Poorly Protected . However, the area has been significantly transformed and is not regarded by the NBA 2018 database to be areas representative of the Marikana Thornveld .	Biome	The study area is situated within the Savanna Biome .				
	Ecosystem types are categorised ⁴ as “not protected”, “poorly protected”, “moderately protected” and “well protected” based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act No. 57 of 2003), and compared with the biodiversity target for that ecosystem type.	Bioregion	The study area is located within the Central Bushveld Bioregion .				
		Vegetation Type	The study area is situated within the Marikana Thornveld (SVcb 6) .				
Climate		Summer rainfall with very dry winters					
		MAP* (mm)	MAT* (°C)	MFD* (Days)	MAPE* (mm)	MASMS* (%)	
Altitude (m)		1050 – 1450					
Distribution	North-West and Gauteng Provinces. Occurs on plains from the Rustenburg area in the west, through Marikana and Brits to the Pretoria area in the east.						
National Threatened Ecosystems (2011) Figure 4	The majority of the study area is located within an ecosystem that is currently considered to be Vulnerable (VU) which is the Marikana Thornveld (Figure A6). According to the description in GN 1002, the Marikana Thornveld falls under Criterion A1 , which identifies ecosystems that have undergone loss of natural habitat, impacting on their structure, function, and composition. Loss of natural habitat includes outright loss, for example the removal of natural habitat for cultivation, building of infrastructure, mining etc., as well as severe degradation. An ecosystem is categorised as vulnerable if the extent of remaining natural habitat in the ecosystem is less than or equal to 60% of the original extent of the ecosystem. For this purpose, habitat is considered severely degraded if it would be unable to recover to a natural or near-natural state following the removal of the cause of the degradation (e.g., invasive aliens, over-grazing), even after very long time periods.	Conservation	Endangered . Target 19%. Less than 1% statutorily conserved in, for example, Magaliesberg Nature Area. More conserved in addition in other reserves, mainly in De Onderstepoort Nature Reserve. Considerably impacted, with 48% transformed, mainly cultivated and urban or built-up areas. Most agricultural development of this unit is in the western regions towards Rustenburg, while in the east (near Pretoria) industrial development is a greater threat of land transformation. Erosion is very low to moderate. Alien invasive plants occur localised in high densities, especially along the drainage lines.				
		Geology & Soils	Most of the area is underlain by the mafic intrusive rocks of the Rustenburg Layered Suite of the Bushveld Igneous Complex. Rocks include gabbro, norite, pyroxenite and anorthosite. The shales and quartzites of the Pretoria Group (Transvaal Supergroup) also contribute. Mainly vertic melanic clays with some dystrophic or mesotrophic plinthic catenas and some freely drained, deep soils. Land types mainly Ea, Ba and Ae.				
		Vegetation & landscape features	Open <i>Vachellia karroo</i> woodland, occurring in valleys and slightly undulating plains, and some lowland hills. Shrubs are denser along drainage lines, on termitaria and rocky outcrops or in other habitat protected from fire.				
		CONSERVATION DETAILS PERTAINING TO THE STUDY AREA (VARIOUS DATABASES CONTINUED)					

⁴ The ecosystem protection level status is assigned using the following criteria:

- If an ecosystem type has more than 100% of its biodiversity target protected in a formal protected area either A or B, it is classified as Well Protected;
- When less than 100% of the biodiversity target is met in formal A or B protected areas it is classified it as Moderately Protected;
- If less than 50% of the biodiversity target is met, it is classified it as Poorly Protected; and
- If less than 5% it is Hardly Protected.

	For Environmental Impact Assessments (EIAs), the 2011 National list of Threatened Ecosystems remains the trigger for a Basic Assessment in terms of Listing Notice 3 of the EIA Regulations published under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).	SAPAD (2020, Q3); SACAD (2020, Q3); NPAES (2010). Figure A7	The South African Protected Areas Database (SAPAD, 2020), the South African Conservation Areas Database (SACAD, 2020), and the National Protected Areas Expansion Strategy (NPAES, 2010) indicate that there are no formally or informally protected areas within a 10 km radius of the study area. According to NPAES (2010), the North-West/Gauteng Focus Area is located approximately 1,8 km north of the study area.
		IBA (2015)	There are no IBAs located within a 10 km radius of the study area.
NORTH WEST BIODIVERSITY SECTOR PLAN (2015)			
Terrestrial Ecosystems	The study area does not fall within a Critical Biodiversity Area (CBA) or Ecological Support Area (ESA).		
STRATEGIC WATER SOURCE AREAS FOR SURFACE WATER (2017)			
Surface Water Source Areas (SWSAs) are defined as areas of land that supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size. They include transboundary areas that extend into Lesotho and Swaziland. The sub-national Water Source Areas (WSAs) are not nationally strategic as defined in the report but were included to provide a complete coverage.			
NAME & CRITERIA	The study area is not within 10 km of a Strategic Water Source Area for Surface Water.		
NATIONAL WEB-BASED ENVIRONMENTAL SCREENING TOOL (2020)			
The screening tool is intended to allow for pre-screening of sensitivities in the landscape to be assessed within the environmental authorisation process. This assists with implementing the mitigation hierarchy by allowing developers to adjust their proposed development footprint to avoid sensitive areas. The different sensitivity ratings pertaining to the plant [and animal] protocols are described below: <ul style="list-style-type: none">➤ <u>Very high</u>: habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km² are considered critical habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under critically endangered (CR), endangered (EN), or vulnerable (VU) criteria of the IUCN or species listed as critically/ extremely rare under South Africa's national red list criteria. For each species reliant on a critical habitat, all remaining suitable habitat has been manually mapped at a fine scale.➤ <u>High</u>: recent occurrence records for all threatened (CR, EN, VU) and/or rare endemic species are included in the high sensitivity level.➤ <u>Medium</u>: model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level.➤ <u>Low</u>: areas where no SCC are known or expected to occur.			
Animal Species	For the Animal Species theme, the entire study area is considered to have a Low Sensitivity		
Plant Species	For the Plant Species theme, the entire study area is considered to have a Low Sensitivity where no RDL plant taxa are anticipated to occur due to unsuitable habitat conditions.		
Terrestrial Sensitivity	The Terrestrial Sensitivity for the entire study area is considered to have a Very High Sensitivity . The triggered sensitivity feature is the Vulnerable ecosystem (i.e., Marikana Thornveld).		

NBA = National Biodiversity Assessment; SAPAD = South African Protected Areas Database; SACAD = South African Conservation Areas Database; NPAES = National Protected Areas Expansion Strategy; IBA = Important Bird Area; MAP = Mean annual precipitation; MAT = Mean annual temperature; MAPE = Mean annual potential evaporation; MFD = Mean Frost Days; MASMS = Mean annual soil moisture stress (% of days when evaporative demand was more than double the soil moisture supply); CBA = Critical Biodiversity Areas; ESA = Ecological Support Areas.

APPENDIX C: Declaration of Independence

DETAILS, EXPERTISE AND CURRICULUM VITAE OF SPECIALISTS

1. (a) (i) Details of the specialist who prepared the report

Christien Steyn	MSc Plant Science (University of Pretoria)
Nelanie Cloete	MSc Botany and Environmental Management (University of Johannesburg)

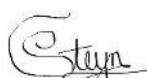
1. (a). (ii) The expertise of that specialist to compile a specialist report including a curriculum vitae

Company of Specialist:	Scientific Terrestrial Services		
Name / Contact person:	Nelanie Cloete		
Postal address:	PO. Box 751779, Gardenview		
Postal code:	2047	Cell:	084 311 4878
Telephone:	011 616 7893	Fax:	086 724 3132
E-mail:	Nelanie@sasenvgroup.co.za		
Qualifications	MSc Environmental Management (University of Johannesburg) MSc Botany (University of Johannesburg) BSc (Hons) Botany (University of Johannesburg) BSc (Botany and Zoology) (Rand Afrikaans University)		
Registration / Associations	Professional member of the South African Council for Natural Scientific Professions (SACNASP) Member of the South African Association of Botanists (SAAB) Member of the International Affiliation for Impact Assessments (IAIAsa) South Africa group Member of the Grassland Society of South Africa (GSSA)		

1. (b) a declaration that the specialist is independent in a form as may be specified by the competent authority

I, Christien Steyn, declare that -

- I act as the **independent specialist** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct



Signature of the Specialist

I, Nelanie Cloete, declare that -

- I act as the **independent specialist (reviewer)** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct



Signature of the Specialist



SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF CHRISTIEN STEYN

PERSONAL DETAILS

Position in Company	Floral Ecologist
Joined SAS Environmental Group of Companies	2018

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Member of the South African Council for Natural Scientific Professions (SACNASP)
Member of the South African Association of Botanists (SAAB)
Member of the Botanical Society of South Africa (BotSoc)

EDUCATION

Qualifications

MSc (Plant Science) (University of Pretoria)	2017
BSc (Hons) Plant Science (Invasion Biology) (University of Pretoria)	2014
BSc Environmental Science (University of Pretoria)	2013

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Northern Cape, Free State

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

Terrestrial Ecological and Biodiversity Scoping Assessments
Terrestrial Ecological and Biodiversity Screening Assessments
Floral Assessments
Input into Terrestrial Rehabilitation Plan design with the focus on the re-establishment of vegetation
Floral Rescue and Relocation Plans
Alien and Invasive Control Plan (AICP)
Alien and Invasive Plant Identification and awareness training
Terrestrial Monitoring
Protected Tree and Floral Marking and Reporting
Desktop Studies, Mapping and Background Information Research

Training

Advanced Grass Identification Course
Practical Plant Identification, including Herbarium Usage and Protocols
Vegetation Classification and Mapping: Use of Geographic Information System for understanding vegetation pattern and biodiversity conservation.
Introduction to Statistics for Biologists: Applications of plant ecology principles in plant conservation, i.e., species distribution modelling, alien plant invasions, conservation planning
Plant Functional Trait Course: Hands-on, field-based exploration of plant functional traits, along with experience in the usage of plant traits data in climate-change research and ecosystem ecology



SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF **NELANIE CLOETE**

PERSONAL DETAILS

Position in Company	Senior Scientist, Member Botanical Science and Terrestrial Ecology
Joined SAS Environmental Group of Companies	2011

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions (SACNASP – Reg No. 400503/14)
 Member of the South African Association of Botanists (SAAB)
 Member of the International Affiliation for Impact Assessments (IAIASa) South Africa group
 Member of the Grassland Society of South Africa (GSSA)
 Member of the Botanical Society of South Africa (BotSoc)
 Member of the Gauteng Wetland Forum (GWF)

EDUCATION

Qualifications

MSc Environmental Management (University of Johannesburg)	2013
MSc Botany (University of Johannesburg)	2007
BSc (Hons) Botany (University of Johannesburg)	2005
BSc (Botany and Zoology) (Rand Afrikaans University)	2004

Short Courses

Certificate – Department of Environmental Science in Legal context of Environmental Management, Compliance and Enforcement (UNISA)	2009
Introduction to Project Management - Online course by the University of Adelaide	2016
Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Northern Cape, Eastern Cape, Free State

Africa - Democratic Republic of the Congo (DRC)

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Terrestrial Monitoring
- Protected Tree and Floral Marking and Reporting
- Biodiversity Offset Plan

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Plant species and Landscape Plan

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions

PROPOSED EXPANSION OF THE PARKING AREA AT THE SHAFT 16 COMPLEX, IMPALA PLATINUM MINE, RUSTENBURG OPERATION - LANDSCAPE/VISUAL SITE SENSITIVITY VERIFICATION REPORT

Prepared for: Impala Platinum Limited

DMRE Reference: TBC

SLR Project No.: 710.09003.000143

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July 2021



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Project Manager	Rizqah Baker
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Author	Dylan Moodaley
Reviewer	Ed Perry
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