



TERRESTRIAL ECOLOGY SCOPING ASSESSMENT REPORT FOR THE PROPOSED KALGOLD EXPANSION PROJECT

Ratlou Local Municipality, North West

October 2020 (amended February 2021)

CLIENT



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1 Introduction

The Biodiversity Company was commissioned to compile a terrestrial ecology scoping report for the Kalgold Expansion project. The existing Harmony Kalgold operation wishes to expand its current production from the current production rate of 130 000 tons per month to 300 000 tons per month. A pre-feasibility study has been undertaken. The findings of the pre-feasibility study have concluded that the following new activities and expansions must be provided for:

- 1 The pit footprint will increase.
- 2 Larger dewatering pipelines.
- 3 Extension to Spanover waste rock dump.
- 4 Road from the pit to new ROM pad.
- 5 New ROM pad.
- 6 New plant.
- 7 Recommission old Tailings Storage Facility (TSF) at low deposition rate.
- 8 Increase tailings deposition rate at D-zone pit.
- 9 Install pipeline from Central dam to the new processing plant.
- 10 Install a tailings pipeline from the new processing plant to old TSF and D-zone pit.
- 11 Install pipeline from old processing plant raw water pond to the new plant (D-zone return water).
- 12 Install two power lines from Ferndale substation to the new processing plant.
- 13 Install evaporators at Central dam (to get rid of excess water).
- 14 Install a water treatment plant at the new plant.
- 15 Relocate and expand the explosives magazine.
- 16 Additional new road from the plant to the N18.

Kalgold mine is an open pit mining operation located some 60km South West of Mahikeng in the North West Province. The mine is owned and operated by Harmony Gold, who acquired the mine in 1999. The mine is located in the Kraaipan Greenstone Belt, which is part of the large Amalia-Kraaipan Greenstone terrain. The largest ore body is found in the D-Zone, which was mined out by a single pit operation along a strike length of 1 300m and to a depth of approximately 290m below surface. Mining at Kalgold Mine continued at the A-Zone, Windmill and Watertank Open Pits, which are all relatively new opencast operations.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations. 2014 (No. 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

The approach has taken cognisance of the recently published Government Notice 320 in terms of NEMA dated 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of

the National Environmental Management Act, 1998, when applying for Environmental Authorisation”. The National Web based Environmental Screening Tool has characterised the terrestrial biodiversity for the project area as “very high sensitivity”.

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making with regards to the proposed project.

2 Document Structure

The table below provides the NEMA (2014) Requirements for Ecological Assessments, and also the relevant sections in the reports where these requirements are addressed (Table 2-1).


Table 2-1 Report Structure


Environmental Regulation	Description	Section in Report
NEMA EIA Regulations 2014 (as amended)		
	Details of –	
Appendix 6 (1)(a):	(I) The specialist who prepared the report; and (II) The expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 3
Appendix 6 (1)(b):	A declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix A
Appendix 6 (1)(c):	An indication of the scope of, and the purpose for which, the report was prepared;	Section 4
Appendix 6 (1)(cA):	An indication of the quality and age of base data used for the specialist report;	Section 8
Appendix 6 (1)(cB):	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 11
Appendix 6 (1)(d):	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A
Appendix 6 (1)(e):	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 8
Appendix 6(1)(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 11
Appendix 6(1)(g):	An identification of any areas to be avoided, including buffers;	Section 10 and 11
Appendix 6(1)(h):	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 11
Appendix 6(1)(i):	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7
Appendix 6(1)(j):	A description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 11
Appendix 6(1)(k):	Any mitigation measures for inclusion in the empr;	Section 12
Appendix 6(1)(l):	Any conditions for inclusion in the environmental authorisation;	N/A
Appendix 6(1)(m):	Any monitoring requirements for inclusion in the empr or environmental authorisation;	N/A
Appendix 6(1)(n):	A reasoned opinion- (i) whether the proposed activity, activities or portions thereof should be authorised; (ia) regarding the acceptability of the proposed activity or activities; and (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;	N/A


Appendix 6(1)(o):	A description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
Appendix 6(1)(p):	A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
Appendix 6(1)(q):	Any other information requested by the competent authority.	N/A


3 Specialist Details

Report Name	TERRESTRIAL ECOLOGY SCOPING ASSESSMENT REPORT FOR THE PROPOSED KALGOLD EXPANSION PROJECT COLLIERY
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Submitted to	
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Report Writer	Lindi Steyn  Lindi Steyn has a PhD in Biodiversity and Conservation from the University of Johannesburg. She specialises in avifauna and has worked in this specialisation since 2013.
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Report Writer	Martinus Erasmus  Martinus Erasmus obtained his B-Tech degree in Nature Conservation in 2016 at the Tshwane University of Technology. Martinus has been conducting EIAs, basic assessments and assisting specialists in field during his studies since 2015.
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Report Writer / Reviewer	Andrew Husted  Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
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Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.
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4 Terms of Reference

The Terms of Reference (ToR) included the following:

- Description of the baseline receiving environment specific to the field of expertise (general surrounding area as well as site specific environment);
- Identification and description of any desktop sensitive receptors in terms of relevant specialist disciplines (fauna and flora) that occur in the project area, and the manner in which these sensitive receptors may be affected by the project;
- Identify 'significant' desktop ecological, botanical and faunal features within the proposed project areas;
- Identification of conservation significant habitats around the project area which might be impacted;
- Screening to identify any critical issues (potential fatal flaws) that may result in project delays or rejection of the application;
- Provide a map to identify sensitive receptors in the project area, based on available maps and database information;
- Impact assessment, mitigation and rehabilitation measures to prevent or reduce the possible impacts as per the study.

5 Project Description

Kalgold mine is an open pit mining operation located some 60 km from Mahikeng in the North West Province. The project area is divided by the N18 national highway and falls in the Ratlou Local Municipality within the Ngaka Modiri Molema District Municipality. The area surrounding the project area consists predominantly of mining activities, secondary roads and agricultural fields. The project layout is shown in Figure 5-1, while the location of the project area is shown in Figure 5-2.

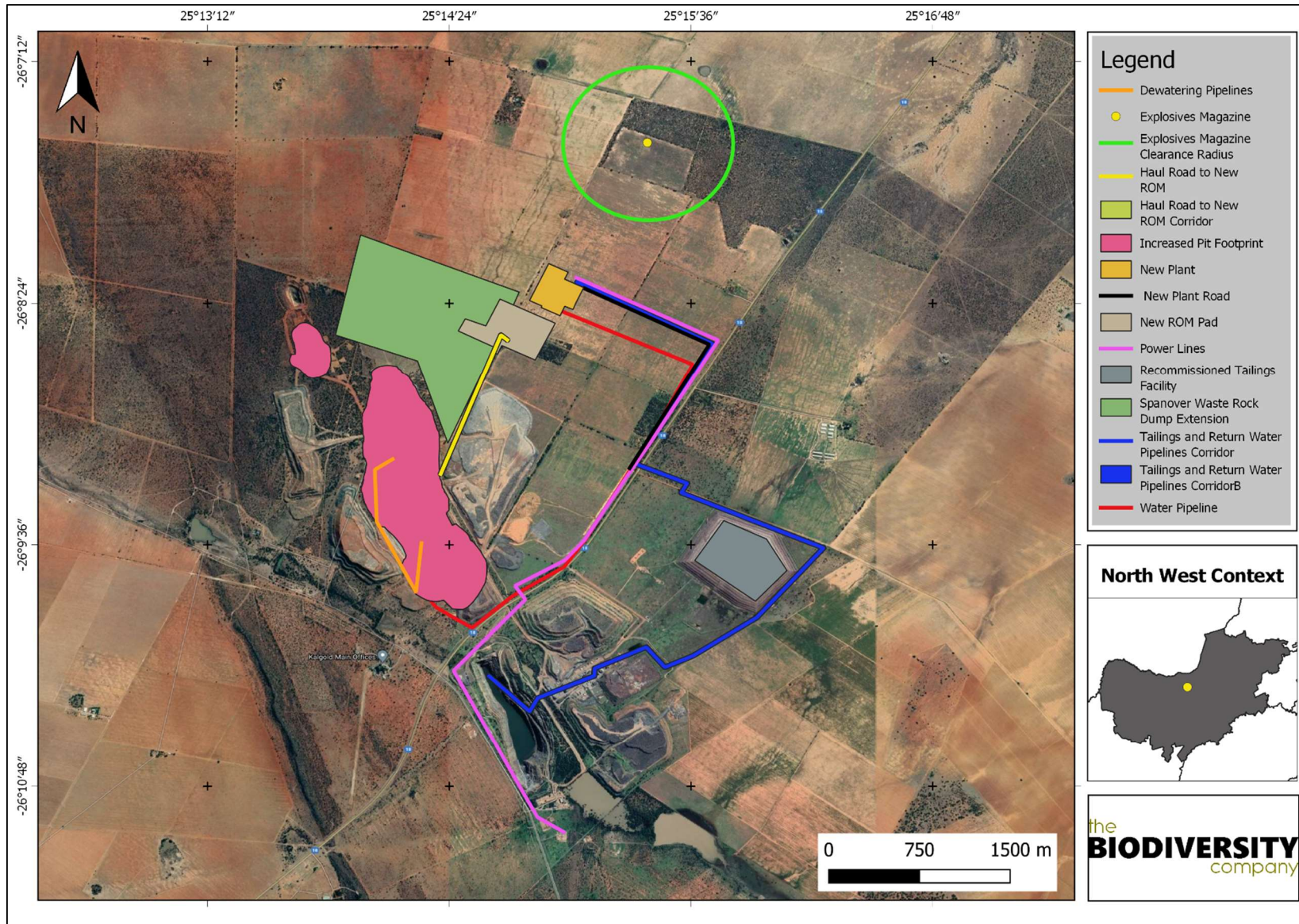


Figure 5-1 Project infrastructure layout

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Figure 5-2 Locality of the project area

6 Key Legislative Requirements

The legislation, policies and guidelines listed below are applicable to the current project in terms of biodiversity and ecological support systems. The list below, although extensive, is not exhaustive and other legislation, policies and guidelines may apply in addition to those listed below (Table 6-1).

Table 6-1 A list of key legislative requirements relevant to biodiversity and conservation in North West

INTERNATIONAL	Convention on Biological Diversity (CBD, 1993)
	The United Nations Framework Convention on Climate Change (UNFCCC, 1994)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
NATIONAL	Constitution of the Republic of South Africa (Act No. 108 of 2006)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management Biodiversity Act (Act No. 10 of 2004)
	The National Environmental Management: Waste Act, 2008 (Act No.59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989)
	National Environmental Management Air Quality Act (Act No. 39 of 2004)
	National Protected Areas Expansion Strategy (NPAES)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Water Act, 1998 (Act No. 36 of 1998)
	National Freshwater Ecosystem Priority Areas (NFEPA's)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations, 2014
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
Sustainable Utilisation of Agricultural Resources (Draft Legislation).	
White Paper on Biodiversity	
PROVINCIAL	North-West Biodiversity Sector Plan of 2015 (READ, 2015).
	The North West Biodiversity Management Amendment Bill, 2017

7 Limitations

The following limitations should be noted for the study:

- This assessment represents the Scoping Phase of the project only. Further field surveys a final baseline and impact assessment report will be submitted once the field studies have been concluded;
- The sensitivity map included in this report is based on desktop information alone;
- The impact assessment in this report is based on desktop information alone; and
- A field survey still needs to be conducted to further advise on the viability of the alternatives.

8 Study Approach

The following approach (or methods) will be implemented for the baseline and impact assessment phase of the project.

8.1 Terrestrial Assessment

8.1.1 Botanical Assessment

The botanical study will encompass an assessment of all the vegetation units and habitat types within the project area. The focus will be on an ecological assessment of habitat types as well as identification of any Red Data species within the known distribution of the project area. The South African National Biodiversity Institute (SANBI) provides an electronic database system, namely the Botanical Database of Southern Africa (BODATSA), to access distribution records on southern African plants. This is a new database which replaces the old Plants of Southern Africa (POSA) database. The POSA database provided distribution data of flora at the quarter degree square (QDS) resolution. The Red List of South African Plants website (SANBI, 2017) was utilized to provide the most current account of the national status of flora. Relevant field guides and texts that will be consulted for identification purposes in the field during the surveys include the following:

- Field Guide to the Wild Flowers of the Highveld (Van Wyk & Malan, 1997);
- A field guide to Wild flowers (Pooley, 1998);
- Guide to Grasses of Southern Africa (Van Oudtshoorn, 1999);
- Orchids of South Africa (Johnson & Bytebier, 2015);
- Guide to the Aloes of South Africa (Van Wyk & Smith, 2014);
- Mesembs of the World (Smith *et al.*, 1998);
- Medicinal Plants of South Africa (Van Wyk *et al.*, 2013);
- Freshwater Life: A field guide to the plants and animals of southern Africa (Griffiths & Day, 2016); and
- Identification guide to southern African grasses. An identification manual with keys, descriptions and distributions (Fish *et al.*, 2015).

Additional information regarding ecosystems, vegetation types, and species of conservation concern (SCC) included the following sources:

- The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2012); and
- Red List of South African Plants (Raimondo *et al.*, 2009; SANBI, 2016).

The field work methodology will include the following survey techniques:

- Timed meanders;
- Sensitivity analysis based on structural and species diversity; and
- Identification of floral red-data species.

8.1.2 Floristic Analysis

The wet season fieldwork and sample sites will be placed within targeted areas (i.e. target sites) perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery (Google Corporation) and GIS analysis (which included the latest applicable biodiversity datasets) available prior to the fieldwork. The focus of the fieldwork will therefore be to maximise coverage and navigate to each target site in the field in order to perform a rapid vegetation and ecological assessment at each sample site. Emphasis will be placed on sensitive habitats, especially those overlapping with proposed expansion areas.

Homogenous vegetation units will be subjectively identified using satellite imagery and existing land cover maps. The floristic diversity and search for flora SCC will be conducted through timed meanders within representative habitat units delineated during the scoping fieldwork. Emphasis will be placed mostly on sensitive habitats overlapping with the proposed project areas.

The timed random meander method is a highly efficient method for conducting floristic analysis, specifically in detecting flora SCC and maximising floristic coverage. In addition, the method is time and cost effective and highly suited for compiling flora species lists and therefore gives a rapid indication of flora diversity. The timed meander search will be performed based on the original technique described by Goff *et al.* (1982). Suitable habitat for SCC will be identified according to Raimondo *et al.* (2009) and targeted as part of the timed meanders.

At each sample site notes will be made regarding current impacts (e.g. livestock grazing, erosion etc.), subjective recording of dominant vegetation species and any sensitive features (e.g. wetlands, outcrops etc.). In addition, opportunistic observations will be made while navigating through the project area.

8.1.3 Faunal Assessment (Mammals & Avifauna)

The faunal desktop assessment included the following:

- Compilation of expected species lists;
- Identification of any Red Data or species of conservation concern (SCC) potentially occurring in the area; and
- Emphasis was placed on the probability of occurrence of species of provincial, national and international conservation importance.

Mammal distribution data were obtained from the following information sources:

- The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005);
- Bats of Southern and Central Africa (Monadjem *et al.*, 2010);
- The 2016 Red List of Mammals of South Africa, Lesotho and Swaziland (www.ewt.org.za) (EWT, 2016); and
- Animal Demography Unit (ADU) - MammalMap Category (MammalMap, 2019) (mammalmap.adu.org.za).

The field survey component of the study will utilise a variety of sampling techniques including, but not limited to, the following:

- Camera trapping;
- Visual observations;
- Small mammal trapping;
- Identification of tracks and signs; and
- Utilization of local knowledge.

Site selection for trapping will be focussed on the representative habitats within the project area. Sites will be selected on the basis of GIS mapping and Google Earth imagery and then final selection was confirmed through ground truthing during the surveys. Habitat types sampled will include pristine, disturbed and semi-disturbed zones, drainage lines, wetlands and rocky ridges.

8.1.4 Herpetology (Reptiles & Amphibians)

A herpetofauna desktop assessment of the possible species in the area was done and attention was paid to the SCCs, sources used included the IUCN (2017) and ADU (2019).

Herpetofauna distributional data was obtained from the following information sources:

- South African Reptile Conservation Assessment (SARCA) (sarca.adu.org);
- A Guide to the Reptiles of Southern Africa (Alexander & Marais, 2007);
- Field guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- Atlas and Red list of Reptiles of South Africa, Lesotho and Swaziland (Bates *et al.*, 2014);
- A Complete Guide to the Frogs of Southern Africa (du Preez & Carruthers, 2009);
- Animal Demography Unit (ADU) - FrogMAP (frogmap.adu.org.za);
- Atlas and Red Data Book of Frogs of South Africa, Lesotho and Swaziland (Mintner *et al.*, 2004); and
- Ensuring a future for South Africa's frogs (Measey, 2011).

A herpetofauna field assessment will be conducted in each habitat or vegetation type within the project area, as identified from the desktop study, with a focus on those areas which will be most impacted by the proposed development (i.e. the infrastructure development).

The herpetological field survey comprised the following techniques:

- Hand searching will be used for reptile species that shelter in or under particular habitats. Visual searches, typically undertaken for species with activities that occur on surfaces or for species that are difficult to detect by hand-searches or trap sampling.

9 Receiving Environment

9.1 Geographic Information Systems (GIS) Mapping

Existing data layers were incorporated into GIS software to establish how the proposed project might interact with any ecologically important entities. Emphasis was placed around the following spatial datasets:

- National Biodiversity Assessment (NBA) (Skowno *et al.*, 2019);
- Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018);
- North-West Biodiversity Sector Plan of 2015 (READ, 2015); and
- Mining and Biodiversity Guideline (SANBI & SAMBF 2012).

9.2 Desktop Spatial Assessment

The following features describe the general area and habitat, this assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and SANBI. The desktop analysis and their relevance to this project are listed in Table 9-1.

Table 9-1 Desktop spatial features examined

Desktop Information Considered	Relevant/Not relevant	Section
Conservation Plan	The project area falls across both a CBA2 and an ESA1 classified areas ¹	9.2
Ecosystem Threat Status	The project area is situated within an ecosystem that are listed as LC	9.3.1
Ecosystem Protection Level	The terrestrial ecosystems associated with the project area is rated as <i>not protected</i>	9.3.2
Protected Areas (SAPAD & SACAD)	Irrelevant; The nearest SAPAD is 52 km from the project area (Baberspan Ramsar site)	-
National Protected Area Strategy	The project area is 7 km from the Molopo NPAES ¹	9.4
NFEPA Rivers and Wetlands	The project area does overlap with a true FEPA river	9.5
NBA Wetlands	A “not protected” wetland and river as well as an unclassified wetland can be found in the project area. These wetlands are CR and unclassified respectively while the river has an ecosystem threat status of EN.	9.6
Strategic Water Source Areas	The project area is 2.2 km from a SWSA.	9.7
Mining and Biodiversity Guidelines	The project area falls in areas classified as “highest biodiversity importance”, “high biodiversity importance” and “moderate biodiversity importance”.	9.8
Important Bird and Biodiversity Areas	Irrelevant: The project area is approximately 46 km away from the Baberspan and Leeupan IBA	-

9.3 North West Biodiversity Sector Plan

The North-West Department of Rural, Environment, and Agricultural Development (READ), as custodian of the environment in the North West, is the primary implementing agent of the

¹ According to the DEA screening tool, this feature has contributed to the Very High sensitivity description for the project area

Biodiversity Sector Plan. The spatial component of the Biodiversity Sector Plan is based on systematic biodiversity planning undertaken by READ. The purpose of a Biodiversity Sector Plan is to inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact on biodiversity. This is done by providing a map of biodiversity priority areas, referred to as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), with accompanying land use planning and decision-making guidelines (READ, 2015).

CBAs are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems as well as the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met (READ, 2015).

ESAs are terrestrial and aquatic areas that are not essential for meeting biodiversity representation targets (thresholds), but which play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree or extent of restriction on land use and resource use in these areas may be lower than that recommended for CBAs (READ, 2015).

The project area falls across both a CBA2 and an ESA1 classified area (Figure 9-1). The Power line, water pipeline, roads and return water corridor falls across the ESA1 areas. The status of these classifications will be confirmed during the field assessment.

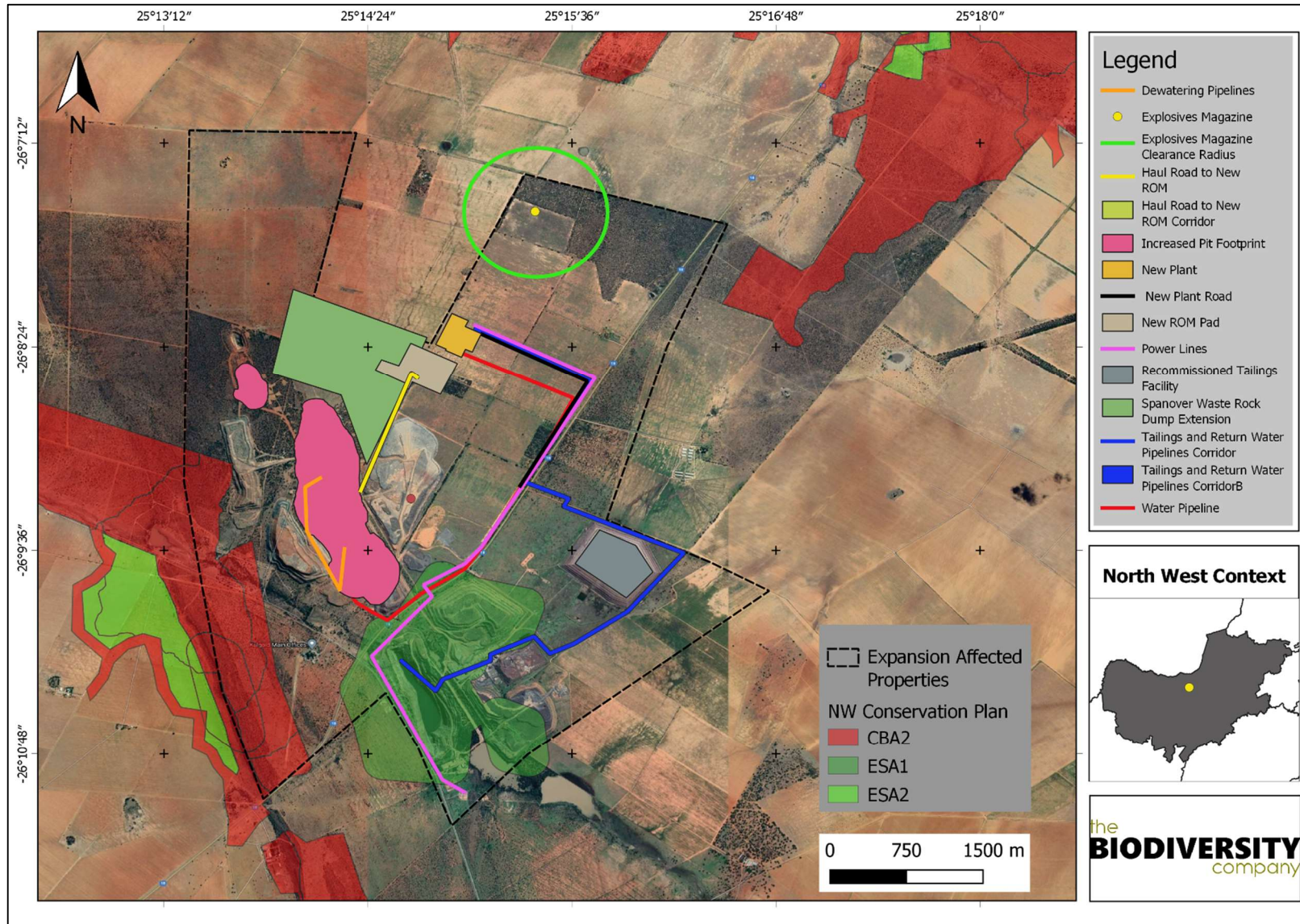


Figure 9-1 Kalgold project area (including the infrastructure portions) superimposed on the North West C-Plan (CBA) map (READ, 2015)

9.4 The National Biodiversity Assessment

The National Biodiversity Assessment (NBA) was completed as a collaboration between the SANBI, the DEA and other stakeholders, including scientists and biodiversity management experts throughout the country over a three-year period (Skowno *et al.*, 2019).

The purpose of the NBA is to assess the state of South Africa's biodiversity with a view to understanding trends over time and informing policy and decision-making across a range of sectors (Skowno *et al.*, 2019).

The two headline indicators assessed in the NBA are *ecosystem threat status* and *ecosystem protection level* (Skowno *et al.*, 2019).

9.4.1 Ecosystem Threat Status

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Skowno *et al.*, 2019).

Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Skowno *et al.*, 2019).

The project area was superimposed on the terrestrial ecosystem threat status (Figure 9-2). As seen in this figure, the project area is situated within an ecosystem that are listed as LC (Figure 9-2). The status refers to the regional status of the ecosystem and might not represent the infield conditions.

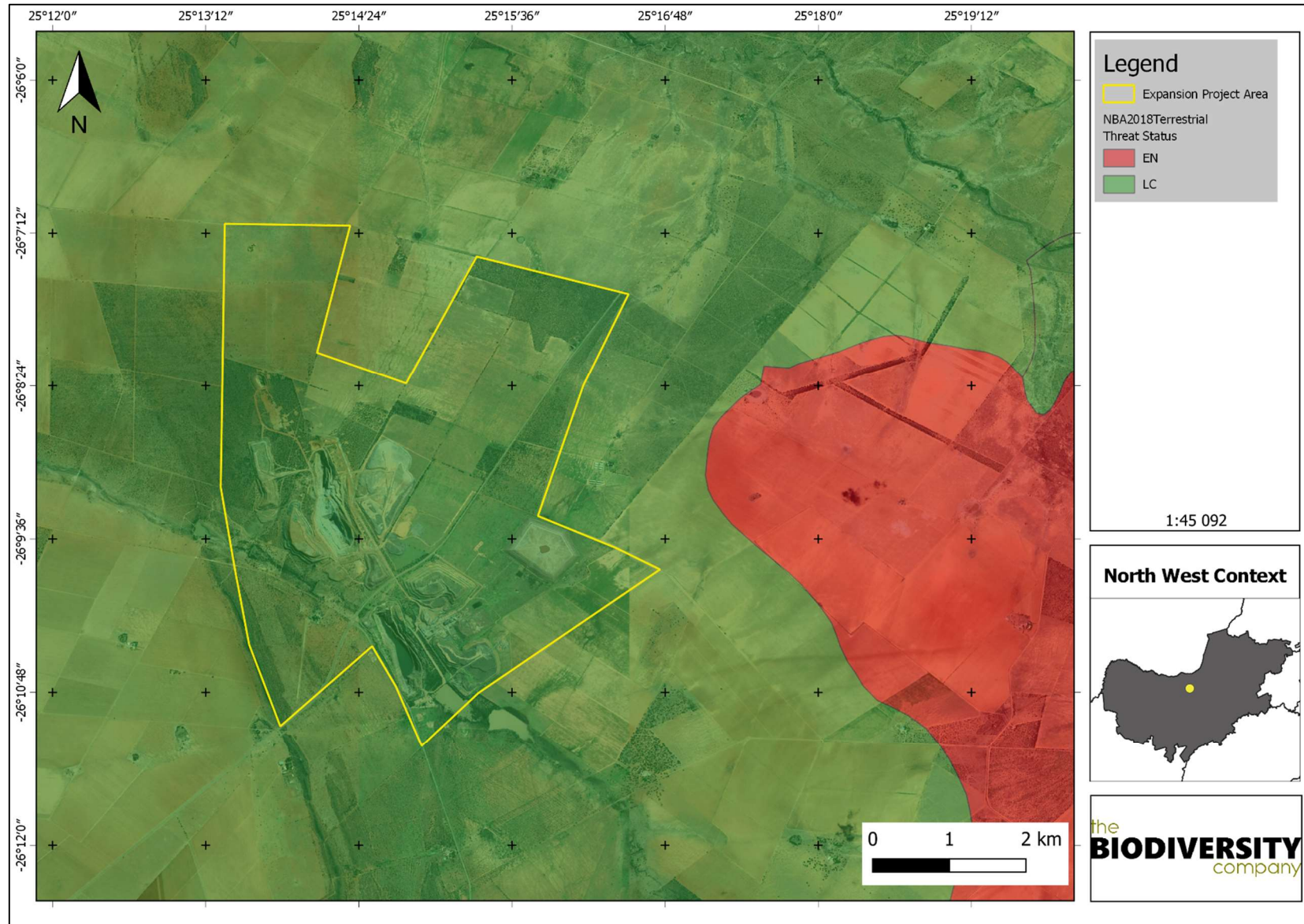


Figure 9-2 The project area showing the regional ecosystem threat status of the associated terrestrial ecosystems (NBA, 2018)

9.4.2 Ecosystem Protection Level

Ecosystem protection level tells us whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected or well protected, based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Skowno *et al.*, 2019).

The project area was superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development (Figure 9-3). Based on Figure 9-3 the terrestrial ecosystems associated with the development are rated as *not protected* for the entire project area. This means that these ecosystems are considered not to be adequately protected in areas such as national parks or other formally protected areas. The status refers to the regional status of the ecosystem and might not represent the infield conditions.

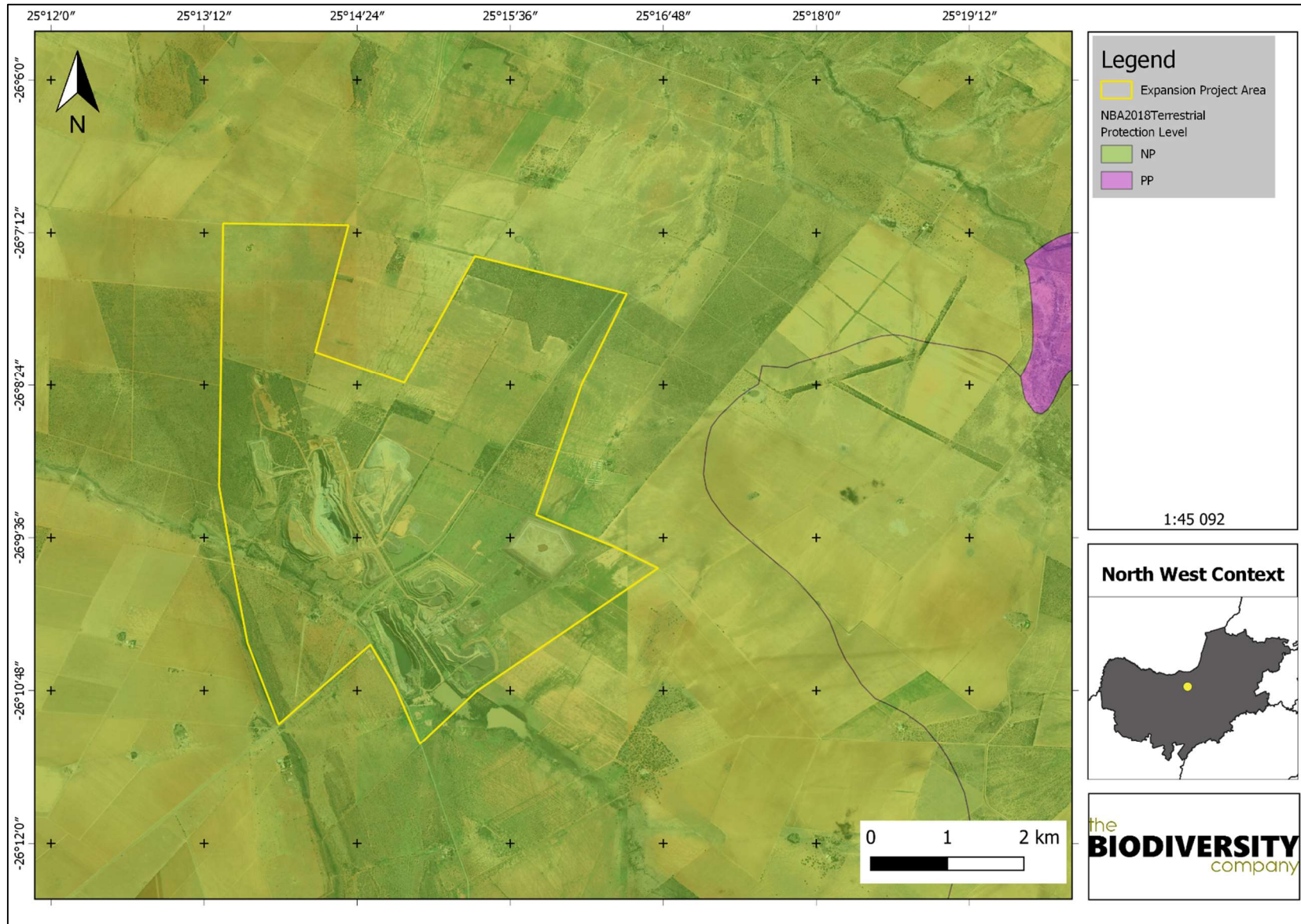


Figure 9-3 The project area showing the regional level of protection of terrestrial ecosystems (NBA, 2018)

9.5 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2010 (NPAES) were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for finescale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2010). The project area is 7 km from the Molopo NPAES (Figure 9-4).

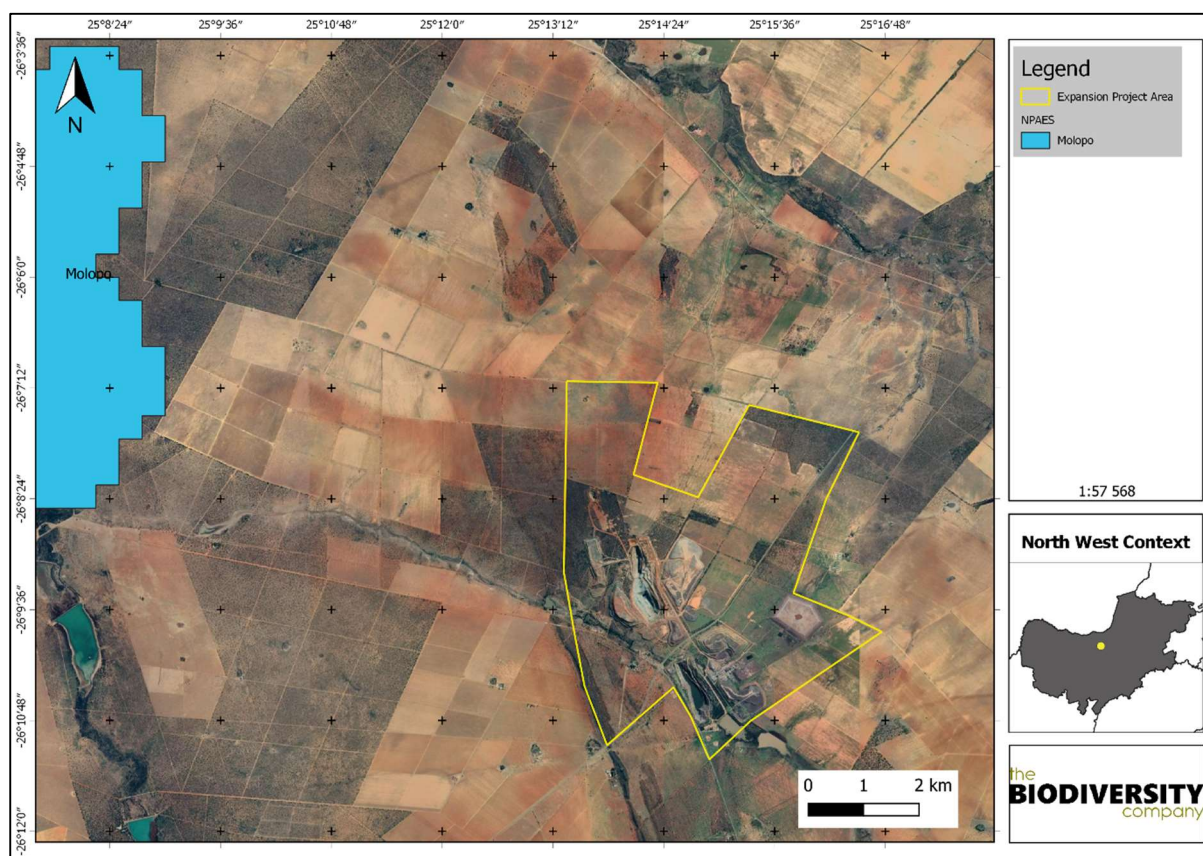


Figure 9-4 The project area in relation to the National Protected Areas Strategy Molopo Area

9.6 Aquatic National Biodiversity Assessment

This spatial dataset is part of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) which was released as part of the National Biodiversity Assessment (NBA) 2018. National Wetland Map 5 includes inland wetlands and estuaries, associated with river line data and many other data sets within the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) 2018.

Ecosystem threat status (ETS) of river ecosystem types is based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LC, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.*, 2019; Skowno *et al.*, 2019).

Figure 9-5 shows that a *not protected* wetland and an *unclassified* wetland can be found in the project area. A *not protected* river can also be found in the project area. Figure 9-6 shows that these wetlands are CR and unclassified respectively while the river has an ecosystem threat status of EN.

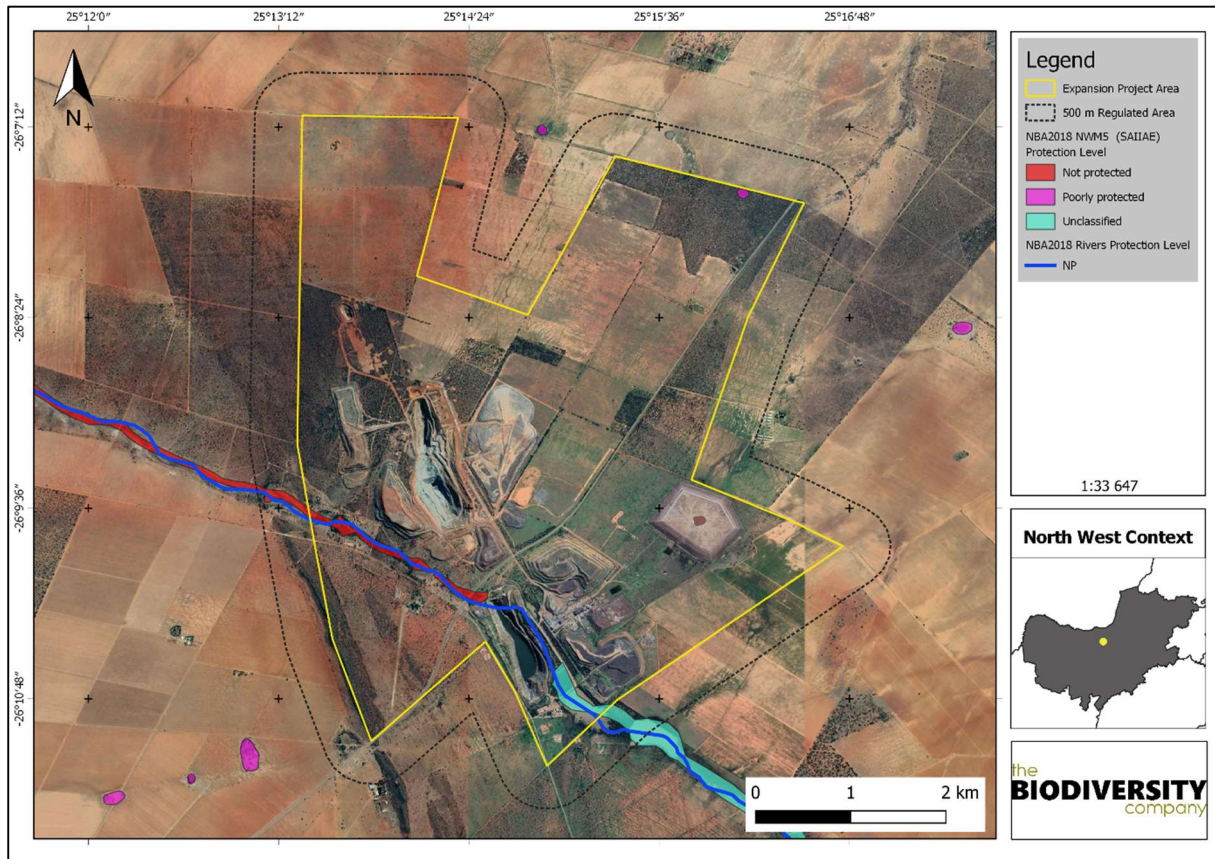


Figure 9-5 The project area in relation to the protection status of the wetlands and rivers (NBA, 2018)

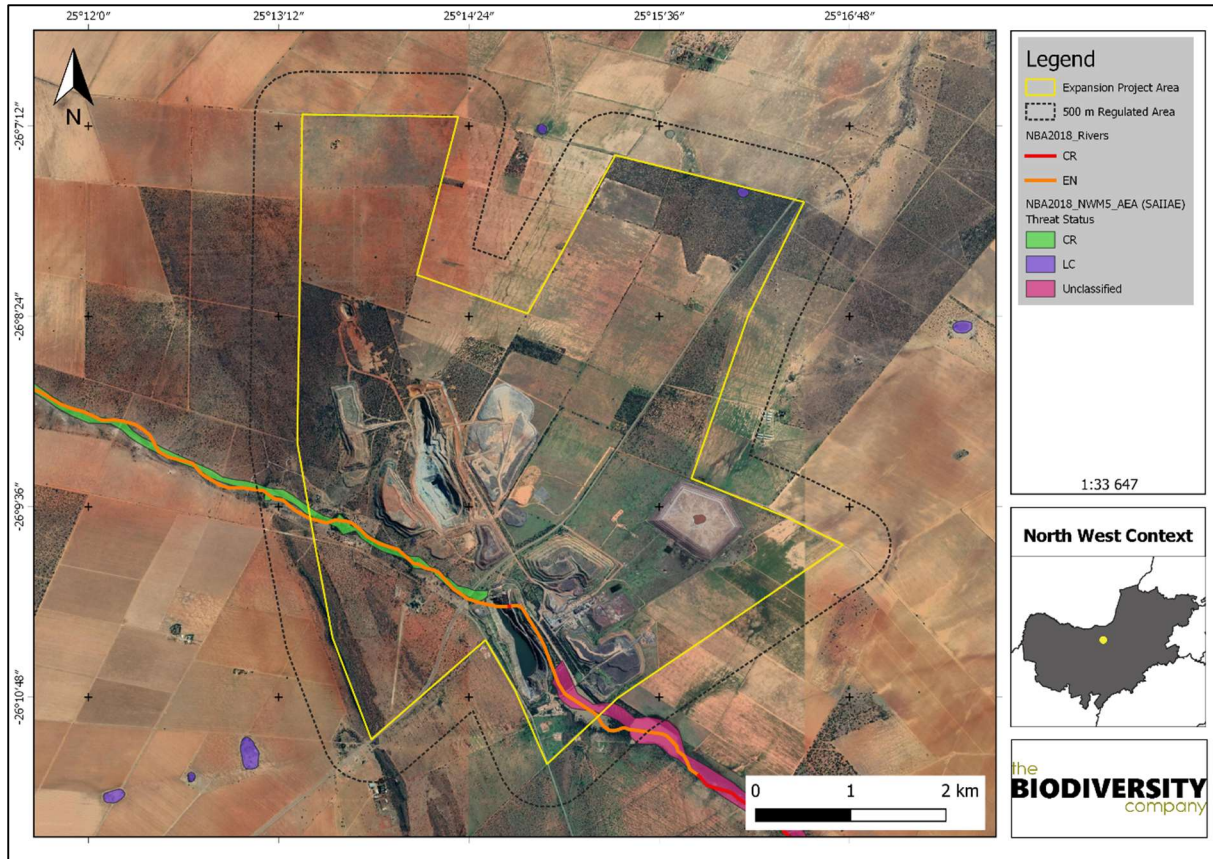


Figure 9-6 The project area in relation to the threat status of the wetland (NBA, 2018)

9.7 National Freshwater Ecosystem Priority Areas

The NFEPA spatial data has been incorporated in the above mentioned SAIIE spatial data set. However, to ensure that this data sets are considered we included it as the Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.*, 2011) are intended to be conservation support tools and are envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act (NEM:BA) biodiversity goals (Nel *et al.*, 2011). The project area overlaps with a non-FEPA wetland (Figure 9-7), and an upstream management area river.

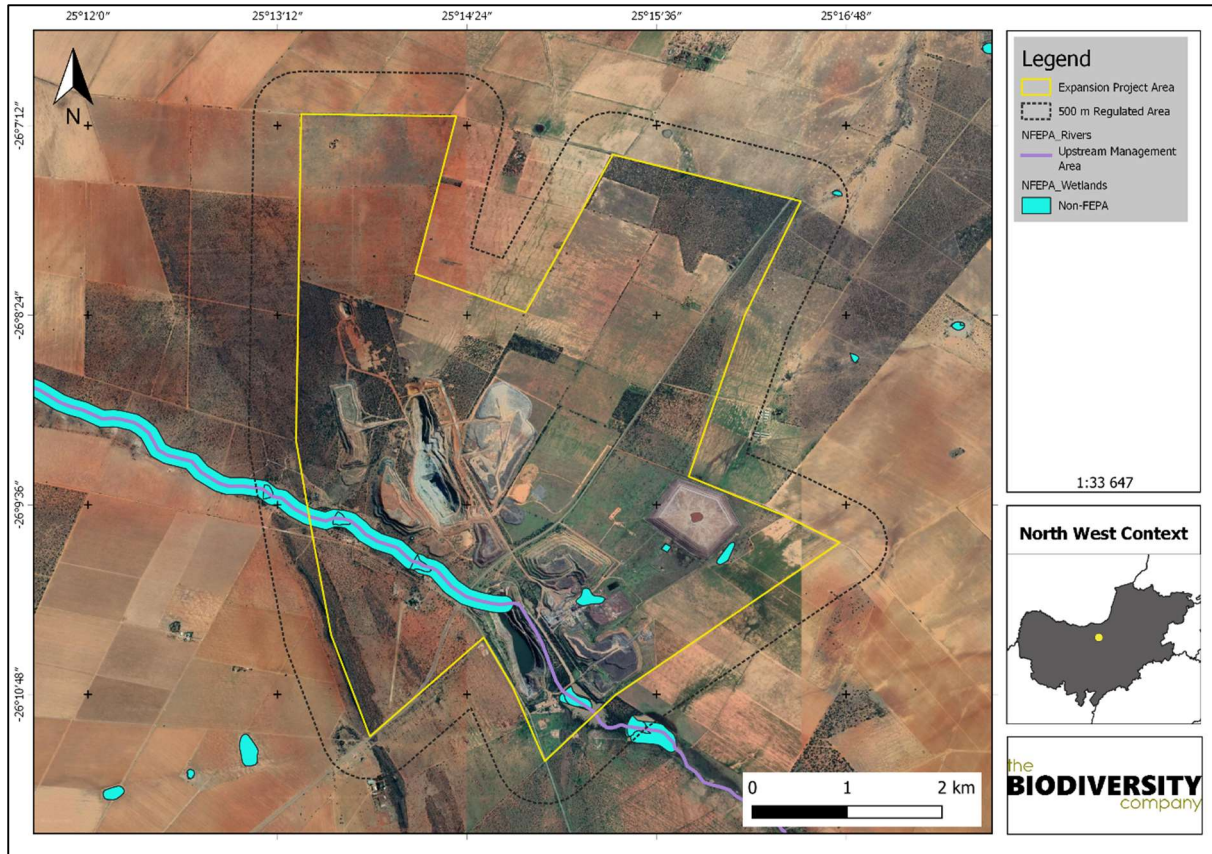


Figure 9-7 The project area in relation to the NFEPA spatial data

9.8 Strategic Water Source Areas

The Strategic Water Source Areas (SWSA) dataset outlines the surface water of south Africa as defined by the Water Research Commission (WRC) project (K5/2431) (WRC, 2017). Surface water WSAs are defined as areas of land that supply a disproportionate (i.e. relatively large) quantity of mean annual surface water runoff in relation to their size. Figure 9-8 shows that the project area is 2.2 km from a SWSA.

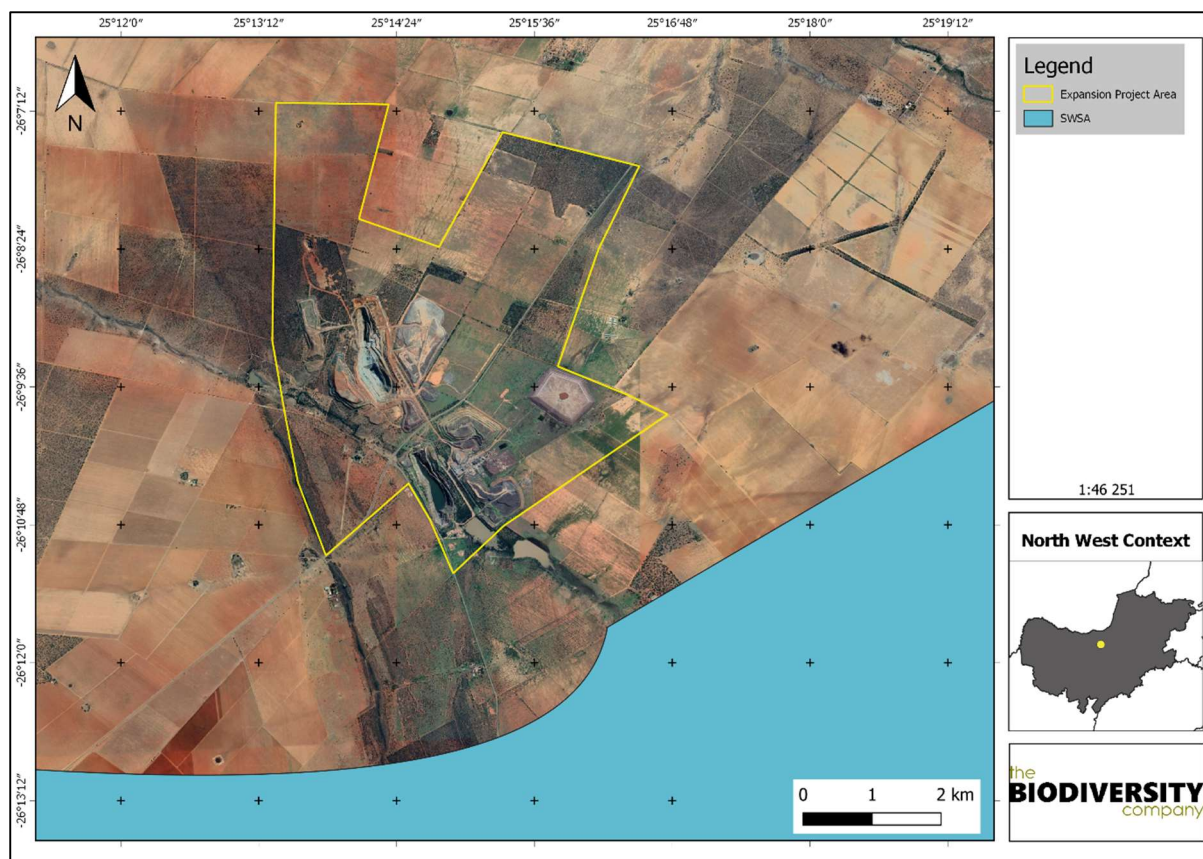


Figure 9-8 The project area in relation to a strategic water source area (WRC, 2017)

9.9 Mining and Biodiversity Guidelines

The Mining and Biodiversity Guidelines (2013) was developed by the Department of Mineral Resources, the Chamber of Mines, the South African National Biodiversity Institute and the South African Mining and Biodiversity Forum, with the intention to find a balance between economic growth and environmental sustainability. The Guideline is envisioned as a tool to “foster a strong relationship between biodiversity and mining which will eventually translate into best practice within the mining sector. In identifying biodiversity priority areas which have different levels of risk against mining, the Guideline categorises biodiversity priority areas into four categories of biodiversity priority areas in relation to their importance from a biodiversity and ecosystem service point of view as well as the implications for mining in these areas:

- A) Legally protected areas, where mining is prohibited;
- B) Areas of highest biodiversity importance, which are at the highest risk for mining;
- C) Areas of high biodiversity importance, which are at a high risk for mining; and

Areas of moderate biodiversity importance, which are at a moderate risk for mining. Table 9-2 shows the four different categories and the implications for mining within each of these categories.

The Guideline provides a tool to facilitate the sustainable development of South Africa’s mineral resources in a way that enables regulators, industry and practitioners to minimise the impact of mining on the country’s biodiversity and ecosystem services. It provides the mining sector with a practical, user- friendly manual for integrating biodiversity considerations into the

planning processes and managing biodiversity during the operational phases of a mine, from exploration through to closure. The Guideline provides explicit direction in terms of where mining-related impacts are legally prohibited, where biodiversity priority areas may present high risks for mining projects, and where biodiversity may limit the potential for mining.

Overall, proponents of a mining activity in biodiversity priority areas should demonstrate that:

- There is significant cause to undertake mining – by commenting on whether the biodiversity priority area coincides with mineral or petroleum reserves that are strategically in the national interest to exploit. Reference should also be made to whether alternative deposits or reserves exist that could be exploited in areas that are not biodiversity priority areas or are less environmentally sensitive areas;
- Through the process of a rigorous EIA and associated specialist biodiversity studies the impacts of the proposed mining are properly assessed following good practice. It is critical that sufficient time and resources are budgeted to do so early in the planning and impact assessment process, including appointing appropriate team of people with the relevant skills and knowledge as required by legislation;
- Cumulative impacts have been considered;
- The mitigation hierarchy has been systematically applied and alternatives have been rigorously considered;
- The issues related to biodiversity priority areas have been incorporated into a robust EMP as the main tool for describing how the mining or prospecting operation’s environmental impacts are to be mitigated and managed; and
- Good practice environmental management is followed, monitoring and compliance enforcement is ensured.

Table 9-2 The mining and biodiversity guidelines categories

Category	Biodiversity priority areas	Risk for mining	Implications for mining
A. Legally protected	<ul style="list-style-type: none"> • Protected areas (including National Parks, Nature Reserves, World Heritage Sites, Protected Environments, Nature Reserves) • Areas declared under Section 49 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) 	Mining prohibited	<p>Mining projects cannot commence as mining is legally prohibited. Although mining is prohibited in Protected Areas, it may be allowed in Protected Environments if both the Minister of Mineral Resources and Minister of Environmental Affairs approve it.</p> <p>In cases where mining activities were conducted lawfully in protected areas before Section 48 of the Protected Areas Act (No. 57 of 2003) came into effect, the Minister of Environmental Affairs may, after consulting with the Minister of Mineral Resources, allow such mining activities to continue, subject to prescribed conditions that reduce environmental impacts.</p>
B. Highest biodiversity importance	<ul style="list-style-type: none"> • Critically endangered and endangered ecosystems • Critical Biodiversity Areas (or equivalent areas) from provincial spatial biodiversity plans • River and wetland Freshwater Ecosystem Priority Areas (FEPAs) and 	Highest risk for mining	<p>Environmental screening, environmental impact assessment (EIA) and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, and to provide site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making for mining, water use licenses, and environmental authorisations.</p> <p>If they are confirmed, the likelihood of a fatal flaw for new mining projects is very high because of the significance of the biodiversity features in these areas and the associated ecosystem services. These</p>

	<ul style="list-style-type: none"> a 1km buffer around these FEPAs Ramsar Sites 		<p>areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being.</p> <p>An EIA should include the strategic assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on biodiversity. This assessment should fully consider the environmental sensitivity of the area, the overall environmental and socio-economic costs and benefits of mining, as well as the potential strategic importance of the minerals to the country. Authorisations may well not be granted. If granted, the authorisation may set limits on allowed activities and impacts and may specify biodiversity offsets that would be written into license agreements and/or authorisations.</p>
<p>C. High biodiversity importance</p>	<ul style="list-style-type: none"> Protected area buffers (including buffers around National Parks, World Heritage Sites* and Nature Reserves) Transfrontier Conservation Areas (remaining areas outside of formally proclaimed protected areas) Other identified priorities from provincial spatial biodiversity plans High water yield areas Coastal Protection Zone Estuarine functional zone 	<p>High risk for mining</p>	<p>These areas are important for conserving biodiversity, for supporting or buffering other biodiversity priority areas, and for maintaining important ecosystem services for particular communities or the country as a whole.</p> <p>An EIA should include an assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on biodiversity.</p> <p>Mining options may be limited in these areas, and limitations for mining projects are possible.</p> <p>Authorisations may set limits and specify biodiversity offsets that would be written into license agreements and/or authorisations.</p>
<p>D. Moderate biodiversity importance</p>	<ul style="list-style-type: none"> Ecological support areas Vulnerable ecosystems Focus areas for protected area expansion (land-based and offshore protection) 	<p>Moderate risk for mining</p>	<p>These areas are of moderate biodiversity value.</p> <p>EIAs and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, identifying features (e.g. threatened species) not included in the existing datasets, and on providing site-specific information to guide the application of the mitigation hierarchy.</p> <p>Authorisations may set limits and specify biodiversity offsets that would be written into license agreements and/or authorisations.</p>

The project area overlap with areas classified as “highest biodiversity importance”, “high biodiversity importance” and “moderate biodiversity importance” with their associated highest, high and moderate risks for mining (Figure 9-9).

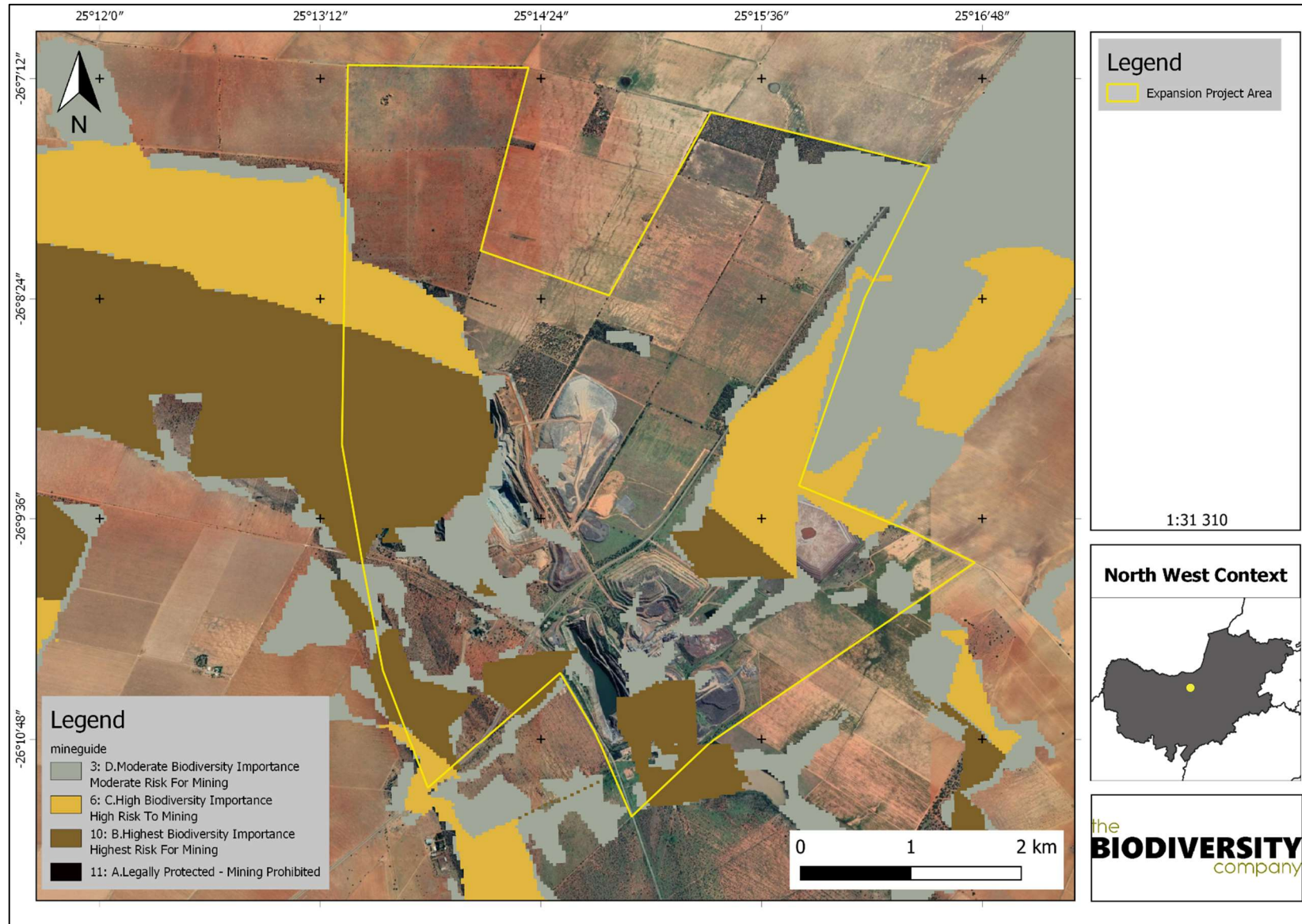


Figure 9-9 The project area superimposed on the Mining and Biodiversity Guideline spatial dataset (2013)

9.10 Desktop Assessment

9.10.1 Vegetation Assessment

The project area is situated within the Savanna biome. The savanna vegetation of South Africa represents the southern-most extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Savanna biome include:

- a) Seasonal precipitation; and
- b) (Sub) tropical thermal regime with no or usually low incidence of frost (Mucina & Rutherford, 2006).

Most savanna vegetation communities are characterised by a herbaceous layer dominated by grasses and a discontinuous to sometimes very open tree layer (Mucina & Rutherford, 2006).

The savanna biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country. Savannas are characterised by a dominant grass layer, over-topped by a discontinuous, but distinct woody plant layer. At a structural level, Africa's savannas can be broadly categorised as either fine-leaved (microphyllous) savannas or broad-leaved (macrophyllous) savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by microphyllous woody plants of the Mimosaceae family (Common genera include *Vachellia*, *Senegalia* and *Albizia*), and a generally dense herbaceous layer.

9.10.1.1 Vegetation Types

The savanna biome comprises many different vegetation types. The project area is situated within one vegetation type; namely the Mafikeng Bushveld vegetation type according to SANBI (2018) (Figure 9-10).



Figure 9-10 The project area showing the vegetation type based on the Vegetation Map of South Africa, Lesotho & Swaziland (BGIS, 2018)

9.10.1.1.1 Mafikeng Bushveld

Mafikeng Bushveld is found in the North West Province, in Aeolian Kalahari sand of Tertiary to Recent age on flat sandy plains. This vegetation type has well developed tree and shrub layers, dense stands of *Terminalia sericea*, *Vachellia luederitzii* and *V. erioloba* in certain areas. The grass layer is also well developed in this vegetation type (Mucina & Rutherford 2006).

Important Plant Taxa

Tall Tree: *Vachellia erioloba*

Small Trees: *Vachellia karroo*, *Senegalia mellifera* subsp. *detinens*, *Terminalia sericea*, *Ziziphus mucronata*.

Tall Shrubs: *Dichrostachys cinerea*, *Grewia flava*, *Searsia tenuinervis*, *Diospyros austro-africana*, *Ehretia rigida* subsp. *rigida*, *Rhigozum obovatum*, *Tarchonanthus camphoratus*.

Low Shrubs: *Vachellia hebeclada* subsp. *hebeclada*, *Grewia retinervis*, *Aptosimum procumbens*, *Felicia muricata*, *Gnidia polycephala*, *Helichrysum zeyheri*, *Hoffmannseggia burchellii*, *Lantana rugosa*, *Talinum arnotii*.

Geoxylic Suffrutex: *Elephantorrhiza elephantina*.

Succulent Shrub: *Lycium cinereum*.

Woody Climber: *Asparagus africanus*.

Graminoids: *Antheophora pubescens*, *Cymbopogon pospischilii*, *Digitaria eriantha* subsp. *eriantha*, *Eragrostis lehmanniana*, *E. pallens*, *Schmidtia pappophoroides*, *Stipagrostis uniplumis*, *Aristida congesta*, *A. meridionalis*, *A. mollissima* subsp. *argentea*, *A. stipitata* subsp. *stipitata*, *Brachiaria nigropedata*, *B. serrata*, *Cynodon dactylon*, *Digitaria argyrograpta*, *Eragrostis superba*, *E. trichophora*, *Melinis repens*, *Tragus racemosus*, *Urochloa panicoides*.

Herbs: *Barleria macrostegia*, *Erlangea misera*, *Harpagophytum procumbens* subsp. *procumbens*, *Hermannia tomentosa*, *Hermbstaedtia odorata*, *Indigofera daleoides*, *Limeum fenestratum*, *Nidorella resedifolia*, *Oxygonum dregeanum* subsp. *canescens* var. *canescens*, *Senna italica* subsp. *arachoides*.

Geophytic Herb: *Ledebouria marginata*.

Biogeographically Important Taxa

Small Tree: *Vachellia luederitzii* var. *luederitzii*.

Graminoid: *Panicum kalahareense*.

Conservation Status of Vegetation Type

The Mafikeng Bushveld vegetation type is listed as Vulnerable (Mucina & Rutherford, 2006). The conservation target for the vegetation type is at 16%. No section of this vegetation type is conserved in statutory conservation areas, but a very small area is conserved in the Mmabatho Recreation Area.

9.10.1.2 Plant Species of Conservation Concern

Based on the Plants of Southern Africa (BODATSA-POSA, 2019) database, 285 plant species have the potential to occur in the project area and its surroundings (Figure 9-11 and Table 9-3).

Of these 285 plant species (Appendix B), two (2) species are listed as being Species of Conservation Concern (SCC) (Table 9-3).

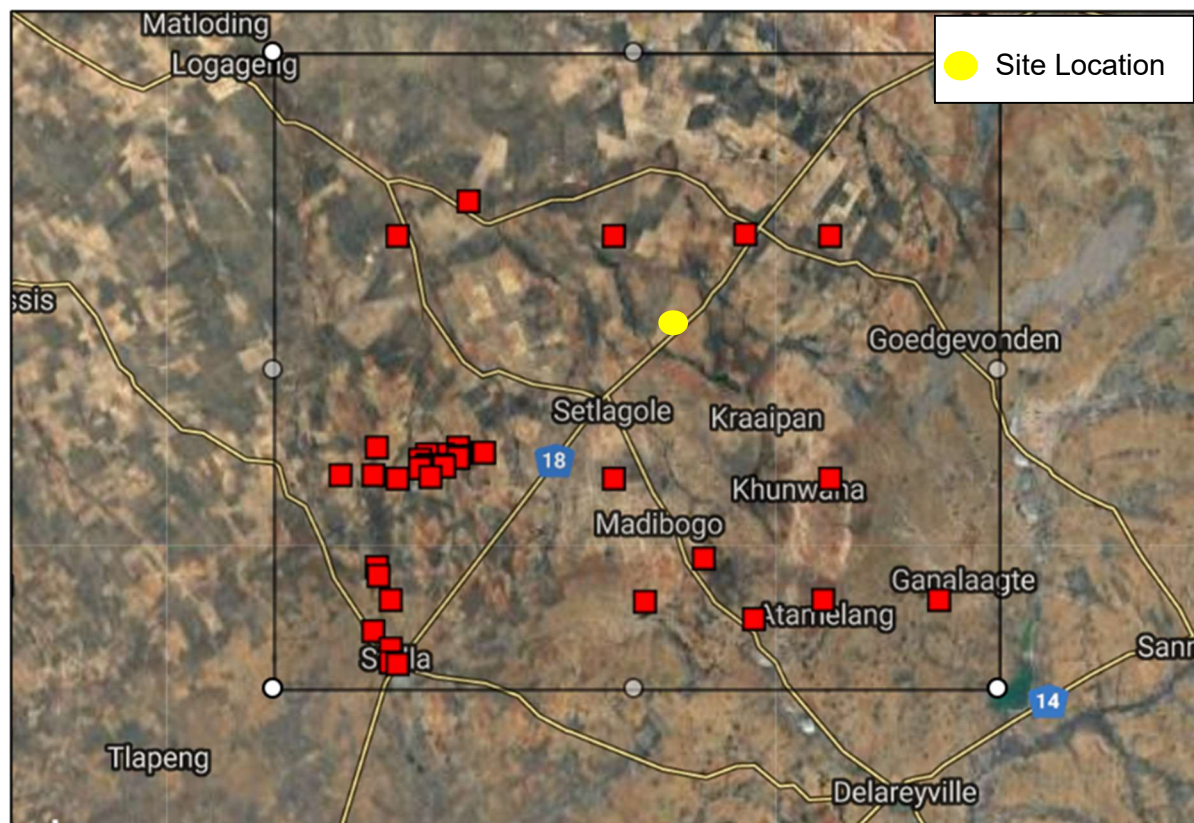


Figure 9-11 Map showing the grid drawn in order to compile an expected plant species list (BODATSA-POSA, 2019)

Table 9-3 Plant Species of Conservation Concern with the potential to occur in the project area

Family	Taxon	Author	IUCN	Ecology
Asphodelaceae	<i>Aloe braamvanwykii</i>	Gideon F.Sm. & Figueiredo	EN	Indigenous; Endemic
Apocynaceae	<i>Brachystelma canum</i>	R.A.Dyer	CR	Indigenous; Endemic

Aloe braamvanwykii is listed as EN according to the Red List of South African Plants (SANBI, 2017). This species is endemic to South Africa and more specifically the North West. It is found in thornveld and deep sandy soils. Based on rates of habitat loss, it is estimated that the aloes population has declined by at least 50% within the past 30 years (one generation of this slow-growing, long-lived species).

Brachystelma canum is CR according to the Red List of South African Plants (SANBI, 2017). This species is endemic to South Africa where it occurs in the North West in the Mafikeng vegetation type. This species is only known from the type collection, dating from 1956. Several attempts to relocate this species at the type locality and surrounding areas have been futile (Hahn, 2013). It is possibly extinct due to habitat loss.

9.10.2 Faunal Assessment

9.10.2.1 Avifauna

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 309 bird species have the potential to occur in the vicinity of the project area (pentads 2605_2505; 2605_2510; 2605_2515; 2610_2505; 2610_2510; 2610_2515; 2615_2505; 2615_2510; 2615_2515). The full list of potential bird species is provided in Appendix C.

Of the potential bird species, nineteen (19) species (6.14%) are listed as SCC either on a regional (17) or global scale (11) (Table 9-4). The SCC include the following:

- One (1) species that is listed as Critically Endangered (CR) on a regional scale;
 - Four (4) species that are listed as Endangered (EN) on a regional basis;
 - Four (4) species that are listed as Vulnerable (VU) on a regional basis; and
 - Eight (8) species that are listed as Near Threatened (NT) on a regional basis.

On a global scale, one (1) species is listed as CR, two (2) species are listed as EN, two (2) species are listed as VU and six (6) species as NT (Table 9-4).

Table 9-4 List of bird species of regional or global conservation importance that are expected to occur in close vicinity to the project area

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
<i>Ardeotis kori</i>	Bustard, Kori	NT	NT	High
<i>Calidris ferruginea</i>	Sandpiper, Curlew	LC	NT	Moderate
<i>Ciconia abdimii</i>	Stork, Abdim's	NT	LC	Low
<i>Ciconia nigra</i>	Stork, Black	VU	LC	Moderate
<i>Circus macrourus</i>	Harrier, Pallid	NT	NT	Moderate
<i>Coracias garrulus</i>	Roller, European	NT	LC	Moderate
<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC	High
<i>Falco chicquera</i>	Falcon, Red-necked	Unlisted	NT	High
<i>Gyps africanus</i>	Vulture, White-backed	CR	CR	Moderate
<i>Gyps coprotheres</i>	Vulture, Cape	EN	EN	Low
<i>Mycteria ibis</i>	Stork, Yellow-billed	EN	LC	High
<i>Oxyura maccoa</i>	Duck, Maccoa	NT	NT	High
<i>Pelecanus rufescens</i>	Pelican, Pink-backed	VU	LC	Moderate
<i>Phoeniconaias minor</i>	Flamingo, Lesser	NT	NT	Low
<i>Phoenicopterus ruber</i>	Flamingo, Greater	NT	LC	Low
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN	VU	High
<i>Rostratula benghalensis</i>	Painted-snipe, Greater	NT	LC	Moderate
<i>Sagittarius serpentarius</i>	Secretarybird	VU	VU	High

<i>Torgos tracheliotus</i>	Vulture, Lappet-faced	EN	EN	Moderate
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Ardeotis kori (Kori Bustard) is listed as NT both on a regional and global scale. It occurs in flat, arid, mostly open country such as grassland, karoo, bushveld, thornveld, scrubland and savanna but also including modified habitats such as wheat fields and firebreaks. Collisions with high voltage power lines are a major threat to this species in the Karoo of South Africa (IUCN, 2007). The project area has suitable habitat for this species and as such the likelihood of occurrence was rated as high.

Calidris ferruginea (Curlew Sandpiper) is migratory species which breeds on slightly elevated areas in the lowlands of the high Arctic and may be seen in parts of South Africa during winter. During winter, the species occurs at the coast, but also inland on the muddy edges of marshes, large rivers and lakes (both saline and freshwater), irrigated land, flooded areas, dams and saltpans (IUCN, 2017). Due to the presence of some of these habitat types within the project area the likelihood of occurrence of this species was rated as moderate.

Ciconia abdimii (Abdim's Stork) is listed as NT on a local scale and the species is known to be found in open grassland and savanna woodland often near water but also in semi-arid areas, gathering beside pools and water-holes. They tend to roost in trees or cliffs (IUCN, 2017). The existence of wet areas creates the potential for this species to occur in the project area but due to the degraded state of the environment the likelihood of occurrence was rated as low.

Ciconia nigra (Black Stork) is native to South Africa, and inhabits old, undisturbed, open forests. They are known to forage in shallow streams, pools, marshes, swampy patches, damp meadows, flood-plains, pools in dry riverbeds and occasionally grasslands, especially where there are stands of reeds or long grass (IUCN, 2017). It is unlikely that this species would breed in the project area due to the lack of forested areas, however some suitable foraging habitat remains in the form of the open grasslands and wetland areas, and as such the likelihood of occurrence is rated as moderate.

Circus macrourus (Pallid Harrier) is listed as NT on a regional and global scale, and overwinters in semi-desert, scrub, savanna and wetlands. The species is migratory, with most birds wintering in sub-Saharan Africa or south-east Asia (IUCN, 2017). The species is most likely only to use the project area as a migratory route or a temporary overwintering location from August to March, the likelihood of occurrence is moderate.

Coracias garrulous (European Roller) is a winter migrant from most of South-central Europe and Asia occurring throughout sub-Saharan Africa (IUCN, 2017). The European Roller has a preference for bushy plains and dry savannah areas (IUCN, 2017). There is a moderate chance of this species occurring in the project area as they prefer to forage in open/disturbed agricultural areas which can be found adjacent to the project area.

Falco biarmicus (Lanner Falcon) is native to South Africa and inhabits a wide variety of habitats, from lowland deserts to forested mountains (IUCN, 2017). They may occur in groups up to 20 individuals but have also been observed solitary. Their diet is mainly composed of small birds such as pigeons and francolins. The likelihood of incidental records of this species in the project area is rated as high due to the presence of many bird species on which Lanner Falcons may predate.

Falco chicquera (Red-necked Falcon) is classed as NT on a global scale. This species was recently split from its Indian counterpart *Falco chicquera chicquera*. The African species is mostly found in semi-desert and savanna areas with some trees for perching. The number of this species is declining due to ongoing habitat degradation. The likelihood of occurrence in the project area is rated as high due to the availability of suitable habitat.

Gyps africanus (White-backed Vulture) has a large range and only occurs throughout sub-Saharan Africa. Primarily a lowland species of open wooded savanna, particularly areas of *Acacia* (*Vachellia*). It requires tall trees for nesting. According to the IUCN (2017) this species faces similar threats to other African vultures, being susceptible to habitat conversion to agro-pastoral systems, loss of wild ungulates leading to a reduced availability of carrion, hunting for trade, persecution, and poisoning. The likelihood of suitably large trees for nesting for this species is moderate at the project site and as such the likelihood of occurrence for the species is moderate.

Gyps coprotheres (Cape Vulture) is listed as EN on both a regional and global scale. Cape Vultures are long-lived carrion-feeders specialising on large carcasses, they fly long distances over open country, although they are usually found near steep terrain, where they breed and roost on cliffs (IUCN, 2017). Individuals may be seen foraging within the project area but are unlikely to be resident. Likelihood of occurrence is rated as low.

Mycteria ibis (Yellow-billed Stork) is listed as EN on a regional scale and LC on a global scale. This species is migratory and has a large distributional range which includes much of sub-Saharan Africa. It is typically associated with freshwater ecosystems, especially wetlands and the margins of lakes and dams (IUCN, 2017). The presence of some water bodies within the project area creates a high possibility that this species may occur there.

Oxyura maccoa (Maccoa Duck) has a large northern and southern range, South Africa is part of its southern distribution. During the species' breeding season, it inhabits small temporary and permanent inland freshwater lakes, preferring those that are shallow and nutrient-rich with extensive emergent vegetation such as reeds (*Phragmites* spp.) and cattails (*Typha* spp.) on which it relies for nesting (IUCN, 2017). The likelihood of occurrence of this species in the project area was rated as high due to the river system that runs through the property and suitable associated vegetation.

Pelecanus rufescens (Pink-backed Pelican) is listed as VU on a regional scale. The species occur in freshwater lakes, swamps, rivers and seasonal ponds, sometimes they occur along the coast. As there is a river system and a number of wetlands within the project area the likelihood of occurrence is rated as high, but due to the area's disturbed nature the likelihood is decreased to moderate.

Phoeniconaias minor (Lesser Flamingo) is listed as NT on a global and regional scale whereas *Phoenicopterus roseus* (Greater Flamingo) is listed as NT on a regional scale only. Both species have similar habitat requirements and the species breed on large undisturbed alkaline and saline lakes, salt pans or coastal lagoons, usually far out from the shore after seasonal rains have provided the flooding necessary to isolate remote breeding sites from terrestrial predators and the soft muddy material for nest building (IUCN, 2017). Due to the absence of its preferred habitat within the project area, combined with the disturbed nature of the area, the likelihood of occurrence is low.

Polemaetus bellicosus (Martial Eagle) is listed as EN on a regional scale and VU on a global scale. This species has an extensive range across much of sub-Saharan Africa, but populations are declining due to deliberate and incidental poisoning, habitat loss, reduction in available prey, pollution, and collisions with power lines (IUCN, 2017). It inhabits open woodland, wooded savanna, bushy grassland, thorn-bush and, in southern Africa, more open country and even sub-desert (IUCN, 2017). With the presence of grassland areas and some trees the likelihood of occurrence in the project area is rated as high.

Rostratula benghalensis (Greater Painted-snipe) shows a preference for recently flooded areas in shallow lowland freshwater temporary or permanent wetland, it has a wide range of these freshwater habitats which they occur in, in this case, sewage pools, reservoirs, mudflats overgrown with marsh grass which may possibly exist within the project area, thus the likelihood of occurrence is moderate.

Sagittarius serpentarius (Secretarybird) occurs in sub-Saharan Africa and inhabits grasslands, open plains, and lightly wooded savanna. It is also found in agricultural areas and sub-desert (IUCN, 2017). The likelihood of occurrence is rated as high due to the grasslands and wetland areas present in the project area, as well as the agricultural areas present in which this species may forage.

Torgos tracheliotus (Lappet-faced Vulture) is listed as EN, both on a regional and global level. Only a small, very rapidly declining population remains, owing primarily to poisoning and persecution, as well as ecosystem alterations (IUCN, 2017). The species inhabits dry savanna, arid plains, deserts and open mountain. It ranges widely when foraging and is mainly a scavenger, feeding predominantly on any large carcasses or their remains. This rare species is unlikely to be resident within the project area due to unsuitable nesting sites but may scavenge on any dead carcasses in the area, and therefore the likelihood of occurrence is rated as moderate.

9.10.2.2 Mammals

The IUCN Red List Spatial Data (IUCN, 2017) lists 67 mammal species that could be expected to occur within the project area. Of these species, 8 are medium to large conservation dependant species, such *Ceratotherium simum* (Southern White Rhinoceros) and *Tragelaphus oryx* (Common Eland) that, in South Africa, are generally restricted to protected areas such as game reserves. These species are not expected to occur in the project area and are removed from the expected SCC list. They are however still included in the expected species list (Appendix D).

Of the remaining 59 small to medium sized mammal species, ten (10) (17%) are listed as being of conservation concern on a regional or global basis (

Table 9-5). The list of potential species includes:

- Four (4) that are listed as VU on a regional basis; and
- Six (6) that are listed as NT on a regional scale.

On a global scale, 1 species is listed as EN, 3 species are listed as VU and 2 species as NT (

Table 9-5).

Table 9-5 List of mammal species of conservation concern that may occur in the project area as well as their global and regional conservation statuses

Species	Common name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
<i>Aonyx capensis</i>	Cape Clawless Otter	NT	NT	Moderate
<i>Atelerix frontalis</i>	South Africa Hedgehog	NT	LC	High
<i>Crocuta crocuta</i>	Spotted Hyaena	NT	LC	Low
<i>Felis nigripes</i>	Black-footed Cat	VU	VU	Moderate
<i>Mystromys albicaudatus</i>	White-tailed Rat	VU	EN	Moderate
<i>Panthera pardus</i>	Leopard	VU	VU	Low
<i>Parahyaena brunnea</i>	Brown Hyena	NT	NT	Low
<i>Poecilogale albinucha</i>	African Striped Weasel	NT	LC	High
<i>Rhinolophus denti</i>	Dent's Horseshoe Bat	NT	LC	Low
<i>Smutsia temminckii</i>	Temminck's Ground Pangolin	VU	VU	Low

Aonyx capensis (Cape Clawless Otter) is the most widely distributed otter species in Africa (IUCN, 2017). This species is predominantly aquatic, and it is seldom found far from water. Based on the absence of a perennial river within the project area but the presence of a nearby wetland area and seasonal stream, the likelihood of occurrence of this species occurring in the project area is considered to be moderate.

Atelerix frontalis (South African Hedgehog) has a tolerance of a degree of habitat modification and occurs in a wide variety of semi-arid and sub-temperate habitats (IUCN, 2017). Based on the Red List of Mammals of South Africa, Lesotho and Swaziland (2016), *A. frontalis* populations are decreasing due to the threats of electrocution, veld fires, road collisions, predation from domestic pets and illegal harvesting. Although the species is cryptic and therefore not often seen, there is suitable habitat in the project area and therefore the likelihood of occurrence is rated as high.

Crocuta Crocuta (Spotted Hyaena) is classified as NT on a national scale. This species mainly occurs in protected areas but in Limpopo and the North-west Provinces they can still be found outside of protected areas. This species is predominantly found in savanna habitats, where they can occur in close association with humans. The likelihood of occurrence in this project area is low due to the lack of suitable prey species and human-induced impacts.

Felis nigripes (Black-footed cat) is endemic to the arid regions of southern Africa. This species is naturally rare, has cryptic colouring is small in size and is nocturnal. These factors have contributed to a lack of information on this species. Given that the highest densities of this species have been recorded in the more arid Karoo region of South Africa, the habitat in the project area can be considered to be optimal for the species and the likelihood of occurrence is rated as moderate.

Mystromys albicaudatus (White-tailed Rat) is listed as VU on a regional basis and EN on a global scale. It is relatively widespread across South Africa and Lesotho, where the species is known to occur in shrubland and grassland areas. A major requirement of the species is black

loam soils with good vegetation cover. Although the vegetation type is suitable, the moderate levels of human disturbance mean that the likelihood of occurrence of this species in the project area is rated as moderate.

Panthera pardus (Leopard) has a wide distributional range across Africa and Asia, but populations have become reduced and isolated, and they are now extirpated from large portions of their historic range (IUCN, 2017). Impacts that have contributed to the decline in populations of this species include continued persecution by farmers, habitat fragmentation, increased illegal wildlife trade, excessive harvesting for ceremonial use of skins, prey base declines and poorly managed trophy hunting (IUCN, 2017). Although known to occur and persist outside of formally protected areas, the densities in these areas are considered to be low. The likelihood of occurrence in the project area which is in such close proximity to an urban area, and where they are likely to be persecuted, is regarded as low.

Parahyaena brunnea (Brown Hyaena) is endemic to southern Africa. This species occurs in dry areas, generally with annual rainfall less than 100 mm, particularly along the coast, semi-desert, open scrub and open woodland savanna. Given its known ability to persist outside of formally protected areas the likelihood of occurrence of this species in the project area is moderate to good. Prey species are most likely absent for the project area and as such the likelihood of occurrence is rated as low.

Poecilogale albinucha (African Striped Weasel) is usually associated with savanna habitats, although it probably has a wider habitat tolerance (IUCN, 2017). Due to its secretive nature, it is often overlooked in many areas where it does occur. There is sufficient habitat for this species in the project area and the likelihood of occurrence of this species is therefore considered to be high.

Rhinolophus denti (Dent's Horseshoe Bat) is listed as NT regionally and is typically associated with savanna habitats. Populations are largely dependent on caves, abandoned mines and similar habitats for roosting (IUCN, 2007). Due to the lack of such habitat at the project site, the likelihood of occurrence is low.

Smutsia temminckii (Temminck's Ground Pangolin) is a predominantly solitary, terrestrial species that inhabits mainly savanna woodland in low-lying regions with moderate to dense scrub where average annual rainfall is between 250 mm and 1,400 mm (IUCN, 2017). The species is eaten as bushmeat to various extents across its range (e.g. South Africa, Zimbabwe, Namibia, Mozambique, Tanzania). Of greater threat is overexploitation for body parts and scales which have superstitious value and are used for medicinal purposes (IUCN, 2017). The likelihood of occurrence of this species in the project area is low due to disturbances which would typically force sensitive species such as this to move to other areas.

9.10.2.3 Herpetofauna (Reptiles & Amphibians)

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the ReptileMap database provided by the Animal Demography Unit (ADU, 2019) 20 reptile species have the potential to occur in the project area (Appendix E). None of the expected species are SCCs (IUCN, 2017).

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the AmphibianMap database provided by the Animal Demography Unit (ADU, 2019) 16 amphibian species have the potential to occur in the project area (Appendix F). No amphibian SCCs are expected to occur in the project area.

10 Terrestrial Sensitivity

10.1 Methodology

As part of the EIMS environmental mapping methodology, specialists are required to identify all features in terms of the specific field of expertise within the study area. This methodology includes the compilation of detailed shapefiles with specific attributes. Three main components form part of this methodology, namely;

- Feature layer;
- Overall sensitivity layer; and
- Legislative constraint layer.

All identified features will be rated according to the sensitivity of the feature as well as threats posed by proposed activities. These sensitivity rankings are described and illustrated in Table 10-1

Table 10-1 Sensitivities relevant to the EIMS methodology

		Sensitivities				
		Least Concern	Low	Medium	High	No-Go
Broad Class Description		The inherent feature status and sensitivity is already degraded. The proposed development will not affect the current status and/or may result in a positive impact. These features would be the preferred alternative for the project or infrastructure placement.	The proposed development will have not had a significant effect on the inherent feature status and sensitivity.	The proposed development will negatively influence the current status of the feature.	The proposed development will negatively significantly influence the current status of the feature.	The proposed development cannot legally or practically take place.
Scoring		0	1	2	3	+99

10.1.1 Feature layers and Overall Sensitivity

The desktop sensitivity assessment is based on the North West Biodiversity Sector Plan, the SAIIAE, the Mining and Biodiversity Guidelines and Google Earth imagery (Figure 10-2). Areas that have been transformed were given a “Least Concerned” rating, while the riparian and surrounding CBA 2 habitat were given a “High” rating based on its importance as a water source for fauna species found in the project area as well as unique habitat. The rest of the areas that seem intact were assigned a “Medium” sensitivity as the habitat may have been indirectly disturbed by fragmentation, based on spatial data available. The extent of this disturbance will need to be confirmed during the field assessment.

It is important to note that these maps do not replace any local, provincial or government legislation relating to these areas or the land use capabilities or sensitivities of these environments. The maps are also not final as it is based on desktop data alone and will be adapted once the area has been ground truthed.

10.1.2 Legislative constraint layer

The biodiversity theme sensitivity as indicated in the screening report was derived to be *Very High* (Figure 10-1). This was based on the CBA2, ESA1 areas as well as the proximity to the

NPAES Molopo area. The animal sensitivity was rated as *Low*, while the plant sensitivity was rated as *Medium*.

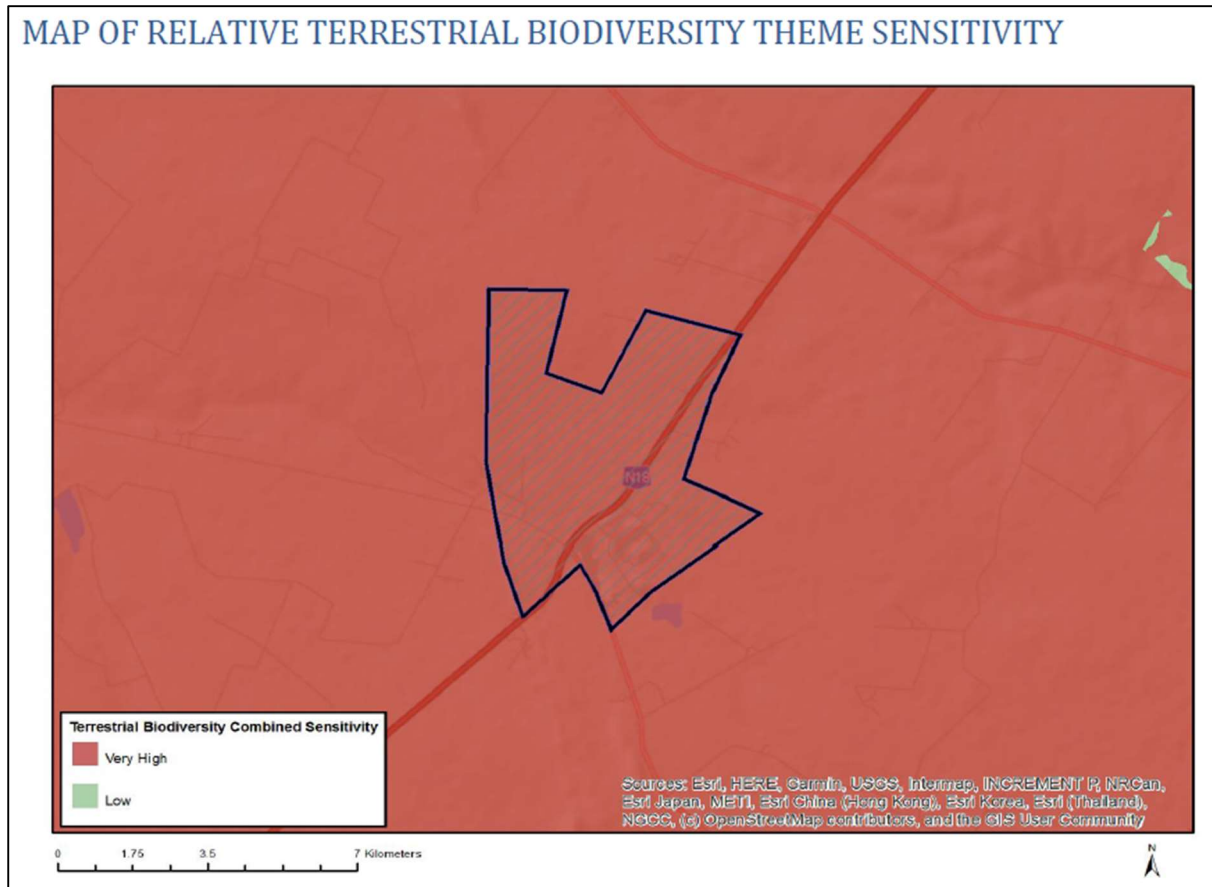


Figure 10-1 Biodiversity Theme Sensitivity, TBC Screening Report

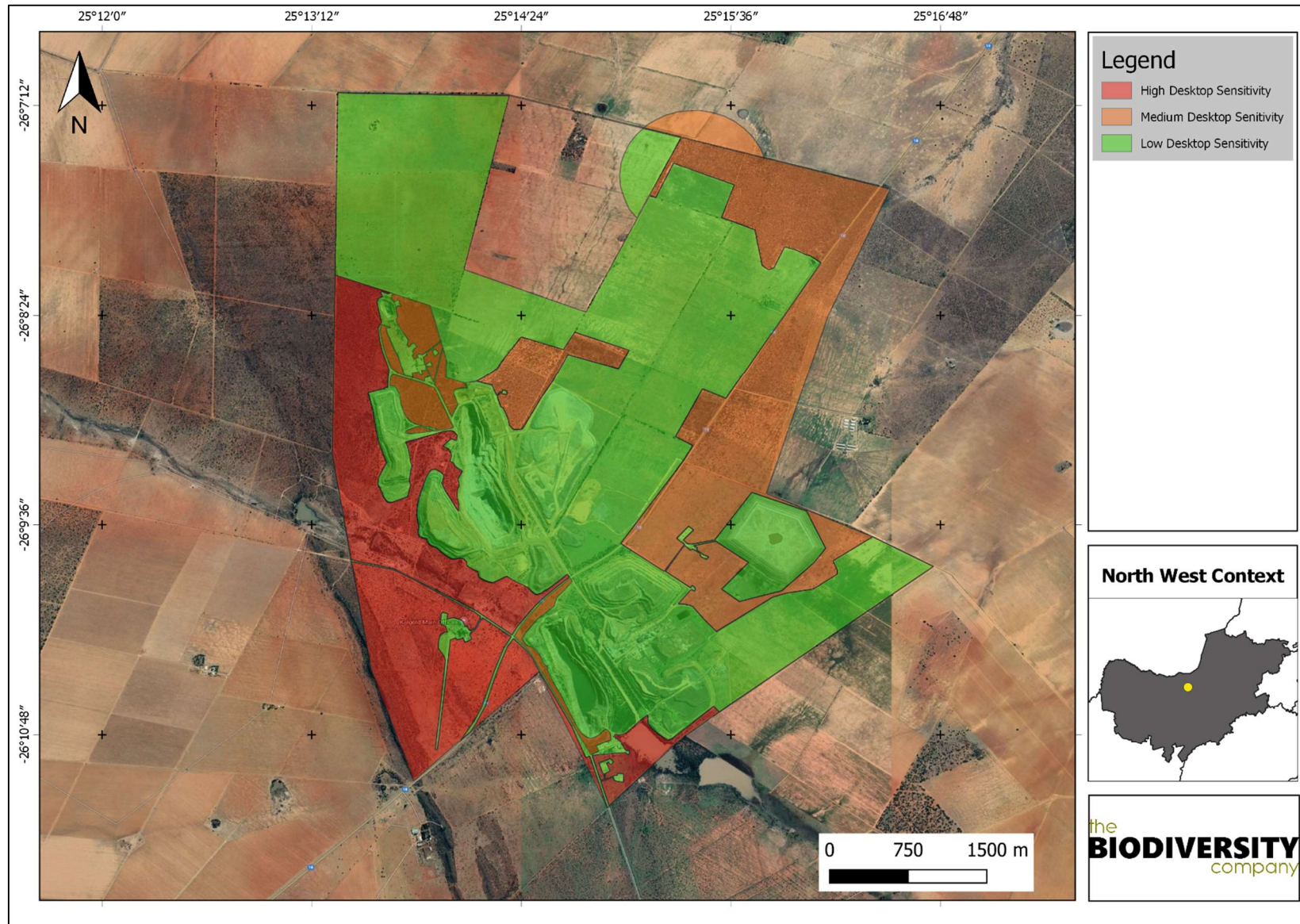


Figure 10-2 The desktop sensitivities of the project area

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11 Impact Assessment

Potential impacts were evaluated against the spatial data to identify relevance to the project area, specifically the proposed expansion footprint area. The relevant impacts were then subjected to a prescribed impact assessment methodology. The details of this methodology can be provided on request.

Impacts were assessed in terms of the planning, construction/operational, decommissioning/rehabilitation and closure phases. Mitigation measures were only applied to impacts deemed relevant based on the impact analysis.

11.1 Impact Assessment Methodology

An impact assessment methodology was provided by EIMS to determine the environmental risk associated with various aspects related to the proposed expansion alternatives. This impact assessment takes the following components into consideration.

- The nature of the associated impact (positive or negative);
- The extent of the proposed activities;
- The duration of the proposed activities;
- The magnitude of the effects caused by the proposed activities;
- The reversibility of associated impacts; and
- The probability of relevant aspects affecting sensitive receptors.

Each one of the above-mentioned components are given a rating, which cumulatively provides the specialist with a pre-mitigation environmental risk rating. These components are then scored again taking into consideration mitigating factors. The cumulative impact and irreplaceable loss to sensitive receptors are then scored to ultimately indicate a “Priority Factor” score.

11.2 Terrestrial Ecology Impact Assessment

The anticipated impacts are derived from the main activities associated with the expansion which include:

- 1 The pit footprint will increase.
- 2 Larger dewatering pipelines.
- 3 Extension to Spanover waste rock dump.
- 4 Road from the pit to new ROM pad.
- 5 New ROM pad.
- 6 New plant.
- 7 Recommission old Tailings Storage Facility (TSF) at low deposition rate.
- 8 Increase tailings deposition rate at D-zone pit.
- 9 Install pipeline from Central dam to the new processing plant.

- 10 Install a tailings pipeline from the new processing plant to old TSF and D-zone pit.
- 11 Install pipeline from old processing plant raw water pond to the new plant (D-zone return water).
- 12 Install two power lines from Ferndale substation to the new processing plant.
- 13 Install evaporators at Central dam (to get rid of excess water).
- 14 Install a water treatment plant at the new plant.
- 15 Relocate and expand the explosives magazine.
- 16 Additional new road from the plant to the N18.

The proposed expansion infrastructure can be seen overlaid with the desktop sensitivity (Figure 11-1). It is evident from the figure that the following expansion activities that may have a negative effect on more sensitive biodiversity features:

- Pit (pit footprint);
- Power lines;
- Water pipelines; and
- Explosive magazine and clearance area.

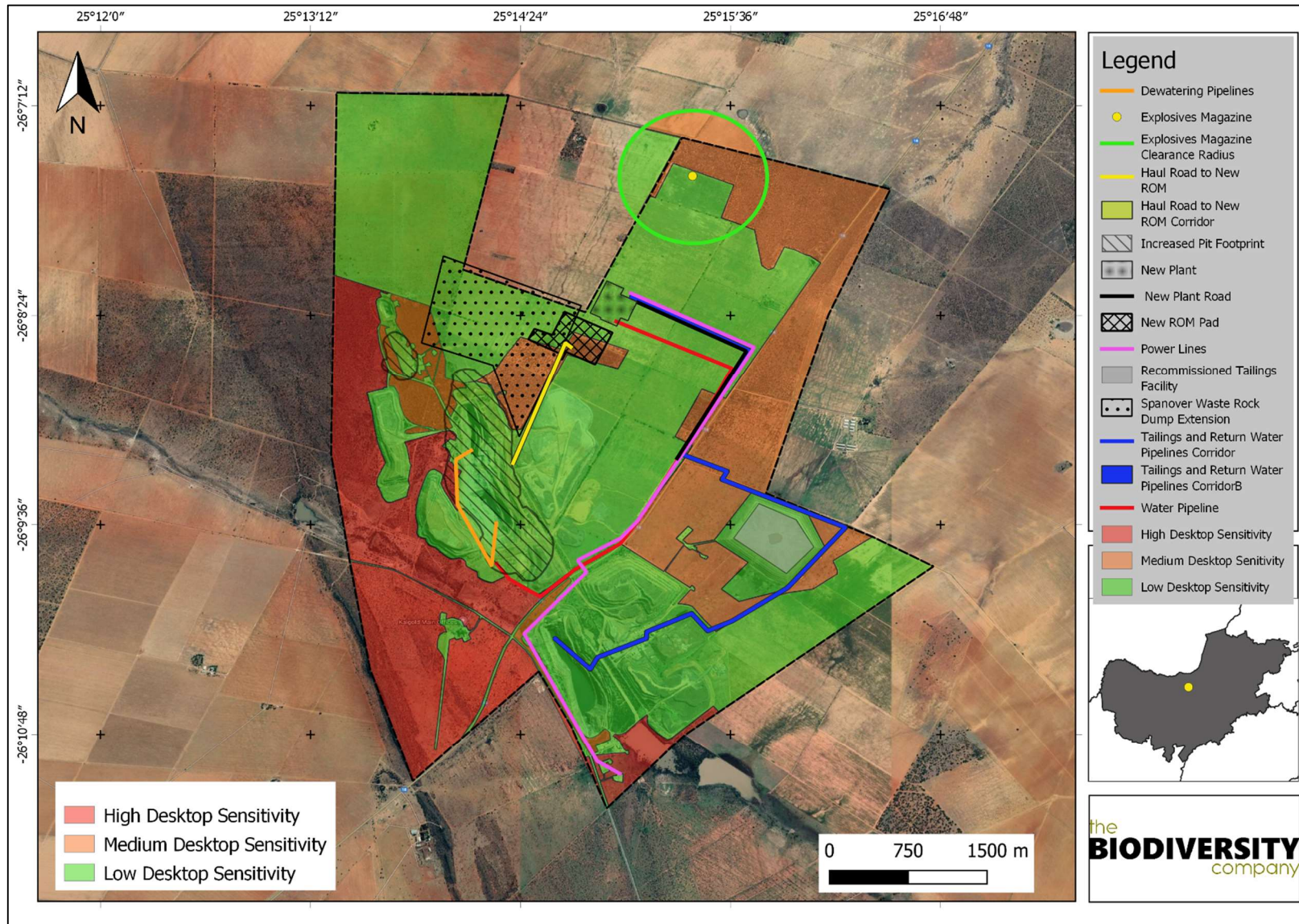


Figure 11-1 The desktop sensitivities of the project area overlaid with the proposed infrastructure

11.2.1 Anticipated Impacts

In the impacts anticipated for the proposed activities are considered in order to predict and quantify these impacts and assess & evaluate the magnitude on the identified terrestrial biodiversity.

Table 11-1 Anticipated impacts for the proposed activities on terrestrial biodiversity

Main Impact	Project activities that can cause loss of habitat (especially with regard to the construction of proposed expansion areas):	Secondary impacts anticipated
1. Destruction, fragmentation and degradation of habitats and ecosystems	Physical removal of vegetation (Production plant, TSF, Spanover waste rock dump expansion) Access roads and servitudes Power lines Soil dust precipitation Water leakages Dumping of waste products Random events such as fire (cooking fires or cigarettes)	Displacement/loss of flora & fauna (including possible SCC) Increased potential for soil erosion Habitat fragmentation Increased potential for establishment of alien & invasive vegetation
Main Impact	Project activities that can cause the spread and/or establishment of alien and/or invasive species	Secondary impacts anticipated
2. Spread and/or establishment of alien and/or invasive species	Vegetation removal Vehicles potentially spreading seed Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive rodents Creation of infrastructure suitable for breeding activities of alien and/or invasive birds	Habitat loss for native flora & fauna (including potential SCC) Spreading of potentially dangerous diseases due to invasive and pest species Alteration of fauna assemblages due to habitat modification
Main Impact	Project activities that can cause the Direct mortality of fauna	Secondary impacts anticipated
3. Direct mortality of fauna	Project activities that can cause direct mortality of fauna Clearing of vegetation Roadkill due to vehicle collision Pollution of water resources due to dust effects, chemical spills, acid mine drainage etc. Intentional killing of fauna for food (hunting) Bird collisions with Power lines	Loss of ecosystem services Increase in rodent populations and associated disease risk
Main Impact	Project activities that can cause reduced dispersal/migration of fauna	Secondary impacts anticipated
4.. Reduced dispersal/migration of fauna	Loss of landscape used as corridor Compacted roads Removal of vegetation (Production plant, TSF, Spanover waste rock dump expansion) Light, noise and dust disturbance Power lines	Loss of ecosystem services Reduced plant seed dispersal
Main Impact	Project activities that can cause pollution in water courses and the surrounding environment	Secondary impacts anticipated
5. Environmental pollution due to water/ mine drainage runoff	Chemical (organic/inorganic) spills Erosion AMD	Faunal mortality (direct and indirectly) Groundwater pollution Loss of ecosystem services
Main Impact	Project activities that can cause disruption/alteration of ecological life cycles due to sensory disturbance and dust.	Secondary impacts anticipated
6. Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust and light pollution.	Operation of machinery (Large earth moving machinery, generators) Vehicles Exposed mine dumps Outside lighting	Loss of ecosystem services

Main Impact	Project activities that can cause staff to interact directly with potentially dangerous fauna	Secondary impacts anticipated
8. Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals	All unregulated/supervised activities outdoors	Harm to fauna and/or staff

11.2.2 Unplanned Events

The planned activities will have anticipated impacts as discussed; however, unplanned events may occur on any project and may have potential impacts which will need management.

Table 11-2 is a summary of the findings of an unplanned event assessment from a terrestrial ecology perspective. Note, not all potential unplanned events may be captured herein, and this must therefore be managed throughout all phases according to recorded events.

Table 11-2 Summary of unplanned events for terrestrial biodiversity

Unplanned Event	Potential Impact	Mitigation
Hydrocarbon spills into the surrounding environment	Contamination of habitat as well as water resources associated with spillage.	A spill response kit must be available at all times. The incident must be reported on and if necessary a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations.
Fire	Uncontrolled/unmanaged fire that spreads to the surrounding natural grassland and wetlands	Appropriate/Adequate fire management plan need to be implemented.
Acid Mine Drainage	Severe water quality and in turn habitat degradation	Water treatment, post closure water monitoring and water level management.
TSF Failing or TSP Pipeline burst	Contamination of habitat as well as water resources.	Monitoring of TSF structure and follow legislative guidelines. Regular monitoring for leaks, cracks and faults in the pipeline

11.2.3 Planning Phase Impacts

The planning phase activities are considered a low risk as they typically involve desktop assessments and initial site inspections. This would include preparations and desktop work in support of waste management plans, environmental and social screening assessments, finalising drill sites and facilities and consultation with various contractors involved with a diversity of proposed project related activities going forward. Only one minor impact was assessed regarding the planning phase:

11.2.3.1 Temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles.

As more vehicles will be driving in the area to survey various components of the project, the wildlife will be disturbed. The possible use of light machinery can also lead to the trampling of both vegetation and faunal species.

11.2.3.1.1 Mitigation Measures

Please see section 12.

11.2.4 Construction Phase/Operational Phase Impacts

The following potential impacts were considered on terrestrial biodiversity. This phase refers to the period when construction of the additional proposed infrastructure is built/installed. This phase usually has the largest direct impact on biodiversity.

11.2.4.1 Destruction, further loss and fragmentation of the vegetation community

The vegetation communities are classed as VU, through site clearing, more of the vegetation communities will be lost. Unmitigated, this will also lead to habitat fragmentation and the establishment of alien invasive species as well as soil erosion.

11.2.4.1.1 Mitigation Measures

Please see section 12.

11.2.4.1.2 Cumulative Impacts

- Further loss of VU vegetation type;

11.2.4.1.3 Irreplaceable Loss of Resources

- Loss of CBA 2

11.2.4.1.4 Impacts on Alternatives Considered

No alternatives were provided.

11.2.4.2 Introduction of alien species, especially plants

The spread of alien invasive species will result in the loss of habitat and water for indigenous fauna and flora. It can also contribute to the spreading of potentially dangerous diseases due to invasive - and pest species. Overall, the fauna assemblage will be changed.

11.2.4.2.1 Mitigation Measures

Please see section 12.

11.2.4.2.2 Cumulative Impacts

- Loss of habitat for indigenous species; and
- Spread of disease to surrounding areas.

11.2.4.2.3 Irreplaceable Loss of Resources

- Loss of CBA 2

11.2.4.2.4 Impacts on Alternatives Considered

No alternatives were provided.

11.2.4.3 Erosion due to storm water runoff and wind

Erosion will lead to the loss of vegetation, the removal/ relocation of the topsoil and the destruction of habitat. Activities that will contribute to this impact:

- Storm water runoff from roads, and other hardened surfaces;
- Vehicles driving outside demarcated areas;
- Footpaths outside demarcated areas;
- Clearing of vegetation; and
- Water runoff from areas with bare soil.

11.2.4.3.1 Mitigation Measures

Please see section 12.

11.2.4.3.2 Cumulative Impacts

- Removal of topsoil;
- Loss of vegetation; and
- Loss of habitat for indigenous species.

11.2.4.3.3 Irreplaceable Loss of Resources

- Loss of CBA 2 area

11.2.4.3.4 Impacts on Alternatives Considered

No alternatives were provided.

11.2.4.4 Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, vibration, Power line collisions and poaching).

Faunal community will be influenced in a number of ways, including the loss of habitat, disturbances that will either make them move out of the area if possible or have to adapt and possible deaths due to physical harm or indirect harm.

11.2.4.4.1 Mitigation Measures

Please see section 12.

11.2.4.4.2 Cumulative Impacts

- Loss of habitat for indigenous species.

11.2.4.4.3 Irreplaceable Loss of Resources

- Loss of potential faunal SCCs.

11.2.4.4.4 Impacts on Alternatives Considered

No alternatives were provided.

11.2.4.5 Environmental pollution due to water/ mine drainage runoff potential leaks, discharges, pollutant, and storage leaching into the surrounding environment

Hydrocarbons leaching into the surrounding area will result in the loss of usable water resources. This will also result in the contamination of the topsoil and reduce the likelihood of successful rehabilitation of an area.

11.2.4.5.1 Mitigation Measures

Please see section 12.

11.2.4.5.2 Cumulative Impacts

- Loss of usable water resources for fauna species; and
- Loss of viable habitat.

11.2.4.5.3 Irreplaceable Loss of Resources

- Loss of usable water resources for fauna species resulting in loss of SCC and other species.

11.2.4.5.4 Impacts on Alternatives Considered

No alternatives were provided.

11.2.5 Decommissioning and Rehab/Closure Phase Impacts

This phase is when the scaling down of activities ahead of temporary or permanent closure, cessation of mining or production is initiated. During this phase, the operational phase impacts will persist until the activity reduces and the rehabilitation measures are implemented.

11.2.5.1 Continued fragmentation and degradation of habitats and ecosystems

The spread of alien invasive species will result in the loss of habitat and water for indigenous fauna and flora. Overall, the fauna assemblage will be changed. Erosion will also disrupt the vegetation in the surrounding areas and result in habitat loss.

11.2.5.1.1 Mitigation Measures

Please see section 12.

11.2.5.1.2 Cumulative Impacts

- Loss of habitat; and
- Loss of indigenous flora species due to competition.

11.2.5.1.3 Irreplaceable Loss of Resources

- Loss of CBA 2 area.

11.2.5.1.4 Impacts on Alternatives Considered

These could be non-applicable for these phases of the project.

11.2.5.2 Continued displacement and fragmentation of the faunal community (including potential threatened or protected species) due to ongoing anthropogenic disturbances (noise, dust and vibrations) and habitat degradation/loss (litter, road mortalities and/or poaching).

During the decommissioning phase infrastructure will now be broken down, removed and disturbed. As the infrastructure is being removed this will disrupt the ecosystem

11.2.5.2.1 Mitigation Measures

Please see section 12.

11.2.5.2.2 Cumulative Impacts

- Loss of suitable habitat.

11.2.5.2.3 Irreplaceable Loss of Resources

- Loss of potential faunal SCCs.

11.2.5.2.4 Impacts on Alternatives Considered

These could be non-applicable for these phases of the project.

11.2.6 Assessment of Significance

Table 11-3 shows the significance of potential impacts associated with the proposed expansion, on biodiversity before and after the implementation of mitigation measures as well as cumulative and irreplaceable loss.

Table 11-3 Assessment of significance of potential impacts on terrestrial biodiversity associated with the project

Impact	Pre-mitigation ER	Post-mitigation ER	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
Planning							
Temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles.	-14	-3	High	1	2	1,13	-3,38
Construction Phase/Operational Phase							
Destruction, further loss and fragmentation of the vegetation community	-16	-6	High	2	2	1,25	-7,50
Introduction of alien species, especially plants	-13	-4	High	2	2	1,25	-5,00
Erosion due to storm water runoff and wind	-14	-6,75	High	2	2	1,25	-8,44
Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, rock chips, bird Power line collisions, vibration and poaching).	-15	-6	High	2	2	1,25	-7,50
Environmental pollution due to water/ mine drainage runoff potential leaks, discharges, pollutant and storage leaching into the surrounding environment	-16	-4	High	2	2	1,25	-5,00
Decommissioning and Rehab/Closure Phase							
Continued encroachment of an indigenous and VU vegetation community by alien invasive plant species as well as erosion due to disturbed soils	-15	6	Medium	1	1	1,00	6,00
Continued displacement and fragmentation of the faunal community due to ongoing anthropogenic disturbances (noise, dust and vibrations) and habitat degradation/loss (litter, road mortalities and/or poaching).	-15	6	Medium	1	1	1,00	6,00

12 Specialist Management Plan

Table 12-1 presents the recommended mitigation measures and the respective timeframes, targets and performance indicators for the terrestrial study. The mitigation measures within this section have been taken into consideration during the impact assessment in cases where the post-mitigation environmental risk is lower than that of the pre-mitigation environmental risk.

Table 12-1 Mitigation measures including requirements for timeframes, roles and responsibilities for the terrestrial study

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Vegetation and Habitats				
All alternatives in high sensitivity areas must be avoided and the favourable alternatives should be considered. The proposed expansion activity infrastructure must be realigned within low sensitivity areas.	Planning	Project manager, Environmental Officer	Development footprint	During phase
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible.	All phases	Project manager, Environmental Officer	Areas of indigenous vegetation (All high sensitivity areas)	Ongoing
Where possible, existing access routes and walking paths must be made use of, and the development of new routes limited.	All phases	Environmental Officer & Design Engineer	Roads and paths used	Ongoing
All laydown, chemical toilets etc. should be restricted to low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. Buildings should preferably be prefabricated or constructed of re-usable/recyclable materials. No storage of vehicles or equipment will be allowed outside of the designated project areas.	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas and material storage & placement.	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Post Construction/Closure Phase/Rehabilitation phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
All structure footprints to be rehabilitated and landscaped after construction is complete. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type.	Post Construction/Closure Phase/Rehabilitation phase	Environmental Officer & Contractor	Footprint rehabilitation	Quarterly monitoring
Progressive rehabilitation and mining will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank Any indigenous woody material removed during construction can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.	Post Construction/Closure Phase/Rehabilitation phase	Environmental Officer & Contractor	Footprint rehabilitation	During Phase
A spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or	Life of Project	Environmental Officer & Contractor	Spill events, Vehicles dripping.	Ongoing

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removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.	Life of Project	Project manager, Environmental Officer & Design Engineer	Water Pathways	During rain events.
Keep the surface & sub-surface water as well as storm water away that may run off from the dumps from the low laying areas, such as wetlands as well as the surrounding areas, from leaving the project area in an uncontrolled manner.	Life of Project	Environmental Officer & Contractor	Leaks and spills	Ongoing
Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.	Life of Project	Environmental Officer & Design Engineer	Water Quality	Monthly
Storm Water run-off & Discharge Water Quality.	Life of Project	Environmental Officer & Design Engineer	Water Quality	Monthly
It should be made an offence for any staff to /take bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.	Life of Project	Project manager, Environmental Officer	Any instances	Ongoing
<ul style="list-style-type: none"> Signs must be put up to enforce this 				
Any topsoil that is removed during construction must be appropriately removed and stored according to the national and provincial guidelines. This includes on-going maintenance of such topsoil piles so that they can be utilised during decommissioning phases and re-vegetation. All removed soil and material must not be stockpiled within the medium/high sensitivity areas. Stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.	Construction/Operational Phase	Project manager, Environmental Officer	Topsoil removal and storage	Ongoing
Appropriate speed humps, enforcing of speed limits via signs and mitre drains must be constructed along the access roads (every three metres of elevation) in order to slow the flow of water run-off from the road surface, if this does not already exist. Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface (with "dirty water") and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds.	Life of Project	Project manager, Environmental Officer	Speed limit of vehicles	Ongoing
A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the rehabilitated areas.	Life of Project	Environmental Officer & Contractor	Fire Management	During Phase
Aquatic monitoring must be done, this includes ground water and surface water to ensure that that acid mine drainage is detected and managed. A management plan must be compiled for acid mine drainage.	Life of Project	Project manager, Environmental Officer	Water Quality	Ongoing on a monthly basis

Management outcome: Fauna

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency

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The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into highly sensitive areas and the surrounding environments; <ul style="list-style-type: none"> Signs must be put up to enforce this 	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into these areas	Ongoing
Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals	Life of Project	Environmental Officer	Noise levels	Ongoing
No trapping, killing, or poisoning of any wildlife is to be allowed <ul style="list-style-type: none"> Signs must be put up to enforce this; 	Life of Project	Environmental Officer	Evidence of trapping etc	Ongoing
The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna	Construction phase	Project manager, Environmental Officer & Design Engineer	Construction/Closure Phase	Ongoing
Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (yellow) lights should be used wherever possible.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light.	Ongoing
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited. <ul style="list-style-type: none"> Signs must be put up to enforce this 	Life of Project	Health and Safety Officer	Compliance to the training.	Ongoing
Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons. <ul style="list-style-type: none"> Driving on access roads close to highly sensitive areas at night should be prevented in order to reduce or prevent wildlife road mortalities which occur more frequently during this period; 	Life of Project	Project manager, Environmental Officer & Design Engineer	Activities should take place during the day.	Ongoing
Water sources must be monitored on a quarterly basis and the quality of the water must be in line with South African water quality guidelines.	Life of Project	Project manager, Environmental Officer	Water Quality	Quarterly
Based on the expected avifaunal species, bird strikes, and electrocutions will be a highly likely, bird flappers must be placed on any transmission lines and the towers must be insulated to prevent electrocutions, especially on any transmission lines close to the river and wetland areas.	Life of Project	Environmental Officer	Presence and condition of flappers and insulation on towers.	Monthly
All areas to be extended must be walked through prior to any activity to ensure no nests or birds area found in the area. Should any species of conservation concern not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.	Planning and Construction	Project manager, Environmental Officer	Presence of Nests	Planning and Construction
Develop post-mining environments in conjunction with regional development plans as well as the recreation of habitats where possible or structure altered landscapes to be compatible with regional habitats	Beyond life of project	Project manager, Environmental Officer & Contractor	Habitat post mining	Indefinitely after Post Closure Phase
Management outcome: Alien species				

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Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Compilation of and implementation of an alien vegetation management plan.	Life of Project	Project manager, Environmental Officer & Contractor	Assess presence and encroachment of alien vegetation	Quarterly monitoring
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas	Construction/Operational Phase	Project manager, Environmental Officer & Contractor	Footprint Area	Life of operation
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. <ul style="list-style-type: none"> Refuse bins will be emptied and secured; Temporary storage of domestic waste shall be in covered waste skips; and Maximum domestic waste storage period will be 10 days. 	Life of Project	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation
A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the likely presence of SCCs	Life of operation	Environmental Officer & Health and Safety Officer	Evidence or presence of pests	Ongoing

Management outcome: Dust

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and dumps especially. This includes wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated.	Life of Project	Contractor	Dustfall	As per the air quality report and the dust monitoring program.

Management outcome: Waste management

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Waste management must be a priority and all waste must be collected and stored effectively.	Life of Project	Environmental Officer & Contractor	Waste Removal	Weekly
Litter, spills, fuels, chemicals and human waste in and around the project area.	Construction/Closure Phase	Environmental Officer & Health and Safety Officer	Presence of Waste	Daily
A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.	Life of Project	Environmental Officer & Health and Safety Officer	Number of toilets per staff member. Waste levels	Daily
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility	Life of Project	Environmental Officer & Health and Safety Officer	Availability of bins and the collection of the waste.	Ongoing

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Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site	Life of Project	Environmental Officer, Contractor & Health and Safety Officer	Collection/handling of the waste.	Ongoing
Refuse bins will be emptied and secured Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.	Life of Project	Environmental Officer, Contractor & Health and Safety Officer	Management of bins and collection of waste	Ongoing, every 10 days
Sewage system must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.	Life of Project	Environmental Officer, Contractor & Health and Safety Officer	Removal of all sewerage	Till completed

Management outcome: Environmental awareness training

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMP. The avoidance and protection of the wetland areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the “no-go” to be avoided.	Life of Project	Health and Safety Officer	Compliance to the training.	Ongoing

Management outcome: Erosion

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Appropriate speed humps, enforcing of speed limits and mitre drains must be constructed along the access roads (every three metres of elevation) in order to slow the flow of water run-off from the road surface, if this does not already exist; <ul style="list-style-type: none"> Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface (with “dirty water”) and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds; Signs must be put up to enforce this. 	Life of Project	Project manager, Environmental Officer	Water Runoff from road surfaces	Ongoing
Where possible, existing access routes and walking paths must be made use of, and the development of new routes limited.	Life of Project	Project manager, Environmental Officer	Routes used within the area	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events.	Life of Project	Project manager, Environmental Officer	Re-establishment of indigenous vegetation	Progressively with mining

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A storm water management plan must be compiled and implemented.	Life of Project	Project manager, Environmental Officer	Management plan	Before construction phase: Ongoing
A row of indigenous trees may be planted to act as a wind breaker and to reduce the overall levels of dust and erosion. The location of the trees must be determined after dust monitoring has been done.	Life of Project	Project manager, Environmental Officer	Dust reducing mitigation	Before construction phase: Ongoing

13 Conclusion

It is evident from the spatial data that the project area has been altered both currently and historically. Agriculture and mining have had an extensive impact on the habitats in general, which has likely influenced the faunal and flora community. From a desktop perspective the project area falls across both a CBA2 and an ESA1 classified area. The Power line, water pipeline, roads and return water corridor falls across the ESA1 areas. The area is also classified as “highest biodiversity importance”, “high biodiversity importance” and “moderate biodiversity importance” with their associated highest, high and moderate risks for mining.

Based on this some portions of the project area were given a high and moderate sensitivity. These potentially remaining high and medium sensitivity areas needs to be ground-truthed in order to determine the actual sensitivity, and the extent thereof.

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15 Appendices

Appendix A Specialist declarations

DECLARATION

I, Martinus Erasmus, 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 Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, 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; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Martinus Erasmus

Terrestrial Ecologist

The Biodiversity Company

October 2020

DECLARATION

I, Lindi 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 Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, 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; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Lindi Steyn

Terrestrial Ecologist

The Biodiversity Company

October 2020

DECLARATION

I, Andrew Husted, 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 Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, 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; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Andrew Husted

Wetland Ecologist

The Biodiversity Company

October 2020

Appendix B Flora species expected in the project area and surrounds

Family	Taxon	Author	IUCN	Ecology
Asteraceae	<i>Acanthospermum glabratum</i>	(DC.) Wild		Not Indigenous; Naturalised
Asteraceae	<i>Acanthospermum hispidum</i>	DC.		Not Indigenous; Naturalised
Amaranthaceae	<i>Aerva leucura</i>	Moq.	LC	Indigenous
Asphodelaceae	<i>Aloe braamvanwykii</i>	Gideon F.Sm. & Figueiredo	EN	Indigenous; Endemic
Asphodelaceae	<i>Aloe grandidentata</i>	Salm-Dyck	LC	Indigenous
Poaceae	<i>Andropogon schirensis</i>	Hochst. ex A.Rich.	LC	Indigenous
Poaceae	<i>Anthephora pubescens</i>	Nees	LC	Indigenous
Rubiaceae	<i>Anthospermum rigidum</i> subsp. <i>pumilum</i>	Eckl. & Zeyh.	LC	Indigenous
Menispermaceae	<i>Antizoma angustifolia</i>	(Burch.) Miers ex Harv.	LC	Indigenous
Aponogetonaceae	<i>Aponogeton rehmannii</i>	Oliv.	LC	Indigenous
Poaceae	<i>Aristida adscensionis</i>	L.	LC	Indigenous
Poaceae	<i>Aristida canescens</i> subsp. <i>canescens</i>	Henrard	LC	Indigenous
Poaceae	<i>Aristida congesta</i> subsp. <i>congesta</i>	Roem. & Schult.	LC	Indigenous
Poaceae	<i>Aristida meridionalis</i>	Henrard	LC	Indigenous
Poaceae	<i>Aristida mollissima</i> subsp. <i>mollissima</i>	Pilg.	LC	Indigenous
Poaceae	<i>Aristida scabrivalvis</i> subsp. <i>scabrivalvis</i>	Hack.	LC	Indigenous
Poaceae	<i>Aristida stipitata</i> subsp. <i>graciliflora</i>	Hack.	LC	Indigenous
Poaceae	<i>Aristida stipitata</i> subsp. <i>stipitata</i>	Hack.	LC	Indigenous
Poaceae	<i>Aristida vestita</i>	Thunb.	LC	Indigenous
Asparagaceae	<i>Asparagus laricinus</i>	Burch.	LC	Indigenous
Poaceae	<i>Avena</i> sp.			
Iridaceae	<i>Babiana bainesii</i>	Baker	LC	Indigenous
Acanthaceae	<i>Barleria macrostegia</i>	Nees		Indigenous
Elatinaceae	<i>Bergia</i> sp.			
Poaceae	<i>Bewsia biflora</i>	(Hack.) Gooss.	LC	Indigenous
Asteraceae	<i>Bidens bipinnata</i>	L.		Not Indigenous; Naturalised
Acanthaceae	<i>Blepharis integrifolia</i> var. <i>integrifolia</i>	(L.f.) E.Mey. ex Schinz	LC	Indigenous
Capparaceae	<i>Boscia foetida</i> subsp. <i>minima</i>	Schinz	LC	Indigenous
Capparaceae	<i>Boscia</i> sp.			
Poaceae	<i>Brachiaria marlothii</i>	(Hack.) Stent	LC	Indigenous
Poaceae	<i>Brachiaria nigropedata</i>	(Ficalho & Hiern) Stapf	LC	Indigenous
Apocynaceae	<i>Brachystelma canum</i>	R.A.Dyer	CR	Indigenous; Endemic
Asphodelaceae	<i>Bulbine abyssinica</i>	A.Rich.	LC	Indigenous
Cyperaceae	<i>Bulbostylis burchellii</i>	(Ficalho & Hiern) C.B.Clarke	LC	Indigenous
Cyperaceae	<i>Bulbostylis hispidula</i> subsp. <i>pyriformis</i>	(Vahl) R.W.Haines	LC	Indigenous

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Poaceae	<i>Cenchrus ciliaris</i>	L.	LC	Indigenous
Scrophulariaceae	<i>Chaenostoma patrioticum</i>	(Hiern) Kornhall	LC	Indigenous
Fabaceae	<i>Chamaecrista biensis</i>	(Steyaert) Lock	LC	Indigenous
Fabaceae	<i>Chamaecrista mimosoides</i>	(L.) Greene	LC	Indigenous
Verbenaceae	<i>Chascanum hederaceum</i> var. <i>hederaceum</i>	(Sond.) Moldenke		Indigenous
Pteridaceae	<i>Cheilanthes hirta</i> var. <i>brevipilosa</i>	Sw.	LC	Indigenous; Endemic
Poaceae	<i>Chloris virgata</i>	Sw.	LC	Indigenous
Agavaceae	<i>Chlorophytum angulicaule</i>	(Baker) Kativu		Indigenous
Agavaceae	<i>Chlorophytum fasciculatum</i>	(Baker) Kativu		Indigenous
Agavaceae	<i>Chlorophytum recurvifolium</i>	(Baker) C.Archer & Kativu		Indigenous
Asteraceae	<i>Chrysocoma obtusata</i>	(Thunb.) Ehr.Bayer	LC	Indigenous
Cleomaceae	<i>Cleome rubella</i>	Burch.	LC	Indigenous
Commelinaceae	<i>Commelina africana</i> var. <i>barberae</i>	L.	LC	Indigenous
Commelinaceae	<i>Commelina africana</i> var. <i>lancispatha</i>	L.	LC	Indigenous
Commelinaceae	<i>Commelina livingstonii</i>	C.B.Clarke	LC	Indigenous
Asteraceae	<i>Conyza bonariensis</i>	(L.) Cronquist		Not Indigenous; Naturalised
Malvaceae	<i>Corchorus asplenifolius</i>	Burch.	LC	Indigenous
Fabaceae	<i>Crotalaria barkae</i> subsp. <i>barkae</i>	Schweinf.	LC	Indigenous
Fabaceae	<i>Crotalaria distans</i> subsp. <i>distans</i>	Benth.	LC	Indigenous
Fabaceae	<i>Crotalaria lotoides</i>	Benth.	LC	Indigenous
Fabaceae	<i>Crotalaria spartioides</i>	DC.	LC	Indigenous
Fabaceae	<i>Crotalaria sphaerocarpa</i> subsp. <i>sphaerocarpa</i>	Perr. ex DC.	LC	Indigenous
Cucurbitaceae	<i>Cucumis</i> sp.			
Commelinaceae	<i>Cyanotis speciosa</i>	(L.f.) Hassk.	LC	Indigenous
Poaceae	<i>Cymbopogon pospischilii</i>	(K.Schum.) C.E.Hubb.	NE	Indigenous
Poaceae	<i>Cymbopogon prolixus</i>	(Stapf) E.Phillips	LC	Indigenous
Poaceae	<i>Cynodon dactylon</i>	(L.) Pers.	LC	Indigenous
Poaceae	<i>Cynodon hirsutus</i>	Stent	LC	Indigenous; Endemic
Poaceae	<i>Cynodon polevansii</i>	Stent	LC	Indigenous; Endemic
Cyperaceae	<i>Cyperus bellus</i>	Kunth	LC	Indigenous
Cyperaceae	<i>Cyperus decurvatus</i>	(C.B.Clarke) C.Archer & Goetgh.	LC	Indigenous
Cyperaceae	<i>Cyperus difformis</i>	L.	LC	Indigenous
Cyperaceae	<i>Cyperus fastigiatus</i>	Rottb.	LC	Indigenous
Cyperaceae	<i>Cyperus fulgens</i>	C.B.Clarke	LC	Indigenous
Cyperaceae	<i>Cyperus margaritaceus</i> var. <i>margaritaceus</i>	Vahl	LC	Indigenous
Cyperaceae	<i>Cyperus palmatus</i>	(Lye) C.Archer & Goetgh.	LC	Indigenous
Cyperaceae	<i>Cyperus rubicundus</i>	Vahl	LC	Indigenous

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Cyperaceae	<i>Cyperus sphaerospermus</i>	Schrad.	LC	Indigenous
Cyperaceae	<i>Cyperus usitatus</i>	Burch.	LC	Indigenous
Solanaceae	<i>Datura inoxia</i>	Mill.		Not Indigenous; Naturalised
Poaceae	<i>Diandrochloa namaquensis</i>	(Nees) De Winter	LC	Indigenous
Pedaliaceae	<i>Dicerocaryum senecioides</i>	(Klotzsch) Abels	LC	Indigenous
Poaceae	<i>Dichanthium annulatum var. papillosum</i>	(Forssk.) Stapf	LC	Indigenous
Fabaceae	<i>Dichrostachys cinerea subsp. africana</i>	(L.) Wight & Arn.	NE	Indigenous
Scrophulariaceae	<i>Diclis petiolaris</i>	Benth.	LC	Indigenous
Asteraceae	<i>Dicoma anomala subsp. gerrardii</i>	Sond.	LC	Indigenous
Poaceae	<i>Digitaria eriantha</i>	Steud.	LC	Indigenous
Poaceae	<i>Digitaria sp.</i>			
Poaceae	<i>Diheteropogon amplexens var. amplexens</i>	(Nees) Clayton	LC	Indigenous
Ebenaceae	<i>Diospyros lycioides subsp. lycioides</i>	Desf.		Indigenous
Hyacinthaceae	<i>Dipcadi viride</i>	(L.) Moench		Indigenous
Iridaceae	<i>Duthieastrum linifolium</i>	(E.Phillips) M.P.de Vos	LC	Indigenous; Endemic
Poaceae	<i>Echinochloa colona</i>	(L.) Link	LC	Indigenous
Poaceae	<i>Echinochloa holubii</i>	(Stapf) Stapf	LC	Indigenous
Poaceae	<i>Elionurus muticus</i>	(Spreng.) Kunth	LC	Indigenous
Poaceae	<i>Enneapogon cenchroides</i>	(Licht. ex Roem. & Schult.) C.E.Hubb.	LC	Indigenous
Poaceae	<i>Enneapogon scoparius</i>	Stapf	LC	Indigenous
Poaceae	<i>Eragrostis barbinodis</i>	Hack.	LC	Indigenous
Poaceae	<i>Eragrostis biflora</i>	Hack. ex Schinz	LC	Indigenous
Poaceae	<i>Eragrostis chloromelas</i>	Steud.	LC	Indigenous
Poaceae	<i>Eragrostis cilianensis</i>	(All.) Vignolo ex Janch.	LC	Indigenous
Poaceae	<i>Eragrostis lehmanniana var. lehmanniana</i>	Nees	LC	Indigenous
Poaceae	<i>Eragrostis obtusa</i>	Munro ex Ficalho & Hiern	LC	Indigenous
Poaceae	<i>Eragrostis pallens</i>	Hack.	LC	Indigenous
Poaceae	<i>Eragrostis pseudobtusa</i>	De Winter	NE	Indigenous; Endemic
Poaceae	<i>Eragrostis rigidior</i>	Pilg.	LC	Indigenous
Poaceae	<i>Eragrostis rotifer</i>	Rendle	LC	Indigenous
Poaceae	<i>Eragrostis sp.</i>			
Poaceae	<i>Eragrostis superba</i>	Peyr.	LC	Indigenous
Poaceae	<i>Eragrostis trichophora</i>	Coss. & Durieu	LC	Indigenous
Poaceae	<i>Eragrostis viscosa</i>	(Retz.) Trin.	LC	Indigenous
Ebenaceae	<i>Euclea crispa subsp. ovata</i>	(Thunb.) Gurke		Indigenous
Euphorbiaceae	<i>Euphorbia duseimata</i>	R.A.Dyer	LC	Indigenous; Endemic
Poaceae	<i>Eustachys paspaloides</i>	(Vahl) Lanza & Mattei	LC	Indigenous

Convolvulaceae	<i>Evolvulus alsinoides</i>	(L.) L.	LC	Indigenous
Asteraceae	<i>Felicia clavipilosa subsp. clavipilosa</i>	Grau	LC	Indigenous
Asteraceae	<i>Felicia muricata subsp. muricata</i>	(Thunb.) Nees	LC	Indigenous
Asteraceae	<i>Flaveria bidentis</i>	(L.) Kuntze		Not Indigenous; Naturalised; Invasive
Apocynaceae	<i>Fockea angustifolia</i>	K.Schum.	LC	Indigenous
Asteraceae	<i>Gazania krebsiana subsp. serrulata</i>	Less.	LC	Indigenous
Asteraceae	<i>Geigeria aspera var. aspera</i>	Harv.	LC	Indigenous
Asteraceae	<i>Geigeria filifolia</i>	Mattf.	LC	Indigenous
Asteraceae	<i>Geigeria ornativa subsp. ornativa</i>	O.Hoffm.	LC	Indigenous
Iridaceae	<i>Gladiolus permeabilis subsp. edulis</i>	D.Delaroche	LC	Indigenous
Asteraceae	<i>Gnaphalium filagopsis</i>	Hilliard & B.L.Burt	LC	Indigenous
Amaranthaceae	<i>Gomphrena celosioides</i>	Mart.		Not Indigenous; Naturalised
Malvaceae	<i>Grewia flava</i>	DC.	LC	Indigenous
Malvaceae	<i>Grewia retinervis</i>	Burret	LC	Indigenous
Celastraceae	<i>Gymnosporia tenuispina</i>	(Sond.) Szyszyl.	LC	Indigenous
Pedaliaceae	<i>Harpagophytum procumbens subsp. procumbens</i>	(Burch.) DC. ex Meisn.	NE	Indigenous
Asteraceae	<i>Helichrysum cerastioides var. cerastioides</i>	DC.	LC	Indigenous
Boraginaceae	<i>Heliotropium ciliatum</i>	Kaplan	LC	Indigenous
Boraginaceae	<i>Heliotropium nelsonii</i>	C.H.Wright	LC	Indigenous
Malvaceae	<i>Hermannia boraginiflora</i>	Hook.	LC	Indigenous
Malvaceae	<i>Hermannia erodioides</i>	(Burch. ex DC.) Kuntze	LC	Indigenous
Malvaceae	<i>Hermannia quartiniana</i>	A.Rich.	LC	Indigenous
Malvaceae	<i>Hermannia stellulata</i>	(Harv.) K.Schum.	LC	Indigenous
Malvaceae	<i>Hermannia tomentosa</i>	(Turcz.) Schinz ex Engl.	LC	Indigenous
Amaranthaceae	<i>Hermbstaedtia odorata var. aurantiaca</i>	(Burch.) T.Cooke	NE	Indigenous
Poaceae	<i>Heteropogon contortus</i>	(L.) Roem. & Schult.	LC	Indigenous
Malvaceae	<i>Hibiscus engleri</i>	K.Schum.	LC	Indigenous
Malvaceae	<i>Hibiscus pusillus</i>	Thunb.	LC	Indigenous
Malvaceae	<i>Hibiscus trionum</i>	L.		Not Indigenous; Naturalised
Asteraceae	<i>Hilliardiella elaeagnoides</i>	(DC.) Swelank. & J.C.Manning		Indigenous
Asteraceae	<i>Hirpicium bechuanense</i>	(S.Moore) Roessler	LC	Indigenous
Poaceae	<i>Hyparrhenia hirta</i>	(L.) Stapf	LC	Indigenous
Fabaceae	<i>Indigofera comosa</i>	N.E.Br.	LC	Indigenous
Fabaceae	<i>Indigofera filipes</i>	Benth. ex Harv.	LC	Indigenous
Fabaceae	<i>Indigofera rhytidocarpa subsp. rhytidocarpa</i>	Benth. ex Harv.	LC	Indigenous
Fabaceae	<i>Indigofera sessilifolia</i>	DC.	LC	Indigenous
Convolvulaceae	<i>Ipomoea bolusiana</i>	Schinz	LC	Indigenous

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Convolvulaceae	<i>Ipomoea oblongata</i>	E.Mey. ex Choisy	LC	Indigenous
Convolvulaceae	<i>Ipomoea obscura</i> var. <i>obscura</i>	(L.) Ker Gawl.	LC	Indigenous
Convolvulaceae	<i>Ipomoea oenotherae</i> var. <i>oenotherae</i>	(Vatke) Hallier f.	LC	Indigenous
Lamiaceae	<i>Kalaharia uncinata</i>	(Schinz) Moldenke		Indigenous
Kewaceae	<i>Kewa bowkeriana</i>	(Sond.) Christenh.	LC	Indigenous
Rubiaceae	<i>Kohautia subverticillata</i> subsp. <i>subverticillata</i>	(K.Schum.) D.Mantell	LC	Indigenous
Cyperaceae	<i>Kyllinga erecta</i> var. <i>erecta</i>	Schumach.	LC	Indigenous
Amaranthaceae	<i>Kyphocarpa angustifolia</i>	(Moq.) Lopr.	LC	Indigenous
Verbenaceae	<i>Lantana mearnsii</i> var. <i>latibracteolata</i>	Moldenke		Indigenous
Poaceae	<i>Leptochloa fusca</i>	(L.) Kunth	LC	Indigenous
Limeaceae	<i>Limeum argute-carinatum</i> var. <i>kwebense</i>	Wawra ex Wawra & Peyr.		Indigenous
Verbenaceae	<i>Lippia scaberrima</i>	Sond.		Indigenous
Fabaceae	<i>Listia heterophylla</i>	E.Mey.	LC	Indigenous
Lobeliaceae	<i>Lobelia sonderiana</i>	(Kuntze) Lammers	LC	Indigenous
Fabaceae	<i>Lotononis crumanina</i>	Burch. ex Benth.	LC	Indigenous
Solanaceae	<i>Lycium cinereum</i>	Thunb.	LC	Indigenous
Solanaceae	<i>Lycium pilifolium</i>	C.H.Wright	LC	Indigenous
Malvaceae	<i>Malva pusilla</i>	Sm.		Not Indigenous; Naturalised
Marsileaceae	<i>Marsilea macrocarpa</i>	C.Presl	LC	Indigenous
Marsileaceae	<i>Marsilea</i> sp.			
Malvaceae	<i>Melhanian prostrata</i>	DC.	LC	Indigenous
Poaceae	<i>Melinis nervigulumis</i>	(Franch.) Zizka	LC	Indigenous
Poaceae	<i>Melinis repens</i> subsp. <i>repens</i>	(Willd.) Zizka	LC	Indigenous
Fabaceae	<i>Melolobium candicans</i>	(E.Mey.) Eckl. & Zeyh.	LC	Indigenous
Fabaceae	<i>Melolobium microphyllum</i>	(L.f.) Eckl. & Zeyh.	LC	Indigenous
Cucurbitaceae	<i>Momordica balsamina</i>	L.	LC	Indigenous
Geraniaceae	<i>Monsonia angustifolia</i>	E.Mey. ex A.Rich.	LC	Indigenous
Fabaceae	<i>Mundulea sericea</i> subsp. <i>sericea</i>	(Willd.) A.Chev.	LC	Indigenous
Amaryllidaceae	<i>Nerine frithii</i>	L.Bolus	LC	Indigenous; Endemic
Amaryllidaceae	<i>Nerine</i> sp.			
Asteraceae	<i>Nidorella resedifolia</i> subsp. <i>resedifolia</i>	DC.	LC	Indigenous
Ochnaceae	<i>Ochna pretoriensis</i>	E.Phillips	LC	Indigenous
Lamiaceae	<i>Ocimum angustifolium</i>	Benth.	LC	Indigenous
Asteraceae	<i>Osteospermum muricatum</i> subsp. <i>muricatum</i>	E.Mey. ex DC.	LC	Indigenous
Asteraceae	<i>Osteospermum scariosum</i> var. <i>scariosum</i>	DC.	NE	Indigenous
Oxalidaceae	<i>Oxalis depressa</i>	Eckl. & Zeyh.	LC	Indigenous
Anacardiaceae	<i>Ozoroa paniculosa</i> var. <i>paniculosa</i>	(Sond.) R.Fern. & A.Fern.	LC	Indigenous

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Anacardiaceae	<i>Ozoroa paniculosa var. salicina</i>	(Sond.) R.Fern. & A.Fern.	LC	Indigenous
Poaceae	<i>Panicum coloratum</i>	L.	LC	Indigenous
Poaceae	<i>Panicum kalaharensis</i>	Mez	LC	Indigenous
Poaceae	<i>Panicum maximum</i>	Jacq.	LC	Indigenous
Poaceae	<i>Panicum schinzii</i>	Hack.	LC	Indigenous
Poaceae	<i>Panicum sp.</i>			
Rubiaceae	<i>Pavetta zeyheri subsp. zeyheri</i>	Sond.	LC	Indigenous
Malvaceae	<i>Pavonia burchellii</i>	(DC.) R.A.Dyer	LC	Indigenous
Apocynaceae	<i>Pentarrhinum inspidum</i>	E.Mey.	LC	Indigenous
Asteraceae	<i>Pentzia calcarea</i>	Kies	LC	Indigenous
Asteraceae	<i>Pentzia globosa</i>	Less.	LC	Indigenous
Poaceae	<i>Perotis patens</i>	Gand.	LC	Indigenous
Phyllanthaceae	<i>Phyllanthus parvulus var. garipensis</i>	Sond.	LC	Indigenous
Phyllanthaceae	<i>Phyllanthus parvulus var. parvulus</i>	Sond.	LC	Indigenous
Plumbaginaceae	<i>Plumbago zeylanica</i>	L.		Not Indigenous; Naturalised
Poaceae	<i>Pogonarthria squarrosa</i>	(Roem. & Schult.) Pilg.	LC	Indigenous
Asteraceae	<i>Polydora poskeana</i>	(Vatke & Hildebr.) H.Rob.	LC	Indigenous
Polygalaceae	<i>Polygala leptophylla var. leptophylla</i>	Burch.	LC	Indigenous
Polygonaceae	<i>Polygonum plebeium</i>	R.Br.	LC	Indigenous
Fabaceae	<i>Pomaria burchellii subsp. burchellii</i>	(DC.) B.B.Simpson & G.P.Lewis	LC	Indigenous
Fabaceae	<i>Prosopis velutina</i>	Wooton	NE	Not Indigenous; Naturalised; Invasive
Asteraceae	<i>Pseudognaphalium luteoalbum</i>	(L.) Hilliard & B.L.Burt	LC	Not Indigenous; Naturalised
Asteraceae	<i>Pseudognaphalium oligandrum</i>	(DC.) Hilliard & B.L.Burt	LC	Indigenous
Pedaliaceae	<i>Pterodiscus speciosus</i>	Hook.	LC	Indigenous
Ranunculaceae	<i>Ranunculus multifidus</i>	Forssk.	LC	Indigenous
Apocynaceae	<i>Raphionacme velutina</i>	Schltr.	LC	Indigenous
Fabaceae	<i>Rhynchosia adenodes</i>	Eckl. & Zeyh.	LC	Indigenous
Fabaceae	<i>Rhynchosia sp.</i>			
Fabaceae	<i>Rhynchosia totta var. longicalyx</i>	(Thunb.) DC.		Indigenous
Fabaceae	<i>Rhynchosia totta var. totta</i>	(Thunb.) DC.	LC	Indigenous
Fabaceae	<i>Rhynchosia totta var. venulosa</i>	(Thunb.) DC.		Indigenous
Acanthaceae	<i>Ruellia patula</i>	Jacq.		Indigenous
Lamiaceae	<i>Salvia coccinea</i>	Etl.		Not Indigenous; Naturalised
Lamiaceae	<i>Salvia disermas</i>	L.	LC	Indigenous
Lamiaceae	<i>Salvia runcinata</i>	L.f.	LC	Indigenous
Ruscaceae	<i>Sansevieria sp.</i>			
Poaceae	<i>Schizachyrium sanguineum</i>	(Retz.) Alston	LC	Indigenous
Asteraceae	<i>Schkuhria pinnata</i>	(Lam.) Kuntze ex Thell.		Not Indigenous; Naturalised

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Poaceae	<i>Schmidtia pappophoroides</i>	Steud.	LC	Indigenous
Cyperaceae	<i>Schoenoplectus muricinux</i>	(C.B.Clarke) J.Raynal	LC	Indigenous
Anacardiaceae	<i>Searsia ciliata</i>	(Licht. ex Schult.) A.J.Mill.		Indigenous
Anacardiaceae	<i>Searsia leptodictya forma leptodictya</i>	(Diels) T.S.Yi, A.J.Mill. & J.Wen		Indigenous
Anacardiaceae	<i>Searsia pyroides var. pyroides</i>	(Burch.) Moffett		Indigenous
Anacardiaceae	<i>Searsia tenuinervis</i>	(Engl.) Moffett		Indigenous
Convolvulaceae	<i>Seddera capensis</i>	(E.Mey. ex Choisy) Hallier f.	LC	Indigenous
Scrophulariaceae	<i>Selago densiflora</i>	Rolfe	LC	Indigenous
Fabaceae	<i>Senegalia hereroensis</i>	(Engl.) Kyal. & Boatwr.	LC	Indigenous
Fabaceae	<i>Senna italica subsp. arachoides</i>	Mill.	LC	Indigenous
Amaranthaceae	<i>Sericocoma avolans</i>	Fenzl	LC	Indigenous
Amaranthaceae	<i>Sericorema remotiflora</i>	(Hook.f.) Lopr.	LC	Indigenous
Pedaliaceae	<i>Sesamum triphyllum var. triphyllum</i>	Welw. ex Asch.	LC	Indigenous
Fabaceae	<i>Sesbania notialis</i>	J.B.Gillett	LC	Indigenous; Endemic
Poaceae	<i>Setaria nigrirostris</i>	(Nees) T.Durand & Schinz	LC	Indigenous
Poaceae	<i>Setaria sphacelata var. torta</i>	(Schumach.) Stapf & C.E.Hubb. ex M.B.Moss	LC	Indigenous
Malvaceae	<i>Sida cordifolia subsp. cordifolia</i>	L.	LC	Indigenous
Solanaceae	<i>Solanum campylacanthum</i>	Hochst. ex A.Rich.		Indigenous
Solanaceae	<i>Solanum tomentosum</i>	L.		Indigenous; Endemic
Poaceae	<i>Sporobolus fimbriatus</i>	(Trin.) Nees	LC	Indigenous
Poaceae	<i>Sporobolus nitens</i>	Stent	LC	Indigenous
Poaceae	<i>Sporobolus oxyphyllus</i>	Fish	LC	Indigenous; Endemic
Poaceae	<i>Sporobolus sp.</i>			
Poaceae	<i>Stipagrostis ciliata var. capensis</i>	(Desf.) De Winter	LC	Indigenous
Poaceae	<i>Stipagrostis uniplumis var. neesii</i>	(Licht.) De Winter	LC	Indigenous
Poaceae	<i>Stipagrostis uniplumis var. uniplumis</i>	(Licht.) De Winter	LC	Indigenous
Orobanchaceae	<i>Striga gesnerioides</i>	(Willd.) Vatke	LC	Indigenous
Pottiaceae	<i>Syntrichia laevipila</i>	Brid.		Indigenous
Asteraceae	<i>Tagetes erecta</i>	L.		Not Indigenous; Naturalised
Tamaricaceae	<i>Tamarix ramosissima</i>	Ledeb.		Not Indigenous; Naturalised; Invasive
Asteraceae	<i>Tarchonanthus camphoratus</i>	L.	LC	Indigenous
Fabaceae	<i>Tephrosia burchellii</i>	Burt Davy	LC	Indigenous
Combretaceae	<i>Terminalia sericea</i>	Burch. ex DC.	LC	Indigenous
Lamiaceae	<i>Teucrium trifidum</i>	Retz.	LC	Indigenous
Poaceae	<i>Themeda triandra</i>	Forssk.	LC	Indigenous
Pottiaceae	<i>Tortella xanthocarpa</i>	(Schimp. ex Mull.Hal.) Broth.		Indigenous
Asphodelaceae	<i>Trachyandra burkei</i>	(Baker) Oberm.	LC	Indigenous

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Asphodelaceae	<i>Trachyandra laxa var. rigida</i>	(N.E.Br.) Oberm.	LC	Indigenous
Asphodelaceae	<i>Trachyandra saltii var. saltii</i>	(Baker) Oberm.	LC	Indigenous
Euphorbiaceae	<i>Tragia dioica</i>	Sond.	LC	Indigenous
Poaceae	<i>Tragus berteronianus</i>	Schult.	LC	Indigenous
Poaceae	<i>Tragus koelerioides</i>	Asch.	LC	Indigenous
Poaceae	<i>Tragus racemosus</i>	(L.) All.	LC	Indigenous
Aizoaceae	<i>Trianthema salsoloides var. transvaalensis</i>	Fenzl ex Oliv.	LC	Indigenous
Aizoaceae	<i>Trianthema sp.</i>			
Zygophyllaceae	<i>Tribulus terrestris</i>	L.	LC	Indigenous
Poaceae	<i>Tricholaena monachne</i>	(Trin.) Stapf & C.E.Hubb.	LC	Indigenous
Poaceae	<i>Trichoneura grandiglumis</i>	(Nees) Ekman	LC	Indigenous
Poaceae	<i>Triraphis andropogonoides</i>	(Steud.) E.Phillips	LC	Indigenous
Poaceae	<i>Triraphis purpurea</i>	Hack.	LC	Indigenous
Poaceae	<i>Triraphis schinzii</i>	Hack.	LC	Indigenous
Poaceae	<i>Urelytrum agropyroides</i>	(Hack.) Hack.	LC	Indigenous
Poaceae	<i>Urochloa brachyura</i>	(Hack.) Stapf	LC	Indigenous
Fabaceae	<i>Vachellia karroo</i>	(Hayne) Banfi & Gallaso	LC	Indigenous
Fabaceae	<i>Vachellia luederitzii var. luederitzii</i>	(Engl.) Kyal. & Boatwr.	LC	Indigenous
Rubiaceae	<i>Vangueria infausta subsp. infausta</i>	Burch.	LC	Indigenous
Santalaceae	<i>Viscum rotundifolium</i>	L.f.		Indigenous
Malvaceae	<i>Waltheria indica</i>	L.	LC	Indigenous
Solanaceae	<i>Withania somnifera</i>	(L.) Dunal	LC	Indigenous
Asteraceae	<i>Xanthium strumarium</i>	L.		Not Indigenous; Naturalised; Invasive
Convolvulaceae	<i>Xenostegia tridentata subsp. angustifolia</i>	(L.) D.F.Austin & Staples		Indigenous
Rhamnaceae	<i>Ziziphus mucronata subsp. mucronata</i>	Willd.		Indigenous
Rhamnaceae	<i>Ziziphus zeyheriana</i>	Sond.		Indigenous
Fabaceae	<i>Zornia milneana</i>	Mohlenbr.	LC	Indigenous

Appendix C Avifauna species expected in the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2017)
<i>Accipiter badius</i>	Shikra	Unlisted	LC
<i>Accipiter minullus</i>	Sparrowhawk, Little	Unlisted	LC
<i>Acridotheres tristis</i>	Myna, Common	Unlisted	LC
<i>Acrocephalus arundinaceus</i>	Reed-warbler, Great	Unlisted	LC
<i>Acrocephalus baeticatus</i>	Reed-warbler, African	Unlisted	Unlisted
<i>Acrocephalus gracilirostris</i>	Swamp-warbler, Lesser	Unlisted	LC
<i>Acrocephalus palustris</i>	Warbler, Marsh	Unlisted	LC
<i>Acrocephalus schoenobaenus</i>	Warbler, Sedge	Unlisted	LC
<i>Actitis hypoleucos</i>	Sandpiper, Common	Unlisted	LC
<i>Actophilornis africanus</i>	Jacana, African	Unlisted	LC
<i>Afrotis afraoides</i>	Korhaan, Northern Black	Unlisted	LC
<i>Alcedo cristata</i>	Kingfisher, Malachite	Unlisted	Unlisted
<i>Alopochen aegyptiacus</i>	Goose, Egyptian	Unlisted	LC
<i>Amadina erythrocephala</i>	Finch, Red-headed	Unlisted	LC
<i>Amandava subflava</i>	Waxbill, Orange-breasted	Unlisted	Unlisted
<i>Amaurornis flavirostris</i>	Crake, Black	Unlisted	LC
<i>Anas capensis</i>	Teal, Cape	Unlisted	LC
<i>Anas erythrorhyncha</i>	Teal, Red-billed	Unlisted	LC
<i>Anas smithii</i>	Shoveler, Cape	Unlisted	LC
<i>Anas undulata</i>	Duck, Yellow-billed	Unlisted	LC
<i>Anhinga rufa</i>	Darter, African	Unlisted	LC
<i>Anthoscopus minutus</i>	Penduline-tit, Cape	Unlisted	LC
<i>Anthus cinnamomeus</i>	Pipit, African	Unlisted	LC
<i>Anthus leucophrys</i>	Pipit, Plain-backed	Unlisted	LC
<i>Anthus vaalensis</i>	Pipit, Buffy	Unlisted	LC
<i>Apus affinis</i>	Swift, Little	Unlisted	LC
<i>Apus apus</i>	Swift, Common	Unlisted	LC
<i>Apus barbatus</i>	Swift, African Black	Unlisted	LC
<i>Apus caffer</i>	Swift, White-rumped	Unlisted	LC
<i>Aquila wahlbergi</i>	Eagle, Wahlberg's	Unlisted	LC
<i>Ardea cinerea</i>	Heron, Grey	Unlisted	LC
<i>Ardea goliath</i>	Heron, Goliath	Unlisted	LC
<i>Ardea melanocephala</i>	Heron, Black-headed	Unlisted	LC
<i>Ardeola ralloides</i>	Heron, Squacco	Unlisted	LC
<i>Ardeotis kori</i>	Bustard, Kori	NT	NT
<i>Arenaria interpres</i>	Turnstone, Ruddy	Unlisted	LC

<i>Asio capensis</i>	Owl, Marsh	Unlisted	LC
<i>Batis pririt</i>	Batis, Pirit	Unlisted	LC
<i>Bostrychia hagedash</i>	Ibis, Hadedda	Unlisted	LC
<i>Bradornis infuscatus</i>	Flycatcher, Chat	Unlisted	LC
<i>Bradornis mariquensis</i>	Flycatcher, Marico	Unlisted	LC
<i>Bubalornis niger</i>	Buffalo-weaver, Red-billed	Unlisted	LC
<i>Bubo africanus</i>	Eagle-owl, Spotted	Unlisted	LC
<i>Bubo lacteus</i>	Eagle-owl, Verreaux's	Unlisted	LC
<i>Bubulcus ibis</i>	Egret, Cattle	Unlisted	LC
<i>Buphagus erythrorhynchus</i>	Oxpecker, Red-billed	Unlisted	Unlisted
<i>Burhinus capensis</i>	Thick-knee, Spotted	Unlisted	LC
<i>Buteo vulpinus</i>	Buzzard, Steppe	Unlisted	Unlisted
<i>Butorides striata</i>	Heron, Green-backed	Unlisted	LC
<i>Calamonastes fasciolatus</i>	Wren-warbler, Barred	Unlisted	LC
<i>Calandrella cinerea</i>	Lark, Red-capped	Unlisted	LC
<i>Calendulauda africanoides</i>	Lark, Fawn-coloured	Unlisted	LC
<i>Calendulauda sabota</i>	Lark, Sabota	Unlisted	LC
<i>Calidris ferruginea</i>	Sandpiper, Curlew	LC	NT
<i>Calidris minuta</i>	Stint, Little	LC	LC
<i>Camaroptera brachyura</i>	Camaroptera, Green-backed	Unlisted	LC
<i>Camaroptera brevicaudata</i>	Camaroptera, Grey-backed	Unlisted	Unlisted
<i>Campethera abingoni</i>	Woodpecker, Golden-tailed	Unlisted	LC
<i>Campethera bennettii</i>	Woodpecker, Bennett's	Unlisted	LC
<i>Caprimulgus rufigena</i>	Nightjar, Rufous-cheeked	Unlisted	LC
<i>Centropus burchellii</i>	Coucal, Burchell's	Unlisted	Unlisted
<i>Centropus superciliosus</i>	Coucal, White-browed	Unlisted	LC
<i>Cercomela familiaris</i>	Chat, Familiar	Unlisted	LC
<i>Cercotrichas leucophrys</i>	Scrub-robin, White-browed	Unlisted	LC
<i>Cercotrichas paena</i>	Scrub-robin, Kalahari	Unlisted	LC
<i>Certhilauda chuana</i>	Lark, Short-clawed	LC	LC
<i>Ceryle rudis</i>	Kingfisher, Pied	Unlisted	LC
<i>Chalcomitra amethystina</i>	Sunbird, Amethyst	Unlisted	LC
<i>Charadrius pecuarius</i>	Plover, Kittlitz's	Unlisted	LC
<i>Charadrius tricollaris</i>	Plover, Three-banded	Unlisted	LC
<i>Chersomanes albofasciata</i>	Lark, Spike-heeled	Unlisted	LC
<i>Chlidonias hybrida</i>	Tern, Whiskered	Unlisted	LC
<i>Chlidonias leucopterus</i>	Tern, White-winged	Unlisted	LC
<i>Chrysococcyx caprius</i>	Cuckoo, Diderick	Unlisted	LC
<i>Chrysococcyx klaas</i>	Cuckoo, Klaas's	Unlisted	LC

<i>Ciconia abdimii</i>	Stork, Abdim's	NT	LC
<i>Ciconia ciconia</i>	Stork, White	Unlisted	LC
<i>Ciconia nigra</i>	Stork, Black	VU	LC
<i>Cinnyricinclus leucogaster</i>	Starling, Violet-backed	Unlisted	LC
<i>Cinnyris fuscus</i>	Sunbird, Dusky	Unlisted	LC
<i>Cinnyris mariquensis</i>	Sunbird, Marico	Unlisted	LC
<i>Cinnyris talatala</i>	Sunbird, White-bellied	Unlisted	LC
<i>Circaetus cinereus</i>	Snake-eagle, Brown	Unlisted	LC
<i>Circaetus pectoralis</i>	Snake-eagle, Black-chested	Unlisted	LC
<i>Circus macrourus</i>	Harrier, Pallid	NT	NT
<i>Cisticola aridulus</i>	Cisticola, Desert	Unlisted	LC
<i>Cisticola chiniana</i>	Cisticola, Rattling	Unlisted	LC
<i>Cisticola fulvicapilla</i>	Neddicky, Neddicky	Unlisted	LC
<i>Cisticola juncidis</i>	Cisticola, Zitting	Unlisted	LC
<i>Cisticola rufilatus</i>	Cisticola, Tinkling	Unlisted	LC
<i>Cisticola textrix</i>	Cisticola, Cloud	Unlisted	LC
<i>Cisticola tinniens</i>	Cisticola, Levillant's	Unlisted	LC
<i>Clamator jacobinus</i>	Cuckoo, Jacobin	Unlisted	LC
<i>Colius colius</i>	Mousebird, White-backed	Unlisted	LC
<i>Columba arquatrix</i>	Olive-pigeon, African	Unlisted	LC
<i>Columba guinea</i>	Pigeon, Speckled	Unlisted	LC
<i>Columba livia</i>	Dove, Rock	Unlisted	LC
<i>Coracias caudatus</i>	Roller, Lilac-breasted	Unlisted	LC
<i>Coracias garrulus</i>	Roller, European	NT	LC
<i>Coracias naevius</i>	Roller, Purple	Unlisted	LC
<i>Corvus albus</i>	Crow, Pied	Unlisted	LC
<i>Corvus capensis</i>	Crow, Cape	Unlisted	LC
<i>Corythaixoides concolor</i>	Go-away-bird, Grey	Unlisted	LC
<i>Cossypha caffra</i>	Robin-chat, Cape	Unlisted	LC
<i>Cossypha humeralis</i>	Robin-chat, White-throated	Unlisted	LC
<i>Coturnix coturnix</i>	Quail, Common	Unlisted	LC
<i>Coturnix delegorguei</i>	Quail, Harlequin	Unlisted	LC
<i>Creatophora cinerea</i>	Starling, Wattled	Unlisted	LC
<i>Crithagra atrogularis</i>	Canary, Black-throated	Unlisted	LC
<i>Crithagra flaviventris</i>	Canary, Yellow	Unlisted	LC
<i>Crithagra mozambica</i>	Canary, Yellow-fronted	Unlisted	LC
<i>Cuculus clamosus</i>	Cuckoo, Black	Unlisted	LC
<i>Cuculus gularis</i>	Cuckoo, African	Unlisted	LC
<i>Cursorius temminckii</i>	Cursor, Temminck's	Unlisted	LC

<i>Cypsiurus parvus</i>	Palm-swift, African	Unlisted	LC
<i>Dendrocygna viduata</i>	Duck, White-faced Whistling	Unlisted	LC
<i>Dendroperdix sephaena</i>	Francolin, Crested	Unlisted	LC
<i>Dendropicos fuscescens</i>	Woodpecker, Cardinal	Unlisted	LC
<i>Dicrurus adsimilis</i>	Drongo, Fork-tailed	Unlisted	LC
<i>Dryoscopus cubla</i>	Puffback, Black-backed	Unlisted	LC
<i>Egretta alba</i>	Egret, Great	Unlisted	LC
<i>Egretta garzetta</i>	Egret, Little	Unlisted	LC
<i>Egretta intermedia</i>	Egret, Yellow-billed	Unlisted	LC
<i>Elanus caeruleus</i>	Kite, Black-shouldered	Unlisted	LC
<i>Emberiza flaviventris</i>	Bunting, Golden-breasted	Unlisted	LC
<i>Emberiza impetواني</i>	Bunting, Lark-like	Unlisted	LC
<i>Emberiza tahapisi</i>	Bunting, Cinnamon-breasted	Unlisted	LC
<i>Eremomela icteropygialis</i>	Eremomela, Yellow-bellied	Unlisted	LC
<i>Eremomela usticollis</i>	Eremomela, Burnt-necked	Unlisted	LC
<i>Eremopterix leucotis</i>	Sparrowlark, Chestnut-backed	Unlisted	LC
<i>Eremopterix verticalis</i>	Sparrowlark, Grey-backed	Unlisted	LC
<i>Estrilda astrild</i>	Waxbill, Common	Unlisted	LC
<i>Estrilda erythronotos</i>	Waxbill, Black-faced	Unlisted	LC
<i>Euplectes afer</i>	Bishop, Yellow-crowned	Unlisted	LC
<i>Euplectes albonotatus</i>	Widowbird, White-winged	Unlisted	LC
<i>Euplectes orix</i>	Bishop, Southern Red	Unlisted	LC
<i>Euplectes progne</i>	Widowbird, Long-tailed	Unlisted	LC
<i>Eurocephalus anguitimens</i>	Shrike, Southern White-crowned	Unlisted	LC
<i>Falco amurensis</i>	Falcon, Amur	Unlisted	LC
<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC
<i>Falco chicquera</i>	Falcon, Red-necked	Unlisted	NT
<i>Falco naumanni</i>	Kestrel, Lesser	Unlisted	LC
<i>Falco rupicoloides</i>	Kestrel, Greater	Unlisted	LC
<i>Falco rupicolus</i>	Kestrel, Rock	Unlisted	LC
<i>Fulica cristata</i>	Coot, Red-knobbed	Unlisted	LC
<i>Gallinago nigripennis</i>	Snipe, African	Unlisted	LC
<i>Gallinula chloropus</i>	Moorhen, Common	Unlisted	LC
<i>Glaucidium perlatum</i>	Owlet, Pearl-spotted	Unlisted	LC
<i>Granatina granatina</i>	Waxbill, Violet-eared	Unlisted	LC
<i>Gyps africanus</i>	Vulture, White-backed	CR	CR
<i>Gyps coprotheres</i>	Vulture, Cape	EN	EN
<i>Halcyon albiventris</i>	Kingfisher, Brown-hooded	Unlisted	LC
<i>Halcyon chelicuti</i>	Kingfisher, Striped	Unlisted	LC

<i>Halcyon senegalensis</i>	Kingfisher, Woodland	Unlisted	LC
<i>Haliaeetus vocifer</i>	Fish-eagle, African	Unlisted	LC
<i>Himantopus himantopus</i>	Stilt, Black-winged	Unlisted	LC
<i>Hippolais icterina</i>	Warbler, Icterine	Unlisted	LC
<i>Hirundo abyssinica</i>	Swallow, Lesser Striped	Unlisted	LC
<i>Hirundo albicularis</i>	Swallow, White-throated	Unlisted	LC
<i>Hirundo cucullata</i>	Swallow, Greater Striped	Unlisted	LC
<i>Hirundo dimidiata</i>	Swallow, Pearl-breasted	Unlisted	LC
<i>Hirundo fuligula</i>	Martin, Rock	Unlisted	Unlisted
<i>Hirundo rustica</i>	Swallow, Barn	Unlisted	LC
<i>Hirundo semirufa</i>	Swallow, Red-breasted	Unlisted	LC
<i>Hirundo spilodera</i>	Cliff-swallow, South African	Unlisted	LC
<i>Indicator indicator</i>	Honeyguide, Greater	Unlisted	LC
<i>Indicator minor</i>	Honeyguide, Lesser	Unlisted	LC
<i>Lagonosticta rhodopareia</i>	Firefinch, Jameson's	Unlisted	LC
<i>Lagonosticta senegala</i>	Firefinch, Red-billed	Unlisted	LC
<i>Lamprotornis australis</i>	Starling, Burchell's	Unlisted	LC
<i>Lamprotornis nitens</i>	Starling, Cape Glossy	Unlisted	LC
<i>Laniarius atrococcineus</i>	Shrike, Crimson-breasted	Unlisted	LC
<i>Lanius collaris</i>	Fiscal, Common (Southern)	Unlisted	LC
<i>Lanius collurio</i>	Shrike, Red-backed	Unlisted	LC
<i>Lanius minor</i>	Shrike, Lesser Grey	Unlisted	LC
<i>Larus cirrocephalus</i>	Gull, Grey-headed	Unlisted	LC
<i>Leptoptilos crumeniferus</i>	Stork, Marabou	Unlisted	LC
<i>Lophotis ruficrista</i>	Korhaan, Red-crested	Unlisted	LC
<i>Lybius torquatus</i>	Barbet, Black-collared	Unlisted	LC
<i>Macronyx capensis</i>	Longclaw, Cape	Unlisted	LC
<i>Malcorus pectoralis</i>	Warbler, Rufous-eared	Unlisted	LC
<i>Megaceryle maximus</i>	Kingfisher, Giant	Unlisted	Unlisted
<i>Melierax canorus</i>	Goshawk, Southern Pale Chanting	Unlisted	LC
<i>Melierax gabar</i>	Goshawk, Gabar	Unlisted	LC
<i>Merops apiaster</i>	Bee-eater, European	Unlisted	LC
<i>Merops bullockoides</i>	Bee-eater, White-fronted	Unlisted	LC
<i>Merops hirundineus</i>	Bee-eater, Swallow-tailed	Unlisted	LC
<i>Merops persicus</i>	Bee-eater, Blue-cheeked	Unlisted	LC
<i>Merops pusillus</i>	Bee-eater, Little	Unlisted	LC
<i>Milvus aegyptius</i>	Kite, Yellow-billed	Unlisted	Unlisted
<i>Mirafra africana</i>	Lark, Rufous-naped	Unlisted	LC
<i>Mirafra apiata</i>	Lark, Cape Clapper	Unlisted	LC

<i>Mirafra cheniana</i>	Lark, Melodious	LC	LC
<i>Mirafra fasciolata</i>	Lark, Eastern Clapper	Unlisted	LC
<i>Mirafra marjoriae</i>	Lark, Agulhas Clapper	Unlisted	Unlisted
<i>Mirafra passerina</i>	Lark, Monotonous	Unlisted	LC
<i>Monticola brevipes</i>	Rock-thrush, Short-toed	Unlisted	LC
<i>Motacilla capensis</i>	Wagtail, Cape	Unlisted	LC
<i>Muscicapa striata</i>	Flycatcher, Spotted	Unlisted	LC
<i>Mycteria ibis</i>	Stork, Yellow-billed	EN	LC
<i>Myrmecocichla formicivora</i>	Chat, Anteating	Unlisted	LC
<i>Netta erythrophthalma</i>	Pochard, Southern	Unlisted	LC
<i>Nilaus afer</i>	Brubru	Unlisted	LC
<i>Numida meleagris</i>	Guineafowl, Helmeted	Unlisted	LC
<i>Nycticorax nycticorax</i>	Night-Heron, Black-crowned	Unlisted	LC
<i>Oena capensis</i>	Dove, Namaqua	Unlisted	LC
<i>Oenanthe monticola</i>	Wheatear, Mountain	Unlisted	LC
<i>Oenanthe pileata</i>	Wheatear, Capped	Unlisted	LC
<i>Oriolus larvatus</i>	Oriole, Black-headed	Unlisted	LC
<i>Ortygospiza atricollis</i>	Quailfinch, African	Unlisted	LC
<i>Oxyura maccoa</i>	Duck, Maccoa	NT	NT
<i>Parisoma subcaeruleum</i>	Tit-babbler, Chestnut-vented	Unlisted	Unlisted
<i>Parus cinerascens</i>	Tit, Ashy	Unlisted	LC
<i>Passer diffusus</i>	Sparrow, Southern Grey-headed	Unlisted	LC
<i>Passer domesticus</i>	Sparrow, House	Unlisted	LC
<i>Passer griseus</i>	Sparrow, Northern Grey-headed	Unlisted	LC
<i>Passer melanurus</i>	Sparrow, Cape	Unlisted	LC
<i>Passer motitensis</i>	Sparrow, Great	Unlisted	LC
<i>Pelecanus rufescens</i>	Pelican, Pink-backed	VU	LC
<i>Peliperdix coqui</i>	Francolin, Coqui	Unlisted	LC
<i>Petronia superciliaris</i>	Petronia, Yellow-throated	Unlisted	LC
<i>Phalacrocorax africanus</i>	Cormorant, Reed	Unlisted	LC
<i>Phalacrocorax carbo</i>	Cormorant, White-breasted	LC	LC
<i>Philetairus socius</i>	Weaver, Sociable	Unlisted	LC
<i>Philomachus pugnax</i>	Ruff	Unlisted	LC
<i>Phoeniconaias minor</i>	Flamingo, Lesser	NT	NT
<i>Phoenicopterus ruber</i>	Flamingo, Greater	NT	LC
<i>Phoeniculus purpureus</i>	Wood-hoopoe, Green	Unlisted	LC
<i>Phylloscopus trochilus</i>	Warbler, Willow	Unlisted	LC
<i>Platalea alba</i>	Spoonbill, African	Unlisted	LC
<i>Plectropterus gambensis</i>	Goose, Spur-winged	Unlisted	LC

<i>Plegadis falcinellus</i>	Ibis, Glossy	Unlisted	LC
<i>Plocepasser mahali</i>	Sparrow-weaver, White-browed	Unlisted	LC
<i>Ploceus velatus</i>	Southern Masked-weaver, Southern	Unlisted	LC
<i>Podiceps cristatus</i>	Grebe, Great Crested	Unlisted	LC
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN	VU
<i>Porphyrio madagascariensis</i>	Swamphen, African Purple	Unlisted	Unlisted
<i>Prinia flavicans</i>	Prinia, Black-chested	Unlisted	LC
<i>Prinia subflava</i>	Prinia, Tawny-flanked	Unlisted	LC
<i>Prionops plumatus</i>	Helmet-shrike, White-crested	Unlisted	LC
<i>Psophocichla litsipsirupa</i>	Thrush, Groundscraper	Unlisted	Unlisted
<i>Pternistis adspersus</i>	Spurfowl, Red-billed	Unlisted	LC
<i>Pternistis swainsonii</i>	Spurfowl, Swainson's	Unlisted	LC
<i>Pterocles burchelli</i>	Sandgrouse, Burchell's	Unlisted	LC
<i>Pterocles namaqua</i>	Sandgrouse, Namaqua	Unlisted	LC
<i>Ptilopusus granti</i>	Scops-owl, Southern White-faced	Unlisted	Unlisted
<i>Pycnonotus nigricans</i>	Bulbul, African Red-eyed	Unlisted	LC
<i>Pycnonotus tricolor</i>	Bulbul, Dark-capped	Unlisted	Unlisted
<i>Pytilia melba</i>	Pytilia, Green-winged	Unlisted	LC
<i>Quelea quelea</i>	Quelea, Red-billed	Unlisted	LC
<i>Recurvirostra avosetta</i>	Avocet, Pied	Unlisted	LC
<i>Rhinopomastus cyanomelas</i>	Scimitarbill, Common	Unlisted	LC
<i>Rhinoptilus africanus</i>	Cursorer, Double-banded	Unlisted	LC
<i>Riparia cincta</i>	Martin, Banded	Unlisted	LC
<i>Riparia paludicola</i>	Martin, Brown-throated	Unlisted	LC
<i>Rostratula benghalensis</i>	Painted-snipe, Greater	NT	LC
<i>Sagittarius serpentarius</i>	Secretarybird	VU	VU
<i>Sarkidiornis melanotos</i>	Duck, Comb	Unlisted	LC
<i>Saxicola torquatus</i>	Stonechat, African	Unlisted	LC
<i>Scleroptila levaillantoides</i>	Francolin, Orange River	Unlisted	LC
<i>Scopus umbretta</i>	Hamerkop, Hamerkop	Unlisted	LC
<i>Sigelus silens</i>	Flycatcher, Fiscal	Unlisted	LC
<i>Spizocorys conirostris</i>	Lark, Pink-billed	Unlisted	LC
<i>Sporopipes squamifrons</i>	Finch, Scaly-feathered	Unlisted	LC
<i>Spreo bicolor</i>	Starling, Pied	Unlisted	LC
<i>Stenostira scita</i>	Flycatcher, Fairy	Unlisted	LC
<i>Streptopelia capicola</i>	Turtle-dove, Cape	Unlisted	LC
<i>Streptopelia semitorquata</i>	Dove, Red-eyed	Unlisted	LC
<i>Streptopelia senegalensis</i>	Dove, Laughing	Unlisted	LC
<i>Struthio camelus</i>	Ostrich, Common	Unlisted	LC

<i>Sylvia borin</i>	Warbler, Garden	Unlisted	LC
<i>Sylvia communis</i>	Whitethroat, Common	Unlisted	LC
<i>Sylvietta rufescens</i>	Crombec, Long-billed	Unlisted	LC
<i>Tachybaptus ruficollis</i>	Grebe, Little	Unlisted	LC
<i>Tachymartitis melba</i>	Swift, Alpine	Unlisted	LC
<i>Tadorna cana</i>	Shelduck, South African	Unlisted	LC
<i>Tchagra australis</i>	Tchagra, Brown-crowned	Unlisted	LC
<i>Tchagra senegalus</i>	Tchagra, Black-crowned	Unlisted	LC
<i>Telophorus sulfureopectus</i>	Bush-shrike, Orange-breasted	Unlisted	LC
<i>Telophorus zeylonus</i>	Bokmakierie, Bokmakierie	Unlisted	LC
<i>Terpsiphone viridis</i>	Paradise-flycatcher, African	Unlisted	LC
<i>Thalassornis leuconotus</i>	Duck, White-backed	Unlisted	LC
<i>Threskiornis aethiopicus</i>	Ibis, African Sacred	Unlisted	LC
<i>Tockus leucomelas</i>	Hornbill, Southern Yellow-billed	Unlisted	LC
<i>Tockus nasutus</i>	Hornbill, African Grey	Unlisted	LC
<i>Torgos tracheliotus</i>	Vulture, Lappet-faced	EN	EN
<i>Trachyphonus vaillantii</i>	Barbet, Crested	Unlisted	LC
<i>Tricholaema leucomelas</i>	Barbet, Acacia Pied	Unlisted	LC
<i>Tringa glareola</i>	Sandpiper, Wood	Unlisted	LC
<i>Tringa nebularia</i>	Greenshank, Common	Unlisted	LC
<i>Tringa stagnatilis</i>	Sandpiper, Marsh	Unlisted	LC
<i>Turdoides bicolor</i>	Babbler, Southern Pied	Unlisted	LC
<i>Turdoides jardineii</i>	Babbler, Arrow-marked	Unlisted	LC
<i>Turdus olivaceus</i>	Thrush, Olive	Unlisted	LC
<i>Turdus smithi</i>	Thrush, Karoo	Unlisted	LC
<i>Turnix sylvaticus</i>	Buttonquail, Kurrichane	Unlisted	LC
<i>Tyto alba</i>	Owl, Barn	Unlisted	LC
<i>Upupa africana</i>	Hoepoe, African	Unlisted	LC
<i>Uraeginthus angolensis</i>	Waxbill, Blue	Unlisted	LC
<i>Urocolius indicus</i>	Mousebird, Red-faced	Unlisted	LC
<i>Urolestes melanoleucus</i>	Shrike, Magpie	Unlisted	LC
<i>Vanellus armatus</i>	Lapwing, Blacksmith	Unlisted	LC
<i>Vanellus coronatus</i>	Lapwing, Crowned	Unlisted	LC
<i>Vidua chalybeata</i>	Indigobird, Village	Unlisted	LC
<i>Vidua macroura</i>	Whydah, Pin-tailed	Unlisted	LC
<i>Vidua paradisaea</i>	Paradise-whydah, Long-tailed	Unlisted	LC
<i>Vidua regia</i>	Whydah, Shaft-tailed	Unlisted	LC
<i>Zosterops pallidus</i>	White-eye, Orange River	Unlisted	LC
<i>Zosterops virens</i>	White-eye, Cape	Unlisted	LC

Appendix D Mammals expected in the project area

Species	Common name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2017)
<i>Aethomys ineptus</i>	Tete Veld Rat	LC	LC
<i>Aethomys namaquensis</i>	Namaqua rock rat	LC	LC
<i>Alcelaphus buselaphus</i>	Hartebeest	LC	LC
<i>Antidorcas marsupialis</i>	Slater's Shrew	LC	LC
<i>Aonyx capensis</i>	Cape Clawless Otter	NT	NT
<i>Atelerix frontalis</i>	South Africa Hedgehog	NT	LC
<i>Canis mesomelas</i>	Black-backed Jackal	LC	LC
<i>Caracal caracal</i>	Caracal	LC	LC
<i>Ceratotherium simum</i>	White Rhinoceros	NT	NT
<i>Connochaetes gnou</i>	Black Wildebeest	LC	LC
<i>Connochaetes taurinus</i>	Blue Wildebeest	LC	LC
<i>Crociodura cyanea</i>	Reddish-grey Musk Shrew	LC	LC
<i>Crocuta crocuta</i>	Spotted Hyaena	NT	LC
<i>Cynictis penicillata</i>	Yellow Mongoose	LC	LC
<i>Dendromus melanotis</i>	Grey Climbing Mouse	LC	LC
<i>Desmodillus auricularis</i>	Short-tailed Gerbil	LC	LC
<i>Diceros bicornis</i>	Black Rhinoceros	EN	CR
<i>Elephantulus myurus</i>	Eastern Rock Sengi	LC	LC
<i>Eptesicus hottentotus</i>	Long-tailed Serotine Bat	LC	LC
<i>Equus quagga</i>	Plains Zebra	LC	NT
<i>Felis nigripes</i>	Black-footed Cat	VU	VU
<i>Felis silvestris</i>	African Wildcat	LC	LC
<i>Genetta genetta</i>	Small-spotted Genet	LC	LC
<i>Gerbilliscus brantsii</i>	Highveld Gerbil	LC	LC
<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil	LC	LC
<i>Gerbilliscus paeda</i>	Hairy-footed Gerbil	LC	Unlisted
<i>Giraffa camelopardalis</i>	Giraffe	LC	VU
<i>Herpestes sanguineus</i>	Slender Mongoose	LC	LC
<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	LC
<i>Ictonyx striatus</i>	Striped Polecat	LC	LC
<i>Lemniscomys rosalia</i>	Single-striped Mouse	LC	LC
<i>Lepus capensis</i>	Cape Hare	LC	LC
<i>Lepus saxatilis</i>	Scrub Hare	LC	LC
<i>Lepus victoriae</i>	African Savanna Hare	LC	LC
<i>Melacothrix typica</i>	Large-eared Mouse	LC	Unlisted
<i>Mastomys coucha</i>	Multimammate Mouse	LC	LC

<i>Mellivora capensis</i>	Honey Badger	LC	LC
<i>Mus musculus</i>	House Mouse	Unlisted	LC
<i>Mystromys albicaudatus</i>	White-tailed Rat	VU	EN
<i>Neoromicia capensis</i>	Cape Serotine Bat	LC	LC
<i>Orycteropus afer</i>	Aardvark	LC	LC
<i>Oryx gazella</i>	Gemsbok	LC	LC
<i>Otocyon megalotis</i>	Bat-eared Fox	LC	LC
<i>Panthera pardus</i>	Leopard	VU	VU
<i>Papio ursinus</i>	Chacma Baboon	LC	LC
<i>Parahyaena brunnea</i>	Brown Hyaena	NT	NT
<i>Pedetes capensis</i>	Springhare	LC	LC
<i>Phacochoerus africanus</i>	Common Warthog	LC	LC
<i>Poecilogale albinucha</i>	African Striped Weasel	NT	LC
<i>Proteles cristata</i>	Aardwolf	LC	LC
<i>Raphicerus campestris</i>	Steenbok	LC	LC
<i>Rhabdomys pumilio</i>	Xeric Four-striped Mouse	LC	LC
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	LC	LC
<i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	LC	LC
<i>Rhinolophus denti</i>	Dent's Horseshoe Bat	NT	LC
<i>Saccostomus campestris</i>	Pouched Mouse	LC	LC
<i>Sauromys petrophilus</i>	Flat-headed Free-tail Bat	LC	LC
<i>Smutsia temminckii</i>	Temminck's Ground Pangolin	VU	VU
<i>Steatomys krebsii</i>	Krebs's Fat Mouse	LC	LC
<i>Suricata suricatta</i>	Suricate	LC	LC
<i>Sylvicapra grimmia</i>	Common Duiker	LC	LC
<i>Syncerus caffer</i>	African Buffalo	LC	LC
<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	LC	LC
<i>Thallomys paedulus</i>	Tree Rat	LC	LC
<i>Tragelaphus oryx</i>	Common Eland	LC	LC
<i>Vulpes chama</i>	Cape Fox	LC	LC
<i>Xerus inauris</i>	Cape Ground Squirrel	LC	LC

Appendix E Reptiles species expected in the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2017)
<i>Acontias gracilicauda</i>	Thin-tailed Legless Skink	LC	LC
<i>Agama atra</i>	Southern Rock Agama	LC	LC
<i>Aparallactus capensis</i>	Black-headed Centipede-eater	LC	LC
<i>Chamaeleo dilepis</i>	Common Flap-neck Chameleon	LC	LC
<i>Dasypeltis scabra</i>	Rhombic Egg-eater	LC	LC
<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	LC	Unlisted
<i>Hemachatus haemachatus</i>	Rinkhals	LC	LC
<i>Hemidactylus mabouia</i>	Common Tropical House Gecko	LC	Unlisted
<i>Lycodonomorphus rufulus</i>	Brown Water Snake	LC	Unlisted
<i>Lygodactylus capensis capensis</i>	Common Dwarf Gecko	LC	Unlisted
<i>Naja annulifera</i>	Snouted Cobra	LC	Unlisted
<i>Pachydactylus capensis</i>	Cape Gecko	LC	Unlisted
<i>Prosymna ambigua</i>	Angolan Shovel-snout	Unlisted	LC
<i>Psammophis trinasalis</i>	Fork-marked Sand Snake	LC	Unlisted
<i>Psammophylax tritaeniatus</i>	Striped Grass Snake	LC	LC
<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	LC	Unlisted
<i>Stigmochelys pardalis</i>	Leopard Tortoise	LC	LC
<i>Trachylepis capensis</i>	Cape Skink	LC	Unlisted
<i>Trachylepis punctatissima</i>	Speckled Rock Skink	LC	LC
<i>Trachylepis varia</i>	Variable Skink	LC	LC

Appendix F Amphibians expected in the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2017)
<i>Amietia fuscigula</i>	Cape River Frog	LC	LC
<i>Breviceps adspersus</i>	Bushveld Rain Frog	LC	LC
<i>Cacosternum boettgeri</i>	Common Caco	LC	LC
<i>Kassina senegalensis</i>	Bubbling Kassina	LC	LC
<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog	LC	LC
<i>Phrynomantis bifasciatus</i>	Banded Rubber Frog	LC	LC
<i>Ptychadena anchietae</i>	Plain Grass Frog	LC	LC
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	LC	LC
<i>Schismaderma carens</i>	African Red Toad	LC	LC
<i>Sclerophrys garmani</i>	Olive Toad	LC	LC
<i>Sclerophrys gutturalis</i>	Guttural Toad	LC	LC
<i>Sclerophrys poweri</i>	Power's Toad	LC	LC
<i>Tomopterna cryptotis</i>	Tremelo Sand Frog	LC	LC
<i>Tomopterna tandyi</i>	Tandy's Sand Frog	LC	LC
<i>Xenopus laevis</i>	Common Platanna	LC	LC