

FLORAL AND FAUNAL ECOLOGICAL ASSESSMENT AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS FOR THE PROPOSED ANGLO PLATINUM DER BROCHEN AMENDMENT PROJECT, LIMPOPO PROVINCE

Prepared for

SRK Consulting (Pty) Ltd

August 2019

Section A – Summary and Background Info

Prepared by:	Scientific Terrestrial Services
Report authors:	M. Meintjies C. Hooton H.de Beer C. Steyn
Report reviewer:	N. Cloete (Pr. Sci. Nat)
Report Reference:	STS 180051
Date:	August 2019

Scientific Terrestrial Services CC
CC Reg No 2005/122329/23
PO Box 751779
Gardenview
2047
Tel: 011 616 7893
Fax: 086 724 3132
E-mail: admin@sasenvgroup.co.za



EXECUTIVE SUMMARY

Scientific Terrestrial Services (STS) was appointed to conduct a floral and faunal ecological assessment as part of the Environmental Impact Assessment (EIA) and authorisation process for the proposed Anglo Platinum Der Brochen Amendment Project, Limpopo Province. An area encompassing all the various expansion areas associated with the Der Brochen Amendment Project was used to gather all background information that might be relevant to the project and will henceforth be referred to as the “focus area”. The field assessment, however focussed only on the various infrastructure expansion areas and did not include the entire focus area, nor the Mining Right Area (MRA).

The purpose of this report is to define the terrestrial ecology of the area, including both floral and faunal aspects as well as mapping and defining areas of increased Ecological Importance and Sensitivity (EIS) and to define the Present Ecological State (PES) of the focus area. It is the objective of this study to provide detailed information to guide the activities associated with the proposed mining activities within the focus area, to ensure the ongoing functioning of the ecosystem in such a way as to support local and regional conservation requirements and the provision of ecological services in the local area.

The proposed mining layout areas are predominantly located in areas of high biodiversity and increased sensitivity, posing a significant risk to both faunal and floral SCC within the layout areas. Impacts to the floral ecology associated with the focus area will be significant and likely permanent within the Open Bushveld and Sekhukhune Mountain Bushveld, with downstream impacts likely to emanate from impacts on the Freshwater Habitat. Therefore, the impacts associated with a loss of floral habitat will decrease the floral diversity within the focus area and will significantly impact on floral SCC. Vegetation clearing will also result in the loss of the tree species *Vitex obovata* subsp *wilmsii*, a known and important food resource for the Cicada species *Pycna silvia* (Observed). The proposed South Portal, Dense Medium Separation (DMS) stockpiles, Pollution Control Dams (PCD's), some of the proposed Vent Shafts, as well as sections of the proposed linear developments are located in areas where there is an increased density of floral SCC. Furthermore, the DMS stockpiles and associated PCDs are located in the Open Bushveld habitat where the floral SCC tree *Sclerocarya birrea* subsp *caffra* (Marula) was observed throughout. *Sclerocarya birrea* subsp *caffra* is a long lived and slow growing tree and considered important not just from a floral conservation point of view, but also for that of faunal species. The trees provide nesting and roosting sites for many avifaunal species, whilst during the seasonal fruiting period becomes a significant food resource for a diversity of faunal species. Within the boundaries of the South Shaft Complex as well as sections of the conveyor system, the floral SCC *Lydenburgia cassinoides* was also observed. *Jamesbrittenia macrantha*, protected under the Limpopo Environmental Management Act (LEMA) (Act 7 of 2003), was scattered throughout the focus area, with several individuals recorded within the Sekhukhune Mountain Bushveld habitat unit, but also present within the proposed DMS complex. Vegetation clearing in these areas will result in the loss of this species in the aforementioned layout areas. The proposed conveyor belts, although limited in width are of a significant length, and will result in an extensive track of vegetation being cleared, including floral SCC. Furthermore, the conveyor belts will likely create an impassable barrier to larger mammal species, resulting in the loss of habitat connectivity, habitat usability and faunal species movement within the focus area. The proposed DMS stockpiles will have a large footprint area, albeit in phases, that will result in the permanent loss of sensitive and niche habitat areas. The proposed South shaft complex will additionally impact upon the rocky outcrop and sheet rock habitats which provide niche habitat for species such as *Hadogenes polytrichobothrius* (Flat Rock Scorpion) and *Platysaurus orientalis* (Sekukhune Flat Lizard). Overall the largest threat to faunal species will stem from the loss of habitat and habitat connectivity, with edge effects and vehicles likely to result in additional species loss through the life of the mine.

Based on the findings of the faunal and floral ecological assessment and results of the impact assessment, it is the opinion of the ecologists that the proposed amendment project carries the potential to pose a significant risk to the terrestrial habitat, species diversity and abundance. The adherence to cogent, well-conceived mitigation measures as well as general good construction practice will aid in reducing the impact significance levels.



DOCUMENT GUIDE

The following table indicates the requirements for Specialist Studies as per Appendix 6 of Government Notice 326 as published in Government Notice 40772 of 2017, amendments to the Environmental Impact Assessment (EIA) Regulations, 2014 as it relates to the National Environmental Management Act, 1998 (Act No. 107 of 1998).

No.	Requirement	Section in report
a)	Details of -	
(i)	The specialist who prepared the report	Section A: Appendix D
(ii)	The expertise of that specialist to compile a specialist report including a curriculum vitae	Section A: Appendix D
b)	A declaration that the specialist is independent	Section A: Appendix D;
c)	An indication of the scope of, and the purpose for which, the report was prepared	Section 1.3 (Section A)
cA)	An indication of the quality and age of base data used for the specialist report	Section 2.1 and 3.1 (Section A)
cB)	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 5 (Section B); and Section 5 (Section C)
d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 2 (Section B); and Section 2 (Section C)
e)	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section B: Appendix A & B; Section C: Appendix A & B
f)	Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives	Section 3 & 4 (Section B); and Section 3 & 4 (Section C)
g)	An identification of any areas to be avoided, including buffers	Section 4 (Section B); and Section 4 (Section C)
h)	A map superimposing the activity including the associated structure and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Section 4 (Section B); and Section 4 (Section C)
i)	A description of any assumption made and any uncertainties or gaps in knowledge	Section 1.4 (Section A)
j)	A description of the findings and potential implication/s of such findings on the impact of the proposed activity, including identified alternatives on the environment or activities	Section 5 (Section B); and Section 5 (Section C)
k)	Any mitigation measures for inclusion in the EMPr	Section 5 (Section B); and Section 5 (Section C)
l)	Any conditions for inclusion in the environmental authorisation	Section 5 (Section B); and Section 5 (Section C)
m)	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 5 (Section B); and Section 5 (Section C)
n)	A reasoned opinion -	
(i)	As to whether the proposed activity, activities or portions thereof should be authorised	Section 5 & 6 (Section B); and Section 5 & 6 (Section C)
(iA)	Regarding the acceptability of the proposed activity or activities	Section 5 & 6 (Section B); and Section 5 & 6 (Section C)
(ii)	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, and where applicable, the closure plan	Section 5 & 6 (Section B); and Section 5 & 6 (Section C)
o)	A description of any consultation process that was undertaken during the course of preparing the specialist report	N/A
p)	A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
q)	Any other information requested by the competent authority	N/A



TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
DOCUMENT GUIDE	iii
LIST OF FIGURES	v
LIST OF TABLES	v
GLOSSARY OF TERMS	vi
ACRONYMS	vii
1 INTRODUCTION.....	1
1.1 Background information.....	1
1.2 Project Description	4
1.3 Scope of Work.....	8
1.4 Assumptions and Limitations	8
1.5 Legislative Requirements	9
2 ASSESSMENT APPROACH	9
2.1 General Approach	9
3 RESULTS OF THE DESKTOP ANALYSIS.....	10
3.1 Conservation Characteristics of the Focus Area.....	10
4 STRUCTURE OF THE REPORT	16
5 REFERENCES.....	17
APPENDIX A: Indemnity and Terms of Use of this Report.....	18
APPENDIX B: Legislative Requirements	19
APPENDIX C: Vegetation Type.....	22
APPENDIX D: Specialist Details and CV's.....	23



LIST OF FIGURES

Figure 1: Digital Satellite image depicting the location of the MRA and Focus Area in relation to surrounding areas.....	2
Figure 2: MRA and Focus Area depicted on a 1:50 000 topographical map in relation to its surrounding area.	3
Figure 3: Proposed mine layout in relation to surrounding area.	6
Figure 4: Proposed mine layout zoomed in onto the focus area.....	7
Figure 5: Endangered Sekhukhune Mountainlands ecosystem associated with the focus area (National Threatened Ecosystems Database, 2011).	12
Figure 6: The focus area falls within the Mpumalanga Mesic Grasslands (NPAES, 2009).13	
Figure 7: CBA 1, ESA 1 and ESA 2 associated with the focus area according to the Limpopo Conservation Plan V2 (2013).	14
Figure 8: The focus area falls within the Sekhukhuneland Phyto Centre of Endemism (Mpumalanga BioBase, 2002).	15

LIST OF TABLES

Table 1: Summary of the conservation characteristics for the study area.	11
---	----



GLOSSARY OF TERMS

Alien and Invasive species	A species that is not an indigenous species; or 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.
Biome	A broad ecological unit representing major life zones of large natural areas – defined mainly by vegetation structure and climate.
CBA (Critical Biodiversity Area)	A CBA is an area considered important for the survival of threatened species and includes valuable ecosystems such as wetlands, untransformed vegetation and ridges.
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.
ESA (Ecological Support Area)	An ESA provides connectivity and important ecological processes between CBAs and is therefore important in terms of habitat conservation.
IBA (Important Bird and Biodiversity Area)	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.
Invasive species	Means any species whose establishment and spread outside of its natural distribution range; they threaten ecosystems, habitats or other species or have demonstrable potential to threaten ecosystems, habitats or other species; and may result in economic or environmental harm or harm to human health
Least Threatened	Least threatened ecosystems are still largely intact.
RDL (Red Data listed) species	Organisms that fall into the Extinct in the Wild (EW), critically endangered (CR), Endangered (EN), Vulnerable (VU) categories of ecological status.
SCC (Species of Conservation Concern)	The term SCC in the context of this report refers to all RDL (Red Data) and IUCN (International Union for the Conservation of Nature) listed threatened species as well as protected species of relevance to the project.



ACRONYMS

BGIS	Biodiversity Geographic Information Systems
CARA	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
CBA	Critical Biodiversity Area
CR	Critically Endangered
EIA	Environmental Impact Assessment
EN	Endangered
ESA	Ecological Support Area
GIS	Geographic Information System
GPS	Global Positioning System
IBA	Important Bird Area
IUCN	International Union for the Conservation of Nature
LEMA	Limpopo Environmental Management Act, 2003 (Act 7 of 2003)
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential for Evaporation
MASMS	Mean Annual Soil Moisture Stress
MAT	Mean Annual Temperature
MFD	Mean Frost Days
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
NBA	National Biodiversity Assessment (2011)
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NEMBA	National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004)
NPAES	National Protected Areas Expansion Strategy
NT	Near Threatened
PES	Present Ecological State
PRECIS	Pretoria Computer Information Systems
QDS	Quarter Degree Square (1:50,000 topographical mapping references)
RDL	Red Data List
SABAP 2	Southern African Bird Atlas 2
SACAD	South Africa Conservation Areas Database
SANBI	South African National Biodiversity Institute
SAPAD	South Africa Protected Area Database
SCC	Species of Conservation Concern
STS	Scientific Terrestrial Services CC
TSP	Threatened Species Programme
VU	Vulnerable



1 INTRODUCTION

1.1 Background information

Scientific Terrestrial Services (STS) was appointed to conduct a floral and faunal ecological assessment as part of the Environmental Impact Assessment (EIA) and authorisation process for the proposed Anglo Platinum Der Brochen Amendment Project, Limpopo Province. An area encompassing all the various expansion areas associated with the Der Brochen Amendment Project was used to gather all background information that might be relevant to the project and will henceforth be referred to as the “focus area”. The field assessment, however focussed only on the various infrastructure expansion areas and did not include the entire focus area, nor the Mining Right Area (MRA) (Figure 1 and 2).

The Anglo Platinum Der Brochen Amendment Project is situated northeast of the R555 provincial road, and northwest of the R540, and approximately 24km south-west (40km by road) of the town of Steelpoort. Lydenburg is approximately 31km from the focus area in a southeast direction. The Anglo Platinum Der Brochen Mine is located in the Greater Tubatse Local Municipality, which forms part of the Greater Sekhukhune District Municipality.

The purpose of this report is to define the terrestrial ecology of the focus area from a desktop conservation database perspective. It is the objective of this study to provide detailed information to guide the fieldwork components to ensure that all relevant ecological aspects were considered prior to performing the field assessments. This report is not a standalone report and should be considered together with the outcome of the floral and faunal assessments (Section B and C).



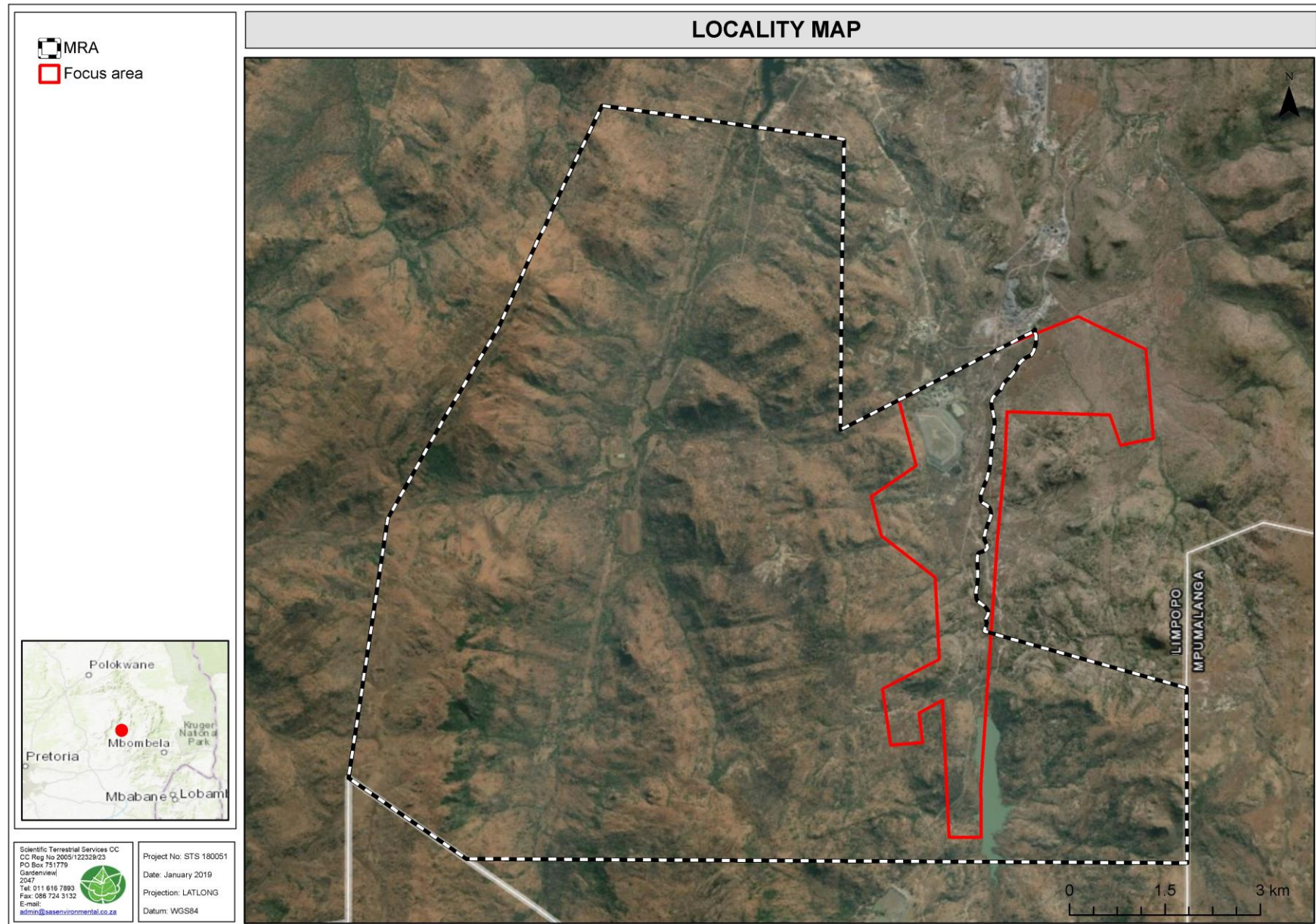


Figure 1: Digital Satellite image depicting the location of the MRA and Focus Area in relation to surrounding areas.



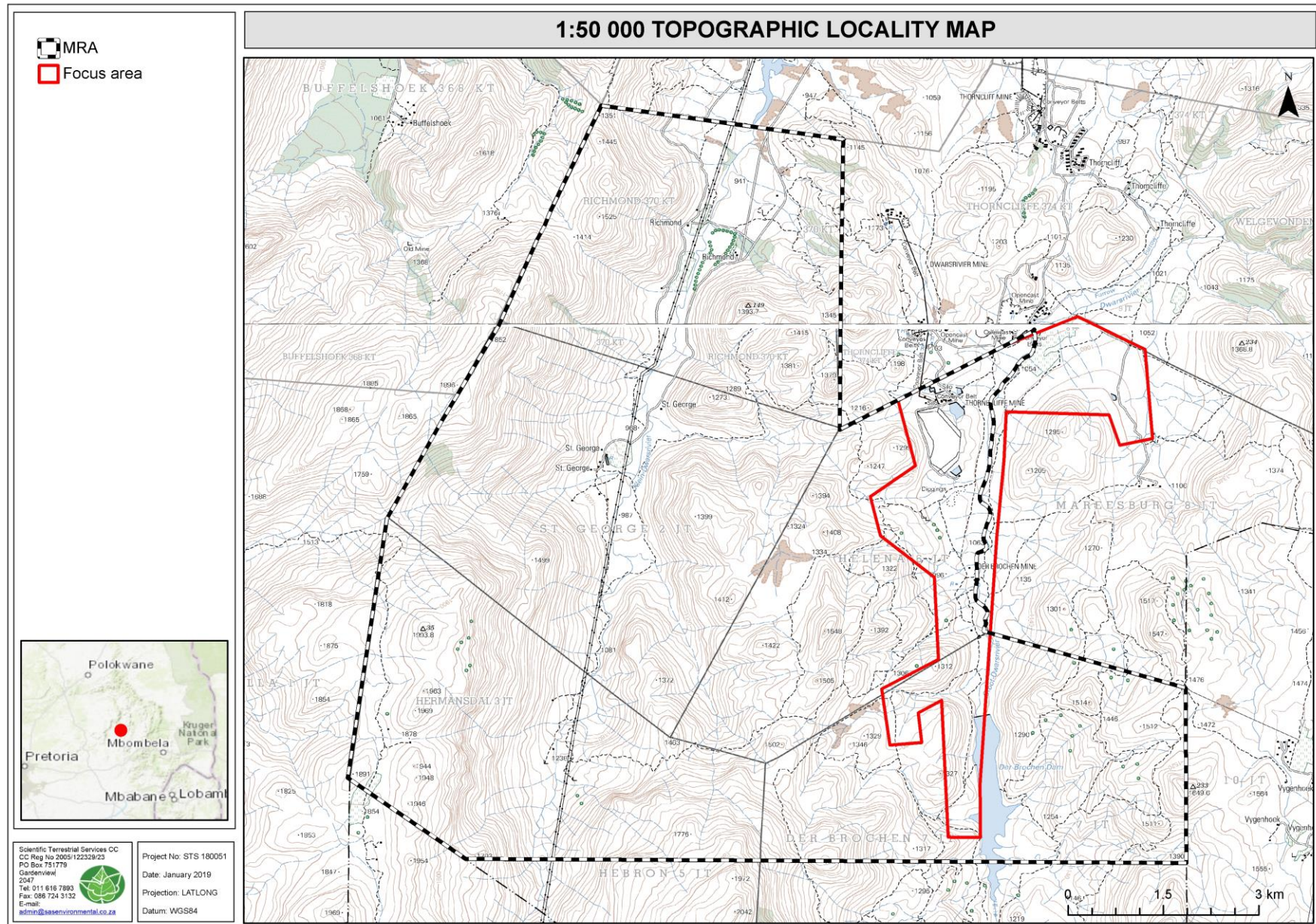


Figure 2: MRA and Focus Area depicted on a 1:50 000 topographical map in relation to its surrounding area.



1.2 Project Description¹

Subsequent to the submission and approval of the Der Brochen Amendment Project Scoping Report, the Der Brochen Team of Anglo American Platinum decided to integrate the previously approved North Opencast Pit (as approved in the 2015 Der Brochen Consolidated Environmental Management Programme (EMPr)) into the Der Brochen Amendment Project. With the integration of the previously approved North Open Pit into the Der Brochen Amendment Project, the need for the proposed North Shaft and associated infrastructure (such as three of the proposed six the ventilation shafts) have been removed. As a result of the above changes, the Der Brochen Amendment Project will henceforth comprise of the following (Figures 3 and 4):

- The South Decline Shaft with associated infrastructure, i.e. water management infrastructure;
- The previously approved North Opencast Pit area with associated infrastructure as previously approved in 2015, i.e. water management infrastructure and waste rock stockpiles;
- Three up-cast ventilation shafts required for the underground workings associated with the South Decline Shaft;
- A Dense Medium Separation (DMS) Plant to be located within the existing footprint area of the Mototolo Concentrator area;
- A DMS Stockpile with associated water management infrastructure;
- The conversion of the existing Mototolo chrome plant from a final tailings' arrangement to an inter-stage arrangement;
- Additional Run of Mine stockpiles and associated silos;
- Change houses and office complex to be located at the proposed South Decline Shaft area;
- An explosive destruction bay area to be located near the proposed South decline shaft;
- Staff accommodation facilities to be located near the Der Brochen Dam; and
- Additional linear infrastructure, i.e.:
 - **Two conveyor systems:** *One conveyor belt will be constructed to connect the proposed South Decline Shaft with the proposed DMS Plant that will be located in the existing footprint area of the Mototolo Concentrator Plant, for the purpose of transporting ore from the South Decline Shaft to the plant area. Another conveyor belt system will be required to transport DMS material from the*

¹ Terms of Reference developed and provided by SRK Consulting, 23 July 2019, Project number: 533247



proposed DMS Plant to the proposed DMS Stockpile area. It is currently anticipated that the DMS conveyor system will run along the existing Mareesburg tailings pipeline system.

- **Access and haul roads.** *New access roads to the proposed ventilation shafts will be required for maintenance purposes. Certain existing roads will also be required to be upgraded to provide sufficient access roads to the project related infrastructure such as the North Opencast Pit area, the South Decline Shaft and offices. The mine is also considering including a haul road within the proposed corridor associated with the ore conveyor belt system to transport ore from the proposed South Decline Shaft to the Mototolo Concentrator Plant area as an interim measure, whilst the conveyor belt system is being constructed.*



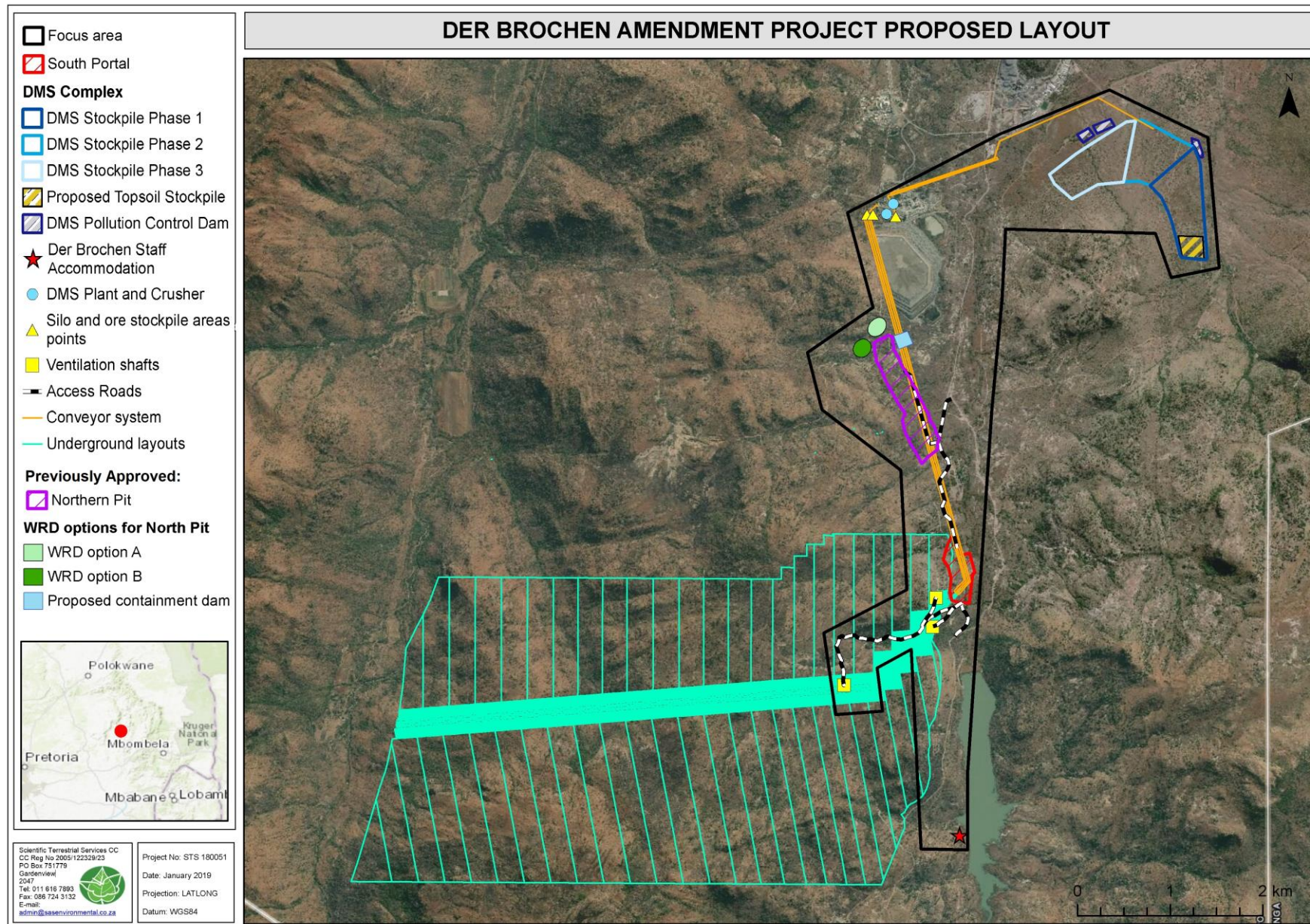


Figure 3: Proposed mine layout in relation to surrounding area.



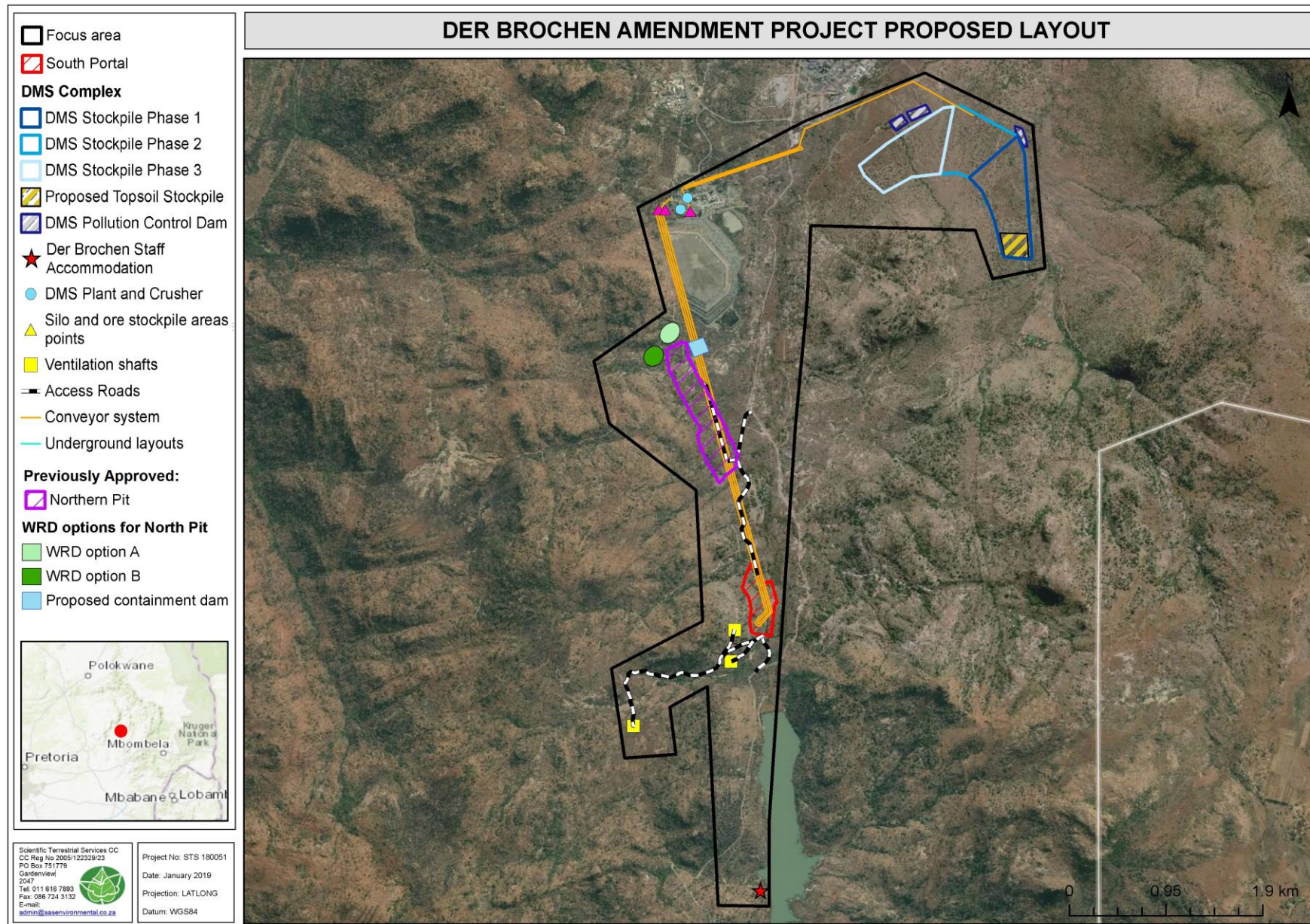


Figure 4: Proposed mine layout zoomed in onto the focus area.



1.3 Scope of Work

Specific outcomes in terms of the report (Section A to C) are as follows:

- Compile a desktop study with all relevant information as presented by South African National Biodiversity Institute's (SANBI's) Biodiversity Geographic Information Systems (BGIS) website (<http://bgis.sanbi.org>), including the Limpopo Conservation Plan Version 2 (2013), to gain background information on the physical habitat and potential floral and faunal biodiversity associated with the focus area;
- To conduct a floral and faunal Red Data Listed (RDL) species assessment as well as an assessment of other Species of Conservation Concern (SCC), including potential for such species or habitat to occur within the focus area;
- To provide inventories of floral and faunal species as encountered within the various infrastructure expansion areas situated within the focus area;
- To determine and describe habitat types, communities and the ecological state of the various expansion infrastructure areas within the focus area and to rank each habitat type based on conservation importance and ecological sensitivity;
- To describe the spatial significance of the infrastructure expansion areas within the focus area with regards to surrounding natural areas;
- To identify and consider all sensitive landscapes including rocky ridges, wetlands and/or any other special features; and
- To determine the environmental impacts of the proposed expansion activities on the terrestrial ecology within the focus area and to develop mitigation and management measures for the project to assist in minimising the impact on the receiving environment.

1.4 Assumptions and Limitations

The following assumptions and limitations are applicable to the set of reports (Section A to C):

- The terrestrial ecological assessment is confined to the various infrastructure expansion areas within the focus area and does not include the entire focus area, nor the MRA or neighbouring and adjacent properties; these were however considered as part of the desktop assessment;
- Due to the nature and habits of most faunal taxa it is unlikely that all species would have been observed during a site assessment of limited duration. Therefore, site observations are compared with literature studies where necessary;



- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most faunal and floral communities have been accurately assessed and considered and the information provided is considered sufficient to allow informed decision making to take place and facilitate integrated environmental management;
- Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa within the various expansion infrastructure areas may therefore have been missed during the assessment; and
- An initial field assessment was undertaken from the 21st to the 23rd of February 2018 (Summer Season) in order to determine the ecological status of the infrastructure expansion areas associated with the focus area. After modifications were made to the proposed infrastructure expansion areas, two additional field assessments were undertaken, one during the winter season from the 22nd to the 23rd of August 2018, and another during the summer season on the 27th of November 2018.

1.5 Legislative Requirements

The following legislative requirements were considered during the assessment:

- The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996);
- National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA);
- National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA);
- Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA);
- Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA);
- The National Forest Act, 1998 (Act 84 of 1998, as amended in September 2011) (NFA); and
- Limpopo Environmental Management Act, 2003 (Act 7 of 2003) (LEMA).

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 General Approach

In order to accurately determine the PES of the focus area and capture comprehensive data with respect to faunal and floral taxa, the following methodology was used:



- Maps, aerial photographs and digital satellite images were consulted prior to the field assessment in order to determine broad habitats, vegetation types and potentially sensitive sites. An initial visual on-site assessment of the various infrastructure expansion areas situated within the focus area was made in order to confirm the assumptions made during consultation of the maps;
- Relevant databases considered during the assessment of the study area included the SANBI Threatened Species Programme (TSP), the Limpopo Conservation Plan Version 2 (2013), Mucina and Rutherford (2012), National Biodiversity Assessment (2011), Important Bird Areas in conjunction with the South African Bird Atlas Project (SABAP 2) (2015), International Union for Conservation of Nature (IUCN), and Pretoria National Herbarium Computer Information Systems (PRECIS);
- An initial field assessment was undertaken from the 21st to the 23rd of February 2018 (Summer Season) in order to determine the ecological status of the infrastructure expansion areas associated with the focus area. After modifications were made to the proposed infrastructure expansion areas, two additional field assessments were undertaken, one during the winter season from the 22nd to the 23rd of August 2018, and another during the summer season on the 27th of November 2018. A reconnaissance 'drive around' followed by a thorough 'walk through' on foot was undertaken; and
- Specific methodologies for the assessment, in terms of field work and data analysis of faunal and floral ecological assemblages will be presented in the Appendices of the relevant sections along with the methodologies for assessing the integrity and function of these assemblages.

3 RESULTS OF THE DESKTOP ANALYSIS

3.1 Conservation Characteristics of the Focus Area

The following section contains data accessed as part of the desktop assessment and are presented as a "dashboard" report below (Table 1). The dashboard report aims to present concise summaries of the data on as few pages as possible in order to allow for improved assimilation of the results by the reader to take place.

It is important to note that although all data sources used provide useful and often verifiable, high quality data, the various databases used do not always provide an entirely accurate indication of the focus area's actual site characteristics at the scale required to inform the EIA process. However, this information is considered to be useful as background information to the study and sufficient decision making can take place with regards to the mining activities based on the desktop results.



Table 1: Summary of the conservation characteristics for the study area.

DETAILS OF THE FOCUS AREA IN TERMS OF MUCINA & RUTHERFORD (2012)		DESCRIPTION OF THE VEGETATION TYPE(S) RELEVANT TO THE STUDY AREA (MUCINA & RUTHERFORD 2012)						
Biome	The focus area is situated within the Savanna Biome .	Vegetation Type	Sekhukhune Mountain Bushveld.					
Bioregion	The focus area is located within the Central Bushveld Bioregion .	Climate	Summer rainfall with very dry winters.					
Vegetation Type	The focus area is situated within the Sekhukhune Mountain Bushveld .		MAP* (mm)	MAT* (°C)	MFD* (Days)	MAPE* (mm)	MASMS* (%)	
CONSERVATION DETAILS PERTAINING TO THE FOCUS AREA (VARIOUS DATABASES)			609	17.5	5	2043	77	
NBA (2011)	The focus area falls within an area that is currently not protected.	Altitude (m)	900–1 600 m					
National Threatened Ecosystems (2011)	The focus area falls within the remaining extent of the endangered Sekhukhune Mountainlands Ecosystem (Figure 5).	Distribution	Limpopo and Mpumalanga Provinces.					
SAPAD and SACAD (2017); NPAES (2009)	There are no formally, or informally protected areas, nor conservation areas situated within 10km of the focus area, according to the SAPAD, SACAD and NPAES datasets. According to the NPAES Dataset however the focus area falls within the Mpumalanga Mesic Grassland Focus Area (Figure 6).	Geology & Soils	Rocks mainly ultramafic intrusive of the lower, critical and main zones of the eastern Rustenberg Layered Suite of the Bushveld Igneous Complex (Vaalian). Three subsuites (zones), namely Croydon, Dwars River and Dsjate consist mainly of norite, pyroxenite, anorthosite and gabbro, and are characterised by localised intrusions of magnetite, diorite, dunite, bronzitite and harzburgite. Soils are predominantly shallow, rocky and clayey. Glenrosa and Mispah soil forms are common, with lime present in low-lying areas. Rocky areas without soil are common on steep slopes. The Dwars River Valley is characterised by prisma-cutanic horizons with melanic structured diagnostic horizons. Around Steelpoort red apedal, freely drained soils occur, and these deeper soils include Hutton, Bonheim and Steendal soil forms.					
IBA (2015)	The focus area does not fall within an Important Bird Area (IBA), nor are there any IBAs within 10 km of the focus area.		Conservation	Least threatened. Target 24%. None conserved in statutory conservation areas.				
IMPORTANCE OF THE STUDY AREA ACCORDING TO THE MINING AND BIODIVERSITY GUIDELINES (2013)		Vegetation & landscape features		Dry, open to closed microphyllous and broad-leaved savanna on hills and mountain slopes that form concentric belts parallel to the northeastern escarpment. Open bushveld often associated with ultramafic soils on southern aspects. Bushveld on ultramafic soils contain a high diversity of edaphic specialists. Bushveld of mountain slopes generally taller than in the valleys, with a well-developed herb layer. Bushveld of valleys and dry northern aspects usually dense, like thicket, with an herb layer comprising many short-lived perennials. Dry habitats contain a number of species with xerophytic adaptations, such as succulence and underground storage organs. Both man-made and natural erosion dongas occur on foot slopes of clays rich in heavy metals.				
Highest Biodiversity Importance	The entire focus area is situated within an area currently considered to be of highest biodiversity importance. Highest Biodiversity Importance areas include areas where mining is not legally prohibited, but where there is a very high risk that due to their potential biodiversity significance and importance to ecosystem services (e.g. water flow regulation and water provisioning) that mining projects will be significantly constrained or may not receive necessary authorisations.							
LIMPOPO CONSERVATION PLAN VERSION 2 (2013) – Figure 7								
Critical Biodiversity Area 1 (CBA1)	The majority of the focus area falls within an area considered to be a CBA1. These are irreplaceable areas required to meet biodiversity pattern and/or ecological process targets, and no alternative sites are available to meet targets.							
Ecological Support Areas (ESA)	A small area located in the north-western portion of the focus area is considered to be an ESA2. These are areas where no natural habitat remains, but that important for meeting ecological processes.							
BIOBASE (E. et al, 2002)								
Phyto centre of endemism	The MRA, including the focus area, falls within the Sekhukhuneland Centre of Endemism (SCPE, Figure 8). This centre falls within the rainfall shadow of the Drakensberg Escarpment, and it is relatively more arid than the areas to the east. The endemic plants of the SCPE are primarily edaphic specialists that are derived from a unique geology. Heavy-metal soils are derived from the norite, pyroxenite and anorthosite formations that predominate over the region. Endemics are both herbaceous and woody with endemism high in the Anacardiaceae, Euphorbiaceae, Liliaceae (incorporating Asphodelaceae) and Lamiaceae (VanWyk & Smith 2001). The SCPE forms part of the Bushveld (Igneous) Complex, which has ultramafic layers, the largest reserves of chrome and platinum-group metals in the world (Van Wyk & Smith 2001).							

CBA = Critical Biodiversity Areas; ESA = Ecological Support Area; 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); NBA = National Biodiversity Assessment; SAPAD = South African Protected Areas Database; SACAD = South Africa Conservation Areas Database; NPAES = National Protected Areas Expansion Areas Strategy.



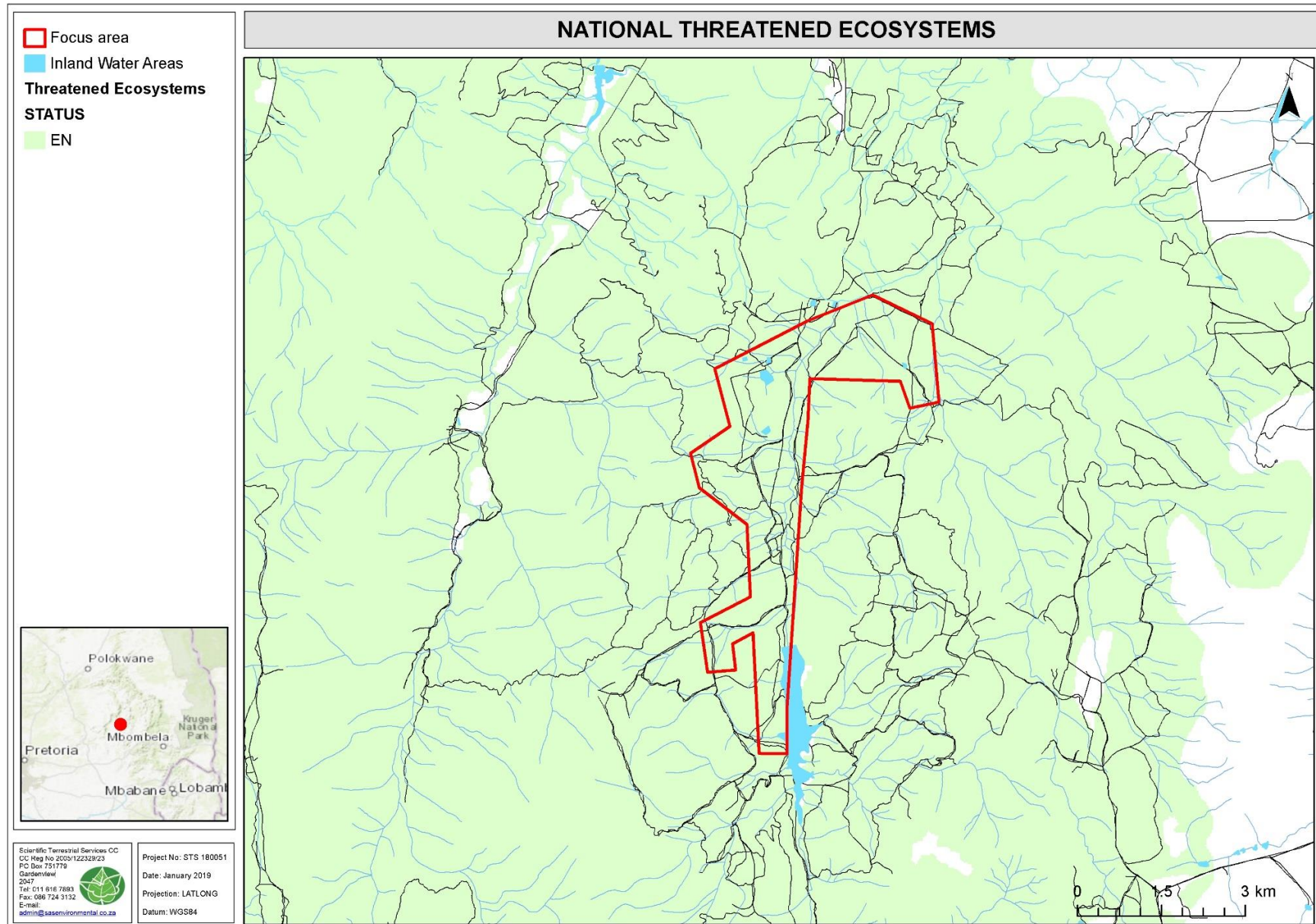


Figure 5: Endangered Sekhukhune Mountainlands ecosystem associated with the focus area (National Threatened Ecosystems Database, 2011).



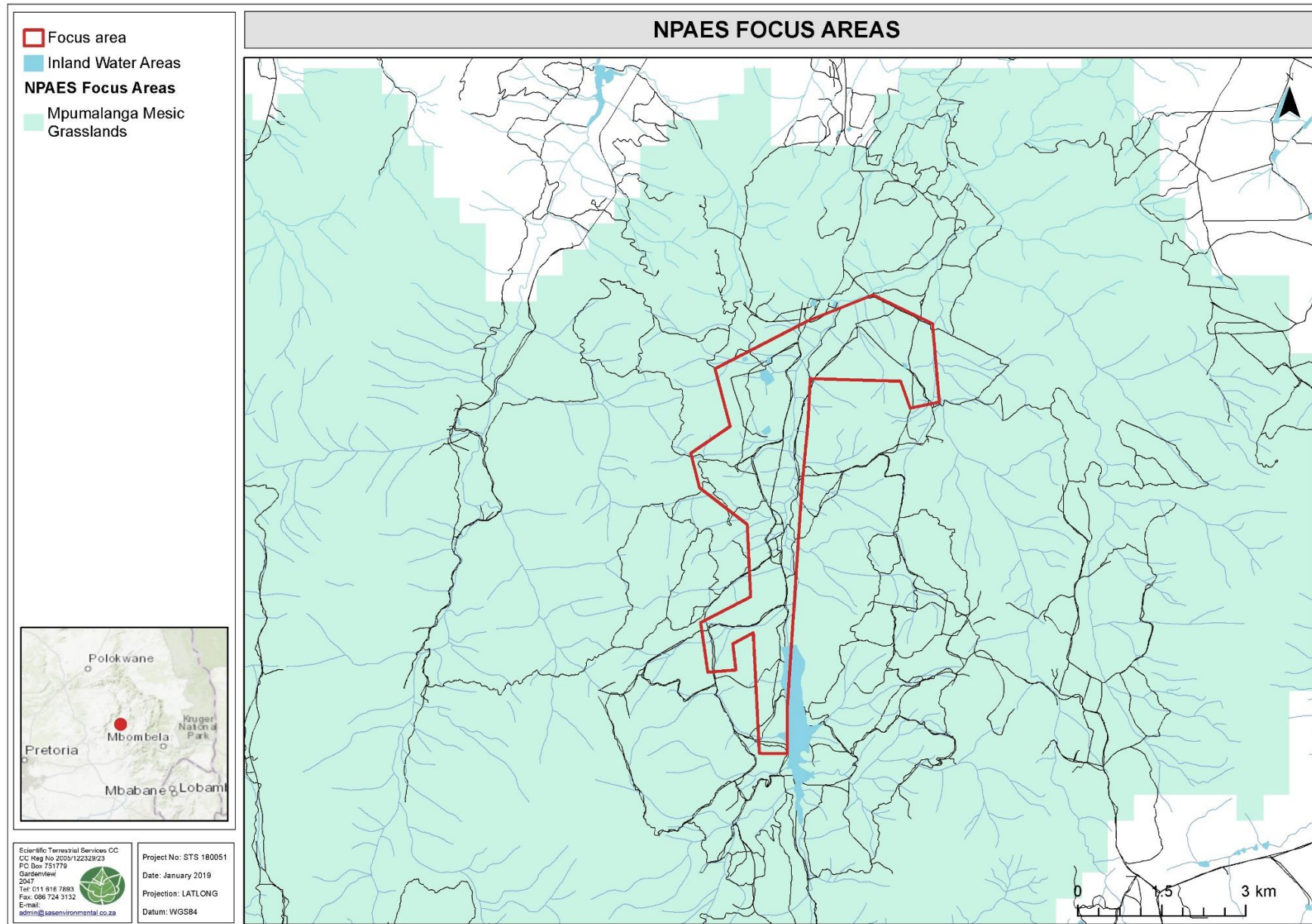


Figure 6: The focus area falls within the Mpumalanga Mesic Grasslands (NPAES, 2009).



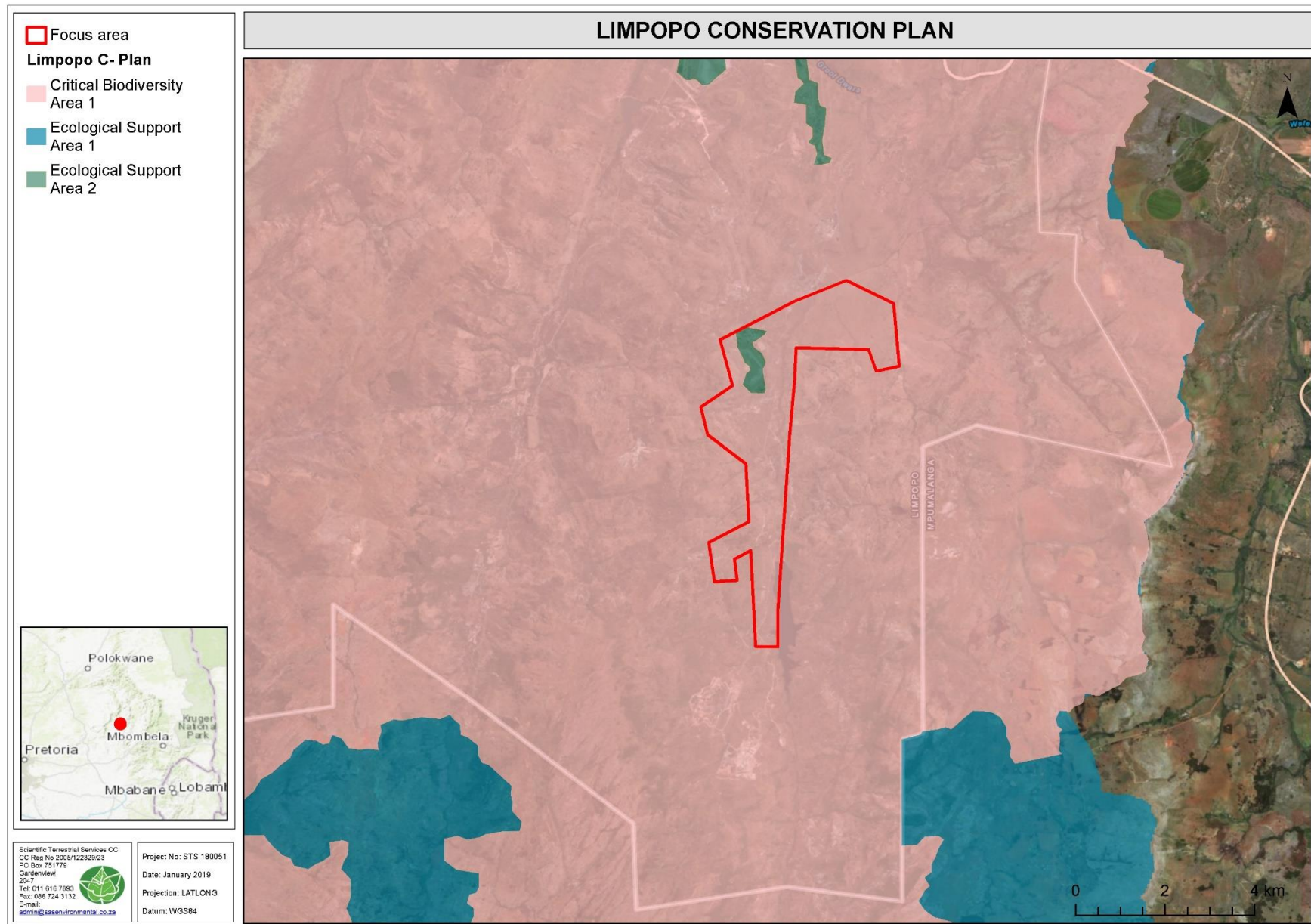


Figure 7: CBA 1, ESA 1 and ESA 2 associated with the focus area according to the Limpopo Conservation Plan V2 (2013).



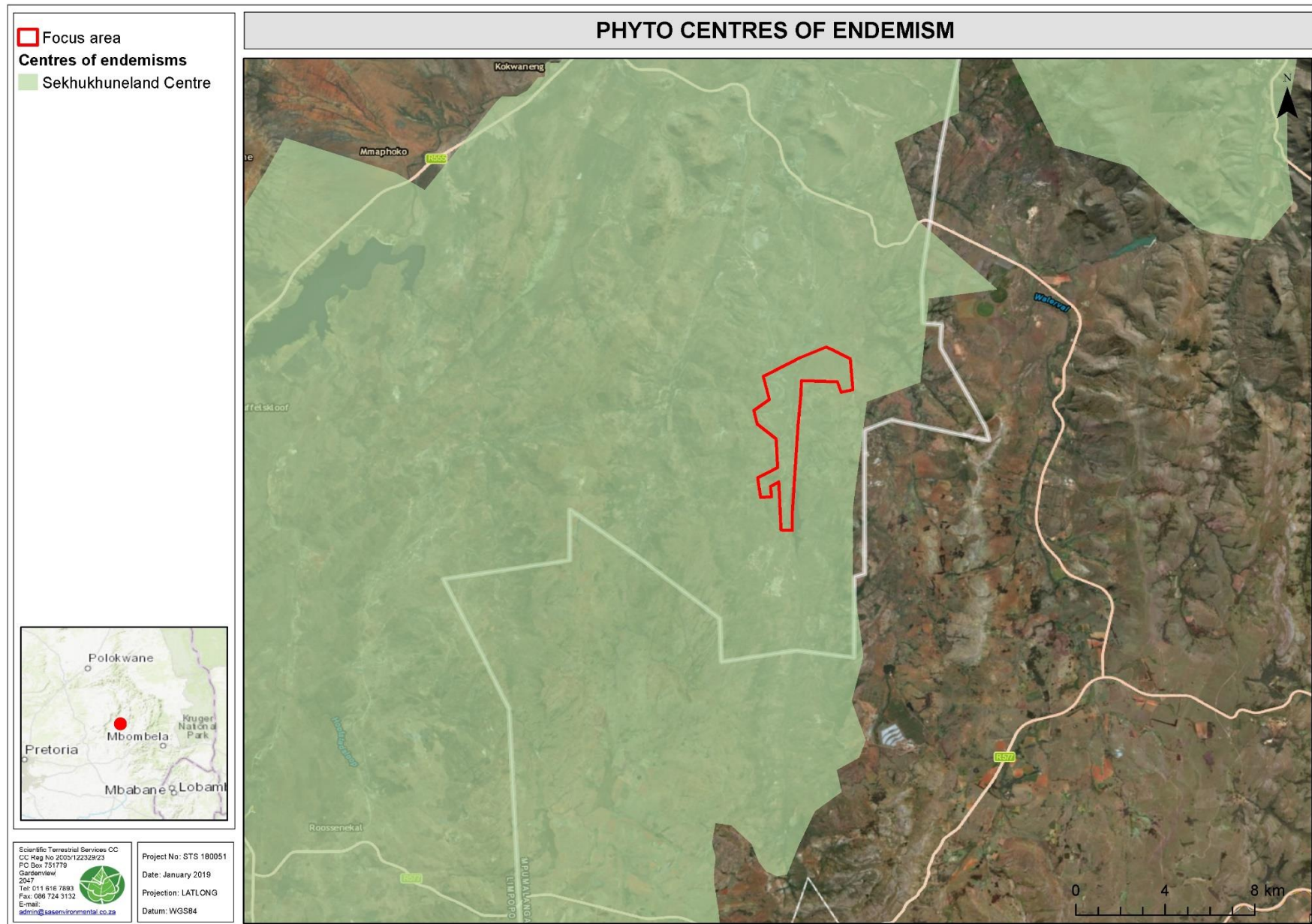


Figure 8: The focus area falls within the Sekhukhuneland Phyto Centre of Endemism (Mpumalanga BioBase, 2002).



4 STRUCTURE OF THE REPORT

Section A of this report served to provide an introduction to the project as well as the general approach to the study. Section A also presents the results of general desktop information reviewed as part of the study, including the information generated by the relevant authorities as well as the context of the site in relation to the surrounding anthropogenic activities and ecological character.

Section B addresses all the issues pertaining to the assessment of the floral ecology of the various infrastructure expansion areas within the focus area.

Section C addresses all the issues pertaining to the assessment of the faunal ecology of the various infrastructure expansion areas within the focus area.



5 REFERENCES

- Conservation of Agricultural Resources Act (CARA) 43 of 1983.
- Emery, A. J., Lotter, M., & Williamson, S. D. (2002). Determining the conservation value of land in Mpumalanga. Mpumalanga Parks Board, Nelspruit.
- IBA: Marnewick MD, Retief EF, Theron NT, Wright DR, Anderson TA. 2015. Important Bird and Biodiversity Areas of South Africa. Johannesburg: BirdLife South Africa. Online available: <http://bgis.sanbi.org/IBA/project.asp>
- Limpopo C Plan V2. Technical Report. 2013. Desmet, P. G., Holness, S., Skowno, A. & Egan, V.T. Contract Number EDET/2216/2012. Report for Limpopo Department of Economic Development, Environment & Tourism (LEDET) by ECOSOL GIS.
- Limpopo Environmental Management Act (LEMA) 7 of 2003
- Mining Guidelines: Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria. 100 pages. Online available: <http://bgis.sanbi.org/Mining/project.asp>
- Mucina, L. & Rutherford, M.C. (Eds). 2012. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria, RSA
- National Environmental Management Act (NEMA; Act 107 of 1998)
- National Environmental Management: Biodiversity Act (NEMBA) 10 of 2004
- NBA: Driver A., Sink, K.J., Nel, J.N., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. & Maze, K. 2012. National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria. Online available: <http://bgis.sanbi.org/NBA/project.asp>
- NPAES: DEA and SANBI. 2009. National Protected Areas Expansion Strategy Resource Document. Online available: <http://bgis.sanbi.org/protectedareas/NPAESinfo.asp>
- SACAD: Department of Environmental Affairs. 2018. South Africa Conservation Areas Database (SAPAD_OR_2018_Q4). Online available: [http://egis.environment.gov.za]
- SAPAD: Department of Environmental Affairs. 2018. South Africa Protected Areas Database (SAPAD_OR_2018_Q4). Online available: [http://egis.environment.gov.za]
- Siebert, S.J. 2001. Vegetation on the ultramafic soils of the Sekhukhuneland Centre of Endemism. PhD thesis, University of Pretoria.
- The South African National Biodiversity Institute - Biodiversity GIS (BGIS) Online available: <http://bgis.sanbi.org>
- Threatened Ecosystems: National Environmental Management Biodiversity Act: National list of ecosystems that are threatened and in need of protection (G 34809, GoN 1002). 2011. Department of Environmental Affairs. Online available: <http://bgis.sanbi.org/ecosystems/project.asp>



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 time and budgetary constraints relevant to the type and level of investigation undertaken and STS CC and its staff 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.

Although STS CC exercises due care and diligence in rendering services and preparing documents, STS CC accepts no liability and the client, by receiving this document, indemnifies STS CC and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs, damages and expensed arising from or in connection with services rendered, directly or indirectly by STS CC and by the use of the information contained in this document.

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, 1998 (Act 107 of 1998) (NEMA) 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.

Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA)

The obtaining of a New Order Mining Right (NOMR) is governed by the MPRDA. The MPRDA requires the applicant to apply to the DMR for a NOMR which triggers a process of compliance with the various applicable sections of the MPRDA. The NOMR process requires environmental authorisation in terms of the MPRDA Regulations and specifically requires the preparation of a Scoping Report, an Environmental Impact Assessment (EIA) and Environmental Management Programme (EMP), and a Public Participation Process (PPP).

National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA)

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 benefits arising from bio-prospecting involving indigenous biological resources;
- to give effect to ratified international agreements relating to biodiversity which are binding to the Republic;
- to provide for co-operative governance in biodiversity management and conservation; and

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



National Environmental Management Biodiversity Act (NEMBA) (Alien and Invasive Species Regulations, Notice number 864 of 29 July 2016 in Government Gazette 40166)

NEMBA 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 NEMBA (Alien and Invasive Species Regulations, 2017):

- **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.

Limpopo Environmental Management Act, 2003 (Act 7 of 2003) (LEMA)

The objectives of this Act are:

- to manage and protect the environment in the Province;
- to secure ecologically sustainable development and responsible use of natural resources in the Province;
- generally, to contribute to the progressive realisation of the fundamental rights contained in section 24 of the Constitution of the Republic of South Africa Act, 1996 (Act No. 108 of 1996), and
- to give effect to international agreements effecting environmental management which are binding on the Province.

This Act must be interpreted and applied in accordance with the national environmental management principles set out in Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

The National Forest Act, 1998 (Act 84 of 1998, as amended in September 2011) (NFA)

Principles to guide decisions affecting forestry resources applicable to land development management are contained in the following principle:



Principle 3

3) The principles are that—

- (a) natural forests must not be destroyed save in exceptional circumstances where, in the opinion of the Minister, a proposed new land use is preferable in terms of its economic, social or environmental benefits;
- (b) a minimum area of each woodland type should be conserved, and forests must be developed and managed to -
 - (i) conserve biological diversity, ecosystems and habitats;
 - (ii) sustain the potential yield of their economic, social and environmental benefits.

This section of the Act alludes to the fact that the conservation status of all vegetation types needs to be considered when any development is taking place to ensure that the adequate conservation of all vegetation types is ensured.

Principle 6

(6) Criteria and indicators may include but are not limited to, those for determining—
the level of maintenance and development of—

- (i) forest resources:
- (ii) biological diversity in forests:
- (iii) the health and vitality of forests:
- (iv) the productive functions of forests:
- (v) the protective and environmental functions of forests; and
- (vi) the social functions of forests.

Applicable sections**Section 12:** Declaration of trees as protected

(1) The Minister may declare—

- a) particular tree,
 - b) a particular group of trees,
 - c) a particular woodland; or
 - d) trees belonging to a particular species,
- to be a protected tree, group of trees, woodland or species.

(2) The Minister may make such a declaration only if he or she is of the opinion that the tree, group of trees, woodland or species is not already adequately protected in terms of other legislation.

(3) In exercising a discretion in terms of this section, the Minister must consider the principles set out in section 3(3) of the NFA.

Section 15(1):

No person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence granted by the Minister or in terms of an exemption from the provisions of this subsection published by the Minister in the Gazette.

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.



APPENDIX C: Vegetation Type

Sekhukhune Mountain Bushveld

Dominant Floral Taxa

Table C1: Dominant & typical floristic species of Sekhukhune Mountain Bushveld (Mucina & Rutherford, 2012)

Group	Species
Tall Tree	<i>Senegalia nigrescens</i>
Small Trees	<i>Senegalia senegal</i> var. <i>leiorhachis</i> (d), <i>Combretum apiculatum</i> (d), <i>Kirkia wilmsii</i> (d), <i>Terminalia prunioides</i> (d), <i>Vitex obovata</i> subsp. <i>wilmsii</i> (d), <i>Ziziphus mucronata</i> (d), <i>Bolusanthus speciosus</i> , <i>Boscia albitrunca</i> , <i>Brachylaena ilicifolia</i> , <i>Combretum molle</i> , <i>Commiphora mollis</i> , <i>Croton gratissimus</i> , <i>Cussonia transvaalensis</i> , <i>Hippobromus pauciflorus</i> , <i>Ozoroa sphaerocarpa</i> , <i>Pappea capensis</i> , <i>Schotia latifolia</i> , <i>Sterculia rogersii</i> , <i>Acacia ormocarpoides</i> (e), <i>Lydenburgia cassinoides</i> ^{SK}
Succulent Tree	<i>Aloe marlothii</i> subsp. <i>marlothii</i> , <i>Euphorbia sekukuniensis</i> (e)
Tall Shrubs	<i>Dichrostachys cinerea</i> (d), <i>Euclea crispa</i> subsp. <i>crispa</i> (d), <i>Combretum hereroense</i> , <i>Euclea linearis</i> , <i>Pavetta zeyheri</i> , <i>Tinnea rhodesiana</i> , <i>Triaspis glaucophylla</i> , <i>Rhus sekukuniensis</i> ^{SK}
Low shrubs	<i>Elephantorrhiza praetermissa</i> (d), <i>Grewia vernicosa</i> (d), <i>Asparagus intricatus</i> , <i>Barleria saxatilis</i> , <i>B. senensis</i> , <i>Clerodendrum ternatum</i> , <i>Commiphora africana</i> , <i>Hermannia glanduligera</i> , <i>Indigofera lydenburgensis</i> , <i>Jatropha latifolia</i> var. <i>angustata</i> , <i>Melhanian prostrata</i> , <i>Phyllanthus glaucophyllus</i> , <i>Psiadia punctulata</i> , <i>Rhus keetii</i> , <i>Rhynchosia komatiensis</i> , <i>Euclea sekukuniensis</i> ^{SK} , <i>Petalidium oblongifolium</i> ^{CB} , <i>Plectranthus venter</i> ^Z , <i>Rhus batophylla</i> ^{SK}
Succulent Shrubs	<i>Aloe castanea</i> (d), <i>A. cryptopoda</i> (d).
Soft Shrub	<i>Plectranthus porcatus</i> (e)
Woody climber	<i>Clematis brachiata</i> (d), <i>Rhoicissus tridentata</i> (d), <i>Acacia ataxacantha</i> , <i>Asparagus sekukuniensis</i> ^{SK} , <i>Rhoicissus sekukuniensis</i> ^{SK}
Woody Succulent Climber	<i>Sarcostemma viminalis</i>
Graminoids	<i>Aristida canescens</i> (d), <i>Heteropogon contortus</i> (d), <i>Panicum maximum</i> (d), <i>Setaria lindenberghiana</i> (d), <i>Themeda triandra</i> (d), <i>Aristida transvaalensis</i> , <i>Cymbopogon pospischilii</i> , <i>Diheteropogon amplexans</i> , <i>Enneapogon scoparius</i> , <i>Loudetia simplex</i> , <i>Panicum deustum</i> , <i>Setaria sphacelata</i>
Herb	<i>Berkheya insignis</i> (d), <i>Commelina africana</i> (d), <i>Cyphostemma woodii</i> , <i>Kyphocarpa angustifolia</i> , <i>Senecio latifolius</i> .
Geophytic herbs	<i>Hypoxis rigidula</i> , <i>Sansevieria hyacinthoides</i> , <i>Chlorophytum cyperaceum</i> ^{SK} , <i>Raphionacme chimanimaniana</i> ^Z .
Succulent Herbs	<i>Huernia stapelioides</i>

^(d) – Dominant species for the vegetation type; (e) – Endemic Taxa, ^NNorthern Sourveld endemic, ^{CB}Central Bushveld endemic, ^{SK}Sekhukhune endemic, ^ZLink to Zimbabwe



APPENDIX D: Specialist Details and CV's

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

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:
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)		

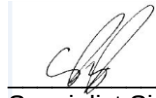
Company of Specialist:	Scientific Terrestrial Services		
Name / Contact person:	Stephen van Staden		
Postal address:	29 Arterial Road West, Oriel, Bedfordview		
Postal code:	2007	Cell:	082 442 7637
Telephone:	011 616 7893	Fax:	086 724 3132
E-mail:	stephen@sasenvgroup.co.za		
Qualifications	MSc (Environmental 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 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, Christopher Hooton, 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.



Specialist Signature

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.



Specialist Signature



I, Stephen van Staden, declare that -

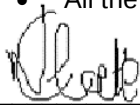
- I act as the **independent specialist (reviewer)** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise 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.



Specialist Signature





SCIENTIFIC TERRESTRIAL SERVICES (STS) – SPECIALIST CONSULTANT INFORMATION CURRICULUM VITAE OF CHRISTOPHER HOOTON

PERSONAL DETAILS

Position in Company	Ecologist
Date of Birth	24 June 1986
Nationality	South African
Languages	English, Afrikaans
Joined SAS	2013

EDUCATION

Qualifications

BTech Nature Conservation (Tshwane University of Technology)	2013
National Diploma Nature Conservation (Tshwane University of Technology)	2008

COUNTRIES OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Eastern Cape, Western Cape, Northern Cape, Freestate
Zimbabwe

SELECTED PROJECT EXAMPLES

Faunal Assessments

- Faunal assessment as part of the environmental assessment and authorisation process for the proposed Mzimvubu Water Project, Eastern Cape.
- Faunal assessment as part of the environmental assessment and authorisation process for the proposed Setlagole Mall Development, North West.
- Faunal assessment as part of the environmental assessment and authorisation process for the proposed Expansion and Upgrade of the Springlake Railway Siding, Hattingspruit, Kwa-Zulu Natal.
- Faunal assessment as part of the environmental assessment and authorisation process for the proposed Styldrift tailings storage facility, return water dams, topsoil stockpile and other associated infrastructure, North West.
- Faunal assessment as part of the environmental assessment and authorisation process for the development of a proposed abalone farm, Brand se Baai, Western Cape.
- Faunal assessment as part of the environmental assessment and authorisation process for the development of a proposed abalone farm, Doringbaai, Western Cape.
- Vegetation composition and subsequent loss of carrying capacity for the Rand Water B19 and VG Residue Pipeline Project, Freestate.
- Faunal assessment as part of the environmental assessment and authorisation process for the Evander Shaft 6 Plant Upgrade, New Tailings Dam Area and Associated Tailings Delivery and Return Water Pipeline, Evander, Mpumalanga.

Previous Work Experience

- Spotted Hyaena Research Project, Phinda Private Game Reserve, KwaZulu Natal.
- Camera Trap Survey as part of the Munyawana Leopard Project, Mkuze Game Reserve, KwaZulu Natal.
- Lowveld Wild Dog Project, Savé Valley Conservancy, Zimbabwe.
- Lion collaring and Tracking as part lion management program, Savé Valley Conservancy, Zimbabwe.
- Junior Nature Conservator, Gauteng Department of Rural Development and Land Reform.





SCIENTIFIC TERRESTRIAL SERVICES (STS) – SPECIALIST CONSULTANT INFORMATION CURRICULUM VITAE OF **CHRISTIEN STEYN**

PERSONAL DETAILS

Position in Company	Junior Field Biologist
Joined SAS	2018
Date of Birth	20 September 1991
Nationality	South African
Languages	English, Afrikaans
Other Business	NA

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Member of the South African Association of Botanists (SAAB)

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

COUNTRIES OF WORK EXPERIENCE

South Africa – Gauteng, Limpopo, Free State, Mpumalanga, Northern Cape

PROJECTS WORKED ON

Specialist studies

- Ecological status quo determination and ecological input into the design masterplan for the proposed development of Rosslyn x 60 in Rosslyn, Gauteng province.
- Terrestrial Ecological Habitat Integrity Assessment as part of the Environmental Impact Assessment and Authorisation process for the proposed development of Northam ext 20, Northam, Limpopo Province.
- Terrestrial Rehabilitation Plan and an Alien and Invasive Plant Management Plan for the demolition of the unauthorised boardwalk and pathways in Klipriviersberg Nature Reserve.
- Faunal and floral ecological scan as part of the environmental impact assessment process for the proposed development of a cellular mast in Witpoort Beaulieu North, Centurion, Gauteng Province.
- An investigation into the ecological status quo of Portion 9 of the Farm Grootfontein 394-JR in Pretoria, Gauteng.
- Terrestrial ecological assessment as part of the environmental assessment and authorisation process of the proposed development situated on the Remaining Extent of Portion 154 of the farm Diepsloot 388, JR.
- Opinion and compilation of memorandum for a student accommodation construction of four storey buildings, located at 455 Frederick Street, Pretoria West, Gauteng.

Background Information, Mapping and Desktop Studies

- Freshwater and Terrestrial Ecological Assessment as part of the Emp Amendment / Water Use License Application for the Bokone Mine Operations near Brits, North West Province.
- Baseline Biodiversity Assessment as part of the Environmental Impact Assessment process for the Mining Right Application for the proposed Goose Bay Project near Parys, Free State Province.
- Baseline Scoping Report as part of the Environmental Impact Assessment process for the Mining Right for Opencast and Underground mining of gold for the Soweto Cluster West Wits Project, north of Soweto, Gauteng Province.
- Terrestrial ecological sensitivity scan as part of the Basic Assessment (BA) Application for the upgrade or supplement of the existing bulk water supply scheme in Bedfordview, Gauteng Province.
- Ecological status quo determination and ecological input into the design masterplan for the proposed sewer pipeline Zithobeni Heights, Bronkhorstspuit, Gauteng Province.



- Terrestrial ecological assessment as part of the environmental assessment and authorisation process for the proposed Elsburgspruit pedestrian bridges and footpaths project, located in the Gauteng province.

Previous Work Experience

- Alien and invasive plant species surveying and collection for the measurement of their plant functional traits on Marion Island (April/May of 2015 & 2016) as part of the scientific research publication:
 - Greve, M., R. Mathakutha, C. Steyn, and S. L. Chown. 2017. Terrestrial invasions on sub-Antarctic Marion and Prince Edward Islands. *Bothalia*, v.47, n.2, p.21. Available at: <https://abcjournal.org/index.php/abc/article/view/2143>
- Alien plant species monitoring along the Sani Pass in January 2013/2014, as part of the research publication:
 - C. Steyn, M. Greve, M.P. Robertson, J.M. Kalwij, P.C. le Roux 2016. Alien plant species that invade high elevations are generalists: support for the directional ecological filtering hypothesis. *J Veg Sci*, 28: 337–346. Available at: <http://onlinelibrary.wiley.com/doi/10.1111/jvs.12477/abstract>; and
 - J.M. Kalwij, C. Steyn, P.C. le Roux 2014. Repeated monitoring as an effective early detection means: first records of naturalised *Solidago gigantea* Aiton (Asteraceae) in southern Africa. *South African Journal of Botany*. Available at: <https://www.sciencedirect.com/science/article/pii/S025462991400088X>





SCIENTIFIC TERRESTRIAL SERVICES (STS) – SPECIALIST CONSULTANT INFORMATION CURRICULUM VITAE OF **STEPHEN VAN STADEN**

PERSONAL DETAILS

Position in Company	Managing member, Ecologist, Aquatic Ecologist
Date of Birth	13 July 1979
Nationality	South African
Languages	English, Afrikaans
Joined SAS	2003 (year of establishment)
Other Business	Trustee of the Serenity Property Trust

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 IAIA South Africa

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
Tools for wetland Assessment short course Rhodes University	2016

COUNTRIES 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

PROJECT EXPERIENCE (Over 2500 projects executed with varying degrees of involvement)

-
- 1 Mining: Coal, Chrome, PGM's, Mineral Sands, Gold, Phosphate, river sand, clay, fluorspar
 - 2 Linear developments
 - 3 Energy Transmission, telecommunication, pipelines, roads
 - 4 Minerals beneficiation
 - 5 Renewable energy (wind and solar)
 - 6 Commercial development
 - 7 Residential development
 - 8 Agriculture
 - 9 Industrial/chemical

REFERENCES

-
- Terry Calmeyer (Former Chairperson of IAIA SA)
Director: ILISO Consulting Environmental Management (Pty) Ltd
Tel: +27 (0) 11 465 2163
Email: terryc@icem.co.za
 - Alex Pheiffer
African Environmental Management Operations Manager
SLR Consulting
Tel: +27 11 467 0945
Email: apheiffer@slrconsulting.com
 - Marietjie Eksteen
Managing Director: Jacana Environmental
Tel: 015 291 4015





SCIENTIFIC TERRESTRIAL SERVICES (STS) – SPECIALIST CONSULTANT INFORMATION CURRICULUM VITAE OF **NELANIE CLOETE**

PERSONAL DETAILS

Position in Company	Senior Scientist Botanical Science and Terrestrial Ecology
Date of Birth	6 June 1983
Nationality	South African
Languages	English, Afrikaans

MEMBERSHIP IN PROFESSIONAL SOCIETIES

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)
 Member of the Botanical Society of South Africa (BotSoc)

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

COUNTRIES 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)

SELECTED PROJECT EXAMPLES

Floral Assessments

- Floral assessment as part of the environmental assessment and authorisation process for the proposed Mzimvubu water project at Maclear, Eastern Cape.
- Floral assessment as part of the environmental authorisation process for the proposed Assmang Iron Ore Black Rock, Northern Cape Province.
- Floral assessment as part of the environmental authorisation process for the proposed Bloemwater Knellpoort water project pipeline assessment, Free State Province.
- Terrestrial ecological scan as part of the environmental authorisation process for the proposed Sappi Pipeline, Gauteng.
- Floral assessment as part of the proposed Setlagole Mall development, North West Province.
- Floral assessment as part of the coastal habitat changes in the Brand-se Baai area, Western Cape.

Environmental and Ecological Management Plans

- Biodiversity Action plans for African Exploration, Mining and Finance Corporation in line with the NEMBA requirements.
- Biodiversity Action plans for Twickenham Platinum mining operations in line with the NEMBA requirements, Limpopo Province.
- Biodiversity Action plans for Bokoni Platinum mining operations in line with the NEMBA requirements, Limpopo Province.
- Maintenance and Management Plan for the Gamagara River, Northern Cape.
- Development of the Limpopo Province Environmental Outlook Report.



Permit applications for protected tree and floral species

- Permit application for the removal and propagation of protected tree species for the Open Cast Operations within Bokoni Platinum Mine in the Limpopo Province.
- Permit application for the removal of protected tree species for Modikwa Mine within the Limpopo Province.
- Permit application for the removal of protected tree species for the Umfolozi Power line within the Kwa-Zulu Natal Province.
- Permit application for the removal of protected tree species for the expansion activities at Black Rock Mining Operations, Northern Cape Province.
- Permit application for the removal of protected tree species for the expansion activities at Assmang Dwars Rivier Mine, Limpopo Province.

