

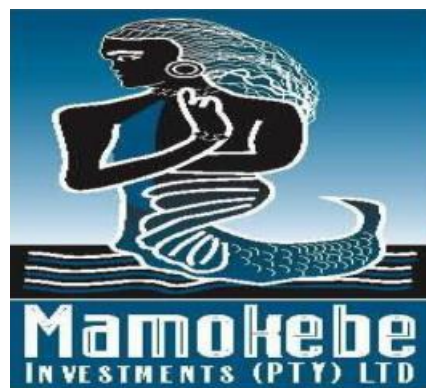
**TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT:  
PROPOSED COAL MINING RIGHT APPLICATION IN PORTION OF  
THE FARMS: GROOTSPRUIT 23 HT (EXCLUDING THE MINING  
PERMIT AREA), KAFFIR LOCATIE 24 HT (EXCLUDING MINING  
PERMIT AREA), VOORSLAG 25 HT AND SOBBEKEN 390 IT,  
WAKKERSTROOM.**



Compiled by:



Compiled for:



May 2022

## Declaration


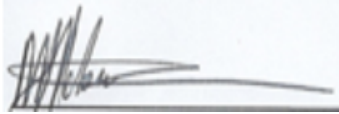
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The study was undertaken by Mr Tshuxekani Maluleke, He holds Professional Natural Scientists qualifications with the following details:

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### APPROVAL

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03 June 2022	Signature: 	Signature: 

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## LIST OF ABBREVIATIONS

<b>ALARP</b>	<b>As Low as Reasonably Practicable</b>
<b>BES</b>	Biodiversity and Ecosystem Services
<b>CARA</b>	Conservation of Agricultural Resources Act
<b>CBA</b>	Critical Biodiversity Area
<b>CBD</b>	Convention on Biological Diversity
<b>CR</b>	Critically Endangered
<b>ESA</b>	Ecological Support Areas
<b>EN</b>	Endangered
<b>GIS</b>	Geographic Information System
<b>I&amp;APS</b>	Interested & Affected Parties
<b>IPPC</b>	International Plant Protection Convention
<b>IUCN</b>	International Union for Conservation of Nature
<b>LC</b>	Least Concern
<b>NBF</b>	National Biodiversity Framework
<b>NEMA</b>	National Environmental Management Act (Act 107 of 1998)
<b>NFEPA</b>	National Freshwater Ecosystem Priority Areas
<b>NT</b>	Near Threatened
<b>PA</b>	Protected Areas
<b>SANBI</b>	South African National Biodiversity Institute
<b>SSC</b>	Species of Special Concern
<b>VU</b>	Vulnerable

## DEFINITIONS

<b>Alien animal</b>	(a) Any live vertebrate, including a bird and a reptile, but excluding a fish, belonging to a species or subspecies that is not a recognised domestic species and the natural habitat of which is not in the Republic; or (b) The egg of such vertebrates.
<b>Biodiversity</b>	Means the diversity of animals, plants or other organisms, including the diversity of animals, plants or other organisms found within and between— (a) Ecosystems; (b) Habitats; (c) The ecological complexes of which these systems and habitats are part;
<b>CITES</b>	Means the Convention on International Trade in Endangered Species of Wild Fauna and Flora;
<b>Endangered Species</b>	This means a species is endangered when it is facing a very high risk of extinction in the wild in the near future and includes— (a) Any living or dead specimen of such a species; or (b) Any egg, skin, bone, feather, seed, flower or any other part or derivative of such a species.
<b>Environment</b>	Means the surroundings within which humans exist and that are made up of— (a) The land, water and atmosphere of the earth; (b) Microorganisms, plant and animal life; (c) Any part or combination of (a) and (b) and the interrelationships amongst and between them; and (d) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing;
<b>Indigenous plant</b>	(a) Means any living or dead plant which is indigenous to the Republic, whether artificially propagated or in its wild state; and (b) Includes the flower, pollen, seed, cone, fruit, bulb, tuber, stem or root or any other part or derivative of such plant but does not include a plant declared a weed in terms of any legislation.
<b>Protected area</b>	Means— (a) A provincial nature reserves; (b) A site of ecological importance; (c) A protected environment; (d) A private nature reserves; or (e) A resource use area.
<b>Protected environment</b>	This means an area is declared a Protected Environment or Private Nature Reserve in terms of section 21 (1) (a).
<b>Rare species</b>	Means a species of fauna and flora referred to in section 68 (a) (ii) and includes— (a) any living or dead specimen of such a species, any egg, skin, bone, feather, seed, flower or any other part or derivative of such a species.



## 1 INTRODUCTION

Nyamoki Consulting (Pty) Ltd, was appointed by Singo Consulting (Pty) Ltd on behalf of Mamokebe Investments (Pty) Ltd (hereafter referred to as the applicant) to conduct a comprehensive Terrestrial Biodiversity Assessment on the on farm Kaffir Locatie 24 HT, Voorslag 25 HT and Sobbeken 390 IT, Mkhondo Local Municipality, Mpumalanga province. The study site is characterised or dominated by cultivated land (semi-commercial/subsistence dryland) and unimproved grassland and the interior of the area is covered by water and a small portion of mines & quarries.

The purpose of this study is to describe and characterise the terrestrial environment, habitats and species present on site. Biodiversity is defined according to the National Environmental Management: Biodiversity Act of 2004 (NEMBA), as “the variability among living organisms from all sources including, terrestrial, aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems”. The NEMBA legislation upholds the country’s commitment to the protection of South Africa’s biological resources and it is imperative that development takes place in a sustainable way to achieve this.

## 2 PROJECT DESCRIPTION

The applicant has appointed Singo Consulting (Pty) Ltd (Consultant) to apply for a mining right and undertake environmental authorization associated with the proposed Coal Mine. The applicant had their Prospecting Right together with a mining permit renewed in 2019 on farm Kaffir Locatie 24 HT, Voorslag 25 HT and Sobbeken 390 IT, Mkhondo Local Municipality, Mpumalanga province. The mining right application to the DMRE includes the above-mentioned properties and to an extent of 10 239.0 ha. The extent of the mining right covers the above-mentioned farm portions and the proposed project relates to the Coal Mine.

### 2.1 Mining operations

#### 2.1.1 Site Establishment / Construction phase:

During the site establishment phase, the applicant must demarcate the boundaries of the site and clear the topsoil and overburden from the extension area to open it for drilling and blasting, a 100m buffer from the watercourses and wetlands onsite has been allocated (Figure 1). Upon stripping, the topsoil and overburden will be stockpiled along the

boundaries of the quarry pit to be used during the rehabilitation phase. Topsoil stripping will be restricted to the areas to be mined. The complete A-horizon (topsoil - the top 100 - 200 mm of soil which is generally darker coloured due to high organic matter content) will be removed. If it is unclear where the topsoil layer ends the top 300 mm of soil must be stripped. The topsoil will be stockpiled in the form of a berm alongside the boundary of the quarry where it will not be driven over, flooded or moved during the operational phase. The topsoil berm will measure a maximum of 1.5 m high and should be planted with indigenous grass species if vegetation does not naturally establish within 6 months of stockpiling to prevent soil erosion and to discourage the growth of weeds. The roots of the grass will also improve the viability of the soil for rehabilitation purposes. The stripped overburden will be stockpiled in a designated area after the topsoil has been removed.

The applicant will introduce the mining equipment to the area during the site establishment phase. The equipment to be used on site will entail the following:

- Weigh bridge
- Mobile Crusher Plant
- Chemical Toilet
- Drilling equipment
- Excavating equipment
- Earthmoving equipment

### **2.1.2 Operational phase:**

The coal mining process includes drilling to set charges; detonation; loading and short haul; and stockpiling. The mining will be conducted by blasting benches from the rock face of the pit face. Blasting is anticipated to occur weekly. The noise caused by blasting will be instantaneous and of short duration. The applicant should ensure that all surrounding residents/farmers are informed of each blasting event. After a blast, the larger coal will be broken into smaller pieces by a hydraulic hammer. The manageable pieces will then be transported by tipper or dumper trucks to the crusher plant. The coal is run through the crushers to produce the final product, in various grades of coal depending on the market.

The mining activities will consist of the following:

- Blasting
- Excavating
- Crushing
- Stockpiling and transporting

The machinery used in the operation will be serviced at the applicants existing off-site workshop. Only emergency repairs will be conducted on site with regular maintenance of the equipment done at the above-mentioned workshop. The mining site will not require the storage of large quantities of diesel as this is already available at the applicant's workshop area. Fuelling of tracked vehicles must be done in the quarry due to logistical reasons.

A chemical toilet will be established on site to be used by the employees. The existing farm road will be used to access the mining area.

### **2.1.3 Decommissioning phase:**

The closure objectives are for the coal pit to be made safe and the remainder of the site to be returned to agricultural use. The coal pit will be incorporated into the closure objectives of the proposed extension area and will entail the benching of the site. Benches will be built with overburden, top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil. Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding (if applicable) has been done in an area. Site management will implement an alien invasive plant management plan during the 12 months aftercare period to address the germination of problem plants in the area.

The decommissioning activities will consist of the following:

- Sloping and landscaping during rehabilitation and Replacing of topsoil
- Implementation of an alien invader plant management plan

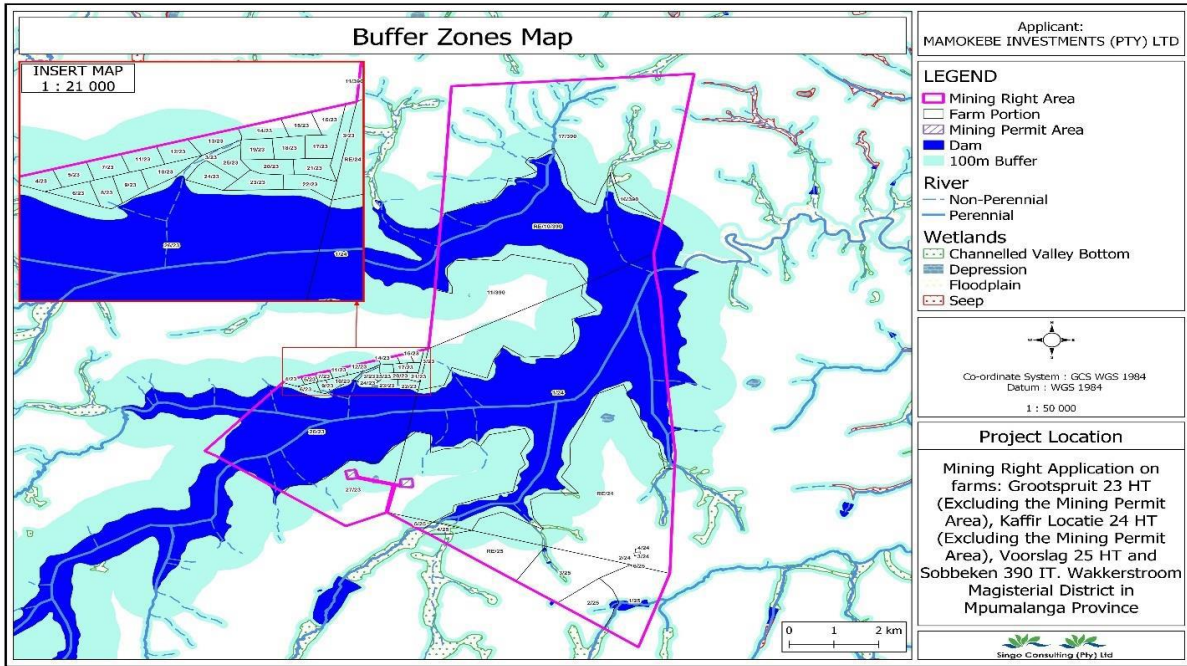


Figure 1: Buffer Zone Map

### 3 STUDY AREA

The mining right area falls under Wakkerstroom Magisterial District, Mkhondo Local Municipality, Mpumalanga Province. The mining area can be reached by an existing access road from the provincial road bordering the property (R543). It is situated approximately 25km West of Piet Retief and approximately 18km Northeast of Dirkie'sdorp town which is along the R543 National Route. The mining right area covers KwaNgema town/ settlement and parts of the Heyshope dam in its radius (Figure 2). The study site is characterised or dominated by cultivated land (semi-commercial/subsistence dryland) and unimproved grassland and the interior of the area is covered by water and a small portion of mines & quarries (Figure 3).



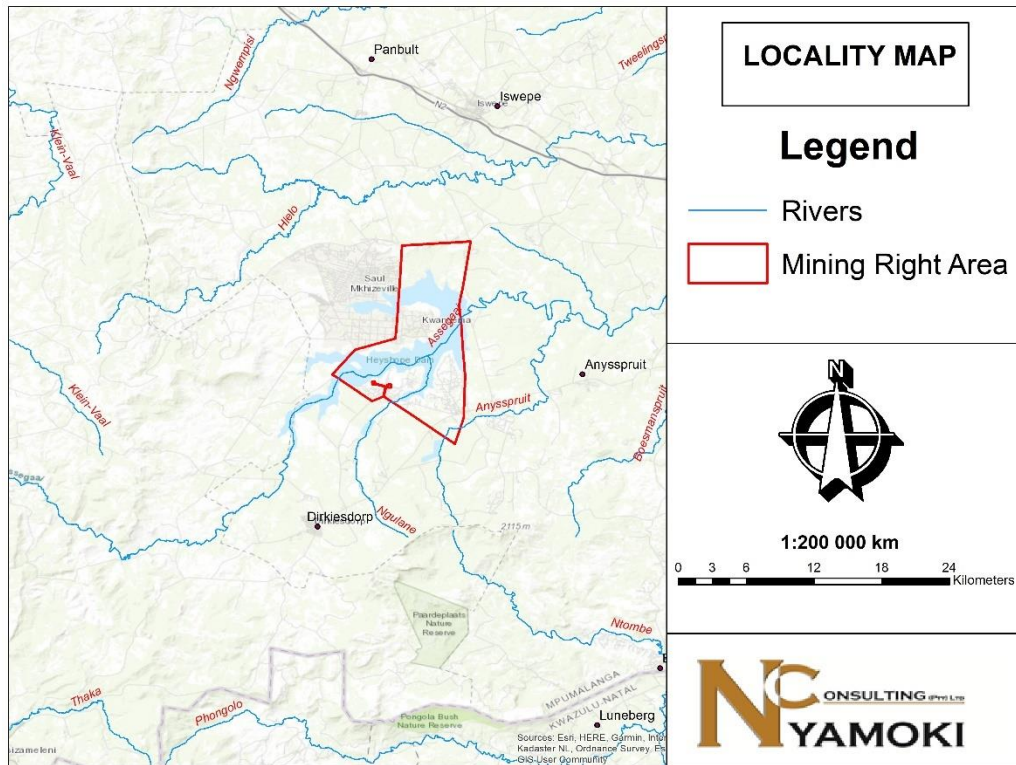


Figure 2: Locality Map

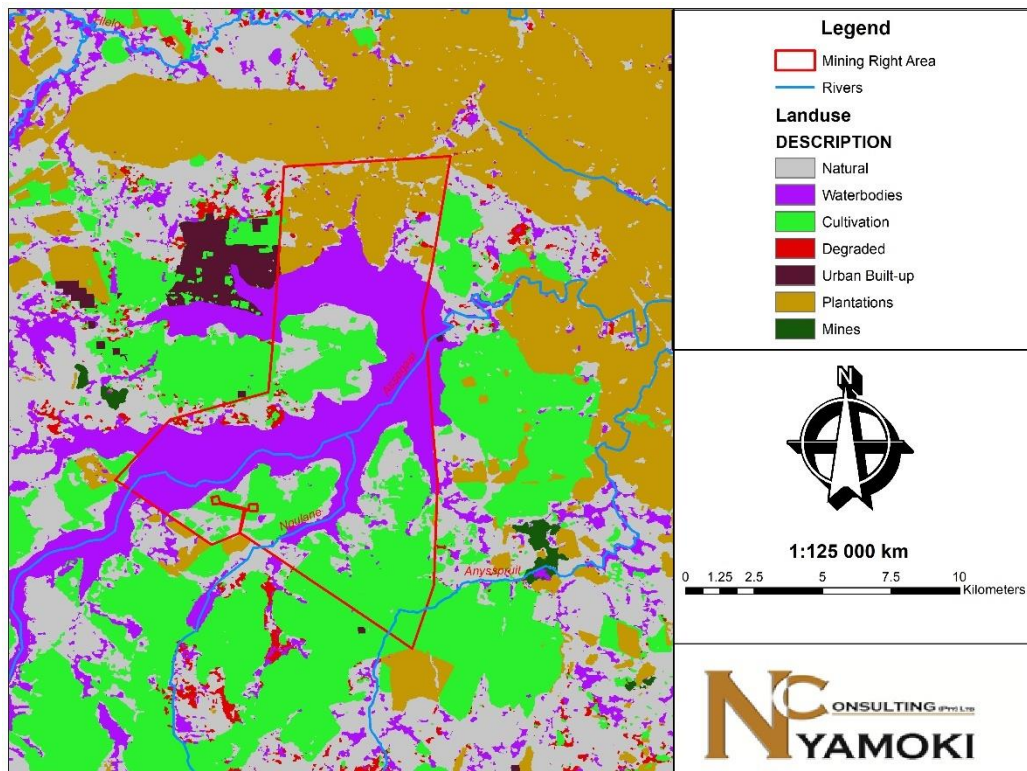


Figure 3: Landuse Map

## 4 TERMS OF REFERENCE

Nyamoki Consulting has been appointed to undertake the following specialist functions:

- Assess the potential impacts of the proposed project on both the fauna and flora.
- Provide mitigation measures, rehabilitation processes and/or vegetation removal procedures that would reduce the potential impacts of the developments on biodiversity.

### 4.1 Scope of the study

#### 4.1.1 Floral study:

- Conduct fieldwork to locate and identify the current state of vegetation in the study area, with emphasis on the footprint of the project.
- Determine the species that are present on site.
- Identify sensitive vegetation types and critical biodiversity areas on site.
- Identify Critical Biodiversity and Ecological Support Areas onsite.
- Determine whether the Farms: Grootspruit 23 HT, Kaffir Locatie 24 HT (, Voorslag 25 HT and Sobbeken 390 IT, Wakkerstroom are located within the distribution range of species listed as Vulnerable, Endangered or Critically Endangered and Protected.
- Provide photographic evidence of the current state of vegetation onsite (i.e. natural or transformed, disturbed etc.) identify and describe the conservation value and conservation planning that are relevant to the site.
- Determine alien species present on site and the recommended management actions.
- Describe the potential direct, indirect and cumulatively negative and positive impacts of the proposed activity on the vegetation species during the construction, operation and decommissioning phases of the project.
- Identification of issues and potentially direct, indirect and cumulative biodiversity impacts.
- Select the most suitable alternative location for the proposed development, based on the risk assessment.
- Provide monitoring requirements, mitigation measures and recommendations.

#### 4.1.2 Faunal study:

- Conduct fieldwork to describe and assess the current state of terrestrial fauna in the area.
- Describe the existing micro-habitats, and the species associated with those habitats.
- Describe species composition and conservation status in terms of protected, endangered or vulnerable faunal species.
  - This description will include species which are likely to occur within, traverse across or forage within the proposed project area, as well as species which may not necessarily occur on-site, but which are likely to be impacted upon as a result of the proposed development.

## 5 LEGAL FRAMEWORK

The following national and provincial legislative guidelines and requirements were followed as part of this study:

### 5.1 The National Environmental Management Act (Act No 107 of 1998) (NEMA) as amended

This Act embraces all three (3) fields of environmental concern namely: resource conservation and exploitation; pollution control and waste management; and land-use planning and development. The environmental management principles include the duty of care for wetlands and special attention is given to management and planning procedures. NEMA provides for cooperative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

### 5.2 National Environmental Management: Biodiversity Act (Act No 10 of 2004) (NEM: BA)

NEMBA was signed into law in mid-2004 and entered into effect on 1 September 2004. NEM: BA provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. Certain activities, known as Restricted Activities, are regulated

on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling.

### **5.3 The National Biodiversity Framework (2017-2022)**

The National Biodiversity Framework (NBF) is a requirement under Section 38 of the National Environmental Management: Biodiversity Act (Act 10 of 2004, hereafter referred to as the 'Biodiversity Act'). The NBF is a short to medium-term coordination tool that shows the alignment between the strategic objectives and outcomes identified in the National Biodiversity Strategy and Action Plan (NBSAP v.2, 2015) and other key national strategies, frameworks and systems that currently guide the work of the biodiversity sector and identifies mechanisms through which this work is coordinated. It also identifies a set of interventions or "acceleration measures" that can unlock or fast-track implementation of the NBSAP and indicates the relative roles of the many agencies involved in implementing these activities. The purpose of the NBF is not to provide a comprehensive review of all work currently being undertaken in the biodiversity sector, nor to list all of the actions required to conserve and manage South Africa's biodiversity in support of sustainable development.

### **5.4 Mpumalanga Nature Conservation Act 10 of 1998**

This Act makes provisions concerning the protection and conservation of the environment in the Mpumalanga Province. It makes provision for a wide variety of matters regarding the environment including protected areas, hunting of wild and exotic animals, the establishment of Wildlife Councils, inland fishing and the protection and aquatic systems. The Act prioritizes the protection of indigenous plants, the application of CITES, restrictions on development and environmental impact reports. The Act makes provisions for the declaration and protection:

- Site of Ecological Importance;
- Protected Environments and Private Nature Reserves; and
- Mountain catchment area.



## **5.5 Conservation of Agricultural Resources Act (Act No 43 of 1983) (CARA):**

This act regulates the utilization and protection of wetlands, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.

## **5.6 The National Forest Act (Act No 84 of 1998) (NFA)**

The main objective of the National Forests Act, 1998 is to promote the sustainable management and development of forests and to provide protection for certain forests and trees. This said protection is provided through the protection of all-natural forests (Section 7 (1), the protection of all trees declared to be protected in terms of section 12(1) of the Act, and the regulation of certain activities in a proclaimed State forest (Section 23(1)(a) - (k)). It should be noted that there is other environmental legislation administered by other State Departments that also regulate natural resources. The Act is responsible for:

- Promotes the sustainable management and development of forests for the benefit of all;
- Creates the conditions necessary to restructure forestry in South Africa;
- Provide special measures for the protection of certain forests and protected trees;
- Promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes;
- Promotes community forestry; and
- Promotes greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.

## **5.7 Convention on Biological Diversity**

The objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilization of genetic resources. The agreement covers all ecosystems, species, and genetic resources.

## **5.8 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)**

The CITES aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Through its three appendices, the Convention accords varying degrees of protection to more than 30,000 plant and animal species.

## **5.9 Convention on the Conservation of Migratory Species of Wild Animals**

The CMS or the Bonn Convention aims to conserve terrestrial, marine and avian migratory species throughout their range. Parties to the CMS work together to conserve migratory species and their habitats by providing strict protection for the most endangered migratory species, concluding regional multilateral agreements for the conservation and management of specific species or categories of species, and by undertaking co-operative research and conservation activities.

## **5.10 The International Treaty on Plant Genetic Resources for Food and Agriculture**

The objectives of the Treaty are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security. The Treaty covers all plant genetic resources for food and agriculture, while its Multilateral System of Access and Benefit-sharing covers a specific list of 64 crops and forages. The Treaty also includes provisions on Farmers' Rights.

## **5.11 Convention on Wetlands (popularly known as the Ramsar Convention)**

The Ramsar Convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The convention covers all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and the well-being of human communities.

## 5.12 World Heritage Convention (WHC)

The primary mission of the WHC is to identify and conserve the world's cultural and natural heritage, by drawing up a list of sites whose outstanding values should be preserved for all humanity and to ensure their protection through closer co-operation among nations.

## 5.13 RAMSAR Convention

The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Ramsar Convention is the only global environmental treaty that deals with a particular ecosystem. The treaty was adopted in the Iranian city of Ramsar in 1971 and the Convention's member countries cover all geographic regions of the planet.

## 5.14 International Plant Protection Convention (IPPC)

The IPPC aims to protect world plant resources, including cultivated and wild plants by preventing the introduction and spread of plant pests and promoting the appropriate measures for their control. The convention provides the mechanisms to develop the International Standards for Phytosanitary Measures (ISPMs) and to help countries to implement the ISPMs and the other obligations under the IPPC, by facilitating the national capacity development, national reporting and dispute settlement. The Secretariat of the IPPC is hosted by the Food and Agriculture Organization of the United Nations (FAO).

# 6 SITE CHARACTERISTICS

## 6.1 Geology & soils

The site consists of Red to yellow sandy soils of the Ba and Bb land types found on shales and sandstones of the Madzaringwe Formation (Karoo Supergroup). Land types Bb (65%) and Ba (30%).

## 6.2 Climate

The study site has strong seasonal summer rainfall, with very dry winters. The Mean Annual Precipitation (MAP) ranges between 650-900 mm (overall average: 726 mm), the MAP is relatively uniform across most of this unit but increases significantly in the extreme

southeast. The coefficient of variation in MAP is 25% across most of the units but drops to 21% in the east and southeast. Incidence of frost from 13-42 days, but higher at higher elevations. See also climate diagram for Gm 12 Eastern Highveld Grassland.

### 6.3 Regional Vegetation -Gm 12 Eastern Highveld Grassland

According to the SANBI database the site consists of the Gm 12 Eastern Highveld Grassland (Figure 4). This vegetation type is distributed within Mpumalanga and Gauteng Provinces: Plains between Belfast in the east and the eastern side of Johannesburg in the west and extending southwards to Bethal, Ermelo and west of Piet Retief. Altitude 1 520-1 780 m, but also as low as 1 300 m.

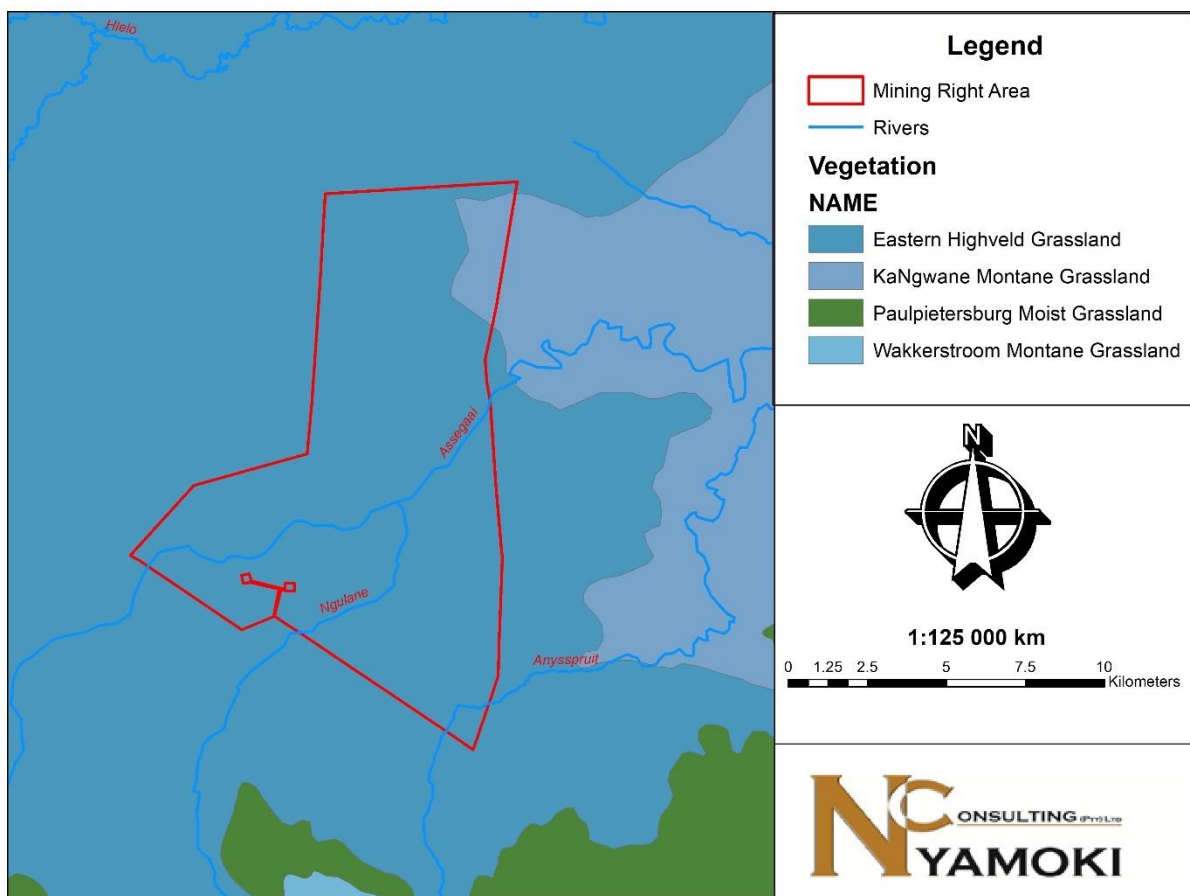


Figure 4: Dominant Vegetation Type Observed onsite

Vegetation & Landscape Features Slightly to moderately undulating plains, including some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual highveld grass composition (*Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya* etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra*, *Celtis africana*, *Diospyros lycioides* subsp *lycioides*, *Parinari capensis*, *Protea caffra*,

*P. welwitschii* and *Rhus magalismontanum*). A full list of the most important plant species found onsite are outlined in **Table 1**.

**Table 1: Important Taxa within the Gm 12 Eastern Highveld Grassland (Mucina and Rutherford 2006)**

PLANT FORM	SPECIES
Graminoids	<i>Aristida aequiglumis</i> (d), <i>A. congesta</i> (d), <i>A. junciformis</i> subsp. <i>galpinii</i> (d), <i>Brachiaria serrata</i> (d), <i>Cynodon dactylon</i> (d), <i>Digitaria monodactyla</i> (d), <i>D. tricholaenoides</i> (d), <i>Elionurus muticus</i> (d), <i>Eragrostis chloromelas</i> (d), <i>E. curvula</i> (d), <i>E. plana</i> (d), <i>E. racemosa</i> (d), <i>E. sclerantha</i> (d), <i>Heteropogon contortus</i> (d), <i>Loudetia simplex</i> (d), <i>Microchloa caffra</i> (d), <i>Monocymbium ceresiiforme</i> (d), <i>Setaria sphacelata</i> (d), <i>Sporobolus africanus</i> (d), <i>S. pectinatus</i> (d), <i>Themeda triandra</i> (d), <i>Trachypogon spicatus</i> (d), <i>Tristachya leucothrix</i> (d), <i>T. rehmannii</i> (d), <i>Alloteropsis semialata</i> subsp. <i>eckloniana</i> , <i>Andropogon appendiculatus</i> , <i>A. schirensis</i> , <i>Bewisia biflora</i> , <i>Ctenium concinnum</i> , <i>Diheteropogon amplectens</i> , <i>Eragrostis capensis</i> , <i>E. gummiflua</i> , <i>E. patentissima</i> , <i>Harpochloa falx</i> , <i>Panicum natalense</i> , <i>Rendlia altera</i> , <i>Schizachyrium sanguineum</i> , <i>Setaria nigrirostris</i> , <i>Urelytrum agropyroides</i> .
Herbs	<i>Berkheya setifera</i> (d), <i>Haplocarpha scaposa</i> (d), <i>Justicia anagalloides</i> (d), <i>Pelargonium luridum</i> (d), <i>Acalypha angustata</i> , <i>Chamaecrista mimosoides</i> , <i>Dicoma anomala</i> , <i>Euryops gilfillanii</i> , <i>E. transvaalensis</i> subsp. <i>setilobus</i> , <i>Helichrysum aureonitens</i> , <i>H. caespititium</i> , <i>H. callicomum</i> , <i>H. oreophilum</i> , <i>H. rugulosum</i> , <i>Ipomoea crassipes</i> , <i>Pentanisia prunelloides</i> subsp. <i>latifolia</i> , <i>Selago densiflora</i> , <i>Senecio coronatus</i> , <i>Vernonia oligocephala</i> , <i>Wahlenbergia undulata</i> .
Geophytic Herbs	<i>Gladiolus crassifolius</i> , <i>Haemanthus humilis</i> subsp. <i>hirsutus</i> , <i>Hypoxis rigidula</i> var. <i>pilosissima</i> , <i>Ledebouria ovatifolia</i> .
Succulent Herb	<i>Aloe ecklonis</i>
Low Shrubs	<i>Anthospermum rigidum</i> subsp. <i>pumilum</i> , <i>Stoebe plumosa</i> .

## 6.4 Regional sensitivity

### Gm 12 Eastern Highveld Grassland

The Gm 12 Eastern Highveld Grassland is classified as **Endangered**. According to Mucina and Rutherford, the conservation for this vegetation type is set at 24%, with nearly 44% being transformed primarily by cultivation, plantations, mines, urbanisation and the building of dams. Cultivation may have had a more extensive impact, as indicated by land-cover data. No serious alien invasions are reported, but *Acacia mearnsii* can become dominant in disturbed sites. Erosion is very low.

## 6.5 2014 Mpumalanga Biodiversity Sector Plan

According to the 2014 Mpumalanga Biodiversity Sector Plan, small portions of the Farms: Grootspruit 23 HT, Kaffir Locatie 24 HT, Voorslag 25 HT and Sobbeken 390 IT, Wakkerstroom falls within a Critical Biodiversity Areas (CBA) (Figure 5)<sup>1</sup>. Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic. The primary purpose of a map of Critical Biodiversity Areas and Ecological Support Areas is to guide decision-making about where best to locate development. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact biodiversity. It is the biodiversity sector's input into multi-sectoral planning and decision-making processes<sup>2</sup>.

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<sup>1</sup> MTPA. 2014. Mpumalanga Biodiversity Sector Plan Handbook. Compiled by Lötter M.C., Cadman, M.J. and Lechmere-Oertel R.G. Mpumalanga Tourism & Parks Agency, Mbombela (Nelspruit).

<sup>2</sup> <http://biodiversityadvisor.sanbi.org/industry-and-conservation/biodiversity-in-the-urban-economy/understand/definitions-related-to-urban-land-use-planning/critical-biodiversity-areas-and-ecological-support-areas/>



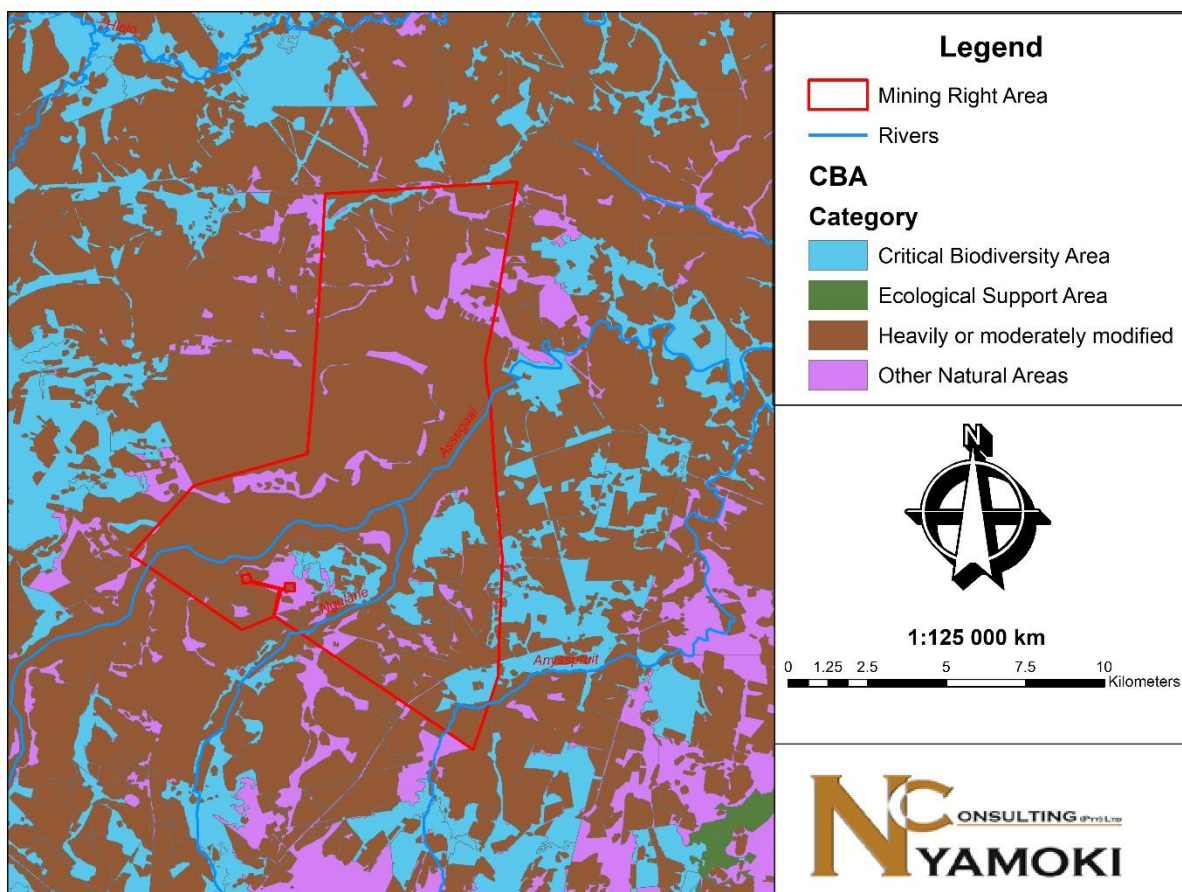


Figure 5: The Farms: Grootspuit 23 HT, Kaffir Locatie 24 HT, Voorslag 25 HT and Sobbeken 390 IT, Wakkerstroom in relation to the 2014 Mpumalanga Biodiversity Sector Plan.

## 6.6 Watercourses on site

The National Freshwater Ecosystems Priority Areas (NFEPA) identify important wetlands in South Africa. The study site falls under the Usuthu to Mhlathuze Water Management Area (WMA=10), Upper Usutu Sub Water Management. The proposed development is located within 500m of a watercourse (Figure 6). The study site is traversed by the Assegai and Anyspruit rivers, and the centre of the proposed Right area consists of the Heyshope Dam (Figure 7).

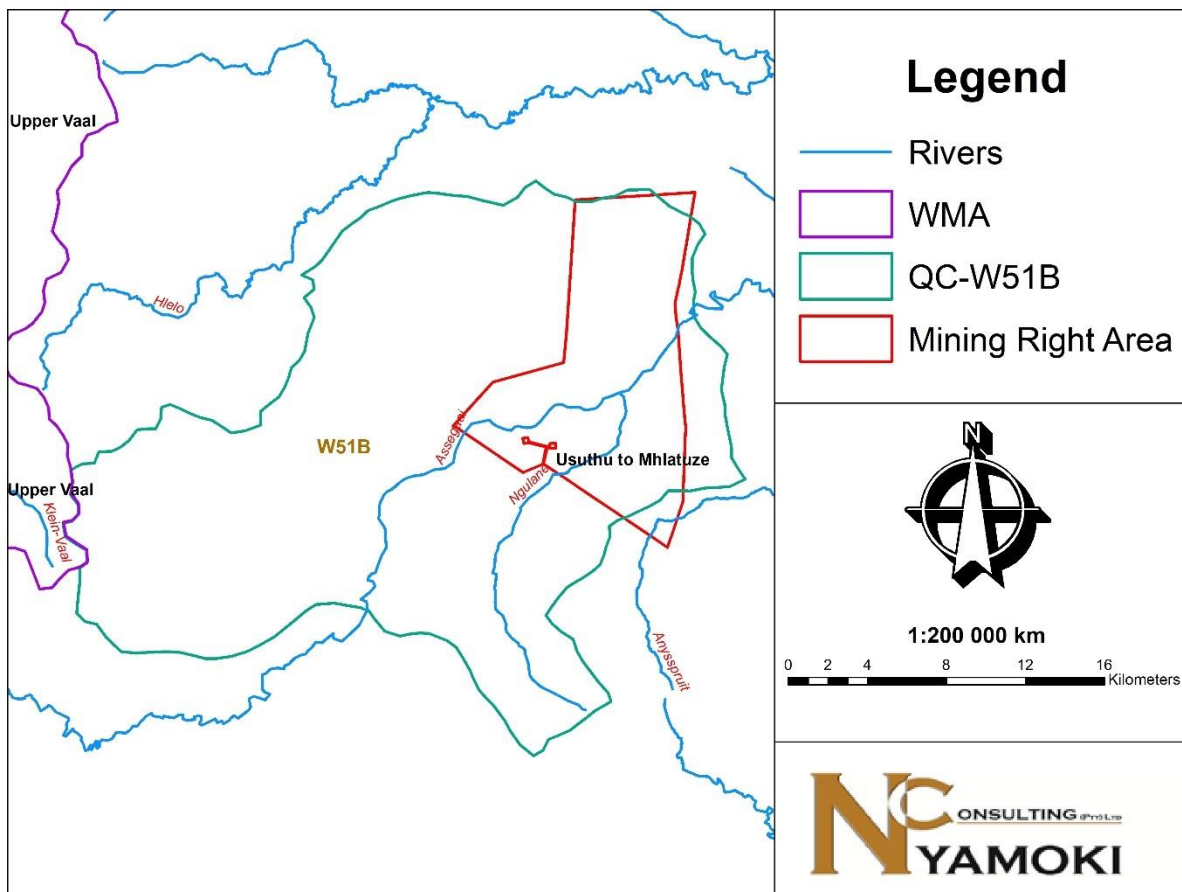


Figure 6: The Farm Farms: Grootspuit 23 HT, Kaffir Locatie 24 HT, Voorslag 25 HT and Sobbeken 390 IT, Wakkerstroom in relation (NFEPA) Hydrology Map



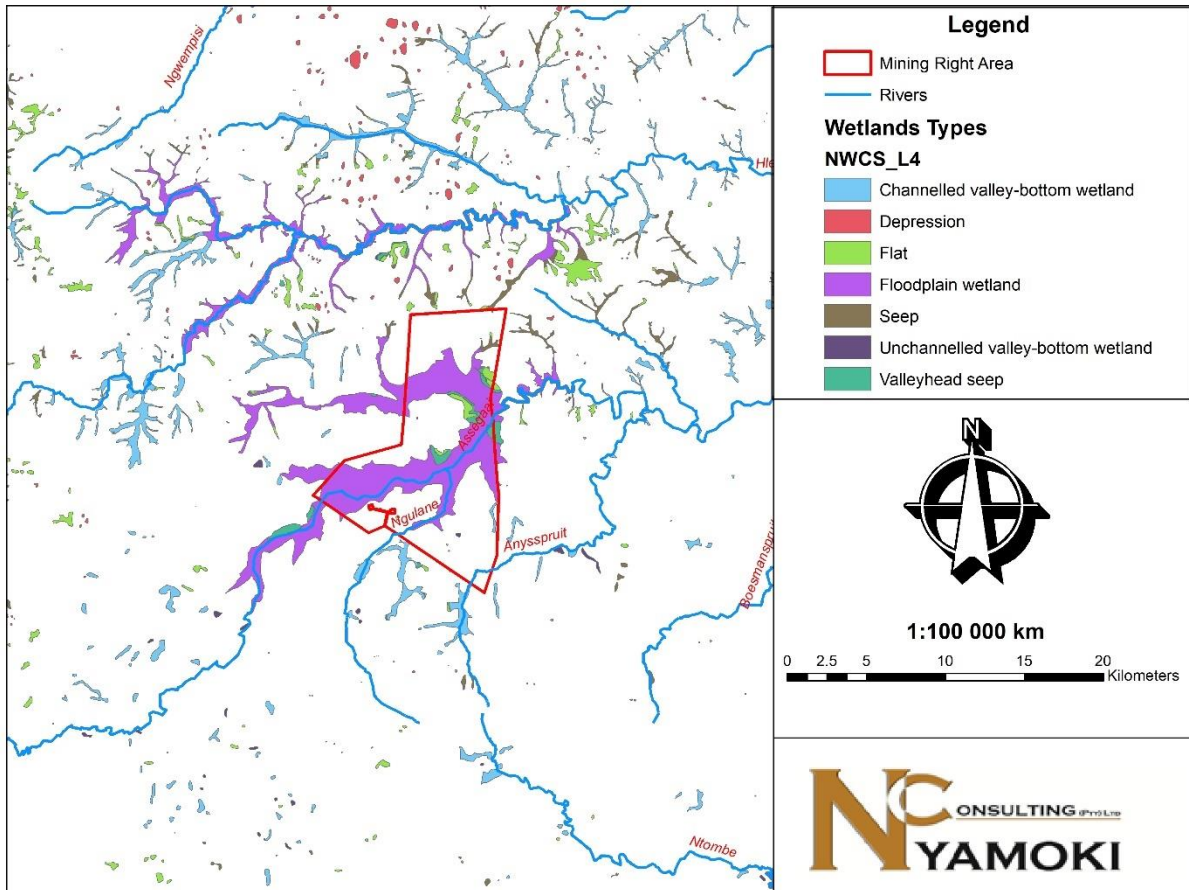


Figure 7: Wetland Delineation Map

## 7 METHODOLOGY

The initial site visits were done on 27 May 2022. The site visits entailed walking through the entire properties (The Farm Farms: Grootspuit 23 HT, Kaffir Locatie 24 HT, Voorslag 25 HT and Sobbeken 390 IT, Wakkerstroom in relation) while investigating both fauna and flora. The aim of the fieldwork component was to scan the study site to gain insight into the current faunal and floral assemblages and to detect any special species that might be present on site.

### 7.1 Species of Special Concern (SSC)

The International Union of Conservation Networks (IUCN) is the international authority for Red Data species. In South Africa, the Threatened Species Programme (TSP) undertakes this role, in collaboration with the South Africa National Biodiversity Institute (SANBI). SSC include any national Red Data, Nationally Protected, Provincially Protected or endemic species recorded on site. The Red Data listed flora and fauna species identified were classified according to the following categories:

- Extinct (EX) - No known individuals remaining;
- Extinct in the Wild (EW) - Known only to survive in captivity, or as a naturalized population outside its historic range;
- Critically Endangered (CR) - Extremely high risk of extinction in the wild;
- Endangered (EN) - High risk of extinction in the wild;
- Vulnerable (VU) - High risk of endangerment in the wild;
- Near Threatened (NT) - Likely to become endangered in the near future;
- Least Concern (LC) - Lowest risk. Does not qualify for a more at risk category. Widespread and abundant taxa are included in this category;
- Data Deficient (DD) - Not enough data to make an assessment of its risk of extinction; and
- Not Evaluated (NE) - Has not yet been evaluated against the criteria.

### 7.2 Impacts Assessment

The potential impacts of the proposed expansion, existing operations and the alternatives were rated using a clearly defined rating scale. The significance rating formula is as follows:

$$\text{Significance} = \text{Consequence} \times \text{Probability}$$

Where

*Consequence = Type of Impact x (Intensity + Spatial Scale + Duration)*

And

*Probability = Likelihood of an Impact Occurring*

In addition, the formula for calculating consequences:

*Type of Impact = +1 (Positive Impact) or -1 (Negative Impact)*

The weight assigned to the various parameters for positive impacts on biodiversity is provided in the formula and is presented in **Table 2**. The probability consequence matrix is displayed in **Table 3**, with the impact significance rating described in **Table 4**.

**Table 2: Biodiversity Impact Assessment Parameter Ratings**

Rating	Intensity		Spatial scale	Duration	Probability
	<i>Negative Impacts (Type of Impact = -1)</i>	<i>Positive Impacts (Type of Impact = +1)</i>			
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or ecosystem. Persistent severe damage. Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	Noticeable, on-going social and environmental benefits have improved the livelihoods and living standards of the local community in general and the environmental features.	International The effect will occur across international borders.	Permanent: No Mitigation The impact will remain long after the life of the Project.	Certain/ Definite. There are sound scientific reasons to expect that the impact will definitely occur.
6	Significant impact on highly valued species, habitat or ecosystem. Irreparable damage to highly valued items of cultural significance or breakdown of social order.	Great improvement to livelihoods and living standards of a large percentage of the population, as well as a significant increase in the quality of the receiving environment.	National Will affect the entire country.	Beyond Project Life The impact will remain for some time after the life of a Project.	Almost certain/Highly probable It is most likely that the impact will occur.
5	Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread positive benefits to local communities which improve livelihoods, as well as an improvement to the receiving environment.	Province/ Region Will affect the entire province or region.	Project Life The impact will cease after the operational life span of the project	Likely The impact may occur.
4	Serious medium-term environmental effects.	Average to intense social benefits to some people.	Municipal Area	Long term 6-15 years.	Probable

Rating	Intensity		Spatial scale	Duration	Probability
	<i>Negative Impacts</i> (Type of Impact = -1)	Positive Impacts (Type of Impact = +1)			
	Environmental damage can be reversed in less than a year. On-going serious social issues. Significant damage to structures/items of cultural significance.	Average to intense environmental enhancements.	Will affect the whole municipal area.		Has occurred here or elsewhere and could therefore occur.
3	Moderate, short-term effects but not affect ecosystem function. Rehabilitation requires the intervention of external specialists and can be done in less than a month. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some.	Local Extending across the site and to nearby settlements.	Medium-term 1-5 years.	Unlikely Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur.
2	Minor effects on the biological or physical environment. Environmental damage can be rehabilitated internally with/ without the help of external consultants. Minor medium-term social impacts on the local population. Mostly repairable. Cultural functions and processes are not affected.	Low positive impacts are experienced by very few of the population.	Limited Limited to the site and its immediate surroundings.	Short term Less than 1 year.	Rare/ improbable Conceivable, but only in extreme circumstances and/ or has not happened during the lifetime of the Project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or

Rating	Intensity		Spatial scale	Duration	Probability
	<i>Negative Impacts (Type of Impact = -1)</i>	<i>Positive Impacts (Type of Impact = +1)</i>			
					implementation of adequate mitigation measures.
1	Limited damage to the minimal area of low significance will have no impact on the environment. Minimal social impacts, low-level repairable damage to commonplace structures.	Some low-level social and environmental benefits are felt by very few of the population.	Very limited Limited to specific isolated parts of the site.	Immediate Less than 1 month.	Highly unlikely/None Expected never to happen.

**Table 3: Probability Consequence Matrix**

Significance	
Probability	7
	6
	5
	4
	3
	2
	1
Consequence	

**Table 4: Significance Threshold Limits**

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify the implementation of the project. The impact may result in permanent positive change.	
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effects on the social and/or natural environment.	
3 to 35	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.	
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development from being approved. These impacts will result in negative medium to short term effects on the social and/or natural environment.	
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effects on the social and/or natural environment.	
-73 to -108	A serious negative impact may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the	

Score	Description	Rating
	(natural and/or social) environment and result in severe effects.	
-109 to -147	A very serious negative impact may be sufficient by itself to prevent the implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	

### 7.3 Study limitations

1. The Gm 12 Eastern Highveld Grassland has not been completely described. As a result, there is limited literature available to aid in the identification of plant species. Some plants were only identified to the genus level. However, some of the faunal and floral species were very difficult to identify.
2. The site inspection was conducted at the beginning of the dry season, and thus their plant species may have been missed or misidentified. Some plant species that emerge and bloom during another time of the year or under very specific circumstances may have been missed entirely. A follow-up study should be conducted in Spring 2022.
3. No faunal trapping was conducted as part of this study. The faunal assessment relied heavily on desktop and literature studies, supported by on-site observations.
4. The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.
5. The site inspection was limited to the parts of the property that are accessible. The results of this report are based on a sample and not the entire properties (Farms: Grootspruit 23 HT, Kaffir Locatie 24 HT, Voorslag 25 HT and Sobbeken 390 IT, Wakkerstroom).

## 8 RESULTS OF THE FLORA ASSESSMENT

The study site is naturally characterised by Slightly to moderately undulating plains, including some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual highveld grass composition (*Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya* etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra*, *Celtis africana*, *Diospyros lycioides* subsp *lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and *Rhus magalismsontanum*). It is important to note that The site has been completely transformed by agricultural activities (**Figures**



8), with patches of Eucalyptus Trees (Figure 9). The vegetation is short dense grassland dominated by the usual highveld grass composition consisting of *Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya* species (Figure 10).



Figure 8: Overview of the disturbed lands with evidence of agricultural lands.



Figure 9: Eucalyptus trees observed onsite.



Figure 10: Combretum species observed onsite.

## 8.1 Flora species of special concern

Species that are provincially protected have been listed under Schedule 12 of LEMA (2003). One national protected plant species was recorded on site, namely: *Sclerocarya birrea*. The study site was found to be rich in endemic species. Endemism is the ecological state where species are confined to a specific region or habitat. Some endemic species were recorded on site such as the *Acacia mellifera*, which was abundant throughout the habitats on site. The region still needs further research and classification of the endemic plant species.

### 8.1.1 Ethnobotanical plant species

Ethnobotany/ Ethnoecology is a branch of botany that focuses on the use of plants for medicines, and cultural and recreational purposes. The overexploitation of indigenous plants for ethnobotanical purposes can be detrimental to populations of those particular plant species, and the other species that depend on its existence for their survival.

South Africa has a rich diversity of medicinal plants that not only have a global significance but also have a cultural and historical role (van Wyk *et al.* 2009). There is a rapidly growing concern for the conservation of medicinal plants that are dwindling in number due to illegal

harvesting (Institute of Natural Resources 2003). This is particularly apparent in rural areas where medicinal plants are overexploited by traditional doctors. Aloes species were found within the study site. The bitter sap in the leaves of *Aloe greatheadii* is used medicinally for the treatment of wounds, sores and burns while *Aloe marlothi* Leaf and root decoctions are used by the Zulus for roundworm infestations and by other cultures for stomach problems and horse sickness.

**No Plant Species with Ethnobotanical value was observed onsite during the site inspection.**

## 9 RESULTS OF THE FAUNA ASSESSMENT

### 9.1 Mammals

According to the desktop study conducted, the species listed in Table 6 were identified as being possible to occur within the study area or the immediate vicinity of the proposed filing station area. It must be noted that some of these species are very sensitive to habitat and in some instances; the likeliness for them to occur is minimal. There are nine Red List mammal species that have a HIGH chance of occurring in the study area. Cattle and other domestic animals graze on the property.

Table 5: Sensitive mammals that are likely to occur onsite

Common name	Recorded on site
Spotted necked otter	None
Greater dwarf shrew	None
Rock dormouse	None
Lesser grey-brown musk	None
African weasel	None
Honey badger	None
Southern hedgehog	None

#### 9.1.1 Field investigation findings

The site is also used for grazing by cattle, the study site has evidence of cow droppings (Figure 11). None of the sensitive mammals which were expected were spotted on site. The presence of evidence of disturbance on site, and the seasonality issues may explain why all the sensitive mammals were not seen during the site visit. Some of the expected animals are nocturnal, and thus may only be seen at night. The study site is located within a dam, which may attract a number of animals for drinking and feeding purposes.





Figure 11: Mammal droppings observed onsite.

## 9.2 Reptiles

There are three Red List reptile species that could occur in the study area, i.e. the African rock python, the Swazi rock snake and the variegated wolk snake. All three of these have a high chance of occurring in the study area, based on habitat requirements and are most likely to occur in rocky habitats, either on rocky outcrops or in rocky, well wooded valleys.

### 9.2.1 Field investigation findings

None of the expected reptiles was observed on site during the site visit. The site has burrows which may harbour reptiles (Figure 12).





Figure 12: Burrow observed onsite.

### 9.3 Avifauna

Birds are generally regarded as good ecological indicators because their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological conditions are directly linked to land cover. As the land cover of an area changes, so do the types of birds in that area (The Bird Community Index, 2007). Land cover is directly linked to habitats within the study area. The diversity of these habitats should give rise to many different species.

According to the South African Bird Atlas Project (SABAP2), almost 300 species of birds have been identified in the Sekhukhuneland area; the majority of these birds are comprised of Bushveld, Grassland and Mountainous species. All birds that could be present within the vicinity of the study area are listed in **Table 7**.

**Table 6: Red Data bird species potentially found within the study site.**

Scientific Name	Common Name	IUCN Status
<i>Geronticus calvus</i>	Southern Bald Ibis	VU
<i>Sagittarius serpentarius</i>	Secretary bird	NT
<i>Gyps coprotheres</i>	Cape Vulture	VU



Scientific Name	Common Name	IUCN Status
<i>Stephanoaetus coronatus</i>	African Crowned Eagle	NT
<i>Circus ranivorus</i>	African Marsh-Harrier	VU
<i>Circus maurus</i>	Black Harrier	NT
<i>Falco biarmicus</i>	Lanner Falcon	LC
<i>Alcedo semitorquata</i>	Half Collared Kingfisher	CR
<i>Bugeranus carunculatus</i>	Wattled Crane	VU
<i>Anthropoides paradiseus</i>	Blue Crane	VU
<i>Balearica regulorum</i>	Grey Crowned Crane	VU
<i>Eupodotis senegalensis</i>	White-bellied Korhaan	VU

### 9.3.1 Field investigation findings

Evidence of avifaunal species was observed on site (**Figure 13**). The proposed construction operations may generate noise pollution which serves as a deterrent to birds.



Figure 13: Feathers observed onsite.

## 9.4 Invertebrates

Butterflies are a good indication of the habitats available in a specific region (Woodhall 2005). Although many species are eurytrops (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope or endemic species (specific habitat requirements with populations concentrated in a small area) which may be very specialised (Woodhall 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and therefore identify. A list of butterflies that are likely to be observed on the study site and the surrounding areas are summarised in **Table 8**.

**Table 7: Butterfly species expected to occur on site (courtesy to the Biodiversity Assessment)**

Scientific Name	Common Name
<i>Melanitis leda Helena</i>	Evening Brown
<i>Acraea anemosa</i>	Broad-bordered Acraea
<i>Acraea neobule</i>	Wandering Acraea
<i>Danaus chrysippus</i>	African Monarch butterfly
<i>Junonia hierta cebrene</i>	Yellow Pansy butterfly
<i>Danays chrysippus</i>	Southern Milkweed
<i>Charaxes jasius</i>	Koppie Emperor
<i>Cyclyrius pirithous</i>	Common Blue
<i>Hyalites esebria</i>	Dusky Acraea butterfly
<i>Phalantha aethiopica</i>	Poplar Leopard
<i>Alaena amazoula</i>	Yellow Zulu
<i>Catacroptera cloanthe</i>	Pirate butterfly
<i>Charaxes achaemenses</i>	Bushveld Emperor
<i>Pinacopteryx eriphia</i>	Zebra White butterfly



Scientific Name	Common Name
<i>Eurema brigitta</i>	Broad-bordered yellow
<i>Vanessa cardui</i>	Painted Lady
<i>Papilio demodocus</i>	Citrus Swallowtail butterfly

#### 9.4.1 Field investigation findings




Figure 14: Evidence of the invertebrates habitats.

## 10 IMPACT ASSESSMENT

The impact assessment is aimed at predicting the potential impacts of the proposed project. Impact assessment strives to avoid damage, loss of ecosystem services, and where they cannot be avoided, to reduce and mitigate these impacts (DEA, 2013). Offsets to compensate for the loss of habitat are regarded as a last resort after all efforts have been made to avoid, reduce and mitigate. The mitigation hierarchy is represented in **Table 9**.



**Table 8: Mitigation hierarchy of impacts**



<b>Avoid or Prevent</b>	Refers to considering options in the project location, sitting, scale, layout, technology and phasing to avoid impacts on biodiversity, associated ecosystem services and people. This is the best option but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts, construction should not take place. In such cases, it is unlikely to be possible or appropriate to rely on the other steps in the mitigation.
<b>Minimise</b>	Refers to considering alternatives in the project location, sitting, scale, layout, technology and phasing that would minimise impacts on biodiversity, and associated ecosystem services. In cases where there are environmental constraints, every effort should be made to minimise impacts.
<b>Rehabilitate</b>	Refers to the rehabilitation of areas where impacts are unavoidable, and measures are provided to return impacted areas to a near natural state or an agreed land use after mine closure. Rehabilitation can, however, fall short of replicating the diversity and complexity of natural systems.
<b>Offset</b>	Refers to measures over and above rehabilitation to compensate for the residual negative impacts on biodiversity after every effort has been made to minimise and then rehabilitate the impacts. Biodiversity offsets can provide a mechanism to compensate for significant residual impacts on biodiversity.

A significant portion of the property with the remaining natural habitat is anticipated to be lost due to the proposed mining and associated activities. The impact of the proposed activity will involve a loss of habitat for both flora and fauna.

## 10.1 Loss of habitat

The properties still have areas that have vegetation regarded as natural with limited species diversity, Cultivation has had a more extensive impact on the study site. In addition to this, minor portions of the study site are located within the area that falls within a Critical Biodiversity Area (CBA). As a result of this, the impacts of the proposed mining and associated aspects, are regarded as highly significant. Due to disturbance of the soil and removal of vegetation, alien plants may likely establish on site.

Alien plants often reduce the diversity of an area due to their invasive habit. Invasive plants grow prolifically and out-compete native species. Loss of vegetation will be irreversible and although rehabilitation can be aimed at reinstating the land to some form of land use, restoration of the natural habitat on site cannot be achieved. This is particularly significant

in an area where some plant species remain undescribed. Many species in this habitat are adapted to specific soil composition and structure and the natural species composition cannot be restored after disturbance to the soil (Victor et al. 2005). The impacts attributed to the loss of habitat are listed below in the phase they occur.

### 10.1.1 Construction phase

Table 9: Loss of habitat during the construction phase

Loss of habitat					
Phase	Construction				
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>Removal of vegetation</li> <li>Disturbance of the soil</li> <li>Vehicle operation</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>Minimise the impacted area and clear only what is required</li> <li>Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation</li> <li>Employ stormwater management measures</li> </ul>				
Parameters	<i>Intensity</i>	<i>Spatial scale</i>	<i>Duration</i>	<i>Probability</i>	<i>Significance</i>
Pre-Mitigation	Very Significant (7)	National (6)	Permanent (6)	Likely (6)	Major (negative) (115)
Post Mitigation	Significant (6)	National (6)	Short-term (3-5 years) (3)	Likely (6)	Minor (negative) (90)

### 10.1.2 Operational phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however, expected to occur. In addition, vehicular transport through the site may increase the risk of roadkill of fauna species that occur.

Table 10: Loss of habitat during the operation phase

Loss of habitat	
Phase	Operational
Criteria	Details / Discussion
Description of impact	<ul style="list-style-type: none"> <li>Establishment of alien plant species in disturbed areas</li> </ul>
Mitigation required	<ul style="list-style-type: none"> <li>Manage alien invasive species establishment continually through chemical or mechanical removal</li> </ul>

	<ul style="list-style-type: none"> <li>Reinstate vegetation cover through concurrent rehabilitation</li> <li>Erect signage to control the speed limit for trucks and other vehicles moving through the site</li> </ul>				
Parameters	<i>Intensity</i>	<i>Spatial scale</i>	<i>Duration</i>	<i>Probability</i>	<i>Significance</i>
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

### 10.1.3 Decommissioning phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however, expected to occur as vehicles and machinery move throughout the site and disturb the soil.

**Table 11: Loss of habitat during decommissioning**

Loss of habitat					
Phase	Decommissioning				
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>Removal of infrastructure and equipment</li> <li>Disturbance of the soil</li> <li>Vehicle operation</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>Minimise the impacted area and revegetate with indigenous where disturbed</li> <li>Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation</li> <li>Employ stormwater management measures</li> </ul>				
Parameters	<i>Intensity</i>	<i>Spatial scale</i>	<i>Duration</i>	<i>Probability</i>	<i>Significance</i>
Pre-Mitigation	Very Significant (7)	National (6)	Permanent (6)	Likely (6)	Major (negative) (115)
Post Mitigation	Significant (6)	National (6)	Short-term (3-5 years) (3)	Likely (6)	Minor (negative) (90)

### 10.1.4 Post-closure phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion should be monitored for up to three years after closure.

Table 12: Loss of habitat during post-closure phase

Loss of habitat					
Phase	Post-closure				
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>On-going establishment of alien plant species in disturbed areas</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>Manage alien invasive species establishment continually through chemical or mechanical removal.</li> <li>Revegetation of the site where previously disturbed.</li> </ul>				
Parameters	<i>Intensity</i>	<i>Spatial scale</i>	<i>Duration</i>	<i>Probability</i>	<i>Significance</i>
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

## 10.2 Loss of Species of Special Concern (SSC)

The loss of vegetation habitat on site will reduce the area available for fauna species. Since fauna has the ability to flee the area, the impacts on common animal species are not regarded as highly significant. Endemic fauna, however, has specific habitat requirements and the impacts on these species are considered to be highly significant.

The impact of the loss of plant SSC can be reduced by implementing a plant relocation strategy. Plant SSC can be located, removed (and seeds collected) and relocated either in an area within proximity to the site or a nursery. If plants are to be translocated to a different area, it is imperative that the donor and host habitat are similar with regard to topography, geology, soil form and orientation of the slope face. Alternatively, a nursery can be established on site where SSC can be relocated to. Loss of some SSC will invariably occur during either process.

### 10.2.1 Construction phase

The greatest impact is expected during the construction phase for loss of SSC.

**Table 13: Loss of SSC during the construction phase**

Loss of SSC					
Phase	Construction				
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>Removal of vegetation</li> <li>Increased human presence</li> <li>Machinery and vehicle operation (noise)</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>Minimise the impacted area and clear only what is required</li> <li>Tag and avoid all Red Data plants</li> <li>Plant SSC according to a relocation plan as a last resort</li> <li>Restricting blasting and operation of machinery to daylight hours</li> </ul>				
Parameters	<i>Intensity</i>	<i>Spatial scale</i>	<i>Duration</i>	<i>Probability</i>	<i>Significance</i>
Pre-Mitigation	Very Significant (7)	National (6)	Permanent (6)	Likely (6)	Major (negative) (108)
Post Mitigation	Very Serious (5)	National (6)	Permanent (6)	Probable (4)	Minor (negative) (68)

### 10.2.2 Operational phase

No impacts on SSC are expected during the operational phase.

### 10.2.3 Decommissioning phase

No impacts on SSC are expected during the decommissioning phase.

### 10.2.4 Post-closure phase

No impacts on SSC are expected during the Post closure phase.

### 10.3 Cumulative impacts

The proposed project area is located in an area that is regarded as Heavily or moderately modified according to the Mpumalanga Biodiversity Conservation Plan and the site inspection, low in plant species diversity with a large number of endemic species. According to the above risk assessment, the proposed project and associated infrastructures will place additional pressure on the environment, especially on the fauna; which will be subjected to increased human presence, reduction in habitat and elevated noise levels. The results of the fauna survey indicate that fauna activity within the area might decline as a result of the current activities around the area. Further to this, the cumulative loss of fauna and flora is expected.

## 11 DISCUSSION

Due to the nature of the proposed development, the impact is expected to be highly significant. In addition to the loss of important natural heritage, the alien invasion is expected to occur, resulting in further degradation of vegetation. However, if the proposed is executed as per the Environmental Management Programme will help minimise the impact by restricting the development to areas that are already disturbed and conserving the undisturbed sites.

## 12 Conclusion and Recommendations

The study site was surveyed on 27 May 2022 to ascertain the overall state of biodiversity. According to the South African National Biodiversity Institute (SANBI), the proposed site is classified as Heavily or Moderately Modified. With smaller patches of the study site being classified as Critical Biodiversity Area (CBA) (**Figure 15**), this implies those patches of land play a role in meeting biodiversity targets for ecosystems, species and ecological processes as identified in a systematic biodiversity plan. They also provide ecosystem services for both fauna and flora onsite, and thus they should be considered during the planning phase of the development. Consider rehabilitating the disturbed areas to allow for the agricul Specific conclusions and recommendations are listed below:

- When selecting alternatives, it is recommended to select sites that have been impacted if possible to minimise the footprint of the project. The pristine sites should be used as a last resort. This will help conserve the remaining vegetation and thus maintain ecosystem services.
- Fauna and Flora monitoring is recommended. The following should be adhered to for the monitoring programme:

- Monitoring must take place annually.
- Monitoring must be completed by qualified specialists;
- Adaptive management must be applied;
- Monitoring during the wet season is essential; and
- Findings must be compared to previous years.

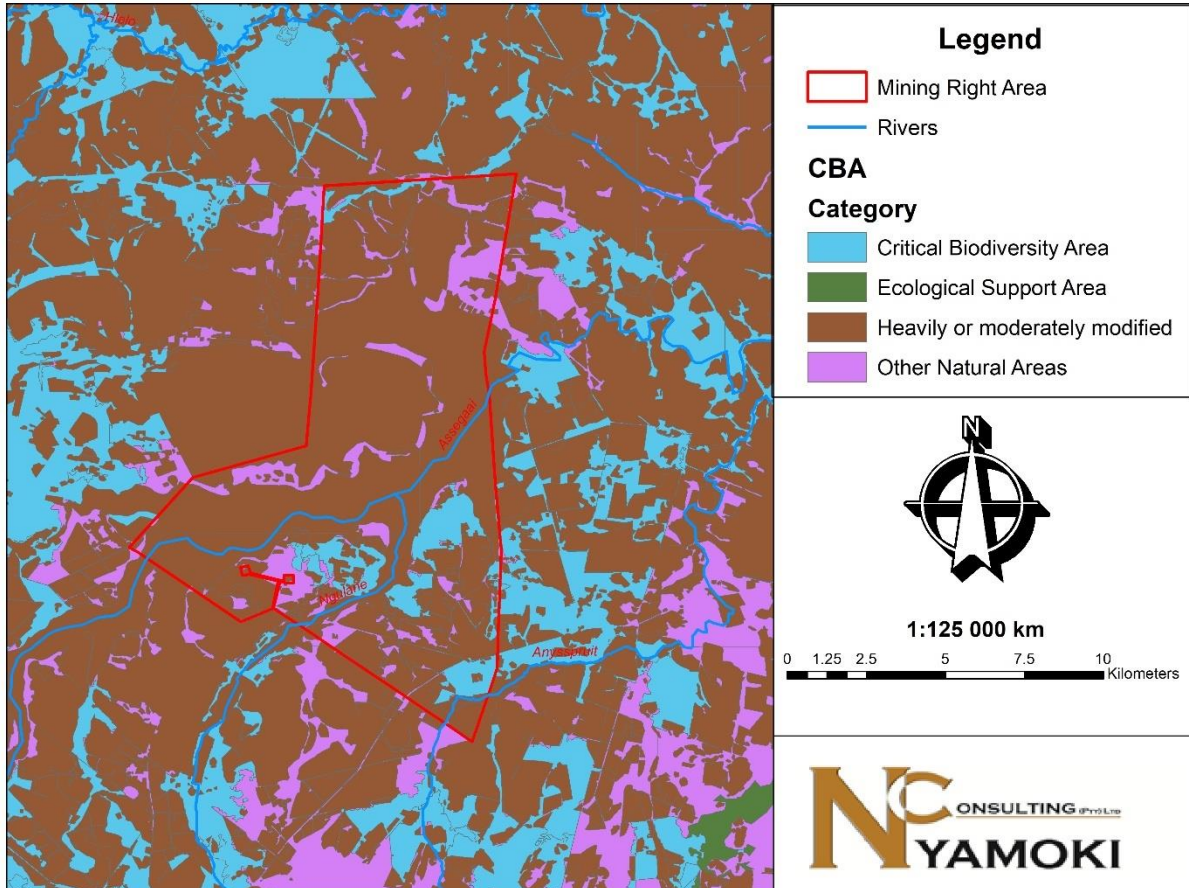


Figure 15: Sensitivity Map

## 13 DECOMMISSIONING AND REHABILITATION

According to the project description provided by the client, The closure objectives are for the coal pit to be made safe and the remainder of the site to be returned to agricultural use. The coal pit will be incorporated into the closure objectives of the proposed extension area and will entail the benching of the site. Benches will be built with overburden, top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil. Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding (if applicable) has been done in an area. Site management will implement an alien invasive plant management plan during the 12 months aftercare period to address the germination of problem plants in the area.



The decommissioning activities will consist of the following:

- Sloping and landscaping during rehabilitation and Replacing of topsoil
- Implementation of an alien invader plant management plan

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