Exclusion of Biodiversity Impact Study for Klipspruit Colliery's proposed Nwabu Project - Pit BD and Pit H Underground Expansion Project

Prepared for

Seriti Power (Pty) Ltd

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Client Name:	Seriti Power (Pty) Ltd		
EAP:	Niara Environmental Consultants (Pty) Ltd		

Document History

Revision	EAP/Author	Reviewed By	Date of Issue	Comments
0	Ndumiso Dlamini	Vumile Ribeiro	01 July 2024	

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- 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.

Signature of the EAP:	 Ndumiso Dlamini (Pr. Sci. Nat.)
Designation:	Senior Ecologist
Qualifications:	BSc Hons Botany, University of Johannesburg
Name of Company:	Niara Environmental Consultants (Pty) Ltd
Experience (Years):	10 Years
Date:	June 2024

Specialist Checklist

EIA REGULATIONS 2017 GNR 327, 325 and 324 Appendix 6 **CONTENT OF THE SPECIALIST REPORTS**	**In accordance with the EIA Regulations**	**Cross reference in this Report**
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	✓	Section **Error! Reference source not found.**
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	✓	Page 3
(c) an indication of the scope of, and the purpose for which, the report was prepared	✓	Section 1.4
(cA) an indication of the quality and age of Base Data used for the specialist report	✓	Section **Error! Reference source not found.**
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and the levels of acceptable change	✓	Section **Error! Reference source not found.**
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	✓	Section **Error! Reference source not found.**
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	✓	Section **Error! Reference source not found.**
(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 5
(g) an identification of any areas to be avoided, including buffers;	✓	N/A
(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	✓	N/A
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	✓	Section **Error! Reference source not found.**
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities	✓	Section **Error! Reference source not found.**
(k) any mitigation measures for inclusion in the EMPr	✓	Section 7
(l) any conditions for inclusion in the environmental authorisation;	✓	Section 7
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	✓	Section 7
(n) a reasoned opinion— i. whether the proposed activity, activities or portions thereof should be authorised; and (iA) regarding the acceptability of the proposed activity or activities; and	✓	Section 6

EIA REGULATIONS 2017 GNR 327, 325 and 324 Appendix 6 CONTENT OF THE SPECIALIST REPORTS	**In accordance with the EIA Regulations**	**Cross reference in this Report**
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;		
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	✓	N/A
(p) any other information requested by the competent authority	✓	N/A

Table of Contents

1 Introduction 1
1.1 Project Applicant 1
1.2 Details of the EAP 2
1.3 Project Locality 3
1.4 Details and Expertise of Specialist 6
2 Project objectives 6
2.1 Mining 7
2.1.1 KPSX Proposed Mining 7
2.1.2 Processing 10
2.1.3 Waste Management 10
2.1.4 Summary of the Infrastructure Requirements 10
3 Exclusion of Biodiversity Impact Study 13
4 Alternative Assessment 17
4.1 Mining Method Alternatives 18
4.2 Mining Footprint 19
4.3 No-go Option 20
5 Impact Assessment Rating Methodology 20
6 Impact Assessment 22
6.1 Construction Phase Impacts 23
6.2 Operational Phase Impacts 23
6.3 Decommissioning Phase Impacts 25
6.4 Post Closure 27
7 Specialist Opinion 28

List of Figures

Figure 1-1: Locality Map 4
Figure 1-2: Affected farm portions over existing and proposed UG mining areas 5
Figure 2-1: Proposed S2A mining 8
Figure 2-2: Proposed S4L Mining 8
Figure 2-3: Life of Mine plan for the proposed KPSX UG mining 10
Figure 2-4: Layout for KPSX UG haul roads, pipelines, conveyor, load-haul and feed infrastructure 11
Figure 3-1: The regional vegetation over the Areas of Focus (Pit H and Pit BD) 14
Figure 3-2: Land Cover over the proposed project area 15
Figure 3-3: Vegetation within the project area 16
Figure 3-4: The classification of the vegetation within the project area 17
Figure 4-1: Mining Method Alternatives 19
Figure 4-2: Mining Footprint Alternatives 20

List of Tables

Table 1-1: Applicants Details 1
Table 1-2: EAPs Details 2
Table 1-3: Activity Location 3
Table 3-1: Vegetation Status 13
Table 3-2: Dominant Plant Species 13
Table 3-3: Plant species observed in the project area 16
Table 5-1: Impact Rating Methodology 20
Table 6-1: Impact Evaluation – Construction Phase 23
Table 6-2: Impact Evaluation – Operational Phase 23
Table 6-3: Impact Evaluation – Closure and Rehabilitation Phase 25
Table 6-4: Impact Evaluation – Post-Closure Monitoring Phase 27

List of Appendices

Specialist CV

List of Abbreviations and Acronyms

BIOTA	Biodiversity Monitoring Transect Analysis in Africa
CBA	Critical Biodiversity Area
CBD	Convention on Biological Diversity
CITES	Convention on the International Trade in Endangered Species
CR	Critically Endangered
DAFF	Department of Agriculture, Forestry and Fisheries (former government department)
DALRRD	Department of Agriculture, Land Reform and Rural Development (formed by merging DAFF and Department of Rural Development and Land Reform in June 2019)
DD	Data Deficient
DEA	Department of Environmental Affairs (former government department)
DEFF	Department of Environment, Forestry and Fisheries (formed by merging DAFF and DEA in June 2019)
DNA	Deoxyribonucleic acid
DWS	Department of Water and Sanitation
EEZ	Exclusive Economic Zone
EN	Endangered
FBIP	Foundational Biodiversity Information Programme
FEPA	Freshwater Ecosystem Priority Areas
GIS	Geographic Information Systems
KBA	Key Biodiversity Area
NBA	National Biodiversity Assessment
NBF	National Biodiversity Framework
NEMBA / NEM:BA	National Environmental Management: Biodiversity Act (10 of 2004) / Biodiversity Act
NFEPA	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
PA	Protected area
PD	Phylogenetic diversity

1 Introduction

Seriti Power (Pty) Ltd ("Seriti Power") is the holder of a Mining Right for coal in respect of its Klipspruit Colliery ("KPS") operation issued under the Department of Mineral Resources and Energy ("DMRE") (Ref No. MP 30/5/1/2/2/125 MR).

KPS consists of three mining areas under a single Mining Right. These areas are referred to as:

- KPS Main Pit which includes the Main Pit, Smaldeel and Bankfontein Pits;
- "KPSX" or Klipspruit Extension Weltevreden including Pit BD, Pit H, Pit G and Pit S; and
- "KPSS" or Klipspruit South which includes the KPSS East of the Thungela conveyor and the KPSS West of the Thungela conveyor.

KPS Main Pit holds an Environmental Management Programme Report ("EMPr"), converted in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) ("MPRDA") and approved on 14 September 2010 and the EMPr for KPSS and KPSX (Pit BD) which was approved on 17 August 2017. KPS was further awarded an Environmental Authorisation ("EA") for the Opencast ("OC") mining of Pit H in October 2022. In August 2023, an EA was granted for the OC mining of Pit G & S.

In October 2022, KPS was granted a Section 102 ("S102") amendment approval as contemplated under the MPRDA to convert the mining method for KPSX and KPSS from opencast ("OC") to underground ("UG") bord and pillar mining. A subsequent amendment application for the EA was submitted to the DMRE on the 18th August 2023 as provided for under Regulation 29 of the NEMA Environmental Impact Assessment ("EIA") Regulations ("GNR 326"), for the conversion of the mining method from OC to UG of the area within KPSX named Pit BD. The approval of this EA is still pending.

KPS intends to apply for a change in mining method to the remainder of the KPSX and KPSS reserves from OC to UG (including all future mining areas of KPSX that fall outside of the Pit BD and inclusive of Pit H). This project has been termed and will for the purposes of this application be referred to as, the "Nwabu Project".

KPS intends on applying for an EA and an Integrated Water Use License ("IWUL") for proposed change in mining method to KPSX and KPSS. The application process to be followed in terms of NEMA, for the additional activities proposed across KPSX and KPSS, is a Basic Assessment ("BA") process as contemplated under Chapter 4 of GNR 326. Seriti Power is also required to apply for a Water Use Licence for the proposed amendments, in terms of Section 21 of the National Water Act, 1998 (Act No. 36 of 1998).

1.1 Project Applicant

Table 1-1: Applicants Details

Name of Applicant:	Seriti Power (Pty) Ltd (previously known as South32 SA Coal Holdings (Pty) Ltd)
Registration No:	1963/000537/07
Responsible Person:	Dirk Muller

	Operations Manager, Klipspruit Colliery
Physical Address:	Moyahabo Jumbo Makagalefe
Postal Address:	Klipspruit Colliery: Portion 12, Farm Klipfontein 3Registration Division IS Ogies, 2230 South Africa
Telephone No:	P.O Box 639 Northlands, Johannesburg 2116
Email:	013 689 4620
	Moyahabo.Makgalefe@seritiza.com

1.2 Details of the EAP

Niara Environmental Consultants (Pty) Ltd (Niara) has been appointed as an Independent Environmental Assessment Practitioner (EAP) by Seriti Power to undertake the BA process in support of an EA application, and an Integrated Water Use Licence Application (IWULA). The details of the EAP are captured in Table 1-2 below.

Table 1-2: EAPs Details

Name of Practitioner:	Vumile Ribeiro
Registration No:	2019/1183
Responsible Person:	Niara Environmental Consultants (Pty) Ltd
Physical Address:	Office 1 Palm Place Office Park 22 Bram Fischer Drive, Linden, Johannesburg 2195
Postal Address:	28 Shamrock Street, Ferndale, Randburg, Johannesburg 2194
Telephone No:	+27 82 767 2786
Email:	vumile@niara.co.za

1.3 Project Locality

KPS and KPSS are located approximately 1 km west of the town of Ogies, with KPSX located 6 km north of the town of Ogies, in the eMalahleni Local Municipality within the Nkangala District Municipality in the Mpumalanga Province. Refer to Figure 1-1 and Appendix B, Plan 1 for a regional setting.

Table 1-3 provides the location for which the proposed project will be undertaken. Plan 2a in Appendix B provides a local setting for the proposed infrastructure.

Table 1-3: Activity Location

Farm Name:	Hartebeestlaagte 325 JS, Weltevreden 324 JS, Tweefontein 328 JS, Wildebeesfontein 327 JS, Grootpan 7 IS, Oggiesfontein 4 IS, Prinshof 2 IS, Klipfontein 3 IS, Smaldeel 1 IS, Phola Plant 830 IS, Zwaaiwater 11 IS.
Application Area (Ha)	
Magisterial District:	Nkangala District Municipality
Distance and Direction from Nearest Town:	Approximately 6km north of Ogies town.
21 Digit Surveyor General Code for each Farm Portion	Attached as Appendix B.

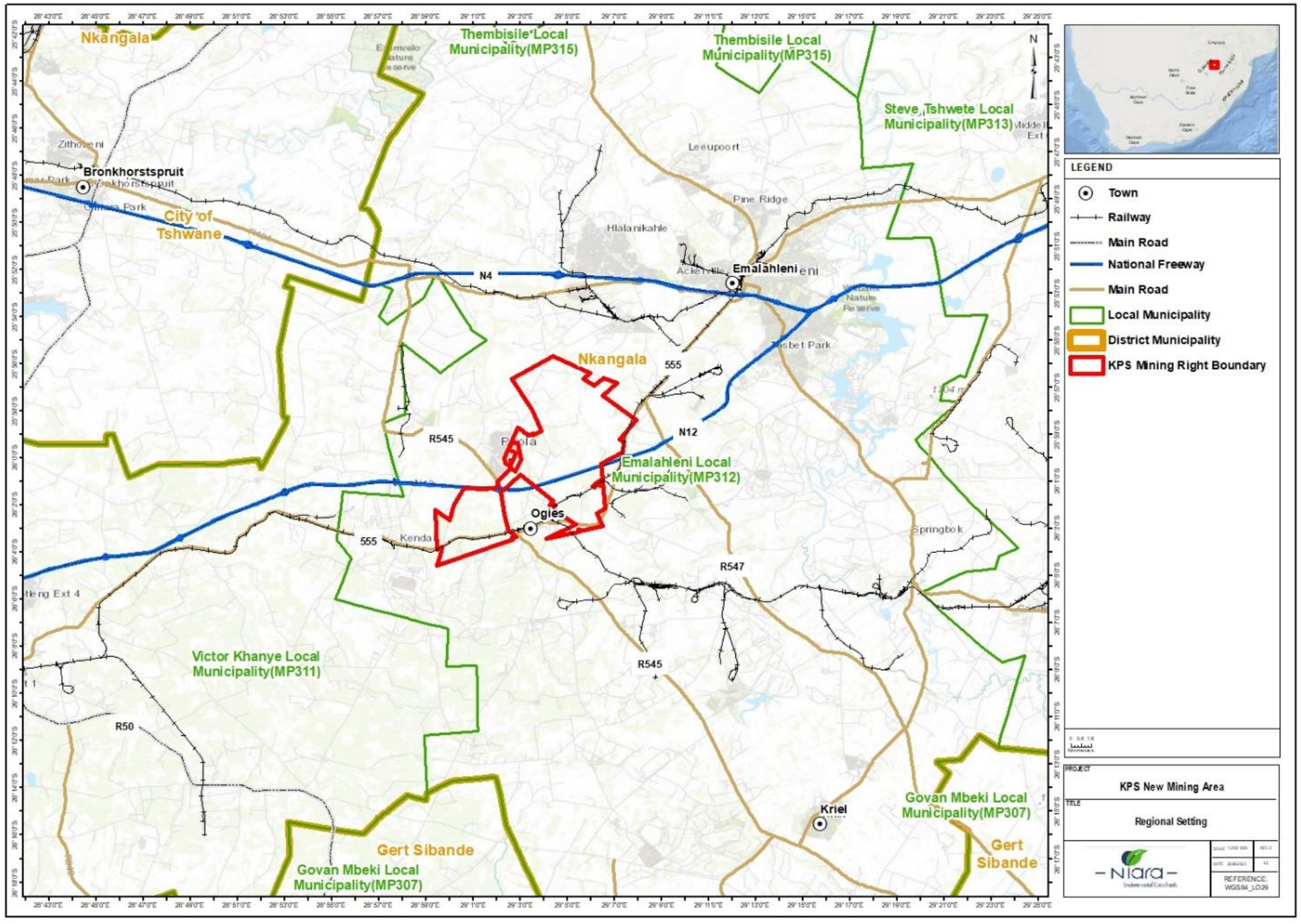

Figure 1-1: Locality Map

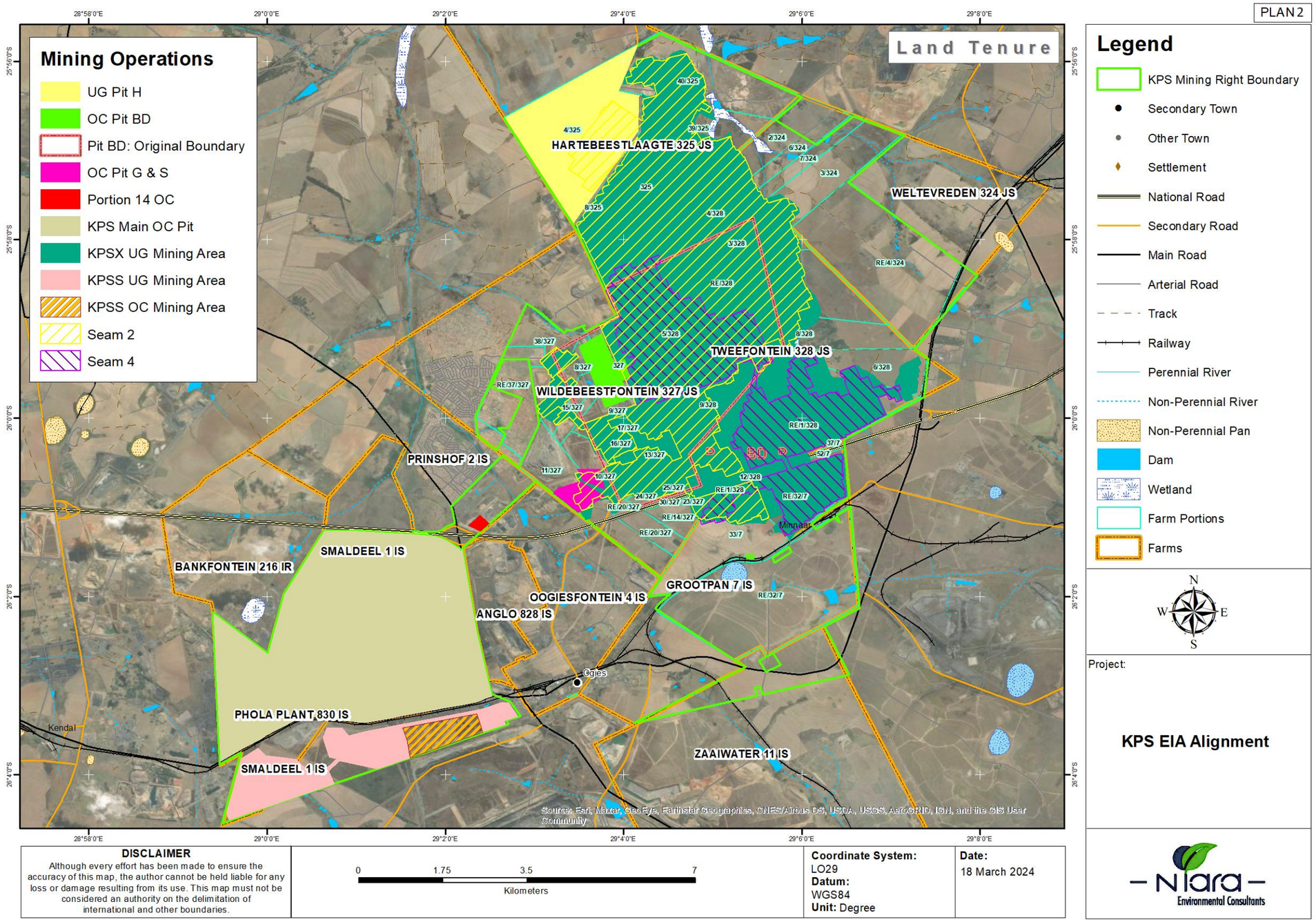

Figure 1-2: Affected farm portions over existing and proposed UG mining areas

1.4 Details and Expertise of Specialist

Ndumiso Dlamini is an Associate Ecology Consultant for Niara Environmental Consultants. Ndumiso has 10 years of professional and international experience in Environmental Assessment Consulting and Management primarily within the minerals resources, infrastructure development and agriculture sectors.

Ndumiso Dlamini obtained his BSc Life and Environmental Sciences in 2010 and his BSc Hons degree in Botany in 2011, both at the University of Johannesburg and is a registered Pr. Sci. Nat with SACNASP in Botanical Science and Ecological Science. Having worked within environmental consultancies and undertaking various multidisciplinary biophysical projects, Ndumiso has a competent understanding of ecosystems and their importance. Ndumiso has been involved in numerous projects and has considerable experience across a range of developmental and environmental sciences; also, having worked in South Africa, Mozambique, Malawi and Zambia he is knowledgeable on the various ecological difference across Southern Africa.

Ndumiso is particularly interested and well versed in the assessment and management of wetlands, biodiversity, ecosystems and sustainable development. Having conducted countless wetland assessments, ecological and habitat rehabilitation, he has gained considerable experience in the value of wetlands and the services they provide. Ndumiso is currently a water resources specialist that specialises on wetland environments and the impacts to these ecosystems.

2 Project Objectives

Seriti Power (Pty) Ltd (“Seriti Power”) is the holder of a Mining Right for coal in respect of its Klipspruit Colliery (“KPS”) operation issued under the Department of Mineral Resources and Energy (“DMRE”) (Ref No. MP 30/5/1/2/2/125 MR).

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2.1 Mining

KPSX was approved in 2011 with the mining of the full extent of Pit BD via the OC method. Pit H was further approved in 2023 for mining via OC method. When Seriti Power took over the operation of KPS in 2021 from South32 SA Coal Holdings, Seriti Power undertook an evaluation of all the assets obtained. The evaluation's focus was on the viability of the mine, including product market evaluations, operational optimisation and cost optimisation. This resulted in Seriti Power's change in mining strategy for the whole of KPS's remaining reserves from OC to UG. UG mining was the initial strategy for KPSS mining in 2006 but was later changed to OC in 2017 due to the economic value at the time.

2.1.1 KPSX Proposed Mining

The KPSX mining of Pit BD was amended from OC to UG in October 2022 through a S102 amendment process as contemplated under the MPRDA. The EA amendment is still outstanding. The S102 approved amendment covers the full extent of the unmined UG reserves within the KPSX (including Pit H) and KPSS mining areas as indicated in **Figure 1-2** above. The mineable coal seams within the KPSX area are the following and the focus of the UG mining will be on the main seams as illustrated in **Figure 2-1** and **Figure 2-2**:

- 5 seam ("S5")
- 4 upper A seam ("S4A")
- 4 upper seam ("S4U")
- 4 lower seam ("S4L")
- 2A seam ("S2A")
- 2 seam ("S2")
- 1 seam ("S1")

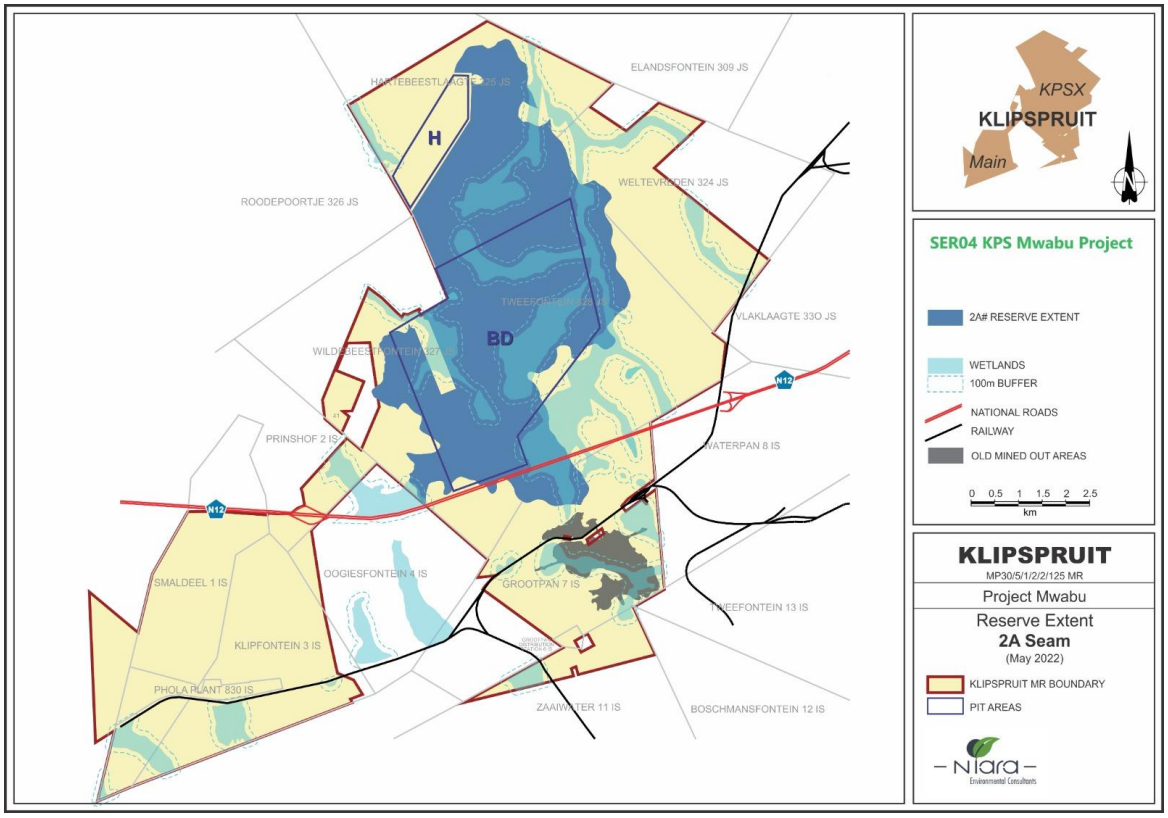


Figure 2-1: Proposed S2A mining

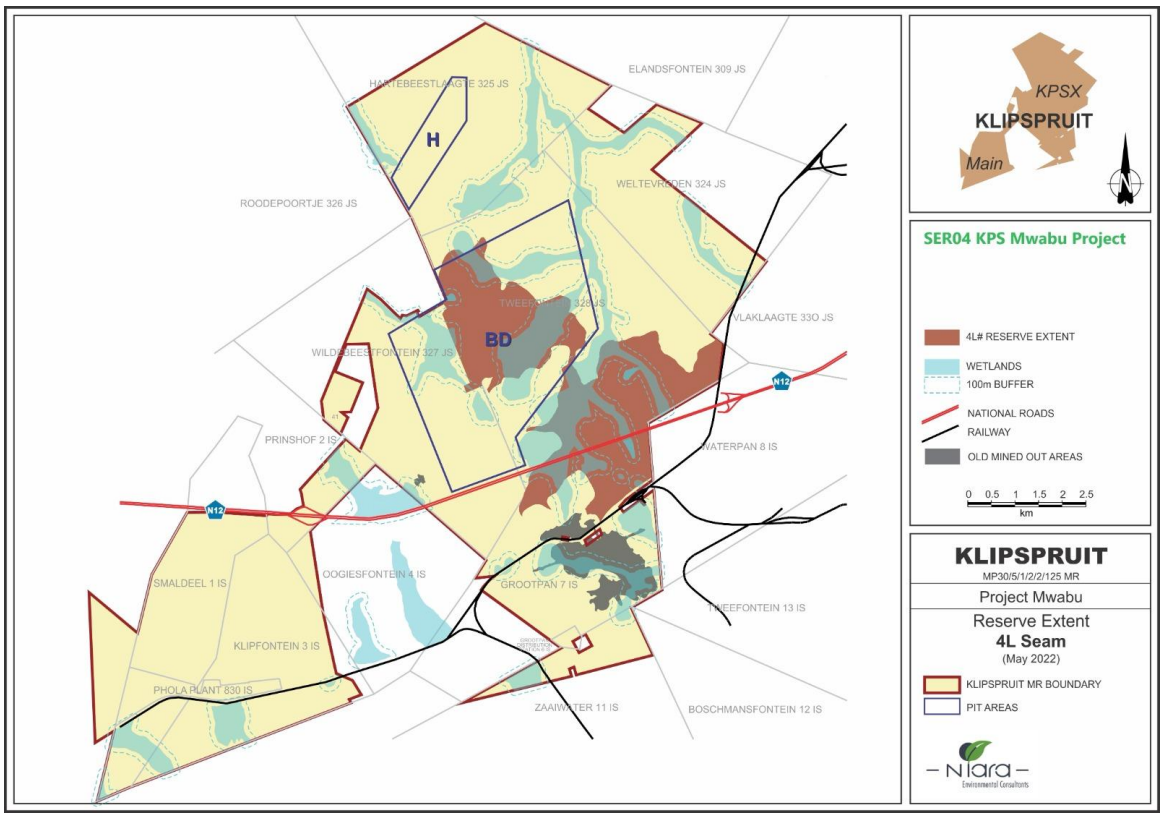


Figure 2-2: Proposed S4L Mining

The mineable coal seams at KPSS will include S5, S4U, S2 and S1.

UG mining has commenced within the Pit BD boundary and the mining method being utilised is bord and pillar mining. The inclusion of the bord and pillar mining method was to ensure optimal extraction of areas that are not profitable by OC method due to high strip ratio (Seriti Power, 2022). An adit has been developed from the pit BD highwall which provides access to the UG workings. The mining will advance towards the North, East, West and Southern directions from the Pit BD boxcut area. The proposed UG mining for both KPSS and KPSX is depicted in Figure 2-3 below. The proposed UG mining will extend mining to 2042. The UG workings designs are based on the following principles for both KPSS and KPSX (Seriti Power, 2022):

- UG workings are expected to be located approximately 25m below the ground surface with a mining height cut-off at 1.5m.
- A safety factor of not less than 1.3 will be applied on all workings with a pillar survival estimated at >99% for >500 years.
- No superimposition of the pillar between S4L and S2A and superimposition of the pillar between S2A and S1 as recommended by the geotechnical study.

UG mining using bord and pillar method will be conducted using a Continuous Miner ("CM") with parallel roadways in the direction of the advance. Perpendicular roads called splits will be developed at predetermined intervals to parallel roads. This road interlinks are the ones that create the pillars. The following activities form part of the board and pillar mining method (Seriti Power, 2022):

- Coal cutting and loading: The CM uses the rotating drum to cutting head, equipped with cutting picks to cut the coal face. The loading mechanism collects the broken coal and delivers it onto the gathering arm, which loads the coal on the CM's chain conveyor. The CM's conveyor transports the broken coal from the front to the rear of the CM. The CM's chain conveyor's capability of horizontal and vertical movements allows for coal loading into the shuttle car.
- Coal hauling and tipping: The loaded shuttle car is used to haul the coal to the section feeder breaker that crushes the coal and feeds it into the conveyor belt system.
- Roof support: A roof bolt machine installs the roof bolts once the CM has finished the development face and roof support is installed on a systematic basis. Roof bolts enhance the stability of the overlying roof. The spacing between roof bolts and the length of the roof bolts is determined during geotechnical studies.
- Coal transportation: The coal is transported using a conveyor belt system from the mining sections to the coal stockpile, linked with the overland conveyor on surface via the UG adit.

The strategy for the mining of the KPSS UG reserve will follow the same methodology as the one depicted above for KPSX and the UG resource will be accessed by using an adit which will be developed on the KPSS OC highwall.

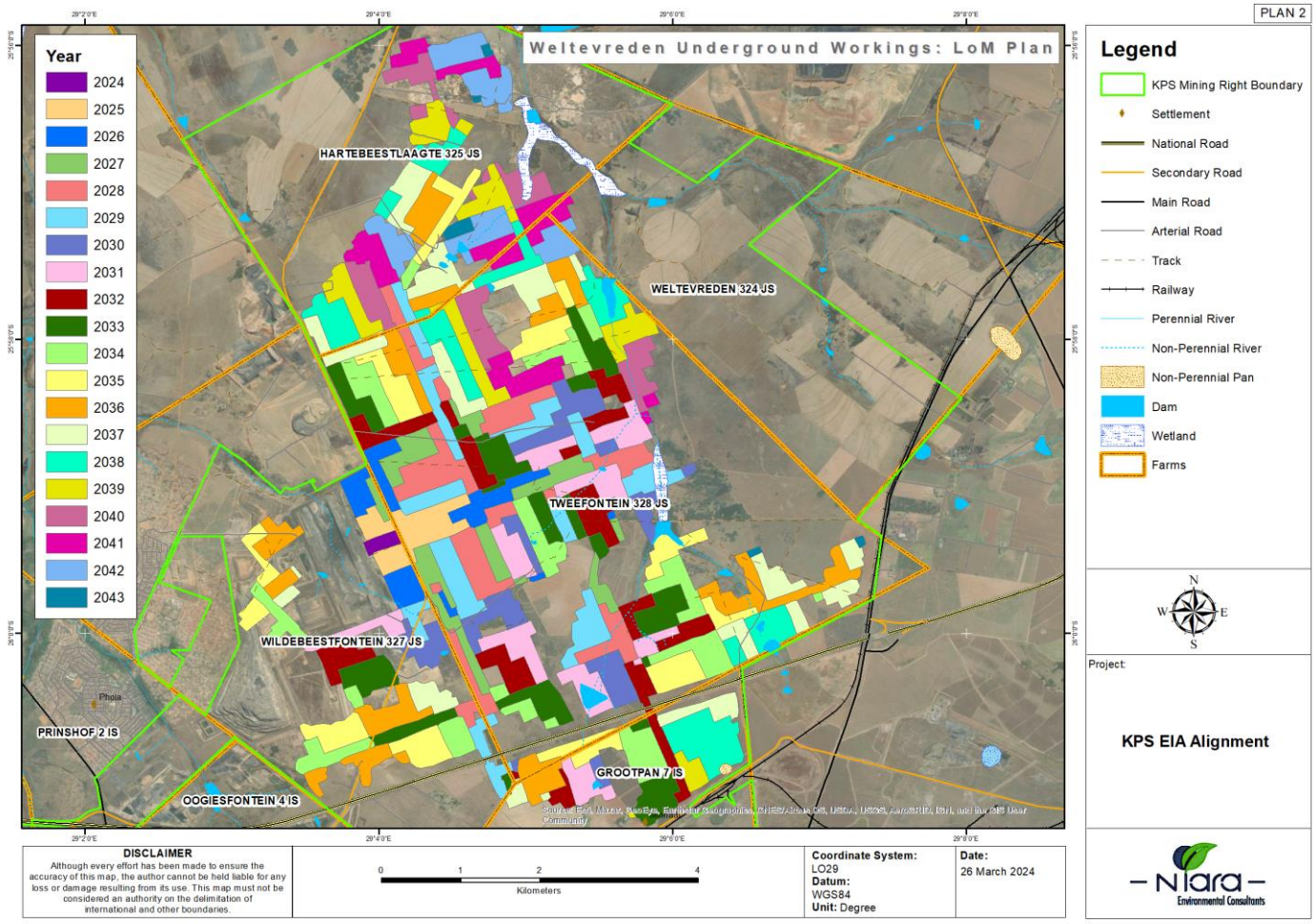


Figure 2-3: Life of Mine plan for the proposed KPSX UG mining

2.1.2 Processing

Once the coal is mined from the UG workings, it will be transported via a network of conveyors to the Phola Processing Plant ("PCPP") which is located adjacent to the KPS operation. The coal is beneficiated here resulting in various grades of quality produced. Following beneficiation at the PCPP, the coal will be transported via rail to the Richards Bay Coal Terminal for export, with a small component being retained for domestic use. Coal discard will be stored at the existing discard dump at the KPS and will be used as additional backfill material in the mining voids as part of the rehabilitation of the KPS.

2.1.3 Waste Management

All waste generated on site will be managed accordingly as per KPS' existing waste management procedures.

2.1.4 Summary of the Infrastructure Requirements

An adit has already been developed to support the UG mining at KPSX together with the supporting UG conveyors. An adit with the supporting UG conveyors will be constructed to support the UG mining at KPSS. This will be constructed on the existing KPSS OC highwall. Further, additional ventilation shafts and rescue boreholes will be constructed in strategic areas as the mining advances for

both KPSX and KPSS. To manage additional dewatering activities from the UG workings, pipelines will be constructed which will link up with existing pipelines on surface and discharge in existing pollution control dams ("PCDs"). Should there be a need in future, a storage dam might also be constructed underground. Potable water supply to the UG workings will be delivered by pipelines which will link up with the existing potable water supply from the Emalahleni Water Treatment Plant. All other existing infrastructure will be utilised to support the proposed UG mining development including PCDs, power supply, haul roads, workshops, pipelines and water supply. The layout for the infrastructure at KPSX is depicted in **Figure 2-4**.

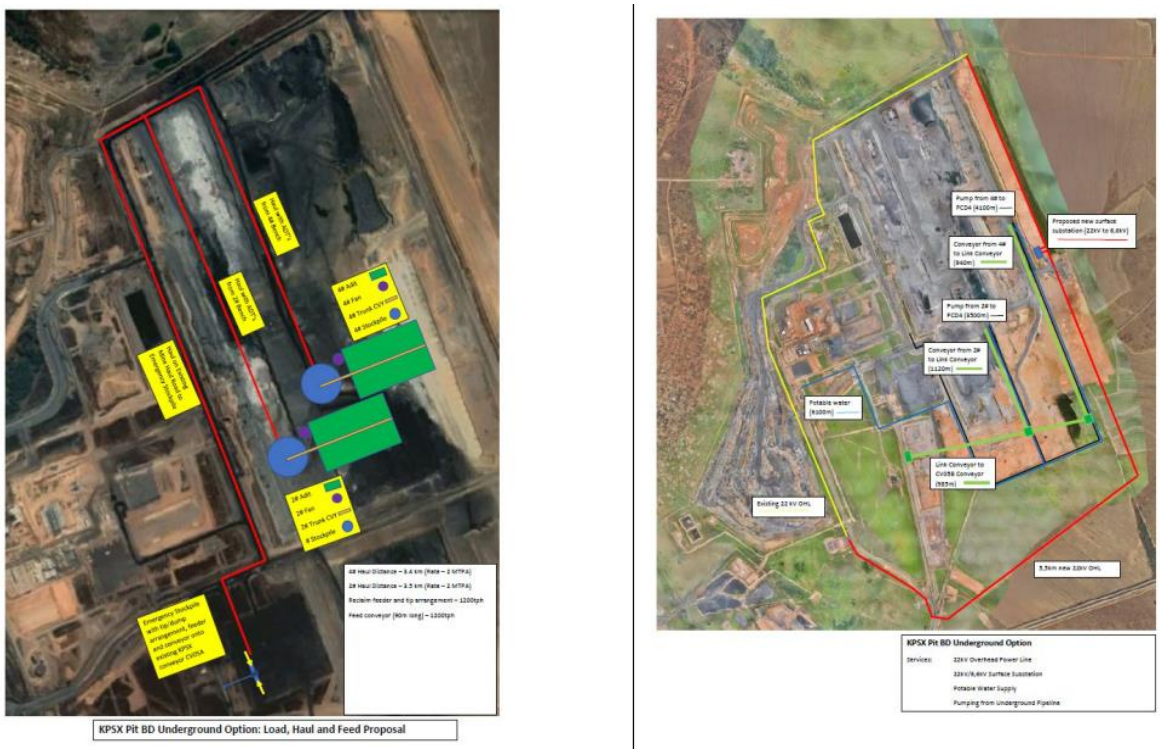


Figure 2-4: Layout for KPSX UG haul roads, pipelines, conveyor, load-haul and feed infrastructure

3 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, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Explanation of certain documents or organisations is provided where these have a high degree of relevance to the project and/or are referred to in this assessment.

3.1 International Legislation and Policy

- Convention on Biological Diversity (Rio de Janeiro, 1992);
- The Ramsar Convention (on wetlands of international importance);

- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival; and
- The IUCN (World Conservation Union). The IUCN's mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

3.2 National Legislation

- Constitution of the Republic of South Africa (Act 108 of 1996). The Bill of Rights, in the Constitution of South Africa states that everyone has a right to a nonthreatening environment and requires that reasonable measures be applied to protect the environment. This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development;
- The National Environmental Management Act (NEMA) No. 107 of 1198): Ecological Assessment Regulations, 2014. Specifically, the requirements of the specialist report as per the requirements of Appendix 6;
- The National Environmental Management: Biodiversity Act (NEM:BA) No. 10 of 2004: specifically, the management and conservation of biological diversity within the RSA and of the components of such biological diversity;
- National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations;
- National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003);
- National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
- National Water Act, 1998 (Act 36 of 1998);
- National Veld and Forest Fire Act (101 of 1998);
- Environmental Conservation Act, 1989 (ECA), (Act no. 73 of 1989);
- National Forests Act, 1998 (Act 84 of 1998), specifically with reference to Protected Tree species;
- National Heritage Resources Act, 1999 (Act 25 of 1999);
- Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983); and
- Sustainable Utilisation of Agricultural Resources (Draft Legislation).

3.3 National Policy and Guidelines

- South Africa's National Biodiversity Strategy and Action Plan (NBSAP);
- National Spatial Ecological Assessment (NSBA); and

- National Freshwater Ecosystem Priority Areas (NFEPA's).

3.4 Provincial and Municipal Level

In addition to national legislation, South Africa's nine provinces have their own provincial biodiversity legislation, as nature conservation is a concurrent function of national and provincial government in terms of the Constitution (Act 108 of 1996).

- The North-West Biodiversity Conservation Plan (2015).
- North-West Biodiversity Management Act, No 4 of 2016.

4 Exclusion of Biodiversity Impact Study

With regards to the proposed expansion of Pit BD and the alteration of Pit H from opencast mining to underground mining, a full biodiversity study was not deemed necessary.

The area is currently approved for opencast mining, accompanied by a biodiversity study that determined the area to be largely monospecific and considered to be of low biodiversity value. nonetheless, the proposed alternative mining method, underground, will prove to reduce the direct impacts and limit any losses to vegetation and habitat.

The regional vegetation occurring within the project area was the Eastern Highveld Grassland Vegetation unit as presented in Figure 4-1. The vegetation unit is found throughout the Mpumalanga and Gauteng provinces. The status of the vegetation, as at the time of publishing (2006), is summarised in Table 4-1 and the dominant plant species within the vegetation unit are shown in Table 4-2. This vegetation type occurs on moderately undulating planes, including some low hills and pan depressions. The vegetation is a short dense grassland dominated by the usual Highveld grass composition (*Arsitida, Digitaria, Erafrostsis, Themeda, Tristachya etc.*) with small scattered rocky outcrops with, wiry sour grasses and some woody species.

Table 4-1: Vegetation Status

Vegetation Name	Ecological Status	Conservation Status	% of Project Area
Eastern Highveld Grassland	Largely Modified	Endangered	100%

Table 4-2: Dominant Plant Species

Vegetation Unit	Dominant Plant Species
Eastern Highveld Grassland	*Andropogon shirensis, Cynodon dactylon, Eragrostis curvula, Eragrostis plan, Harpachloa falx Aristida congesta Sporobulus africana, Panicu,a natalense, Themeda triandra*

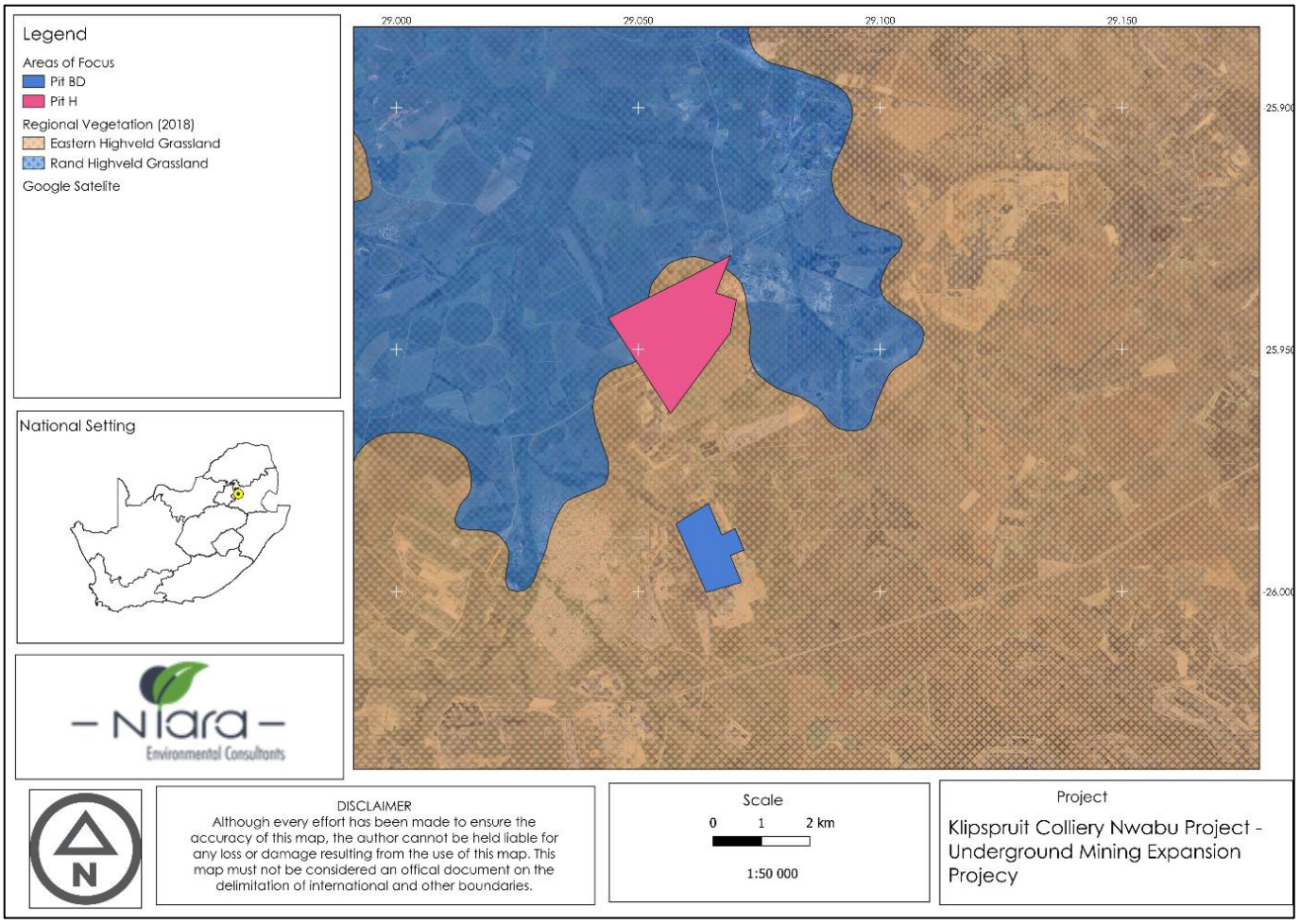


Figure 4-1: The regional vegetation over the Areas of Focus (Pit H and Pit BD)

The vegetation within the proposed project area was determined to be mostly secondary grassland on areas that were previously classified as agricultural crop fields as presented in Figure 4-2. Parts of the vegetation were dominated by dense *Digitaria eriantha* grassland with good ground cover; however, very monospecific. Other parts were observed to be patchy grassland dominated by *Gomphocarpus physocarpus*. The grassland was largely unidentifiable as the grass species were in a poor condition as a result of seasonal changes and grazing (Figure 4-3). Furthermore, areas of bare soil were common throughout the area which indicates the degraded state of the vegetation.

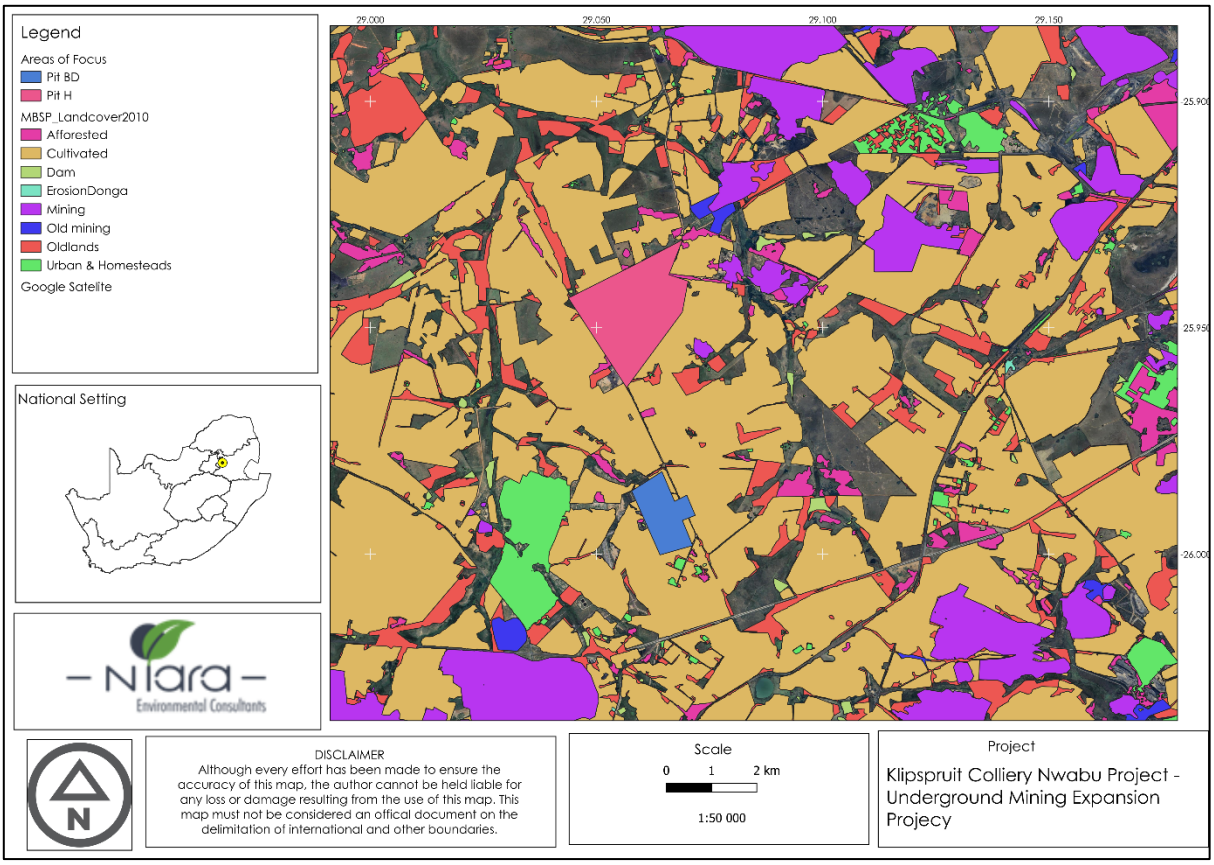


Figure 4-2: Land Cover over the proposed project area

Figure 4-3: Vegetation within the project area

The plant species observed within the project area are listed in Table 4-3. Some plant species were suspected based on the plant material available and the probability of occurrence. The dry season had commenced at the time of the assessment and the seasonal changes were evident with the loss of flowering parts on the majority of the floral species. No plant species of conservation concern were identified and the vegetation classified as secondary grassland (Figure 4-4).

Table 4-3: Plant species observed in the project area

Species Name	Common Name	Conservation Status
Acacia mearnsii	Black wattle	Category 1b invasive
Bidens pilosa	Black jack	
Cynodon dactylon	Couch grass	
Digitaria eriantha	Rhodes grass	
Eragrostis curvula	Weeping love grass	
Gomphocarpus physocarpus	Balloon plant	
Seriphium plumosa	Bankrupt bush	
Solanum syssimbrifolium	Wild tomato	Category 1b invasive
Sporobolus africanus	Rat's tail grass	
Tagetes minuta	Khakibos	
Verbena bonariensis	Purple top	Categroy 1b invasive

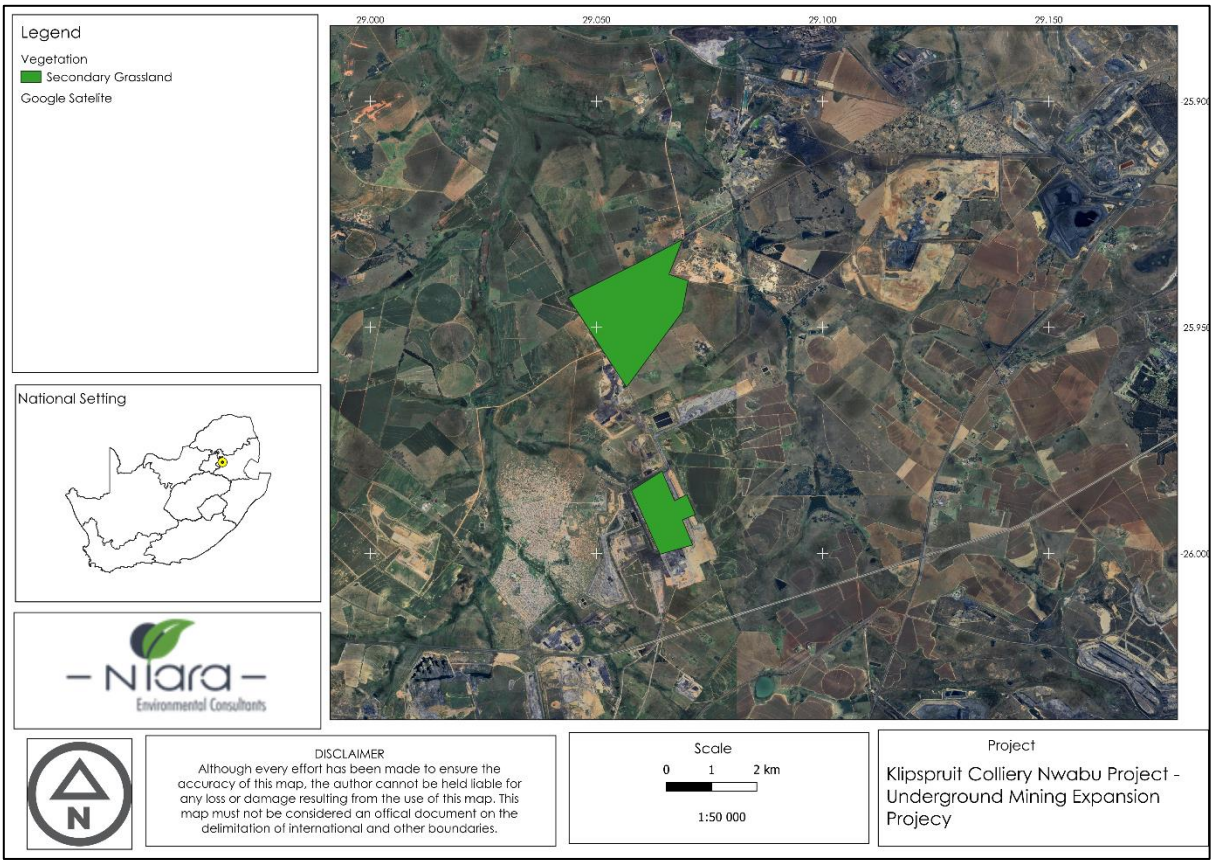


Figure 4-4: The classification of the vegetation within the project area

5 Alternative Assessment

In accordance with the requirements outlined in Appendix 2 of the EIA Regulations 2014, as amended, a consideration of reasonable and feasible alternatives, including site and technology alternatives and the "do-nothing" alternative must be undertaken. Each alternative is to be accompanied by a description and comparative assessment of the advantages and disadvantages that such development and activities will pose on the environment and socio-economy. When no feasible and/or reasonable alternatives can be identified and investigated in terms of a comparative assessment during the Scoping Phase, the EIA Report will then not contain a section with alternatives.

The EIA Regulations 2014, as amended, define alternatives as the different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

- The property on which or location where it is proposed to undertake the activity;
- The type of activity to be undertaken;
- The design or layout of the activity;
- The technology to be used in the activity;

- The operational aspects of the activity; and
- The option of not implementing the activity.

Limited alternatives may exist for the project may exist for the Proposed Project.

The Department of Environmental Affairs (DEA) EIA guidelines necessitate the consideration of various development alternatives as part of the EIA process. The consideration of project alternatives is a key requirement of an EIA as it provides a basis for choice for the competent authority and I&APs. In the NEMA EIA Regulations, alternatives in relation to a proposed activity are defined as "different means of meeting the general purpose and requirements of the activity, which may include alternatives to the –

property on which or location where it is proposed to undertake the activity;

- type of activity to be undertaken;
- design or layout of the activity;
- technology to be used in the activity; and
- operational aspects of the activity.

Alternatives that are considered must be reasonable and feasible and should have the potential to reduce negative impacts that may occur due to the proposed Project. Alternatives are considered as a means of reaching the same need and purpose as the proposed Project in a way that minimises the impacts and maximises the benefits. The anticipated environmental impacts which these alternatives may pose have been discussed below.

The following alternatives were considered for the mining of the Nwabu Project:

- Mining method alternatives;
- Mining footprint;
- No-go option.

5.1 Mining Method Alternatives

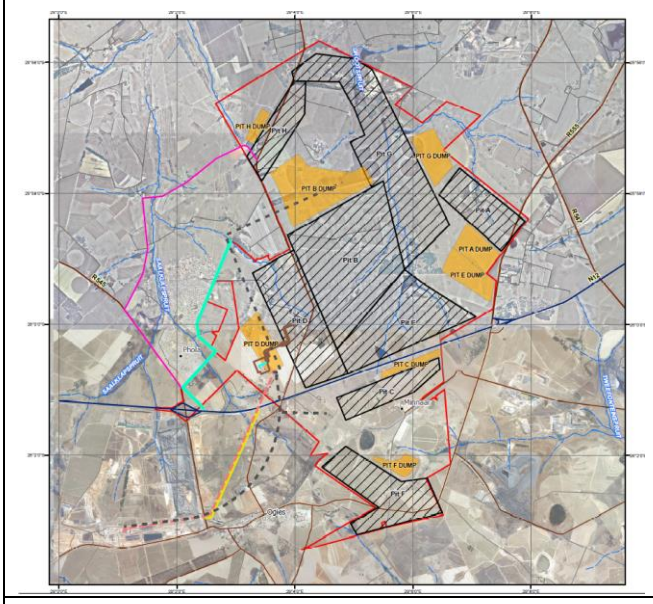
An array of underground and surface mining techniques exists; however, technical and economic feasibility studies are required to determine which process/method is best. These studies are based on the regional geologic conditions, including characteristics of the site; seam continuity; thickness; structure; quality; and depth and strength.

Both the OC mining method and the UG method were considered, where the UG mining was found to be the preferred mining strategy going forward due to the following reasons:

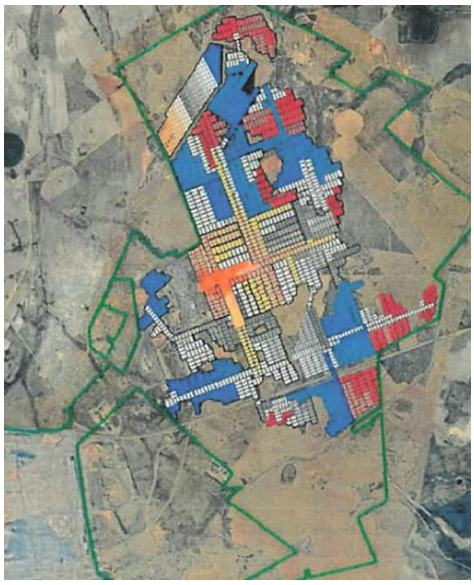
- The proposed area of mining has a significant number of wetlands which will be destroyed when using OC method;
- The destruction of wetlands requires rehabilitation compensation measures in other wetlands within the catchment which require significant financial resources;

- Most of the areas to be mined at KPSX had significantly higher strip ratios which would increase the mining expenses and waste management costs.

The OC mining considered and the UG preferred option are illustrated in **Figure 5-1** below.



OC Mining Alternative

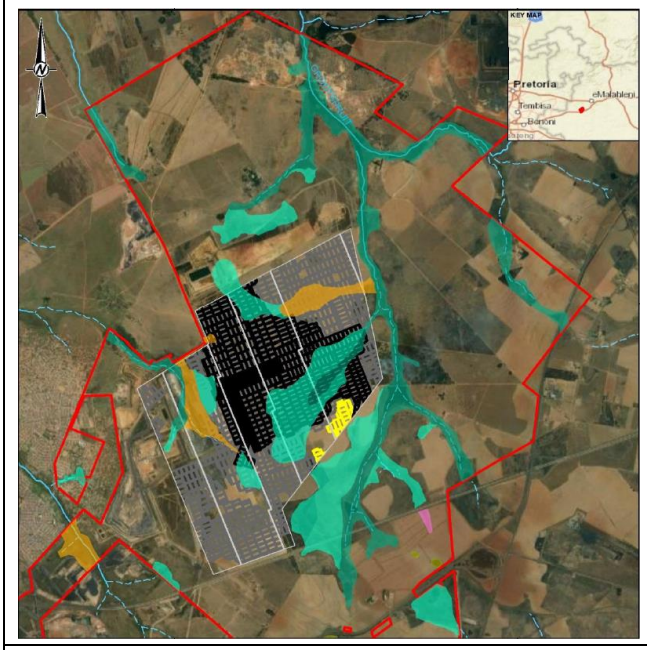


UG Mining (Preferred Option)

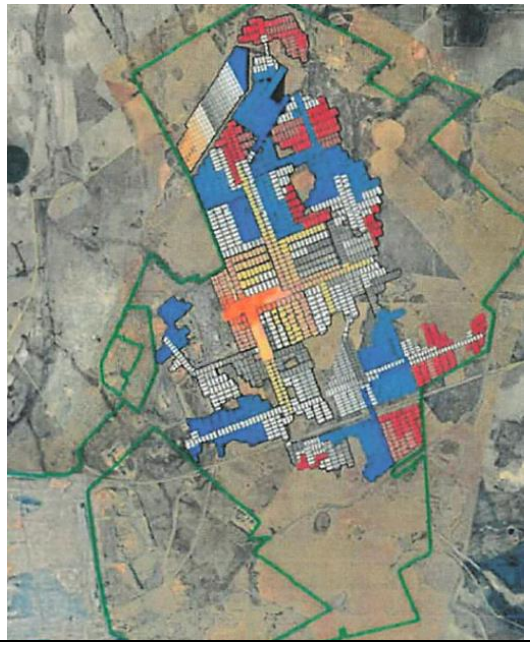
Figure 5-1: Mining Method Alternatives

5.2 Mining Footprint

As Pit BD mining has already been approved in 2017 for OC mining, KPS did consider only converting this pit to UG mining initially, as it was assumed that the authorisation process for the amendment would be quicker. However, the economic viability of the project was not adequate to sustain the project, hence the preferred alternative was to mine the economically viable reserves remaining at KPSX. The considered alternatives are illustrated in **Figure 5-2** below.



UG Mining Alternative- Only Pit BD



UG Mining _Whole Extent (Preferred Option)

Figure 5-2: Mining Footprint Alternatives

5.3 No-go Option

The No-go alternative was deemed non-viable as this would mean the current KPS OC pits would be depleted in 2039, resulting in the closure of the facility whilst the reserves are still available. This "premature" closure would also result in a shortage of coal to both Eskom and the Export market and impact negatively on the country's GDP. The ongoing capital investment planned for KPS for the development of UG and OC mining is estimated at R1.7 billion and will not be invested if the project does not continue.

6 Impact Assessment Rating Methodology

The methodology used to evaluate and quantify the potential environmental impacts of the proposed Projects has been presented below.

Table 6-1: Impact Rating Methodology

Magnitude		Quantitative Score
The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it has a significant, moderate or insignificant		
(VL) Very Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.	1
(L) Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected significantly.	2
(M) Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.	3
(H) High	Function or process of the affected environment is disturbed to the extent where it temporarily ceases.	4
(VH) Very High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.	5

Extent		
Classification of the physical and spatial aspect of the impact		
(F) Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.	1
(S) Site	The impact could affect the whole, or a significant portion of the site.	2
(R) Regional	The impact could affect the area including the neighbouring Farms, the transport routes and the adjoining towns.	3
(N) National	The impact could have an effect that expands throughout the country (South Africa).	4
(I) International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.	5
Reversibility		
This describes the degree to which the impact can be managed following mitigation. The classes are rated as follows:		
Reversible	Can be avoided, managed or mitigated in such a way that natural processes are not affected and returned to natural state	1
Recoverable	Can be avoided, managed or mitigated to the degree that functions and processes continue in a modified way)	3
Irreversible	Irreversible impact (may cause irreplaceable loss of resources). Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.	5
Duration		
The lifetime of the impact, that is measure in relation to the lifetime of the proposed development.		
(S) Short Term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.	1
(SM) Short - Medium Term	The impact will be relevant through to the end of a construction phase.	2
(M) Medium	The impact will last up to the end of the development phases, where after it will be entirely negated.	3
(L) Long Term	The impact will continue or last for the entire operational lifetime (i.e. exceed 20years) of the development, but will be mitigated by direct human action or by natural processes thereafter.	4
(P) Permanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact is transient.	5
Probability		
This describes the likelihood of the impact actually occurring. The impact may occur for any length of time during the life cycle of the activity. The classes are rated as follows:		
(I) Improbable	The possibility of the Impact occurring is none, due to the circumstances or design. The chance of this Impact occurring is zero (0%)	1
(P) Possible	The possibility of the Impact occurring is very low, due either to the circumstances or design. The chance of this Impact occurring is defined as 25% or less	2
(L) Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of Impact occurring is defined as 50%	3
(H) Highly Likely	It is most likely that the Impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.	4
(D) Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.	5
Weighting Factor		
Subjective score assigned by Impact Assessor to give the relative importance of a particular environmental component based on project knowledge and previous experience. Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance		
(L) Low		1
(LM) Low - Medium		2

(M) Medium	3
(MH) Medium - High	4
(H) High	5

Mitigation Measures and Mitigation Efficiency		
Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures		
Mitigation measures were recommended to enhance benefits and minimise negative impacts and address the following:		
Mitigation objectives: what level of mitigation must be aimed at: For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make "educated guesses" based on professional experience;		
Recommended mitigation measures: For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided;		
Effectiveness of mitigation measures: The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible; and		
Recommended monitoring and evaluation programme: The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives. Each environmental impact is to be assessed before and after mitigation measures have been implemented.		
The management objectives, design standards, etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits. National standards or criteria are examples, which can be stated as mitigation objectives.		
Negligible	The impact will be mitigated to the point where it is of limited importance	**</=20**
Low	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels	**</=40**
Moderate	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw	**</=60**
High	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.	**>60**

7 Impact Assessment

The conversion of the mining method from opencast to underground will have a significant role on the impact ratings, in particular the loss of habitat and disturbance of habitats. The impact assessment had previously been completed with the intention to fully mine through and remove all vegetation and topsoil over the proposed expansion area. The current proposed underground mining activity will have minimal impact on the surface landscape, vegetation and habitats.

The tables below consider the scale of the specific predicted impacts related to biodiversity by presenting the impact evaluation ratings for the three Project phases.

7.1 Construction Phase Impacts

Table 7-1: Impact Evaluation – Construction Phase

Activity	Impact Description		Impact Rating Without Mitigation	Impact Rating with Mitigation
Site clearance for establishment or access roads, infrastructure and pit area	Clearing of vegetation	***Calculated Significance Rating (Low, Medium, High)***	**Low**	**Low**
		Impact Status: (positive or negative)	Negative	Negative
		Reversibility: (Reversible or Irreversible)	Irreversible	
		Irreplaceable loss of resources: (Yes or No)	No	
		Can impacts be enhanced: (Yes or No)	Yes	
		Residual impacts Continued degradation of habitat, adjacent areas and loss of biodiversity		
		Mitigation measures Avoid sensitive areas and implement buffer zones		

7.2 Operational Phase Impacts

Table 7-2: Impact Evaluation – Operational Phase

Activity	Impact Description		Impact Rating Without Mitigation	Impact Rating with Mitigation
Operation of mine and access roads	Loss of grassland habitat and establishment of alien invasive plants	***Calculated Significance Rating (Low, Medium, High)***	**Low**	**Low**
		Impact Status: (positive or negative)	Negative	Negative
		Reversibility: (Reversible or Irreversible)	Reversible	

Activity	Impact Description		Impact Rating Without Mitigation	Impact Rating with Mitigation
		Irreplaceable loss of resources: (Yes or No)	No	
		Can impacts be enhanced: (Yes or No)	Yes	
		Residual impacts • Continued degradation of habitat, adjacent areas and loss of biodiversity		
		Mitigation measures • Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas		
Operation of mine and access roads	Disturbance of vegetation communities	***Calculated Significance Rating (Low, Medium, High)***	**Low**	**Low**
		Impact Status: (positive or negative)	Negative	Negative
		Reversibility: (Reversible or Irreversible)	Reversible	
		Irreplaceable loss of resources: (Yes or No)	No	
		Can impacts be enhanced: (Yes or No)	Yes	
		Residual impacts • Continued loss of biodiversity and alteration of habitat		
		Mitigation measures • Avoid high biodiversity sensitivity areas (natural vegetation, watercourses & wetlands) and comply with prescribed buffer zones. • Minimise footprint area • Work only in demarcated areas		
Operation of mine and access roads	Habitat Fragmentation	***Calculated Significance Rating (Low, Medium, High)***	**Low**	**Low**
		Impact Status: (positive or negative)	Negative	Negative

Activity	Impact Description		Impact Rating Without Mitigation	Impact Rating with Mitigation
		Reversibility: (Reversible or Irreversible)	Irreversible	
		Irreplaceable loss of resources: (Yes or No)	No	
		Can impacts be enhanced: (Yes or No)	No	
		Residual impacts • Continued loss of biodiversity, habitat degradation and alteration of vegetation structures (monospecific grasslands)		
		Mitigation measures • Avoid areas in which specialized habitats occur (wetlands); • Implement rehabilitation strategy and rehabilitation interventions; • Implement a rehabilitation monitoring and audit programme; • Establish an on-site nursery to supply plant specimens for rehabilitation and vegetation management.		

7.3 Decommissioning Phase Impacts

Table 7-3: Impact Evaluation – Closure and Rehabilitation Phase

Activity	Impact Description		Impact Rating Without Mitigation	Impact Rating with Mitigation
Rehabilitation	Encroachment of alien invasive plant species	***Calculated Significance Rating (Low, Medium, High)***	**Low**	**Low**
		Impact Status: (positive or negative)	Negative	Negative
		Reversibility: (Reversible or Irreversible)	Reversible	
		Irreplaceable loss of resources: (Yes or No)	No	
		Can impacts be enhanced: (Yes or No)	Yes	
		Residual impacts		

Activity	Impact Description		Impact Rating Without Mitigation	Impact Rating with Mitigation
		▪ Continued degradation of habitat, adjacent areas and loss of biodiversity		
		Mitigation measures ▪ Implementation of alien invasive plant management plan needs to be continued during decommissioning to prevent the growth of invasive plants on rehabilitated areas; ▪ Rehabilitation of site with indigenous vegetation that occurs in the vicinity of the project area. ▪ Monitoring the establishment, spread and growth of invasive species clumps		
Shaping of landscape	Loss of species of conservation concern	***Calculated Significance Rating (Low, Medium, High)***	**Low**	**Low**
		Impact Status: (positive or negative)	Negative	Negative
		Reversibility: (Reversible or Irreversible)	Irreversible	
		Irreplaceable loss of resources: (Yes or No)	Yes. Loss of sensitive habitat and species cannot be undone.	
		Can impacts be enhanced: (Yes or No)	No	
		Residual impacts ▪ Continued degradation of habitat, adjacent areas and loss of biodiversity. ▪ Loss of specialised habitat structures		
		Mitigation measures ▪ Minimise footprint area Work only in demarcated areas ▪ Implement a faunal activity monitoring programme, ▪ Implement training for all employees and contractors on human-wildlife interactions ▪ All infrastructure that could have a negative impact on faunal species (powerlines etc) needs to be decommissioned and removed.		
Revegetation of landscape	Impact on the growth and health of both	***Calculated Significance Rating (Low, Medium, High)***	**Low**	**Low**

Activity	Impact Description		Impact Rating Without Mitigation	Impact Rating with Mitigation
		Impact Status: (positive or negative)	Negative	Positive
		Reversibility: (Reversible or Irreversible)	Reversible	
		Irreplaceable loss of resources: (Yes or No)	No	
		Can impacts be enhanced: (Yes or No)	Yes	
		Residual impacts • Continued loss of biodiversity and alteration of habitat • Introduction and proliferation of invasive species		
		Mitigation measures • Implement rehabilitation strategy and rehabilitation interventions • Revegetation of site with indigenous vegetation that occurs in the vicinity of the project area. • Establish an on-site nursery to supply plant specimens for rehabilitation and vegetation management • Protect topsoil stockpiles from loss and nutrient depletion		

7.4 Post Closure

Table 7-4: Impact Evaluation – Post-Closure Monitoring Phase

Activity	Impact Description		Impact Rating Without Mitigation	Impact Rating with Mitigation
Post-Closure Monitoring	Encroachment of alien invasive plant species	***Calculated Significance Rating (Low, Medium, High)***	**Low**	**Low**
		Impact Status: (positive or negative)	Positive	Positive
		Reversibility: (Reversible or Irreversible)	Reversible	

Activity	Impact Description		Impact Rating Without Mitigation	Impact Rating with Mitigation
		Irreplaceable loss of resources: (Yes or No)	No	
		Can impacts be enhanced: (Yes or No)	Yes	
		Residual impacts • Ensured regeneration and maintenance of habitat, adjacent areas		
		Mitigation measures • Implementation of monitoring plan; • Action plan for remedial actions.		

8 Specialist Opinion

An impact statement is required as per the NEMA regulations with regards to the proposed development.

It is the opinion of the specialist that the proposed project be authorised provided that all mitigation measures are implemented, particularly as the proposed conversion of opencast mining to underground mining will result in a reduction of impacts to the vegetation and habitat of the area.

Ndumiso Dlamini (Pr. Sci. Nat.)

Senior Ecologist

Appendix A: Specialist CV

Ndumiso Dlamini

Principal Ecologist
SACNASP Pr. Sci. Nat

Address: Address
Email: ndumiso@niara.co.za
Contact No: +27 68 236 3454

EDUCATION AND QUALIFICATIONS

- BSc Life & Environmental Sciences, University of Johannesburg, 2010
- BSc Hons Botany, University of Johannesburg, 2011
- M Sustainable Urban Development & Planning, University of Johannesburg, Ongoing
- Tool for Conducting Wetland Assessments, Rhodes University, 2015
- Methods for Rehabilitation of Wetlands, University of Freestate, 2015

AFFILIATIONS

- South African Council for Natural Scientific Professions (SACNASP) – *Pr. Sci. Nat*
- South African Wetland Society
- Mpumalanga Wetland Forum

YEARS OF EXPERIENCE

- 10

KEY COMPETENCIES

- Botanical Taxonomy
- Wetland Assessment
- Terrestrial Ecology
- Water Resources Management
- Alien Invasive Plants Management

BIOGRAPHY

Ndumiso Dlamini is an Associate Ecology Consultant for Niara Environmental Consultants. Ndumiso has 10 years of professional and international experience in Environmental Assessment Consulting and Management primarily within the minerals resources, infrastructure development and agriculture sectors.

Ndumiso Dlamini obtained his BSc Life and Environmental Sciences in 2010 and his BSc Hons degree in Botany in 2011, both at the University of Johannesburg and is a registered Pr. Sci. Nat with SACNASP in Botanical Science and Ecological Science. Having worked within environmental consultancies and undertaking various multidisciplinary biophysical projects, Ndumiso has a competent understanding of ecosystems and their importance. Ndumiso has been involved in numerous projects and has considerable experience across a range of developmental and environmental sciences; also, having worked in South Africa, Mozambique, Malawi and Zambia he is knowledgeable on the various ecological difference across Southern Africa.

Ndumiso is particularly interested and well versed in the assessment and management of wetlands, biodiversity, ecosystems and sustainable development. Having conducted countless wetland assessments, ecological and habitat rehabilitation, he has gained considerable experience in the value of wetlands and the services they provide. Ndumiso is currently a water resources specialist that specialises on wetland environments and the impacts to these ecosystems.

- Wetland Offset
- Wetland Rehabilitation
- Ecological Restoration
- Ecological Monitoring

COUNTRIES OF WORK EXPERIENCE

- South Africa
- Mozambique
- Malawi
- Zambia

LANGUAGES

- IsiZulu
- English
- Afrikaans

EMPLOYMENT HISTORY

Jul 2023 to Current: Assistant Director – Wetlands Programme, Department of Forestry, Fisheries and the Environment

Mar 2019 to Jun 2023: Principal Scientist, 9ZeroSeven Environmental

Mar 2016 to Feb 2019: Senior Water Resources Consultant, The Biodiversity Company

May 2014 to Feb 2016: Ecologist, Digby Wells Environmental

Oct 2012 to Apr 2014: Genetic Research Assistant, University of Pretoria

EXPERIENCE HIGHLIGHTS

The below highlight key recent and relative project experience:

- Wetland Offset Strategy for the North Block Complex Paardeplaats Colliery, North Block Complex Colliery, Wetland Ecologist
- Wetland Offset Strategy for the Sparks School Development in Eerste Rivier, Cape Town, Century Property Development, Wetland Ecologist
- Alien Invasive Plant Species Management Plant for the Harmony Gold Mining Right Area, Welkom, Harmony Gold, Botanical Specialist
- Biodiversity Baseline Update for the North Block Complex Paardeplaats Colliery, North Block Colliery, Biodiversity Specialist
- Wetland Risk Assessment for the proposed Engen Cape Winelands 1-Stop Upgrade, Western Cape, Engen South Africa, Wetland Ecologist

Please consult the attached appendix for a comprehensive list detailing the project experiences undertaken.

APPENDIX A: PROJECT EXPERIENCE

Duration	Assignment name / brief description of main deliverables/outputs	Name of client and country of assignment	Role on the assignment
2014	The relocation and post-relocation monitoring of Khadia carolinensis plants at the Exxaro Eerstelingsfontein Coal Mine	Exxaro Operations South Africa (Pty) Ltd, South Africa	Botanical Ecologist/ Report Author/ ECO
2015	Wetland Impact Assessment for the proposed Klipspruit Extension: Weltevreden	BHP Billiton Energy Coal South Africa Limited, South Africa	Wetland Ecologist
2015	Wetland Impact Assessment for the Integrated Water Use Licence Application for the proposed Middelburg – Mhluzi Powerline Project	Eskom SOC Holdings Limited South Africa	Wetland Ecologist
2015	The Baseline Environmental Assessment and Conceptual Rehabilitation Plan of Anker Coal Mining Operation - Golfview	Anker Coal South Africa	Biodiversity Specialist/Rehabilitation Specialist
2015	The Baseline Environmental Assessment and Conceptual Rehabilitation Plan of Anker Coal Mining Operation - Elandsfontein	Anker Coal South Africa	Biodiversity Specialist/Rehabilitation Specialist
2015 – 2016	Wetland Rehabilitation Monitoring at Anker Coal Golfview	Anker Coal South Africa	Rehabilitation Specialist/ ECO
2015	Environmental Studies for the Liwonde Dry Port	Mota Engil, Malawi	Biodiversity Specialist
2015	De Groote Boom Mining Permit Application: Biodiversity Impact Assessment	De Groote Boom Minerals (Pty) Ltd South Africa	Biodiversity Specialist
2015	Wetland Assessment for the Roodekop Wetland Offset and Compensation Strategy Project	Universal Coal Development IV (Pty) Ltd South Africa	Wetland Ecologist
2015	Wetland Impact Assessment for the Northern Coal Jagust Colliery	Northern Coal South Africa	Wetland Ecologist
2015	Environmental Impact Assessment for the Ixia Imvula Opencast Coal Mine	Ixia Coal (Pty) Ltd South Africa	Wetland Ecologist
2016	Biodiversity Studies for the Mozambique Gas Pipeline project	Delonex, Mozambique	Biodiversity Specialist
2016	Wetland and Biodiversity Impact Assessment in for proposed mine in Douglas, Northern Cape	Milnex South Africa	Biodiversity Specialist/ Wetland Ecologist

Duration	Assignment name / brief description of main deliverables/outputs	Name of client and country of assignment	Role on the assignment
2016 – 2020	Water Resource Risk Assessment for +/- 200 infrastructure development projects (Pipelines, Roads, Residential and Commercial Housing)	Department of Roads and Transport, Various Municipalities	Biodiversity Specialist/ Wetland Ecologist
2017	Biodiversity Studies for the Barclays Sports Complex in Lusaka	Barclays Group, Zambia	Biodiversity Specialist
2017	Biodiversity Impact Assessment for the proposed Kalkfontein Mine	Ankone Consulting, South Africa	Biodiversity Specialist
2017	Biodiversity Impact Assessment for the proposed Viljoenskroon Mine	Ankone Consulting, South Africa	Biodiversity Specialist
2017	Biodiversity Impact Assessment for the proposed Jozine Quarry	Ankone Consulting, South Africa	Biodiversity Specialist
2018	Wetland Assessment for the Solomon Mahlangu Drive Stormwater Canal Upgrade	Tshwane Metropolitan Municipality, South Africa	Wetland Ecologist
2018	Biodiversity Assessment for the Dunnottar Water Pipeline	Ekurhuleni Metropolitan Municipality, South Africa	Biodiversity Specialist
2018	Wetland Offset Strategy for the Eskom Richards Bay CCRP	Savannah Environmental Consultants, South Africa	Wetland Ecologist
2018	Rehabilitation, Decommissioning and Mine Closure Plan for the Proposed Woestalleen Holdings (Pty) Ltd Coal Mine in Middelburg, Mpumalanga Province	Woestalleen Holdings (Pty) Ltd	Rehabilitation Specialist
2018	Biodiversity Impact Assessment for the KwaMagwaza Piggery	KZN Department of Agriculture	Biodiversity Specialist
2018	Wetland Risk Assessment for the proposed Newcastle Landfill Site	Newcastle Municipality	Wetland Ecologist
2018	Conceptual Rehabilitation Plan for Section 24G Dam Development	Isolendalo Environmental Consultants, Port Edward South Africa	Wetland Ecologist/Rehabilitation Specialist
2019	Biodiversity Impact Assessment The Development of the Proposed Matai Mining Project in Mankwe District, North West Province	Matai Mining (Pty) Ltd, South Africa	Biodiversity Specialist
2019	Wetland Impact Assessment The Development of the Proposed Matai Mining Project in Mankwe District, North West Province	Matai Mining (Pty) Ltd, South Africa	Wetland Ecologist
2019	Biodiversity Impact Assessment The Development of the Proposed Panfontein Mining Project in the Magisterial District of Vereeniging, Gauteng Province	Richtrau 253 (Pty) Ltd, South Africa	Biodiversity Specialist
2019	Plant Species Plan for the Charl Cilliers Waste Water Treatment Plant	Mhlaba H&G, South Africa	Botanical Specialist
2019	Elandsfontein Colliery (Pty) Ltd: Elandsfontein Mine Wetland Fire Damage Report	Anker Coal South Africa	Wetland Ecologist

Duration	Assignment name / brief description of main deliverables/outputs	Name of client and country of assignment	Role on the assignment
2019	Biodiversity Assessment for the proposed Motswedi Clinic and associated borrow pits	Simmek Projects, South Africa	Biodiversity Specialist
2019	Wetland Rehabilitation Monitoring for the Transnet Gas Pipeline	Transnet SOC, South Africa	Wetland Ecologist/ ECO
2019	Wetland Offset Strategy for the proposed Andreason Street development	Isolendalo Environmental Consultants, South Africa	Wetland Ecologist
2019	Wetland Risk Assessment for the proposed Orlando Bridge Upgrade	Johannesburg Road Agency, South Africa	Wetland Ecologist
2019	Biodiversity Impact Assessment for the proposed Orlando Bridge Upgrade	Johannesburg Road Agency, South Africa	Biodiversity Specialist
2020	Biodiversity Impact Assessment: The Proposed Jabula Coal Mine in Newcastle, KwaZulu Natal	Jabula Mines (Pty) Ltd, South Africa	Biodiversity Specialist
2020	Wetland Impact Assessment: The Proposed Jabula Coal Mine in Newcastle, KwaZulu Natal	Jabula Mines (Pty) Ltd, South Africa	Wetland Ecologist
2020	Plant Species Plan for Eskom Duvha Powerstation Water Retention Dams	Eskom Holdings SOC, South Africa	Botanical Specialist
2020	Wetland Risk Assessment for the proposed Risenga Colliery	Risenga. South Africa	Wettland Ecologist
2020	Wetland Risk Assessment for the proposed Klipoortjie Sewage Pipeline Upgrade	Ekurhuleni Metropolitan Municipality, South Africa	Wetland Ecologist
2020	Biodiversity Impact Assessment for the proposed Klipoortjie Sewage Pipeline Upgrade	Ekurhuleni Metropolitan Municipality, South Africa	Biodiversity Specialist
2020	Botanical Survey for the Transent South Dunes Expansion Project	Transnet SOC, South Africa	Botanical Specialist
2021	Wetland Assessment for the Erand Gardens Residential Development	NKT Consulting Services, South Africa	Wetland Ecologist
2021	Wetland Assessment for the Kendal Processing Plant	Fecund Consultants, South Africa	Wetland Ecologist
2021	Terrestrial Ecology Assessment for the Kendal Processing Plant	Fecund Consultants, South Africa	Biodiversity Specialist
2021	Terrestrial Ecology Assessment for the Ikwezi Minerals Mine	Ikwezi Minerals, South Africa	Biodiversity Specialist
2021	Terrestrail Ecology Assessment for the Seriti/South 32 Expansion at Klipspruit Operations	Seriti Power. South Africa	Biodiversity Specialist
2021	Wetland and Biodiversity Impact Assessment for the Witbank Pipeline	Lefasthe Engineering, South Africa	Biodiversity Specialist/ Wetland Ecologist
2021	Terrestrail Ecology Assessment for the ArnotOpco Grootlagte Expansion	ArnotOpco (Pty) Ltd, South Africa	Biodiversity Specialist
2021	Wetland and Biodiversity Impact Assessment for the Tuutuuka Mine in Vryheid	Tuutuuka Resources, South Africa	Biodiversity Specialist/ Wetland Ecologist

Duration	Assignment name / brief description of main deliverables/outputs	Name of client and country of assignment	Role on the assignment
2021	Wetlland and Biodiversity Assessment for the Cwaka Cemetery	uMsinga Local Municipality, South Africa	Biodiversity Specialist/ Wetland Ecologist
2021	Wetland Assessment and Rehabilitation Plan for S24G Dam in Port Edward	EnviroPro Consulting, South Africa	Wetland Ecologist
2021	Wetland Assessment and Rehabilitation Plan for Petrol Station Development in Port Shepstone	EnviroPro Consulting, South Africa	Wetland Ecologist
2021	Vegetation and Wetland Assessment and Rehabilitation Plan for S24G Dam in Port Edward	EnviroPro Consulting, South Africa	Biodiversity Specialist/ Wetland Ecologist
2022	Wetland and Biodiversity Impact Assessment for the Jubillee Prospecting Project - Dannhauser	BGES, South Africa	Biodiversity Specialist/ Wetland Ecologist
2022	Biodiversity Site Walkdown for R103 Upgrade in Camperdown	Raubex Construction, South Africa	Biodiversity Specialist
2022	Wetland/Riparian Assessment for the proposed Gravelotte Mine	Singo Consulting, South Africa	Wetland Ecologist
2022	Biodiversity Assessment for the proposed Amajuba Mines	Venatrix Resources, South Africa	Biodiversity Specialist/ Wetland Ecologist
2022	Alien Invasive Plant Species Management Plant for the Harmony Gold Mining Right Area, Welkom	Harmony Gold, South Africa	Botanical Specialist
2022	Biodiversity and Wetland Assessment for the Soul City Residential Development in Newcastle	EnviroPro Consulting, South Africa	Biodiversity Specialist/ Wetland Ecologist
2022	Biodiversity and Wetland Assessment for the Sweet Waters Residential Development in Vosloorus	Masire Consultants, South Africa	Biodiversity Specialist/ Wetland Ecologist
2022	Biodiversity and Wetland Assessment for the Sharpville Extension Township Development in Vereeniging	Masire Consultants, South Africa	Biodiversity Specialist/ Wetland Ecologist
2022	Biodiversity Assessment for the Arengo Thabazimbi Mine in Thabazimbi	BGES, South Africa	Biodiversity Ecologist
2022	Biodiversity and Wetland Assessment for the Makajaneng Township Development in the North-West Province	Envirostep Consulting, South Africa	Biodiversity Specialist/ Wetland Ecologist

Duration	Assignment name / brief description of main deliverables/outputs	Name of client and country of assignment	Role on the assignment
2022	Biodiversity and Wetland Assessment for the Tembisa Bridge Development in Tembisa, Gauteng	Thevha Sustainable Solutions, South Africa	Biodiversity Specialist/ Wetland Ecologist
2023	Biodiversity and Wetland Assessment for the Nonkala Bridge Development in eNgcobo, Eastern Cape	Thevha Sustainable Solutions, South Africa	Biodiversity Specialist/ Wetland Ecologist
2023	Biodiversity and Wetland Assessment for the Tyangatyanga Bridge Development in eNgcobo, Eastern Cape	Thevha Sustainable Solutions, South Africa	Biodiversity Specialist/ Wetland Ecologist
2023	Biodiversity and Wetland Assessment for the Hala Bridge Development in eNgcobo, Eastern Cape	Thevha Sustainable Solutions, South Africa	Biodiversity Specialist/ Wetland Ecologist
2023	Wetland Offset Strategy for the North Block Complex Paardeplaats Colliery	North Block Complex, South Africa	Wetland Ecologist
2023	Biodiversity and Wetland Assessment for the Matoding Water pipeline in Reitz, Free State	Nketoana Local Municipality, South Africa	Biodiversity Specialist/ Wetland Ecologist
2023	Alien Invasive Plant Species Management Plant for the Harmony Gold Mining Right Area, Welkom	Harmony Gold, South Africa	Botanical Specialist
2023	Biodiversity and Wetland Assessment for Sparks School Development in Eerste Rivier, Cape Town	Century Property Development, South Africa	Biodiversity Specialist/ Wetland Ecologist
2023	Wetland Risk Assessment for the proposed Engen Turfontein Sewer Upgrade, Gauteng	Engen, South Africa	Wetland Ecologist
2023	Wetland Risk Assessment for the proposed Engen Buffalo 1-Stop Sewer Upgrade, Eastern Cape	Engen, South Africa	Wetland Ecologist
2023	Wetland Risk Assessment for the proposed Engen Cape Winelands 1-Stop Upgrade, Western Cape	Engen, South Africa	Wetland Ecologist
2024	Biodiversity Baseline Update for the North Block Complex Paardeplaats Colliery	North Block Complex, South Africa	Biodiversity Specialist
2024	Wetland Offset Strategy for the Sparks School Development in Eerste Rivier, Cape Town	Century Property Development, South Africa	Wetland Ecologist

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The Council and the Senate of the
UNIVERSITY OF JOHANNESBURG
hereby certify that the degree

BACCALAUREUS SCIENTIAE

with field of study

Life and Environmental Sciences with specialisation in Botany and Biochemistry

with all its associated rights and privileges
in accordance with the Statute of the
University has been conferred upon

NDUMISO NTOKOZO IAN DLAMINI

at a congregation of the University

Vice-Chancellor

Registrar

10 MARCH 2011
Johannesburg
ID 9001175356087

UNIVERSITY OF JOHANNESBURG

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UNIVERSITY
OF
JOHANNESBURG

The Council and the Senate of the
UNIVERSITY OF JOHANNESBURG
hereby certify that the degree

BACCALAUREUS SCIENTIAE CUM HONORIBUS

with field of study

Botany

with all its associated rights and privileges
in accordance with the Statute of the
University has been conferred upon

NDUMISO NTOKOZO IAN DLAMINI

at a congregation of the University

Vice-Chancellor

Registrar

06 MARCH 2012
Johannesburg
ID 9001175356087

UNIVERSITY OF JOHANNESBURG

60611

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Ndumiso Ntokozo Ian Dlamini

Registration Number: 116579

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Botanical Science (Professional Natural Scientist)
Ecological Science (Professional Natural Scientist)

Effective **13 September 2017** Expires **31 March 2025**

Chairperson

Chief Executive Officer

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NATUUR- EN
LANDBOUWETENSKAPPE

CERTIFICATE OF ATTENDANCE | BYWONINGSERTIFIKAAT

This is to certify that | Hiermee word gesertifiseer dat

Ndumiso Dlamini

attended a Short Learning Programme (five days) presented by the Centre for Environmental Management, University of the Free State, during the period 17 – 19 November 2015 | 'n Kort Leerprogram (vyf dae), aangebied deur die Sentrum vir Omgewingsbestuur, Universiteit van die Vrystaat, Vanaf 17 – 19 November 2015 bygewoon het.

WETLAND REHABILITATION | REHABILITASIE VAN VLEILANDE

Code | Kode

WLRH1500S

CREDITS: 2* | KREDIETE: 2*
NQF LEVEL: 5 | NKR-VLAK: 5

CONTENT OF THE SHORT LEARNING PROGRAMME
Introduction to wetland ecology, functioning and the purpose and legal implications of rehabilitation
Wetland ecosystem drivers: factors that disrupt wetland drivers
Principles and effectiveness of rehabilitation measures and products
Wet-RehabMethod
Rehabilitation monitoring and evaluation
Fieldwork: Practical implications of mitigation and rehabilitation measures, monitoring and legal implications

INHOUD VAN DIE KORT LEERPROGRAM
Inleiding tot vleilandekologie en funksionering, die doel en regsimplikasies van rehabilitasie
Vleiland ekosisteem drywers: Faktore wat vleilanddrywers ontwrig
Beginsels en die effektiwiteit van rehabilitasiemaatreëls en –produkte
Wet-RehabMethod
Rehabilitasiemonitering en -evaluering
Veldwerk: Praktiese toepassing van beperkings- en rehabilitasiemaatreëls, monitering en wetlike implikasies

LEARNING OUTCOMES
The attendee is able to:
Apply key terms, concepts and principles of basic wetland ecology
Select and apply standard methods, procedures and techniques for the monitoring, evaluation and rehabilitation of wetlands
Discuss environmental systems involved in wetland management
Identify, evaluate and solve problems posed by wetland degradation
Gather information for analysing and evaluating conditions in wetlands

LEERUITKOMSTE
Die deelnemer is in staat om:
Sleutelterme, -konsepte en –beginsels wat met vleilandekologie verband hou, toe te pas
Standaardmetodes, -prosedures en –tegnieke te selekteer en toe te pas op die monitering, evaluering en rehabilitasie van vleilande
Omgewingsisteme wat betrokke is by vleilandbestuur te bespreek
Probleme wat veroorsaak word deur vleilanddegradasie te identifiseer, evalueer en op te los
Inligting te versamel om vleilandtoestande te analiseer en evalueer

Prof. PD Vermeulen
Acting Dean /Waarnemende Dekaan

Me. MF Avenant
Programme Director / Programdirekteur

Certificate number/Sertifikaatnommer: WLRH1500S006
Not credit-bearing towards a UFS qualification/module/Nie-kredietdraend tot 'n UV-kwalifikasie/module nie

No: SANW 4113

SAGIC Invasive Species Training

This serves to notify that

Ndumiso Dlamini

has attended the South African Green Industries Council (SAGIC)
Invasive Species Training: Module 1 - Introduction to Legislation

Chairman: Ida-Marie Strydom

Trainer

Training date: 05/07/16

No: SANW 4142

SAGIC Invasive Species Training

This serves to notify that

Ndumiso Dlamini

has attended the South African Green Industries Council (SAGIC)
Invasive Species Training: Module 2 - Introduction to Herbicides and Control Methods

Chairman: Ida-Marie Strydom

Trainer

Training date: 06/07/16

SAGIC

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THE CAPE Green Forum

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LANDSCAPE IRRIGATION ASSOCIATION OF S.A.

OPPASA

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AFRICA LAND-USE TRAINING

Certificate

This is to certify that

Ndumi Dlamini

attended a 1-day course on

GRASS IDENTIFICATION

at

Ukulinga Research Farm,
Pietermaritzburg

on

24 January 2017

Presented by

Africa Land-Use Training

2007/198/105/23

Head of Training