

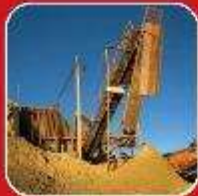
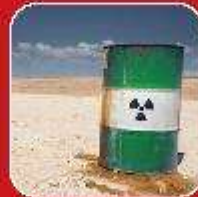
BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED PROSPECTING ON PORTIONS OF THE FARM BOEKENHOUTKLOOF 315 JR, CITY OF TSWHANE, GAUTENG PROVINCE

DMR REF. NO: GP/30/5/1/1/2 (10489) PR
ENVIASS REF. NO: 186-17_18

Submitted to:

Department of Mineral Resources
Gauteng Region
Johannesburg

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BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT: Klei Minerale (Pty) Ltd

Contact Person: Mr Elfranco Swart

TEL NO: 012 372 9502



FAX NO: 086 657 3338

POSTAL ADDRESS: P.O. Box 48357, Hercules, Pretoria

PHYSICAL ADDRESS: Plot 95, Boekenhoutkloof, Hercules, Pretoria West

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	Originated By	Reviewed By	Approved By
Name	Monica Niehof		Corrie Retief
Designation	Environmental Consultant		Senior Environmental Consultant
Signature			
Date	2017/12/12		2018/01/10
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EXECUTIVE SUMMARY

Environmental Assurance (Pty) Ltd (ENVASS) as independent environmental consultant was appointed by Klei Minerale (Pty) Ltd (Klei Minerale) to undertake the Environmental Authorisation Application process for the proposed prospecting in the City of Tshwane, Gauteng Province. The prospecting is proposed on Portions 36, 37, 38, 39, 40 and 41 of the farm Boekenhoutkloof 315 JR, Gauteng Province (the study area), constituting a total area of 60.6998 hectares (ha). The study area is located approximately 14 km west of Pretoria. Akasia is located approximately 4 km north-east of the area demarcated for prospecting and Atteridgeville is located approximately 6 km to the south of the study area. Klei Minerale is an operating clay mining company.

Legislative Requirements

The most important legislation applicable to the proposed project are listed below:

National Environmental Management Act (No. 107 of 1998) [as amended]

Section 28: Duty of Care and responsibilities to minimise and remediate environmental degradation.

EIA Regulations, 2014 (Government Notices 982) [as amended]


The EIA regulations prescribes the manner and content of the Basic Assessment and Public Participation Processes to be followed.

Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) [as amended]

In order to apply for a prospecting right, an application was submitted on the Department of Mineral Resources' Samrad online application system.

Need and Desirability

The project is not completely aligned with the objectives of the municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP), however, it will not compromise the integrity of these respective forward planning documents, due to the small extent and fairly short term period of the prospecting activities. Unemployment within the City of Tshwane is high, according to the IDP of CoT. The Klei Minerale operations will have a positive impact on the socio-economic conditions of the local communities involved, should the results of the prospecting show that feasible reserves are present to mine and a mining right is approved. The mining and resulting brick-making will sustain several employment opportunities after the closure of the existing clay mines in the area.

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The approval of this prospecting application will not compromise the integrity of the existing environmental management priorities of the area as defined in the GPEMF, provided that sensitive areas and vegetation as indicated by the specialist are avoided and the mitigation measures as recommended in this report and in the EMPR (refer to Part B of this report), are implemented. However, should a mining right be applied for and be approved in future, the integrity of the existing environmental management priorities of the area may be compromised, and a full Environmental Impact Assessment must then be conducted to determine the sustainability of the mining activities.

The study area where prospecting is proposed is located adjacent to the existing Klei Minerale Boekenhoutkloof clay mine and the J Robbertse Vervoer (Pty) Ltd (trading as SABRIX) (SABRIX) brick making factory. The existing infrastructure is sufficient and no new infrastructure is required for the proposed activities.

The geology of the area is known for clay and sand resources, and from a mining and prospecting perspective is ideal for the type of land use. However, in terms of the environment, the location is not ideal, due to the sensitive ridge habitat and bordering Magaliesberg Protected environment.

Prevention and mitigation measures as recommended by the specialists, were included in this Basic Assessment Report (BAR) and the Environmental Management Programme (EMPR) (please refer to Table 13 Mitigation Measures (the EMPR section). The implementation of the EMPR will ensure that the environment is affected to the minimum. The potential cumulative impacts were also assessed and found not to be of high significance after mitigation for the prospecting period.

It should be noted, however, that future mining activities may have more significant cumulative impacts.


Alternatives

Prospecting is conducted in phases, where the activities and location of drilling and trenching to sample soil is dependent on the previous phase. Therefore, the specific locations and extent of soil sampling and diamond core drilling cannot be predetermined. The overall prospecting area is indicated in Figure 1. Areas to be avoided in terms of sensitivities are also indicated on the sensitivity maps in this report.

The following alternatives were investigated as feasible alternatives:

- a) The property on which or location where it is proposed to undertake the activity

Klei Minerale (Pty) Ltd is an operating clay mining company which conducts mining immediately west of the study area and also to the east of the study area. Therefore, infrastructure and resources are

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available in close proximity to the study area. In addition, geological information indicated that the area potentially contains shale that weathers to clay on surface. The clay present in the area can be used in various applications with numerous quarries and brickworks located in the region.

The site is therefore, the preferred site and alternative sites are not considered.

b) The type of activity to be undertaken

Prospecting activities will not compromise any future land uses on the study area. Should results of the prospecting indicate a viable reserve is present, then a comprehensive social and environmental impact assessment will be conducted to obtain environmental authorisation and a mining right from the competent authority/ies, in accordance with legislation. Alternative land uses to mining would be investigated as part of the social and environmental impact assessments.

c) The design or layout of the activity


The specific locations of intrusive drilling activities will be determined during Phase 1 of the Prospecting Work Programme. All infrastructure to be developed will be mobile and temporary.

d) The technology to be used in the activity

In terms of technologies proposed, prospecting work will initially entail a high-level desktop study and potential desktop resource evaluation. This will include a data search of any previous drilling, trenching, sampling activities, exploration activities, existing maps and relevant historical data. Desktop studies to be undertaken would include studying of geological reports, prospecting data, plans/maps, aerial photographs, topography maps and any other related geological information regarding the specific area.

On successful completion of this desktop study, further possible drilling, trenching and resource estimations will be performed if the results warrant it. The type of invasive prospecting activities have been determined based on the historic success of the methods to be utilised. The prospecting activities are, however, dependent on the preceding phase (non-invasive) as indicated above and therefore no alternatives are indicated, but rather a phased approach of trusted prospecting techniques.

Diamond core drilling is planned to be executed on a phase by phase basis. Planned borehole depths will be determined during the desktop study, but it is estimated that drilling activities will be conducted down to relatively shallow depths. Logging and sampling of the borehole core will be performed to evaluate the area. Trenching will involve the digging of excavation trenches down to approximately 3 metres below surface using graders and excavators. Mapping of the trench walls will then be performed.

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e) The operational aspects of the activity

No permanent services including water supply, electricity, or sewerage facilities are required. All infrastructure to be developed will be mobile and temporary including generators, portable toilets and water tanks.

f) The option of not implementing the activity

According to Section 24 of the Constitution, a development must be ecologically sustainable and also support socio-economic development.

Not implementing the prospecting activities will result in a loss of information of mineral reserves present on the study area. Should economically feasible reserves exist on the study area and the applicant cannot prospect, the opportunity to utilise the reserves for future mining and brick-making will be lost, i.e. the minerals will be sterilised and resultant socio-economic benefits will be lost.

The proposed prospecting activities has the potential to have a negative impact on the ecological environment as well as the social environment of the area. These impacts, however, can potentially be prevented, minimised, mitigated and managed to low and very low levels, as shown through the impact assessment.

Public Participation


A Public Participation Process is undertaken for the Environmental Authorisation for prospecting. The process is undertaken to ensure compliance with regard to the requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [as amended] (MPRDA) and the Environmental Impact Assessment Regulations (2014) [as amended].

Tasks undertaken for the Public Participation Process (PPP):

- Identification of key interested and affected parties (affected and adjacent landowners) and other stakeholders (organs of state and other parties);

Interested and Affected parties (I&APs) representing the following sectors of society have been identified:

- National, provincial and local government;
- Agriculture, including local landowners (affected and adjacent);
- Community Based Organisations;
- Non-Governmental Organisations;
- Water bodies;

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- Tourism;
 - Industry and mining;
 - Commerce; and
 - Other stakeholders.
- Formal notification of the application to interested and affected parties (including all affected and adjacent landowners) and other stakeholders
 - Publication of media advertisement (English) in the Pretoria News on 8 November 2017;
 - Two site notices were erected on site and at visible locations close to the site on 8 November 2017;
 - I&AP's and other key stakeholders, who included the above-mentioned sectors, were directly informed of the proposed development by e-mail on 8 November 2017.

I&APs were given 30 days to comment and / or raise issues of concern regarding the proposed development. The commenting period expired on the 8th of December 2017.

- Consultation and correspondence with I&APs and stakeholders.

All I&AP registrations and comments that are received from stakeholders are formally recorded in the Comments and Responses Report. The Draft BAR and EMPR are herewith released for a period of 30 days from 18 January 2018 to 18 February 2018. Hard copies of the Draft BAR and EMPR are also submitted to all relevant organs of state and authorities. In addition copies are placed at Mountain View Public Library, 3 Bergsig Sentrum, 454 Karel Trichardt Ave, Mountain View, Pretoria, 0082 Tel no: 012 379 1338, and on the ENVASS website (www.envass.co.za).

Next phases of the public participation process


All comments received from I&APs and organs of state and responses sent will be included in the final BAR and EMPR to be submitted to the Competent Authority (CA). Further consultation with the landowners will be conducted in January 2018.

Specialist studies

The following specialist studies have been conducted:

- Surface Water Assessment;
- Ecological and Biodiversity Scan; and
- Cultural heritage desktop assessment.

The main objective of the specialist studies is to provide independent scientifically sound information on issues of concern relating to the project proposal.

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The findings and recommendations identified by the various specialist studies undertaken, were incorporated into the Basic Impact Assessment.

- Surface Water Assessment

The hydrologic functions ran for a digital elevation model (DEM) created from the 1:50000 topographical map series data of South Africa (grid reference 2528) showed that, based on elevation data, no major streams were expected to accumulate through or near the site. Data obtained from the Department of Water and Sanitation (DWS, 2017) showed that the Swartspruit (a former tributary of the Crocodile River (West) and now flowing into the Hartbeespoort Dam) has its origin +/- 1.5 km south of the outer boundary of the Boekenhoutkloof proposed prospecting area.

- Ecological and Biodiversity Scan


The state of habitat on site was found to be mostly natural, with some alien and invasive vegetation present. The site, especially towards the northern portions provide valuable shelter for animals.

The study site is situated within a sensitive environment, including in close proximity to the Magaliesberg Protected Natural Environment which is protected under the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003). In terms of the Gauteng Conservation Plan, certain areas of the study site are classified as Irreplaceable, and others are identified as Ecological Support Areas. The study site is also situated within the Magaliesberg Important Bird Area (IBA). And the northern section of the study site is situated on a Class 2 Ridge area.

The results of this study indicate that the study area is deemed sensitive, due to the current state of the site and its location. Portion 36 and Portion 37 seems to be the most sensitive, the northern sites. Several Red Data mammals and avifauna probably occur on or in the vicinity of the site.

The ecologists concluded that the northern portions (Portion 36 and 37) be excluded from the prospecting activities, due to the sensitive nature of the habitat and vegetation. The northern portions of the study area falls within a Class 2 sensitive ridge and a 200 m buffer of low impact development is required in terms of the Gauteng Department of Agriculture and Rural Development (GDARD) Development Guidelines for Ridges 2001. The remaining portions may be utilised for prospecting purposes provided that the recommendations are adhered to.

- Cultural heritage desktop assessment

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From the records of previous research conducted in the area, the specialist concluded that the general region is significant from a heritage perspective. Heritage sites are likely to include graveyards, Iron Age/Farmer and Historical remains. Since heritage sites, e.g. graves, are not always clearly identifiable as it might consist of stone cairns, it is advised that a qualified archaeologist inspect the proposed prospecting sites prior to drilling to establish whether the sites might be sensitive from a heritage perspective.

Reasoned Opinion of the EAP


Based on the findings of the basic impact assessment, the EAP is of the opinion that the proposed prospecting be approved, due to the potential positive social and economic impacts it will have on the local and regional communities. The potential negative impacts can be mitigated to levels of low and very low significance, provided that the mitigation measures are strictly implemented and monitored. It is, however, recommended, that the northern portions (Portion 36 and 37) be excluded from the prospecting activities, due to the sensitive nature of the habitat and the potential impact on biodiversity. The remaining portions may be utilised for prospecting purposes provided, that all the recommendations of the specialists and mitigation measures provided in the Environmental Management Programme (PART B of this report) are adhered to.

Recommendations

In order to achieve appropriate environmental management standards and ensure that the findings of the environmental studies are implemented through physical measures, the recommendations from the basic assessment report are included within the Environmental Management Programme (EMPR). The EMPR is based on all the information contained within this report as well as all the specialists' reports.

Key specialist recommendations:

- The northern portions (Portion 36 and 37) be excluded from the prospecting activities, due to the sensitive nature of the habitat and the potential impact on biodiversity;
- A suitably qualified specialist (ecologist) to accompany the site manager to demarcate areas for prospecting, in order to avoid damaging sensitive vegetation and fragment fauna migration patterns;
- Care must be taken to reduce impacts on the adjacent properties through the implementation of all the mitigation measures proposed by the specialists;
- No vegetation clearance outside the demarcated areas, except for the removal of alien invasive species will be allowed;
- An Alien and Invasive Species Management Plan must be compiled and implemented in respect of physical prospecting sites only;

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- Environmental awareness training to all staff and sub-contractors entering the site should be conducted;
- A Stormwater Management Plan (SMP) to be developed for the collective area where prospecting will occur, and should include the management of stormwater during excavation, as well as the installation of temporary stormwater and erosion control measures during prospecting, followed up by rehabilitation of the area;
- Prior to any development, construction or prospecting, a qualified archaeologist should conduct a site inspection on the areas demarcated for geotechnical drilling/prospecting. Proposed access roads to the drill sites should also be surveyed in order to avoid the destruction of heritage material;
- Should the prospecting outcome result in further development or construction and mining, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered.

A variety of mitigation measures have been identified that will serve to mitigate the scale, intensity, duration or significance of the potential negative impacts identified. These include guidelines to be applied during all phases of the proposed prospecting. The EMPR contains detailed mitigation measures for all impacts identified.

The proposed mitigation measures, if implemented, will reduce the significance of the majority of the identified impacts.


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ABBREVIATIONS

CA	Competent Authority
CBA	Critical Biodiversity Area
CoJ	City of Johannesburg
CoT	City of Tshwane
CSA	Constitution of South Africa (Act No. 108 of 1996)
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DTM	Dimensional Terrain Modelling
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPR	Environmental Management Programme
ENVASS	Environmental Assurance (Pty) Ltd
ESA	Ecological Support Area
ESM	Environmental Site Manager
GDARD	Gauteng Department of Agriculture and Rural Development
GDP	Gross Domestic Product
GEMF	Gauteng Environmental Management Framework
GN	Government Notice
GIS	Geographic Information System
GPS	Global Positioning System
GVA	Gross Value Added
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
Mamsl	Metres above mean sea level
MHSA	Mine Health and Safety Act (Act No. 29 of 1996) [as amended]
MPRDA	Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (as amended)
NEMA	National Environmental Management Act, 1998 (Act no 107 of 1998) (as amended)

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NEMAQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004) (as amended)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act (Act No. 59 of 2008) (as amended)
NHRA	National Heritage Resource Act, 1999 (Act No. 25 of 1999)
NVFFA	National Veld and Forest Fire Act (Act No. 101 of 1998)
NWA	National Water Act, 1998 (Act No. 36 of 1998) (as amended)
PM	Public Meeting
PPE	Personal Protective Equipment
PPP	Public Participation Process
RWD	Return Water Dam
SAHRA	South African Heritage Resources Agency
SANS	South African National Standards
SAWS	South African Weather Service
SDF	Spatial Development Framework
SLP	Social and Labour Plan
SM	Site Manager
VAC	Visual Absorption Capacity

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IMPORTANT NOTICE


In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting right if among others the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment and an environmental authorisation is issued”.

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.


It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

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Objective of the basic assessment process

The objective of the basic assessment process is to, through a consultative process—

- (a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- (b) identify the alternatives considered, including the activity, location, and technology alternatives;
- (c) describe the need and desirability of the proposed alternatives,
- (d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage , and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the these aspects to determine:
 - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - (ii) the degree to which these impacts—
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be managed, avoided or mitigated;
- (e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
 - (i) identify and motivate a preferred site, activity and technology alternative;
 - (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and
 - (iii) identify residual risks that need to be managed and monitored.

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PART A

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1. Contact Person and correspondence address

a) Details of:

i) **The EAP who prepared the report**

Name of The Practitioner: Corrie Retief

Tel No.: 012 460 9768

Fax No.: 012 460 3071

e-mail address: corrie@envass.co.za

ii) **Expertise of the EAP**

(1) **The qualifications of the EAP**


(With evidence attached as Appendix 1)

- University of South Africa, BA Hons Geography - 2007
- University of South Africa, BA Environmental - 2005

(2) **Summary of the EAP's past experience.**

(Attach the EAP's curriculum vitae as Appendix 2)

Corrie Retief is an Environmental Scientist with more than 12 years of experience in applying the principles of Integrated Environmental Management, and in applying the Environmental Legislation to a number of development projects and initiatives in Southern Africa. He has co-ordinated and managed a number of diverse projects and programs related to the Environment and Waste within both the public and private sectors for national, multi-national and international companies. His interpersonal and organisational skills have enabled him to efficiently direct these projects from initiation to implementation. Furthermore his training in sustainability and sustainable project delivery has helped him to deliver profitable sustainability into customers operations throughout the asset lifecycle.

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A significant element of public participation is required throughout the life cycle of an EIA process. Corrie has successfully liaised with interested and affected parties, ensuring that all communication procedures and dialogues are open and transparent, and that capacity building is conducted where necessary. His proficient report-writing skills have been utilised for the compilation of a wide variety of reports, which include but is not limited to Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports, Environmental Management Plans (Planning, Construction, Operation and Closure), Environmental Audit Reports, Opportunities and Constraints Analyses, Feasibility studies, Waste License Applications, Water-Use Application Reports, Prospecting Right and Mining Right Applications.


The EAP has experience in the following disciplines:

- Environmental risk assessments;
- Environmental site screening, investigation and evaluations;
- Environmental legal screenings;
- Environmental feasibility studies;
- Environmental impact assessments;
- Basic assessments;
- Environmental compliance auditing;
- Compilation, implementation and monitoring of environmental management plans;
- Waste Management;
- Waste Disposal site selection screenings;
- Waste license applications;
- Water-Use License Applications;
- Mining Right applications;
- Managing and facilitating public participation; and
- Prospecting Right Applications.

2. Location of the overall Activity

Table 1: Location of the Overall Activity

Farm Name:	Portions 36, 37, 38, 39, 40 and 41 of the Farm Boekenhoutkloof 315 JR
Application area (Ha)	60.6998
Magisterial district:	City of Tshwane
Distance and direction from nearest town	Approximately 14 km north-west of Pretoria CBD

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21 digit Surveyor General Code for each farm portion	T0JR00000000031500036
	T0JR00000000031500037
	T0JR00000000031500038
	T0JR00000000031500039
	T0JR00000000031500040
	T0JR00000000031500042

3. Locality map

(show nearest town, scale not smaller than 1:250000)

Refer to Appendix 3 for the locality map.


4. Description of the scope of the proposed overall activity

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site.

(i) Listed and specified activities

Table 2: Listed and specified activities

NAME OF ACTIVITY (All activities including activities not listed) (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985 /NOT LISTED	WASTE MANAGEMENT AUTHORISATION (Indicate whether an authorisation is required in terms of the Waste Management Act)
OPERATIONAL PHASE				
• Clearing of vegetation and topsoil.	Less than 1 hectare in total	-	NOT LISTED	NOT LISTED
• Stockpiling of overburden positioned for later rehabilitation.	Less than 1 hectare in total	-	NOT LISTED	NOT LISTED
• Prospecting.	Less than 1 hectare in total.	X	Listing Notice 1 Activity 20	NOT LISTED
• Dust Suppression.	Extent of dirt roads open, non-paved areas.		NOT LISTED	NOT LISTED

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(ii) Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to be prospected/mined and for a linear activity, a description of the route of the activity)

Background

Klein Minerale (Pty) Ltd is applying for a Prospecting Right without bulk sampling, to prospect the following types of minerals:


(CS) Shale/Brick Clay; (Cy) Clay (General); (Q) Silica Sand (General); (Qy) Sand (General); (RM) Aggregate.

Sedimentary rocks of the Silverton Formation of the Pretoria Group (which forms part of the Transvaal Supergroup) and Diabase Intrusions are the main lithologies present on the study area. Sedimentary rocks of the Magaliesberg Formation of the Pretoria Group (which forms part of the Transvaal Supergroup) and igneous rocks of the Lower Zone of the Rustenburg Layered Suite (which forms part of the Bushveld Complex) are found to the north of the proposed prospecting area.

The area demarcated for the prospecting of Shale/Brick Clay, Clay, Silica Sand, Sand and Aggregate covers an area of approximately 60.6998 ha (refer to Table 3 and Figure 1).

Table 3: Property name & coordinates

Property	Portion	Map Reference (1:50 000)	Coordinates
Boekenhoutkloof 315 JR	36	2528CA	S: -25.688399 E: 28.063330
Boekenhoutkloof 315 JR	37	2528CA	S: -25.687947 E: 28.066328
Boekenhoutkloof 315 JR	38	2528CA	S: -25.691207 E: 28.064781
Boekenhoutkloof 315 JR	39	2528CA	S: -25.694705 E: 28.062592
Boekenhoutkloof 315 JR	40	2528CA	S: -25.694705 E: 28.064234
Boekenhoutkloof 315 JR	41	2528CA	S: -25.694800 E: 28.065400

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Prospecting work will initially entail a high-level desktop study and potential desktop resource evaluation. This will include a data search of any previous drilling, trenching, sampling activities, exploration activities, existing maps and relevant historical data. On successful completion of this desktop study, further possible drilling, trenching and resource estimations will be performed if the results warrant it.

Prospecting Method:

- Planned non-invasive activities


Desktop studies to be undertaken over the area would include studying of geological reports, prospecting data, plans/maps, aerial photographs, topography maps and any other related geological information about this area.

- Planned invasive activities

Diamond core drilling is planned to be executed on a phase by phase basis. Planned borehole depths will be determined during the desktop study, but it is estimated that drilling activities will be done down to relatively shallow depths. Logging and sampling of the borehole core will be performed to evaluate the area. Trenching will involve the digging of excavation trenches down to approximately 3 metres below surface using graders and excavators. Mapping of the trench walls will then be performed.

- Pre-feasibility studies

Geological modelling of gathered existing geological data and prospecting data will be performed, if the results warrant it.

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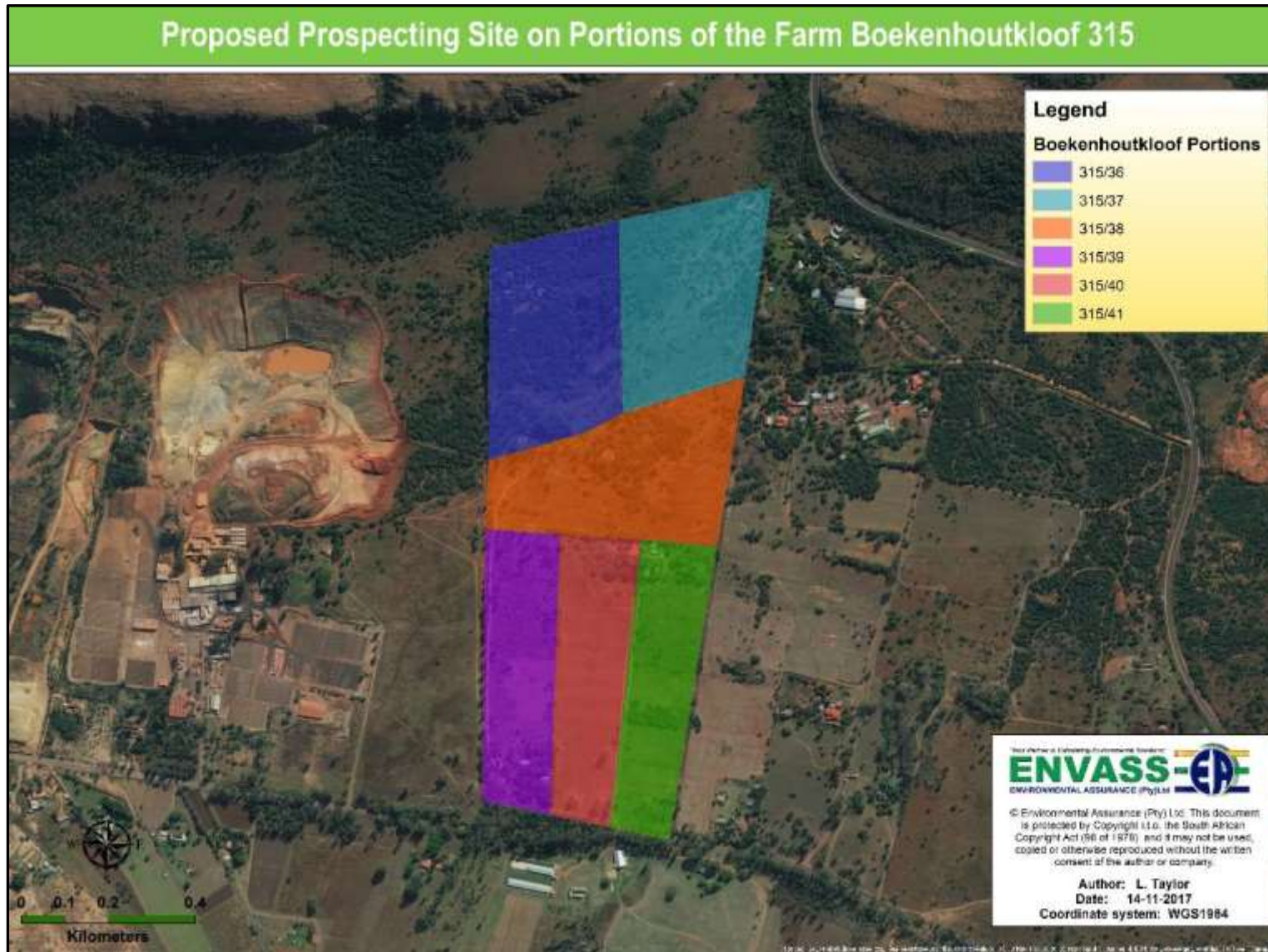



Figure 1: Farm Portions of the Study Area

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5. Policy and Legislative Context

Table 4: Policy and Legislative Context


APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i>	REFERENCE WHERE APPLIED
<p>Constitution of South Africa, 1996 (Act No. 108 of 1996) [as amended]</p> <ul style="list-style-type: none"> • <i>Section 24</i> <p><i>Environment. -Everyone has the right-</i></p> <p><i>(a) to an environment that is not harmful to their health or well-being; and</i></p> <p><i>(b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that-</i></p> <p><i>i) prevent pollution and ecological degradation;</i></p> <p><i>ii) promote conservation; and</i></p> <p><i>Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</i></p>	<p>The proposed activity has the potential to harm the environment and poses a risk to the health and wellbeing of people.</p> <p>The Applicant has the overall responsibility to ensure that the rights of people in terms of Section 24 of the Constitution is protected in terms of the proposed prospecting activity.</p>
<p>National Environmental Management Act (No. 107 of 1998) [as amended]</p> <ul style="list-style-type: none"> • <i>Section 24</i> <p><i>Environmental Authorisations</i></p> <ul style="list-style-type: none"> • <i>Section 28 (1)</i> <p><i>Duty of Care and responsibilities to minimise and remediate environmental degradation.</i></p>	<p>The proposed activity is a listed activity in terms of the EIA Regulations and requires environmental authorisation.</p> <p>Overall responsibility of the prospecting rests with the Applicant, especially in terms of liabilities associated with the operational phase.</p>
<p>EIA Regulations, 2014 (Government Notices 982 and 984) [as amended in 2017]</p> <p><i>Chapter 2: Timeframes for EIA processes</i></p> <p><i>Chapter 3: Duties of proponent</i></p> <p><i>Chapter 4: Application for Environmental Authorisation:</i></p> <p><i>Part 2: Basic Assessment</i></p> <p><i>Part 4: Environmental Authorisation</i></p> <p><i>Chapter 6: Regulation 39 to 44: Public Participation</i></p> <p><i>Appendix 1: Basic Assessment Report</i></p> <p><i>Appendix 4: Environmental Management Programme</i></p> <p><i>Appendix 6: Specialist Reports</i></p>	<p>The EIA Regulations, 2014 [as amended] prescribes <i>inter alia</i>:</p> <p>the manner in which public participation needs to be conducted as well as the requirements of a basic assessment process and content of a basic assessment report, Environmental Management Programme and specialist reports.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i>	REFERENCE WHERE APPLIED
Mineral and Petroleum Resources Development Act, 2002 (Act. 28 of 2002) [as amended]: <i>Chapter 2 (5): Legal nature of a prospecting right;</i> <i>Chapter 4: Mineral and Environmental Regulation</i> <i>(9) Order of processing of applications</i> <i>(10) Consultation with Interested and Affected Parties;</i> <i>(16 – 19) Prospecting right application.</i> <i>(37) Environmental Management Principles</i>	The application is for a prospecting right and therefore all regulations pertaining to the application process of a prospecting right and environmental management is applicable to this application.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended] <ul style="list-style-type: none"> • Section 16 <i>General duty in respect of waste management;</i> <ul style="list-style-type: none"> • Section 17; <i>Reduction, re-use, recycling and recovery of waste;</i> <ul style="list-style-type: none"> • Section 21 <i>General requirements for storage of hazardous and general waste.</i>	The proposed activities will produce general and hazardous waste which need to be managed and disposed of according to best practices such as recycling, safe storage, etc.
National Water Act, 1998 (Act No. 36 of 1998) [as amended] <ul style="list-style-type: none"> • Section 3 <i>Regulation of flow and control of all water</i> <ul style="list-style-type: none"> • Section 19 <i>Prevention of pollution to watercourses</i>	Stormwater need to be managed properly in order to achieve prevention of pollution and hazards.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996) [as amended] and associated regulations <ul style="list-style-type: none"> • Chapter 2, Sections 2 – 4 <i>Responsibilities of owner</i> <ul style="list-style-type: none"> • Chapter 2, Sections 5 – 13 <i>Responsibilities of manager;</i> <ul style="list-style-type: none"> • Chapter 2, Sections 14 – 18; <i>Documentation requirements;</i> <ul style="list-style-type: none"> • Chapter 2, Section 19 – 20 and 22 to 24 <i>Employee’s rights and duties; and</i> <ul style="list-style-type: none"> • Chapter 2, Section 21 <i>Manufacturer’s and supplier’s duty for health and safety.</i>	The development activities will create an environment that may not be safe and healthy for workers on and visitors to the site. The act provides for measures to prevent threats to the health and safety of humans in the development area.
National Heritage Resources Act, 1999 (Act No. 25 of 1999) <ul style="list-style-type: none"> • Section 38 	Protection of indigenous heritage resources that may potentially occur on the property.


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<p><i>Statutory Comments to be obtained from the South African Heritage Resources Agency (SAHRA)</i></p> <ul style="list-style-type: none"> • <i>Section 44 (1);</i> <p><i>Preservation and protection of heritage resources;</i></p> <ul style="list-style-type: none"> • <i>Section 3 Types and ranges of heritage resources (i) (i);</i> <p><i>Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens.</i></p>	<p>A cultural heritage desktop assessment was conducted in 2017 by Tobias Coetzee. The specialist concluded that the general region is significant from a heritage perspective. Heritage sites are likely to include graveyards, Iron Age/Farmer and Historical remains. Since heritage sites, e.g. graves, are not always clearly identifiable as it might consist of stone cairns, it is advised that a qualified archaeologist inspect the proposed prospecting sites prior to drilling to establish whether the sites might be sensitive from a heritage perspective.</p> <p>Comments to be obtained from SAHRA on the Draft BAR and EMPR and cultural heritage desktop assessment.</p>
<p>National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) [as amended]</p> <ul style="list-style-type: none"> • <i>Section 32</i> <p><i>Control of dust</i></p> <ul style="list-style-type: none"> • <i>Section 34</i> <p><i>Control of noise</i></p>	<p>Impacts on surrounding landowners need to be managed through dust and noise monitoring and mitigation measures.</p>
<p>National Dust Control Regulations, 2013 (Government Notice 827 of 2013)</p> <ul style="list-style-type: none"> • <i>Section 3</i> <p><i>Dust fall standard</i></p> <ul style="list-style-type: none"> • <i>Section 4</i> <p><i>Dust fall monitoring program</i></p> <ul style="list-style-type: none"> • <i>Section 6</i> <p><i>Measures for control of dust</i></p> <ul style="list-style-type: none"> • <i>Section 7</i> <p><i>Ambient air quality monitoring (PM10)</i></p> <ul style="list-style-type: none"> • <i>Section 8</i> <p><i>Offences</i></p> <ul style="list-style-type: none"> • <i>Section 9</i> <p><i>Penalties</i></p>	<p>Dust fallout need to be monitored in accordance to the standards set out in the monitoring programme with the specified measures. This is a result of the Applicant being liable to offences and penalties associated with non-conformance to dust which may influence employees and surrounding landowners.</p>
<p>Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) [as amended]</p> <ul style="list-style-type: none"> • <i>Section 12 (1)</i> <p><i>Duty of the landowner to prevent fire from spreading to neighbouring properties.</i></p>	<p>Cautionary steps in avoiding the spread of fires to and from neighbouring properties.</p>

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National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) [as amended] <ul style="list-style-type: none"> • Section 9 <i>Norms and standards</i> <ul style="list-style-type: none"> • Section 27 <i>Delegation of power and duties</i> <ul style="list-style-type: none"> • Section 30 <i>Financial accountability</i> <ul style="list-style-type: none"> • Section 43 <i>Biodiversity management plans.</i>	Indigenous vegetation need to be protected and managed in accordance with management measures set out in the management plans developed for the proposed activity. The Applicant need to ensure he is aware of and covers his liabilities.
(Government Notice 609 of 2017) Notice of the List of Protected Tree Species under the National Forests Act, 1998 (Act No. 84 of 1998).	It is the responsibility of the Applicant to avoid unnecessary removal of protected tree species. Should protected tree species need to be removed, a permit must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF).
Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2016 in terms of NEMBA (Government Notice 864 of 2016) <ul style="list-style-type: none"> • Notice 2 <i>Exempted Alien Species in terms of Section 66 (1)</i> <ul style="list-style-type: none"> • Notice 3 <i>National Lists of Invasive Species in terms of Section 70(1)</i> <ul style="list-style-type: none"> – List 1, 3-6 8 & 11 • Notice 4 <i>Prohibited Alien Species in terms of Section 67 (1) – List 1, 3-6, 9 & 12</i>	It is the responsibility of the Applicant to ensure that all prohibited plant and animal species are eradicated as far as possible.
Conservation of Agricultural Resources Act (no. 43 of 1983) <ul style="list-style-type: none"> • Section 5 <i>Prohibition of spreading of weeds</i> <ul style="list-style-type: none"> • Section 12 <i>Maintenance of soil conservation works and maintenance of certain states of affairs</i> <ul style="list-style-type: none"> • Section 16 <i>Regional Conservation Committees</i>	Listed invader/alien plants occurring on site which requires management measures to be implemented to strive to maintain the status quo environment, especially through the guidelines provided by the Regional Conservation Committee.
Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended]	The Applicant must ensure the safety of people working with hazardous chemicals (specifically fuels), as well as

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<ul style="list-style-type: none"> • Section 2 <i>Declaration of grouped hazardous substances;</i> <ul style="list-style-type: none"> • Section 4 <i>Licensing;</i> <ul style="list-style-type: none"> • Section 16 <i>Liability of employer or principle</i> <ul style="list-style-type: none"> • Section 9 (1) <i>Storage and handling of hazardous chemical substances</i> <ul style="list-style-type: none"> • Section 18 <i>Offences</i>	safe storage, use and disposal of containers during the on-site operational phase together with the associated liability should non-compliance be at the order of the day.
Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995) <ul style="list-style-type: none"> • Section 4 <i>Duties of persons who may be exposed to hazardous chemical substances</i> <ul style="list-style-type: none"> • Section 9A (1) <i>Penalties</i>	Hazardous substances will be stored and utilised on the site and non-compliance to management measures will result in prosecution of the Applicant in terms of his liabilities to the socio-economic environment.
NEMA: Government Notice. 805 Companion Guideline on the Implantation of the Environmental Impact Assessment Regulations, 2010, October 2012.	The application for Environmental Authorisation is submitted in terms of the EIA Regulations.
NEMA: GN. 807 Public Participation Guideline, October 2012	Consultation with Interested and Affected Parties and Communities.
National Development Plan 2030 (2012)	Land uses
National Framework for Sustainable Development (2008)	Land uses
National Strategy for Sustainable Development and Action Plan 2011 – 2014 (NSSD 1) (2011)	Land uses
Gauteng Spatial Development Framework (SDF)	Land uses
Gauteng Spatial Development Plan (SDP)	Land uses
Department of Mineral Resources Guidelines for the compilation of a Scoping Report with due regard to consultation with communities and Interested and Affected Parties.	Consultation with Interested and Affected Parties and Communities.
Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector (2013)	The Guideline provides guidance on the impacts on biodiversity typically associated with mining as well as mitigation measures and strategies. The guideline is taken

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(Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute.	into consideration in this EIA and the development of the Environmental Management Programme.
Gauteng Province Environmental Management Framework, 2014 (GPEMF) <i>Zone 3 and 4 General Guidelines</i>	The study area where the prospecting activity is proposed, is located within the Gauteng Province and falls within Control Zones 3 and 4 of the GEMF. The General Guidelines for these zones should be applied to the proposed prospecting activity. The guidelines should be implemented through the EIA process. According to the GEMF, the proposed activity or land use is incompatible with Zone 3, of which the northern and some of the middle part of the study area falls into, and conditionally compatible with Zone 4, of which the middle and southern parts of the study area falls into. No new mining development should be allowed in Zone 3 and, therefore, this area should be excluded from prospecting activities.
Development Guidelines for Ridges (GDARD)	Ridges have been identified and delineated within the Gauteng Province by GDARD. The northern part of the study area falls within the delineation of a Class 2 ridge. Class 2 ridges between 5 and 35% transformed. GDARD maintains a no-go development policy in these areas, however, low impact developments will be considered, but requires full a full EIA and public participation process. A buffer of 200 m is required around class 2 ridges. Development proposals with the buffer zone should proceed at least to the mini EIA stage (Basic Impact Assessment) (refer to Figure 16 for the delineation of the ridge and buffer zone).
Gauteng Transport Infrastructure Act, 2001 (Act No. 8 of 2001) [as amended];	<ul style="list-style-type: none"> The Gauteng Strategic Transportation Network namely, provincial Road(s): PWV7, K16 and K67 may be affected and as such, when an application for a change of land use, is lodged with the relevant authority, the said application

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	<p>must be lodged with the Gauteng Department of Roads and Transport.</p> <ul style="list-style-type: none"> • An application must be submitted to the Department for a way leave if any part of a proposed service falls within 95,0 m (measured from the centreline of any of the Department's existing or future road(s)/railway line or within a 500,0 m radius of any intersection on said road(s)/railway line. • Where mining operations are to be undertaken, Section 49 of the Gauteng Transport Infrastructure Act, 2001 (Act No 8 of 2001) shall apply.
City of Tshwane Metropolitan Spatial Development Framework (MSDF), 2012	Land use
City of Tshwane Regional Spatial Development Framework (RSDF): Region 3	Land use
City of Tshwane Draft Integrated Development Plan (IDP) 2017/21	Land use Socio-economic baseline information and need and desirability for the development.
Magaliesberg Biosphere Proposed Management Plan	Guidelines for activities and land uses within the biosphere.
Magaliesberg Protected Environment: Environmental Management Framework and Plan	Guidelines for activities and land uses within the biosphere.
SANS 10103:2008 The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication.	Impacts on surrounding landowners need to be managed through noise mitigation measures.
SANS 1929: Ambient Air Quality – Limits for Common Pollutants	Impacts on surrounding landowners need to be managed through dust mitigation measures.
SANS 1137: Standard test method for the collection and measurement of dust fall (settleable particulate matter).	Impacts on surrounding landowners need to be managed through dust mitigation measures.
SANS 10234: 2008 Globally Harmonised Systems of classification and labelling of chemicals (GHS) Government Notice 634. August 2013: Waste Classification	All dangerous goods on site need to be managed according to these standards.

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APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)</i>	REFERENCE WHERE APPLIED
SANS 10228:2006 The Identification and Classification of Dangerous Goods for Transport	All dangerous goods to be transported to and from the site need to be managed according to these standards.
ASTM d 1739, 1970 or equivalent approved protocol for dust monitoring.	Impacts on surrounding landowners need to be managed through dust mitigation measures.
Gauteng Conservation Plan: Version 3.3	Identifies Critical Biodiversity Areas, Ecological Support Areas, and irreplaceable, protected and important areas. The study areas are categorised into Irreplaceable and Ecological Support Areas (refer to Figure 14).
All other relevant national, provincial, district and local municipality legislation and guidelines that may be applicable to the application.	-


6. Need and desirability of the proposed activities

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).


According to the Western Cape Department of Environmental Affairs and Development Planning's (WC DEADP) Guideline on Need and Desirability: EIA Guideline and Information Document Series (2011), to describe the need for a development, it must be determined whether it is the right time for locating the type of land use and/or activity being proposed. To describe the desirability for a development, it must be determined, whether it is the right place for locating the type of land use and/or activity being proposed. Need and desirability can be equated to the concept of wise use of land which can be determined through the question of what is the most sustainable use of land. In light of the above, the need and desirability of an application must be addressed separately and in detail answering *inter alia* the following questions:

Table 5: Need and desirability considerations


A) NEED (TIMING)	
QUESTION A1: Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority?	The project is not completely aligned with the objectives of the municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP), however, it will not compromise the integrity of these respective forward planning documents, due to the relatively short term period of the prospecting activities.
YES	NO X

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QUESTION A2: Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time?	The proposed activity will enable Klei Minerale (Pty) Ltd to apply for a mining right, should prospecting be successful, which in turn will enable them to extend their mining operations and SABRIX its brickmaking operations with a significant number of years and, therefore, the benefits for local communities and South Africa as a whole for e.g. employment provision will continue for longer.
YES X	NO
QUESTION A3: Does the community/area need the activity and the associated land use concerned (is it a societal priority)?	Unemployment within the City of Tshwane is high, according to the IDP (2017 – 2021) of CoT. The Klei Minerale operations will have a positive impact on the socio-economic conditions of the local communities involved once mining operations commence. The abovementioned mining and brick-making will sustain several employment opportunities after the closure of the existing clay mines in the area.
YES X	NO
QUESTION A4: Are the necessary services with the adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	All infrastructure for services and capacity is sufficient for the proposed prospecting activities.
YES X	NO
QUESTION A5: Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?	No municipal infrastructure will be required for the proposed prospecting activities.
YES	NO X
QUESTION A6: Is this project part of a national programme to address an issue of national concern or importance?	-
YES	NO X
B) DESIRABILITY (PLACING)	
QUESTION B1: Is the development the best practicable environmental option for this land/site?	The study site is situated within a sensitive environment, including in close proximity to the Magaliesberg Protected Natural Environment which is protected under the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003). In terms of the Gauteng Conservation Plan, certain areas of the study site are classified as Irreplaceable, and others are identified as Ecological Support Areas. The study site is also situated within the Magaliesberg Important Bird Area (IBA). And the northern section of the study site is situated on a Class 2 Ridge area.
YES	NO X
	The results of ecological scan indicate that the study area is deemed sensitive, due to the current state of the site and its location. Portion 36 and Portion 37 seems to be the most sensitive, the northern sites. Several Red Data mammals and avifauna potentially occur on or in the vicinity of the site. Long-term impacts can be severe.
	The ecologists concluded that the northern portions (Portion 36 and 37) be excluded from the prospecting activities, due to the sensitive nature of the habitat and vegetation. The northern portions of the study area falls within a Class 2 sensitive ridge and a 200 m buffer of low impact development is required in terms of the Gauteng Department of Agriculture and Rural Development (GDARD) Development

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		Guidelines for Ridges 2001. The remaining portions may be utilised for prospecting purposes provided that the recommendations are adhered to.
QUESTION B2: Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF as agreed to by the relevant authorities?		The project is not completely aligned with the objectives of the municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP), however, it will not compromise the integrity of these respective forward planning documents, due to the relatively short term period of the prospecting activities.
YES	NO X	
QUESTION B3: Would the approval of this application compromise the integrity of the existing environmental management priorities of the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?		The approval of this prospecting right application will not compromise the integrity of the existing environmental management priorities of the area as defined in the GPEMF, provided that sensitive areas and vegetation as indicated by the specialist are avoided and the mitigation measures as recommended in this report and in the EMPR (refer to Part B of this report), are implemented.
YES	NO X	However, should a mining right be approved in future, the integrity of the existing environmental management priorities of the area may be compromised, and a full Environmental Impact Assessment must be conducted to determine the sustainability of the mining activities.
QUESTION B4: Do location factors favour this land use (associated with the activity applied for) at this place, etc.)?		The study area where prospecting is proposed is located adjacent to the existing Klei Minerale clay mine and the SABRIX brick making factory. The existing infrastructure is sufficient and no new infrastructure is required for the proposed activities.
YES X	NO	The geology of the area is known for clay and sand resources, and from a mining and prospecting perspective is ideal for the type of land use. However, in terms of the environment, the location is not ideal, due to the sensitive ridge habitat and bordering Magaliesberg Protected environment.
QUESTION B5: Will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?		A cultural heritage desktop assessment was conducted in 2017 by Tobias Coetzee. The specialist concluded that the general region is significant from a heritage perspective. Heritage sites are likely to include graveyards, Iron Age/Farmer and Historical remains. Since heritage sites, e.g. graves, are not always clearly identifiable as it might consist of stone cairns, it is advised that a qualified archaeologist inspect the proposed prospecting sites prior to drilling to establish whether the sites might be sensitive from a heritage perspective.
YES X	NO	The study site is situated within a sensitive environment, including in close proximity to the Magaliesberg Protected Natural Environment which is protected under the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003). In terms of the Gauteng Conservation Plan, certain areas of the study site are classified as Irreplaceable, and others are identified as Ecological Support Areas. The study site is also situated within the Magaliesberg Important Bird Area (IBA). And the northern section of the study site is situated on a Class 2 Ridge area.


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		<p>The results of ecological scan indicate that the study area is deemed sensitive, due to the current state of the site and its location. Portion 36 and Portion 37 seems to be the most sensitive, the northern sites. Several Red Data mammals and avifauna potentially occur on or in the vicinity of the site.</p> <p>The ecologists concluded that the northern portions (Portion 36 and 37) be excluded from the prospecting activities, due to the sensitive nature of the habitat and vegetation. The northern portions of the study area falls within a Class 2 sensitive ridge and a 200 m buffer of low impact development is required in terms of the Gauteng Department of Agriculture and Rural Development (GDARD) Development Guidelines for Ridges 2001. The remaining portions may be utilised for prospecting purposes provided that the recommendations are adhered to.</p> <p>The prospecting activities itself will not impact on these sensitive areas, if managed appropriately.</p>
<p>QUESTION B6: Will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?</p>		<p>The proposed prospecting activities will have noise, dust and visual impacts on the local community and the natural environment. However, due to the relative short term of the proposed prospecting activities and the nature and extent of the activities, with the proper mitigation and good practice environmental management measures, it will result in impacts of low or very low significance.</p> <p>Prevention and mitigation measures were included in this Basic Assessment Report (BAR) and the Environmental Management Programme (EMPR) (please refer to Table 13 Mitigation Measures (the EMPR section) and in all the tables in the EMPR section of the report).</p> <p>It should be noted, however, that future mining activities will have more significant, although not permanent, impacts of dust, noise, visual character and the sense of place of the local area.</p>
YES X	NO	
<p>QUESTION B7: Will the proposed land use result in unacceptable cumulative impacts?</p>		<p>Prevention and mitigation measures as recommended by the specialists, were included in this Basic Assessment Report (BAR) and the Environmental Management Programme (EMPR) (please refer to Table 13: Mitigation Measures (the EMPR section) and in all the tables in the EMPR section of the report). The implementation of the EMPR will ensure that the environment is affected to the minimum. The potential cumulative impacts were also assessed and found not to be of high significance after mitigation for the prospecting period.</p>

7. Motivation for the overall preferred site, activities and technology alternative

8. Full description of the process followed to reach the proposed preferred alternatives within the site

(NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.)

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Prospecting is conducted in phases, where the activities and location of drilling and trenching to sample soil is dependent on the previous phase. Therefore, the specific locations and extent of soil sampling and diamond core drilling cannot be predetermined. The overall prospecting area is indicated in Figure 1. Areas to be avoided in terms of sensitivities are also indicated on the sensitivity maps in this report. Positioning of invasive prospecting planned in the sensitive areas and buffer zones should be conducted with a suitably qualified ecologist in order to avoid or minimise the destruction of any sensitive vegetation or habitats occurring in these areas.


i) Details of all alternatives considered

(With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

- (a) the property on which or location where it is proposed to undertake the activity;*
- (b) the type of activity to be undertaken;*
- (c) the design or layout of the activity;*
- (d) the technology to be used in the activity;*
- (e) the operational aspects of the activity; and*
- (f) the option of not implementing the activity)*

According to the Western Cape Department of Environmental Affairs & Development Planning (WC DEADP) Guideline on alternatives: EIA Guideline and Information Document Series (2011) feasible and reasonable alternatives have to be identified for a development as required by the NEMA EIA Regulations and applicable to EIA. 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. Alternatives forms a vital part of the initial assessment process through the consideration of modifications in order to prevent and/or mitigate environmental impacts associated with a particular development. Alternatives are to be amended when the development's scope of work is amended. It is vital that original as well as amended alternative identification, investigation and assessment together with the generation and consideration of modifications and changes to the development and activities are documented.

Although an array of alternatives could be investigated for each project, such alternatives will not necessarily be applicable to each project and/or project phase. However, there must always be strived to seek alternatives that maximises efficient and sustainable resource utilisation and minimise any negative impacts on the bio-physical and socio-economic environments.

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Feasible alternatives

The following alternatives were investigated as feasible alternatives:

- g) The property on which or location where it is proposed to undertake the activity

Klei Minerale (Pty) Ltd is an operating clay mining company with its Boekenhoutkloof clay mine immediately west of the study area and its Zandfontein clay mine to the east of the study area. Therefore, infrastructure and resources are available in close proximity to the study area. In addition, geological information indicated that the area potentially contains shale that weathers to clay on surface. The clay present in the area can be used in various applications with numerous quarries and brickworks located in the region.

The site is therefore, the preferred site and alternative sites are not considered.

- h) The type of activity to be undertaken

Prospecting activities will not compromise any future land uses on the study area. Should results of the prospecting indicate a viable reserve is present, then a comprehensive social and environmental impact assessment will be conducted to obtain environmental authorisation and a mining right from the competent authority/ies, in accordance with legislation. Alternative land uses to mining would be investigated as part of the social and environmental impact assessments.


- i) The design or layout of the activity

The specific locations of intrusive drilling activities will be determined during Phase 1 of the Prospecting Work Programme. All infrastructure to be developed will be mobile and temporary.

- j) The technology to be used in the activity

In terms of technologies proposed, prospecting work will initially entail a high-level desktop study and potential desktop resource evaluation. This will include a data search of any previous drilling, trenching, sampling activities, exploration activities, existing maps and relevant historical data. Desktop studies to be undertaken would include studying of geological reports, prospecting data, plans/maps, aerial photographs, topography maps and any other related geological information regarding the specific area.

On successful completion of this desktop study, further possible drilling, trenching and resource estimations will be performed if the results warrant it. The type of invasive prospecting activities have been determined based on the historic success of the methods to be utilised. The prospecting

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activities are, however, dependent on the preceding phase (non-invasive) as indicated above and therefore no alternatives are indicated, but rather a phased approach of trusted prospecting techniques.

Diamond core drilling is planned to be executed on a phase by phase basis. Planned borehole depths will be determined during the desktop study, but it is estimated that drilling activities will be conducted down to relatively shallow depths. Logging and sampling of the borehole core will be performed to evaluate the area. Trenching will involve the digging of excavation trenches down to approximately 3 metres below surface using graders and excavators. Mapping of the trench walls will then be performed.

k) The operational aspects of the activity


No permanent services including water supply, electricity, or sewerage facilities are required. All infrastructure to be developed will be mobile and temporary including generators, portable toilets and water tanks.

l) The option of not implementing the activity

According to Section 24 of the Constitution, a development must be ecologically sustainable and also support socio-economic development.

Not implementing the prospecting activities will result in a loss of information of mineral reserves present on the study area. Should economically feasible reserves exist on the study area and the applicant cannot prospect, the opportunity to utilise the reserves for future mining and brick-making will be lost, i.e. the minerals will be sterilised and resultant socio-economic benefits will be lost.

The proposed prospecting activities have the potential to have a negative impact on the ecological environment as well as the social environment of the area. These impacts, however, can potentially be prevented, minimised, mitigated and managed to low and very low levels, as shown through the impact assessment.

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ii) Details of the Public Participation Process Followed

(Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land)

A joint Public Participation Process is undertaken for the proposed prospecting. The process is undertaken to ensure compliance with regard to the requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [as amended] (MPRDA), the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA), the National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) [as amended] (NEMWA), the National Water Act, 1998 (Act No. 36 of 1998) [as amended] (NWA) and Environmental Impact Assessment Regulations (2014) [as amended].

Tasks undertaken for the Public Participation Process (PPP)

This section of the report provides an overview of the tasks undertaken for the PPP to date. All PPP undertaken is in accordance with the requirements of the NEMA requirements and EIA Regulations (2014) [as amended]. It further provides an outline of the next steps in the PPP and makes recommendations for tasks to be undertaken during the environmental assessment phase of the environmental authorisation process.


The PPP tasks conducted for the proposed prospecting project to date include:

IDENTIFICATION OF KEY INTERESTED AND AFFECTED PARTIES (AFFECTED AND ADJACENT LANDOWNERS) AND OTHER STAKEHOLDERS (ORGANS OF STATE AND OTHER PARTIES)

Public Participation is the involvement of all parties who are either potentially interested and / or affected by the proposed development. The principle objective of public participation is to inform and enrich decision-making. This is also its key role in this BA process.

Interested and Affected parties (I&APs) representing the following sectors of society have been identified:

- National, provincial and local government;
- Agriculture, including local landowners (affected and adjacent);

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- Community Based Organisations;
- Non-Governmental Organisations;
- Water bodies;
- Tourism;
- Industry and mining;
- Commerce; and
- Other stakeholders.

FORMAL NOTIFICATION OF THE APPLICATION TO INTERESTED AND AFFECTED PARTIES (INCLUDING ALL AFFECTED AND ADJACENT LANDOWNERS) AND OTHER STAKEHOLDERS

The project was announced as follows:

- Newspaper advertisement

Publication of media advertisement (English) in the Pretoria News on 8 November 2017. *Refer to Appendix 5.1 for proof of newspaper notice placement.*

- Site notice placement

In order to inform surrounding communities, affected and adjacent landowners of the proposed development, two site notices were erected on site and at visible locations close to the site on 8 November 2017. *Refer to Appendix 5.2 for proof of site notice placement.*


- Written notification

I&AP's and other key stakeholders, who included the above-mentioned sectors, were directly informed of the proposed development by e-mail on 8 November 2017. I&APs were given 30 days to comment and / or raise issues of concern regarding the proposed development. The commenting period expired on the 8th of December 2017. *Refer to Appendix 5.3 for proof of email notification.*

- Notification to and consultation with landowners and/or lawful occupiers.

CONSULTATION AND CORRESPONDENCE WITH I&AP'S AND STAKEHOLDERS

All I&AP registrations and comments that are received from stakeholders are formally recorded in the Comments and Responses Report. *Refer to Appendix 5.4 for comments and responses.*

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Draft Basic Assessment Report (BAR) and Environmental Management Programme (EMPR)

The Draft BAR and EMPR are herewith released for a period of 30 days from 18 January 2018 to 18 February 2018.


Hard copies of the Draft BAR and EMPR are herewith submitted to all organs of state and relevant authorities. In addition copies are placed at Mountain View Public Library, 3 Bergsig Sentrum, 454 Karel Trichardt Ave, Mountain View Tel no: 012 379 1338, and on the ENVASS website (www.envass.co.za). Refer to Appendix 5.5 for proof of notification of the basic assessment report review period and submission to relevant parties.

NEXT PHASES OF THE PUBLIC PARTICIPATION PROCESS

All comments received from I&APs and organs of state and responses sent will be included in the final BAR and EMPR to be submitted to the Competent Authority (CA).

Further consultation with the landowners will be conducted in January 2018.

Once the BAR and EMPR are submitted, the CA will have 107 days to reach a decision on the application. Thereafter the registered I&APs will be notified of the CA's decision.

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- **Summary of issues raised by I&Aps**

(Complete the table summarising comments and issues raised, and reaction to those responses)

Table 6: Summary of issues raised

Interested and Affected Parties List the names of persons consulted in this column and mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (consensus dispute, not finalised, etc)
<u>AFFECTED PARTIES</u>				
Landowner/s				
Ms Frieda Elizabeth Lydia Hartig Mr Heiner Hartig				
Lawful occupier/s of the land				
		No comments received to date.		
Landowners or lawful occupiers on adjacent properties				
		No comments received to date.		
Municipal councillor				
		No comments received to date.		
Local Municipality – City of Tshwane Metropolitan Municipality				
		No comments received to date.		
District Municipality – N/A				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS etc.				
		No comments received to date.		
Communities				

Interested and Affected Parties List the names of persons consulted in this column and mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (consensus dispute, not finalised, etc)
		No comments received to date.		
Dept. Land Affairs				
		No comments received to date.		
Traditional Leaders				
		No comments received to date.		
Dept. Environmental Affairs				
		No comments received to date.		
Other Competent Authorities affected				
The Department of Agriculture, Forestry and Fisheries (DAFF)		No comments received to date.		
<u>OTHER AFFECTED PARTIES</u>				
Magaliesberg Protection Association		No comments received to date.		
<u>INTERESTED PARTIES</u>				
		No comments received to date.		

9. The Environmental attributes associated with the alternatives


(The environmental attributes described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

Baseline Environment

(1) Baseline Environment

The study area is located approximately 14 km west of Pretoria. Akasia is located approximately 4 km north-east of the area demarcated for prospecting and Atteridgeville is located approximately 6 km to the south of the study area. Opencast mining of clay by Klei Minerale takes place on adjacent portions of land and clay bricks are manufactured by SABRIX by means of coal fired clamp kilns and a coal fired tunnel kiln. The current surrounding land uses in the region includes mining, agricultural smallholdings, residential communities and individual homesteads to the north, east, south and west and the Magaliesberg Protected Environmental immediately to the north of the study area.

The study area falls within the A21H Quaternary Catchment that forms part of the Limpopo Water Management Area. The closest major river to the study area is the Swartspruit, a perennial river flowing roughly 1.5 km to the south of the area demarcated for prospecting.

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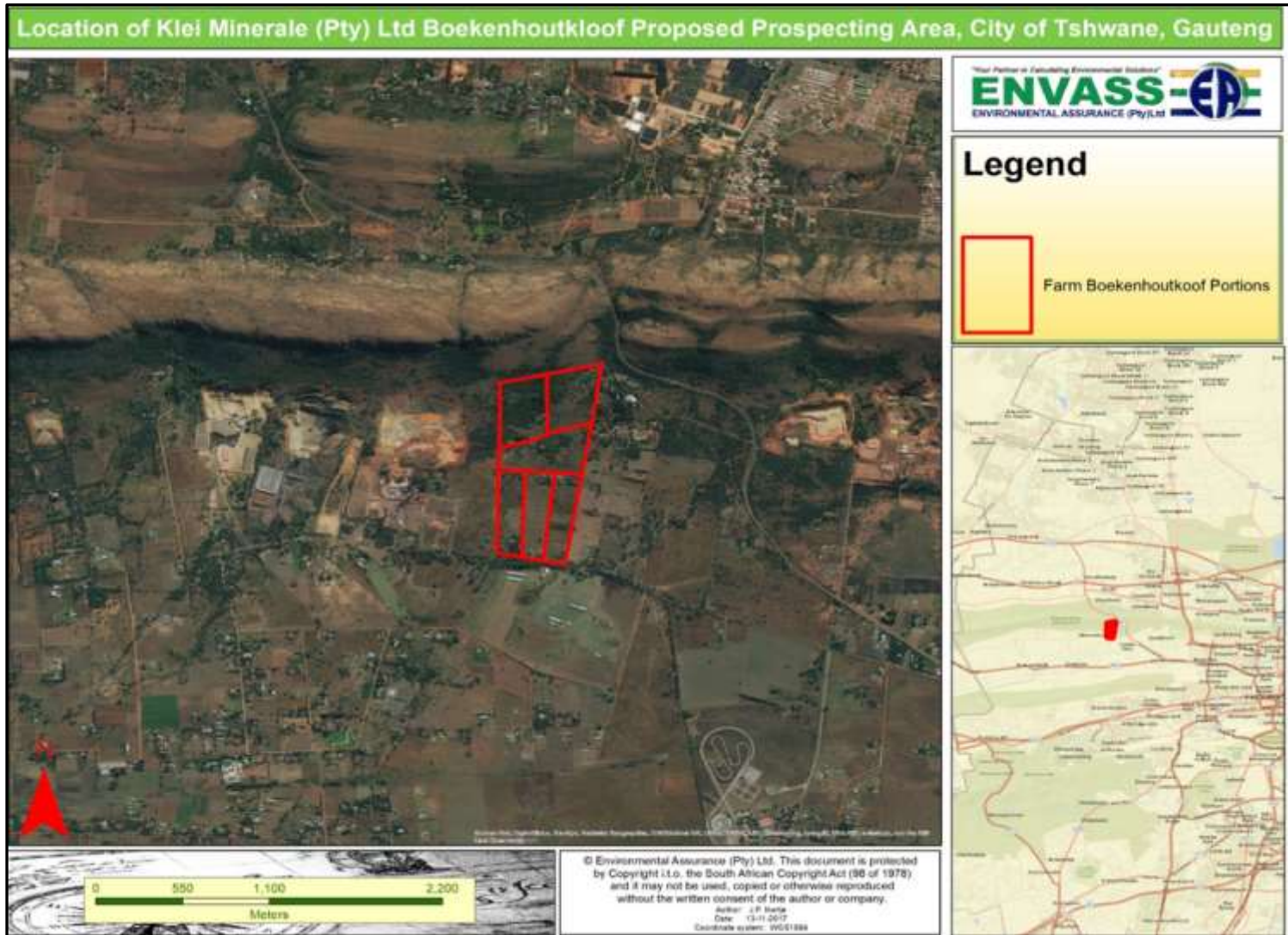


Figure 2: Regional Locality Map of the Study Area

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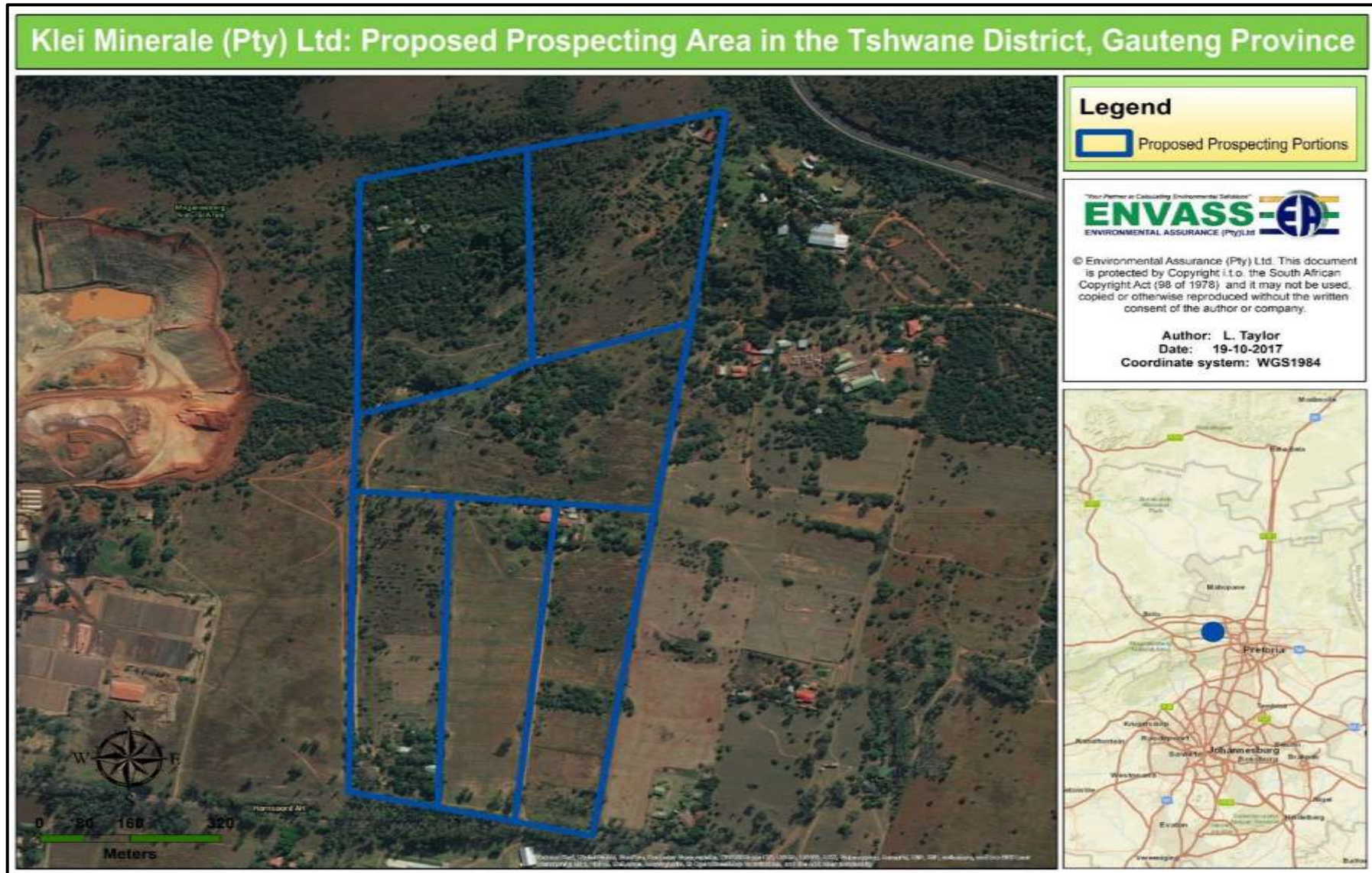


Figure 3: Locality Map of the Study Area

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(a) Type of environment affected by the proposed activity.

(Its current geographical, physical, biological, socio- economic, and cultural character)


Gradient and landscape context

The average elevation for the Moot Plains Bushveld, in which the majority of the study area is located, varies between 1050 and 1450 mamsl while the elevation for the Gold Reef Mountain Bushveld, in which a small section of the study area is located, varies between 1200 and 1750 mamsl. The topography of the study area is characterised by flat terrain and the average elevation is 1320 mamsl and it is noted that the northern boundary is more elevated as it border the Magaliesberg. The most prominent geomorphological feature in the area is the Magaliesberg Mountain range, which runs from West to East immediately to the North of the study area. The Magaliesberg Mountain range is a National Protected Area. The Magaliesberg Mountain range rises to approximately 1800 mamsl at its highest point.

Geology and Soils

Sedimentary rocks of the Silverton Formation of the Pretoria Group (which forms part of the Transvaal Supergroup) and Diabase Intrusions are the main lithologies present. Sedimentary rocks of the Magaliesberg Formation of the Pretoria Group (which forms part of the Transvaal Supergroup) and igneous rocks of the Lower Zone of the Rustenburg Layered Suite (which forms part of the Bushveld Complex) are found to the north of the proposed prospecting area.

The surface geology of the study area is dominated by rocks of the Silverton Formation of the Pretoria Group (which forms part of the Transvaal Supergroup) and Diabase Intrusions (of Transvaal Supergroup age). Magaliesberg Formation lithologies (of the Pretoria Group) and rocks of the Lower Zone of the Rustenburg Layered Suite are found to the north of the proposed prospecting area, as indicated by the 1:250 000 geological map (Figure 5). The Silverton Formation (indicated in light brown with the code “Vsi” on the geological map) is composed predominantly of shale (with some minor occurrences of hornfels and chert). Diabase (indicated as light green with the code “di” on the geological map) intruded the Silverton Formation and Magaliesberg Formations as dykes and sills (Figure 4). The Magaliesberg Formation (shown in hatched purple on the geological map with the code “Vm”) consists mainly of quartzite with some minor hornfels present.

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The shale contained within the Silverton Formation weathers to clay on surface. This clay present in the area can be used in various applications with numerous quarries and brickworks located in the region (Figure 6). Several operating clay mines and clay deposits are shown on the geological map in the vicinity of the proposed prospecting area. These clay mines and clay deposits are indicated with the code “CL” on the geological map.

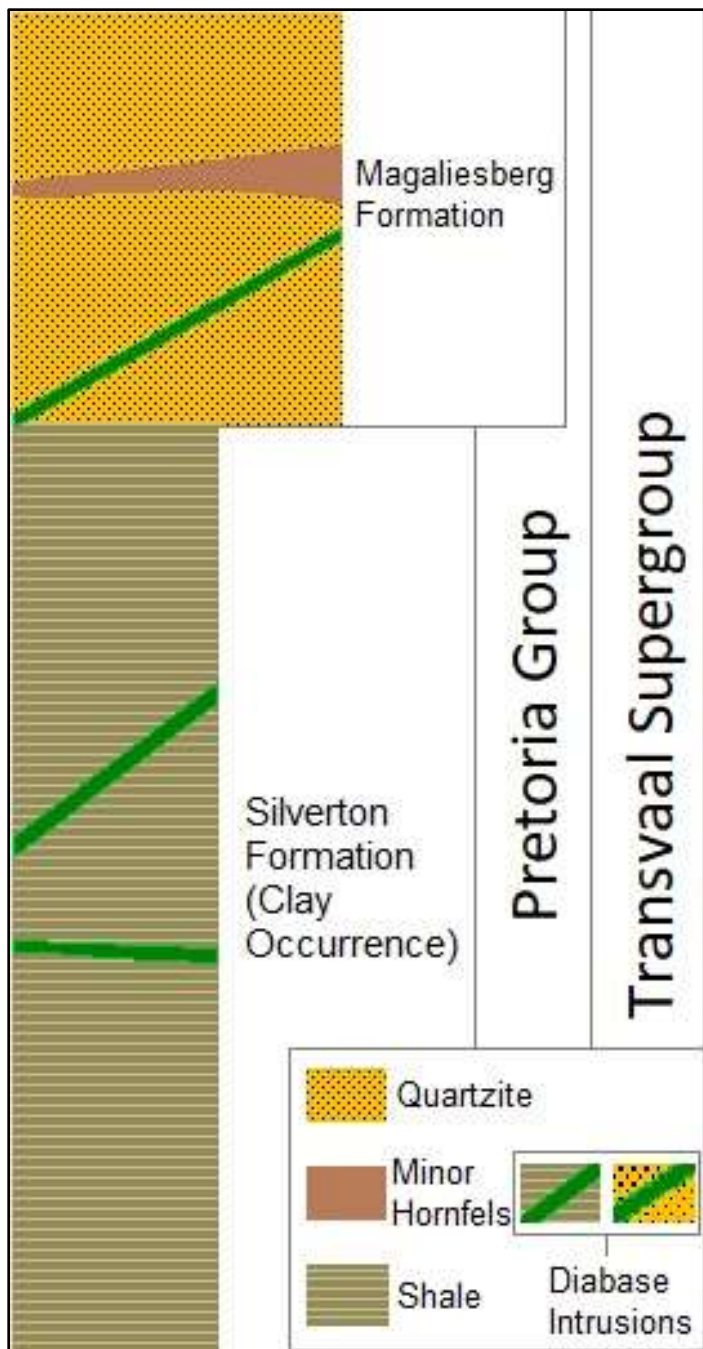



Figure 4: General Stratigraphic Column of region (After Eriksson et al, 2006)

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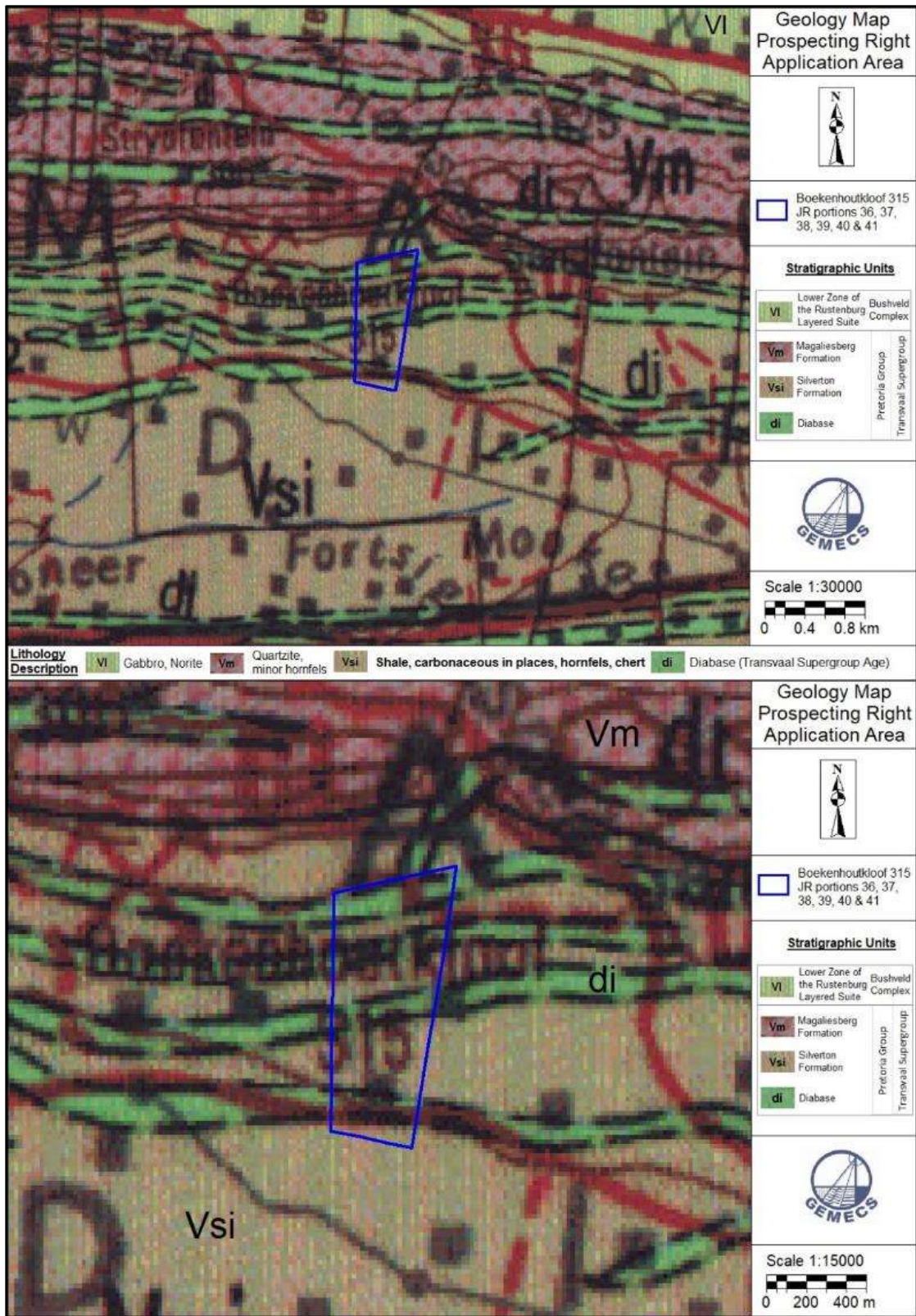



Figure 5: Maps indicating the locality of the proposed prospecting area (in blue), overlain on to the 1:250 000 Geological Map of Pretoria (Map Sheet 2528)

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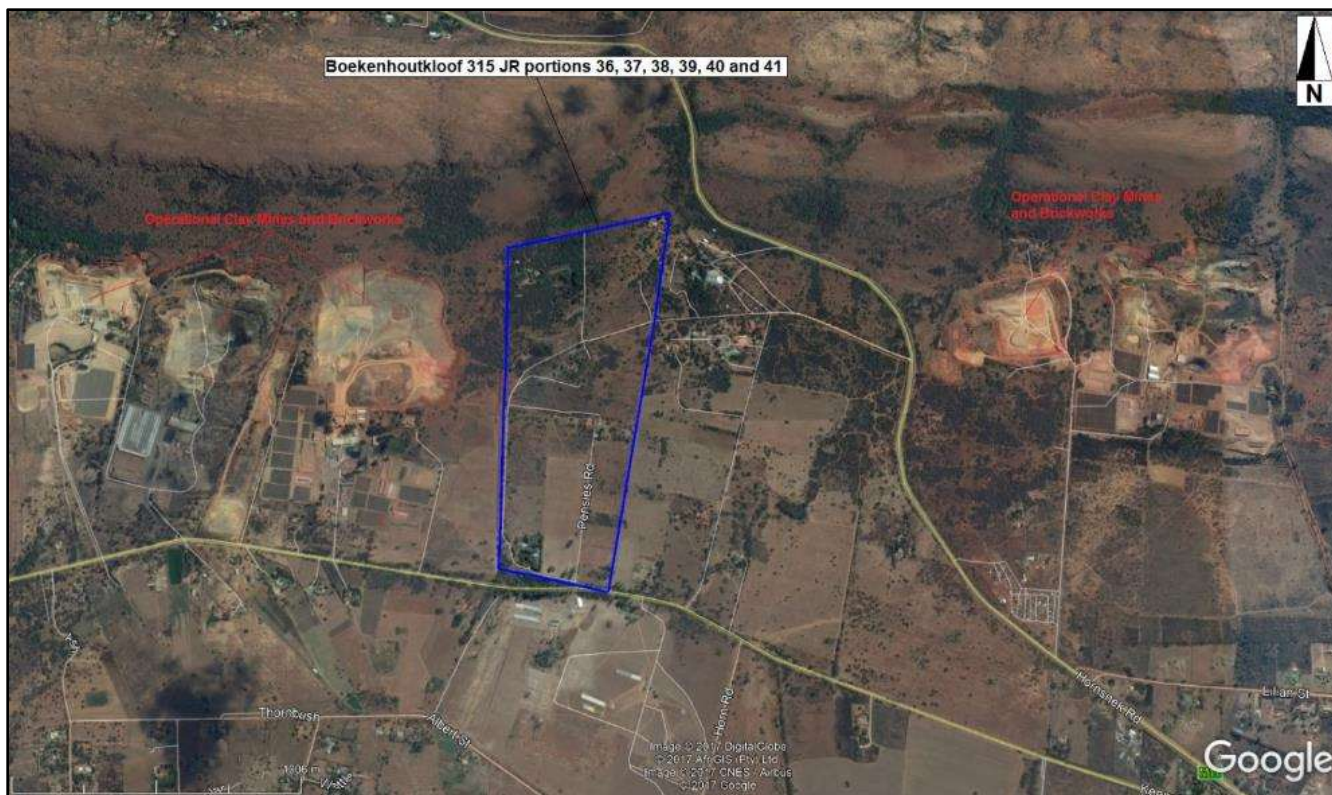


Figure 6: Positions of relevant adjacent and nearby properties in relation to the study area


Climate

Regional Climate

The City of Tshwane is situated in the Highveld Climatic Zone, which is a temperate climate with a summer rainfall season. Temperatures vary between a minimum of 3°C in winter to maximum of 30°C in summer. The mean annual rainfall is 650 mm in the western region and 900 mm in the eastern region of the zone.

Precipitation is mainly in the form of thunderstorms in the summer months (October to March). Thunderstorms appear frequently and are often violent with severe lightning and strong winds, with occasional hail. The winter months (April to September) are normally dry.

The mean daily maximum temperature is approximately 27°C in January and 17°C in July. However, maximum temperatures may rise to approximately 38 °C in January and 26 °C in July. The mean daily minimum temperatures varies between approximately 13 °C in January and 0 °C in July. The average

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daily minimum temperatures range from about 13°C in January to 0° in July, whereas extremes may plunge to 1°C in January and -13°C in July. Frost is likely to occur between May and September.


Local Climate

The average annual rainfall for Pretoria is roughly 573 mm per year. The average maximum temperature for the study area ranges from 18.3 °C in June to 27.5 °C in January. The lowest temperatures occur during July when an average of 1.7 °C is reached during the night (SA Explorer accessed 24/10/2017). The predominant wind direction in the region is from South-West (SW) to North-East (NE).

Surface Water

The study area falls within the A21H Quaternary Catchment that forms part of the Limpopo Water Management Area. The closest major river to the study area is the Swartspuit, a perennial river flowing roughly 1.5 km to the south of the area. The Magaliesberg is located immediately to the north of the study area. The mountain forms a separation between two catchment areas. As the gradient of the site is toward the south of the Magaliesberg, no impacts on surface water in the northern catchment area is envisioned.

The hydrologic functions ran for a digital elevation model (DEM) created from the 1:50000 topographical map series data of South Africa (grid reference 2528) showed that, based on elevation data, no major streams were expected to accumulate through or near the site. Data obtained from the Department of Water and Sanitation (DWS, 2017) showed that the Swartspuit (a former tributary of the Crocodile River (West) and now confluence with the Hartbeespoort Dam) has its origin +- 1.5 km south of the outer boundary of the Boekenhoutkloof proposed prospecting area.

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Drainage Basins of the Boekenhoutkloof Proposed Prospecting Area, City of Tshwane, Gauteng

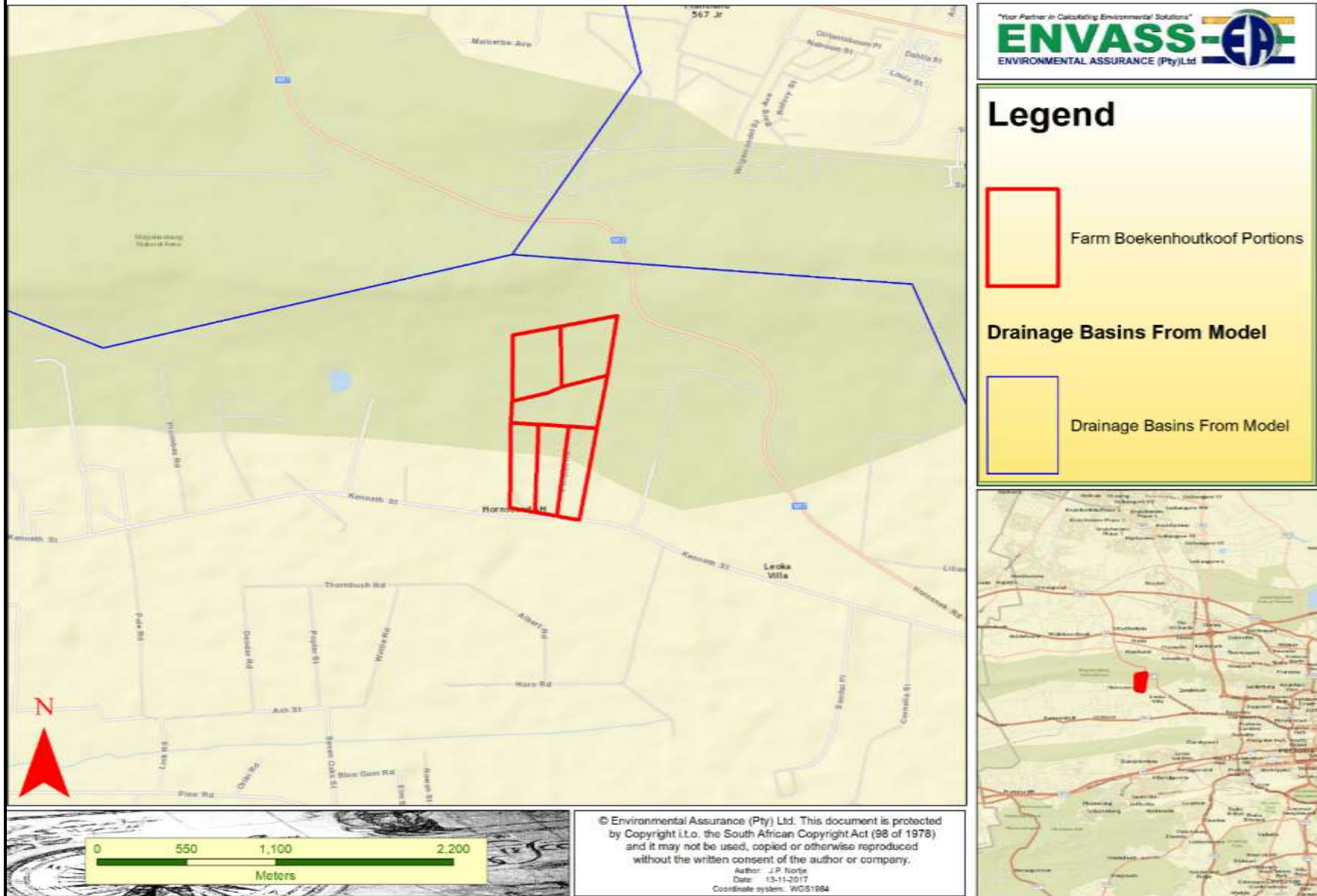



Figure 7: Drainage basins from hydrologic modelling

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Streams from Hydrological Modelling - Grid Reference 2528, City of Tshwane, Gauteng

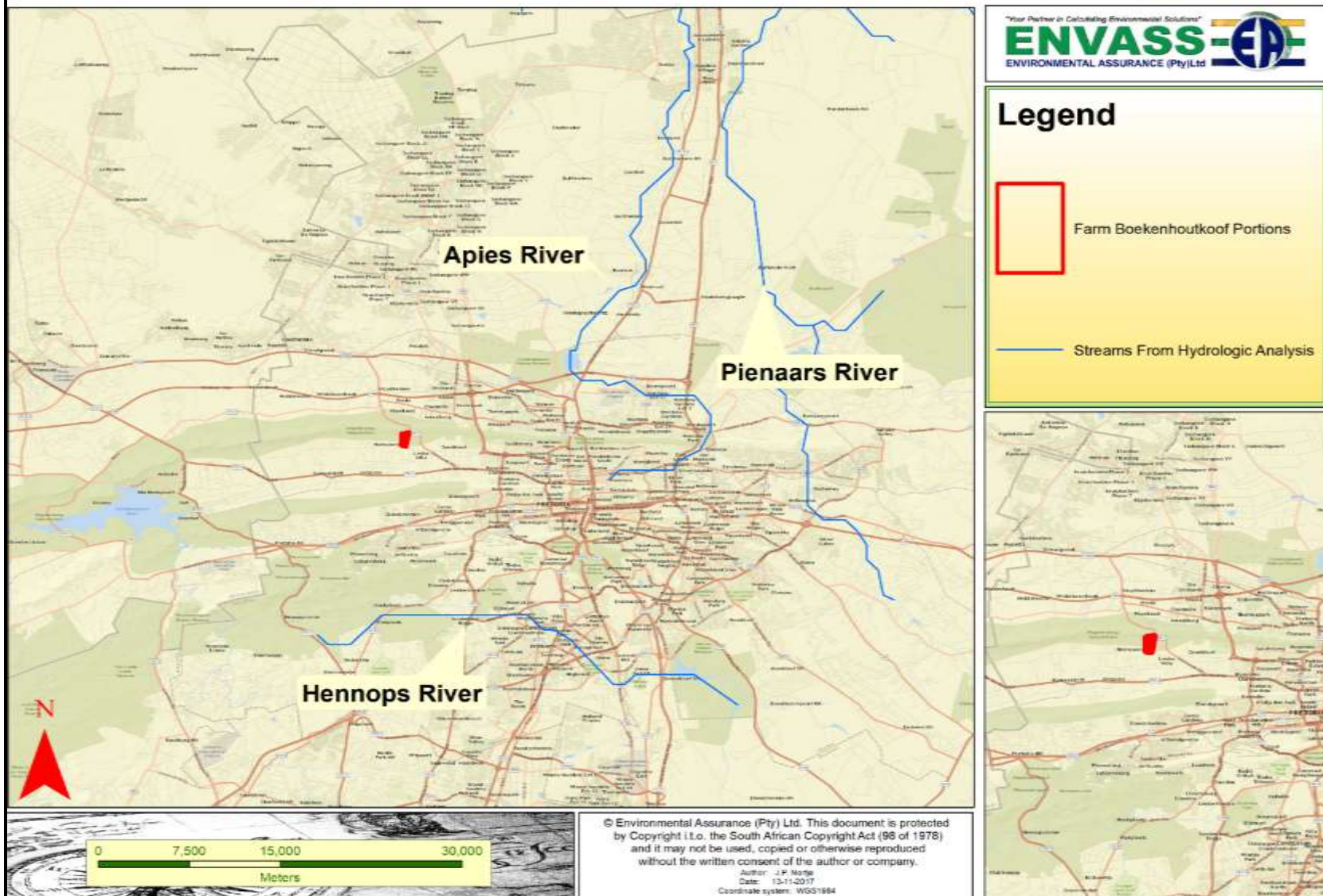


Figure 8: Streams (flow accumulation) from hydrologic modelling

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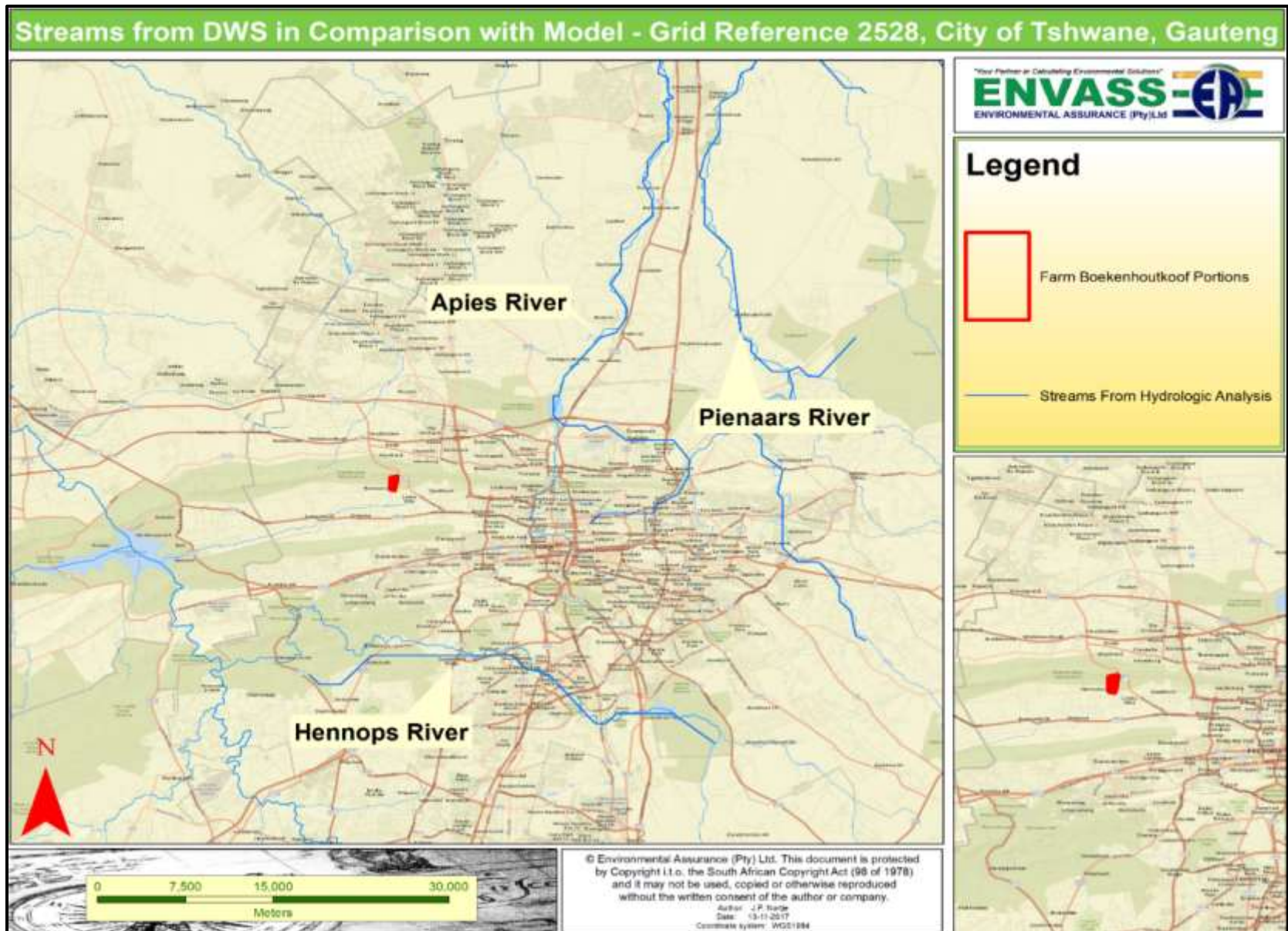


Figure 9: Streams from hydrologic modelling in comparison with actual streams (DWS, 2017)

Proximity of the Swartspruit Downstream of Boekenhoutkloof, City of Tshwane, Gauteng

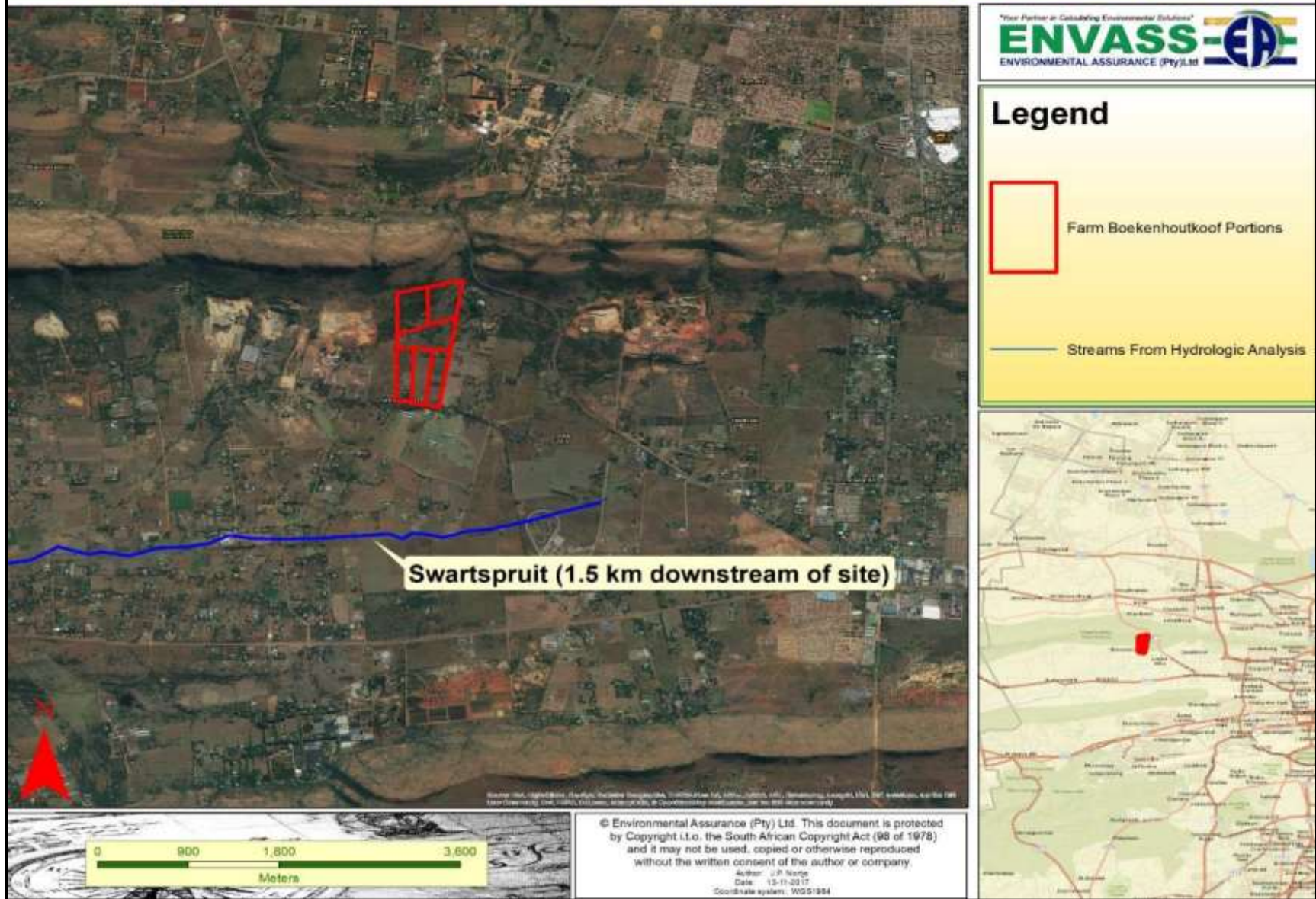


Figure 10: Proximity of the Swarspruit to the proposed prospecting area

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Biodiversity

The information in this section has been obtained from the Ecological Scan by ENVASS (Taylor, 2018)

Environmental Assurance (Pty) Ltd was appointed by Klei Minerale (Pty) Ltd to undertake an ecological baseline assessment for the remaining semi-natural area on the study area.

The study area consists mostly of natural vegetation with a few residential houses and their associated structures present. The study site falls on six (6) portions of land. Each contains houses and their associated structures. The main land use is residential, with roads, fences and power lines present on site.

Ecoregion


According to the delineation provided by Dallas (2005), the Level 1 Ecoregions of the area, are the Western Bankenveld (7) and Bushveld Basin (8) (Figure 11).

The Western Bankenveld region consist of a complex topography, varying from lowlands, hills and mountains to closed hills and mountains and relief ranging from moderate to high (Kleynhans et al. 2005). Mixed bushveld is the most definitive vegetation type, with several other Bushveld and Grassland types occurring in the region. This ecoregion measures approximately 19 365.5 km² in size. The Marico-, the Crocodile- (west), the Elands- (west) and the Pienaars River traverse this region and the perennial tributary of the Sand River has its source in the northern part of the ecoregion.

Kleynhans et al. (2005) describes the Bushveld Basin a region consisting predominantly of plains with a low relief. Mixed bushveld is the definitive vegetation type, while in the eastern area, plains with a moderate relief and lowlands with a moderate relief occur. The Bushveld Basin ecoregion measures approximately 32 460.1 km² in size. Several perennial rivers traverse the region, including the Olifants, Marico, Crocodile (West), Elands (West) and Pienaars.

Vegetation and Ecosystems

The proposed site for prospecting falls within the Savanna Biome (Mucina & Rutherford 2006), which is characterised by strong summer rainfall and dry winters. The Savanna Biome mainly comprises of an herbaceous layer dominated by grass species and a discontinuous to sometimes very open tree layer. Biomes are further divided into bioregions, which are spatial terrestrial units possessing similar biotic and physical features, and processes at a regional scale. The study area is situated within the Central Bushveld Bioregion and the Moot Plains Bushveld (SVcb 8) vegetation type (Figure 12). The

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main vegetation belt occurs in the North-West and Gauteng Provinces, immediately south of the Magaliesberg from the Selons River Valley in the west through Maanhaarrand, filling the valley bottom of the Magalies River, proceeding east of the Hartbeestpoort Dam between the Magaliesberg and Daspoort mountain ranges to Pretoria (Mucina & Rutherford 2006). The Moot Plains Bushveld vegetation is classified as Vulnerable, with about 13% conserved in the statutory Magaliesberg Nature Area. Approximately 28% has been transformed by cultivation, urbanisation, and built-up areas.

The entire proposed prospecting site falls within the Moot Plains Bushveld vegetation type (Refer to Figure 12) which is classified as Vulnerable. The vegetation is predominantly natural with some houses present and a few roads and footpaths. Situated immediately north of the study site, is the Magaliesberg Protected Natural Environment. This area is protected, providing habitat to various faunal species of conservation concern.

Floral Assessment

Eleven (11) species of Alien and Invasive vegetation were recorded in the study area.

Category 1 a & b NEMBA invasive species and the removal of these plants are compulsory in terms of the regulations formulated under the, National Environmental Management: Biodiversity Act 2004 (act no. 10 of 2004) Alien and Invasive Species Regulations, 2014, as amended. Alien Invasive Plant infestation on site, could become a problem if not management accordingly.

Faunal Assessment

The most transformed areas are comprised of homesteads and roads. Based on the predominantly natural state of the study area, various vegetation suitable as faunal habitats were observed, especially towards the northern region of the site. Various bird fauna diversity was observed on the day of the assessment. The area of concern has the correct attributes to successfully house a variety of animal species, especially in the northern woodland area. Free species migration is possible, even though some habitat fragmentation occurs.

Mammals

The ecological scan report lists all the mammal species of conservation concern which could possibly occur on the study site in the Gauteng Province – several of these species have the potential to occur on site, especially on the northern region of the site due to its location next to the Magaliesberg Nature Area and the natural state of this part of the study area.


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Herpetofauna

The local occurrences of reptiles and amphibians are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock dwelling) and wetland-associated vegetation cover. Three of these habitat types for Herpetofauna were present, namely, terrestrial, arboreal and rupicolous habitat. The presence or absence of reptile and amphibian species was deduced based on their known distribution ranges. No individuals of Herpetofauna were recorded on the day of the assessment. The ecological scan report lists all species of Herpetofauna which could possibly occur on the study site. All species are of Least Concern (LC)

Avifauna

The avifaunal species listed in the ecological scan report are the species of conservation concern that are likely to occur on the study site. Refer to Annexure A of the ecological scan for a full list containing all avifaunal species likely to occur on the study site. Approximately 370 potential bird species occur within the area, however none of the species of conservation concern were recorded on site. The bird species observed on the study site are the more common bird species associated with the various habitat systems and species that are able to adapt to areas transformed by man. However, the habitat systems on site will favour many of the mentioned Red Data avifaunal species due to the presence of suitable breeding, roosting and/or foraging habitat on and surrounding the study site and its close proximity to the Magaliesberg Nature Area, all forming part of the Magaliesberg IBA.

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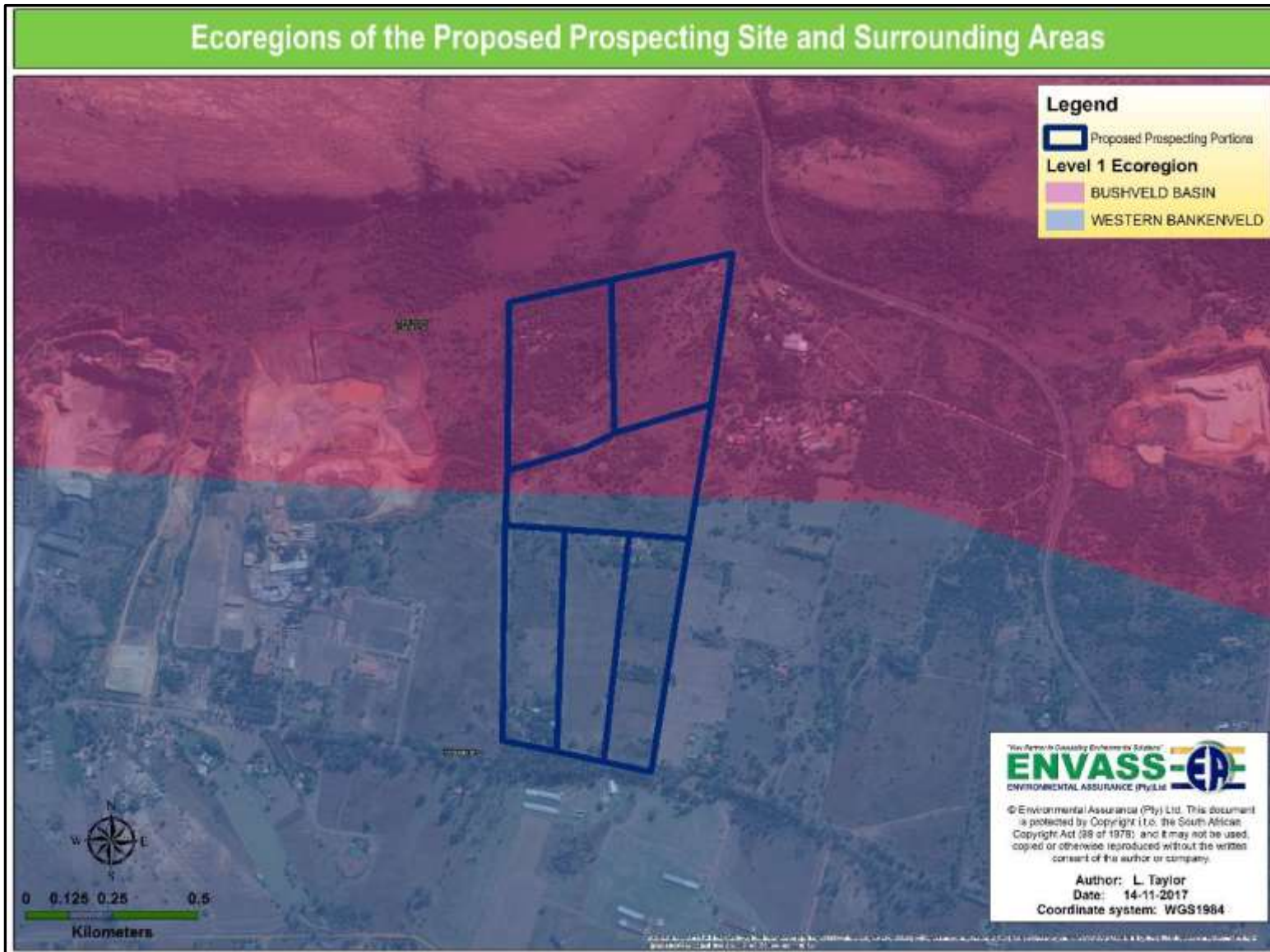



Figure 11: Ecoregion of the Study Area

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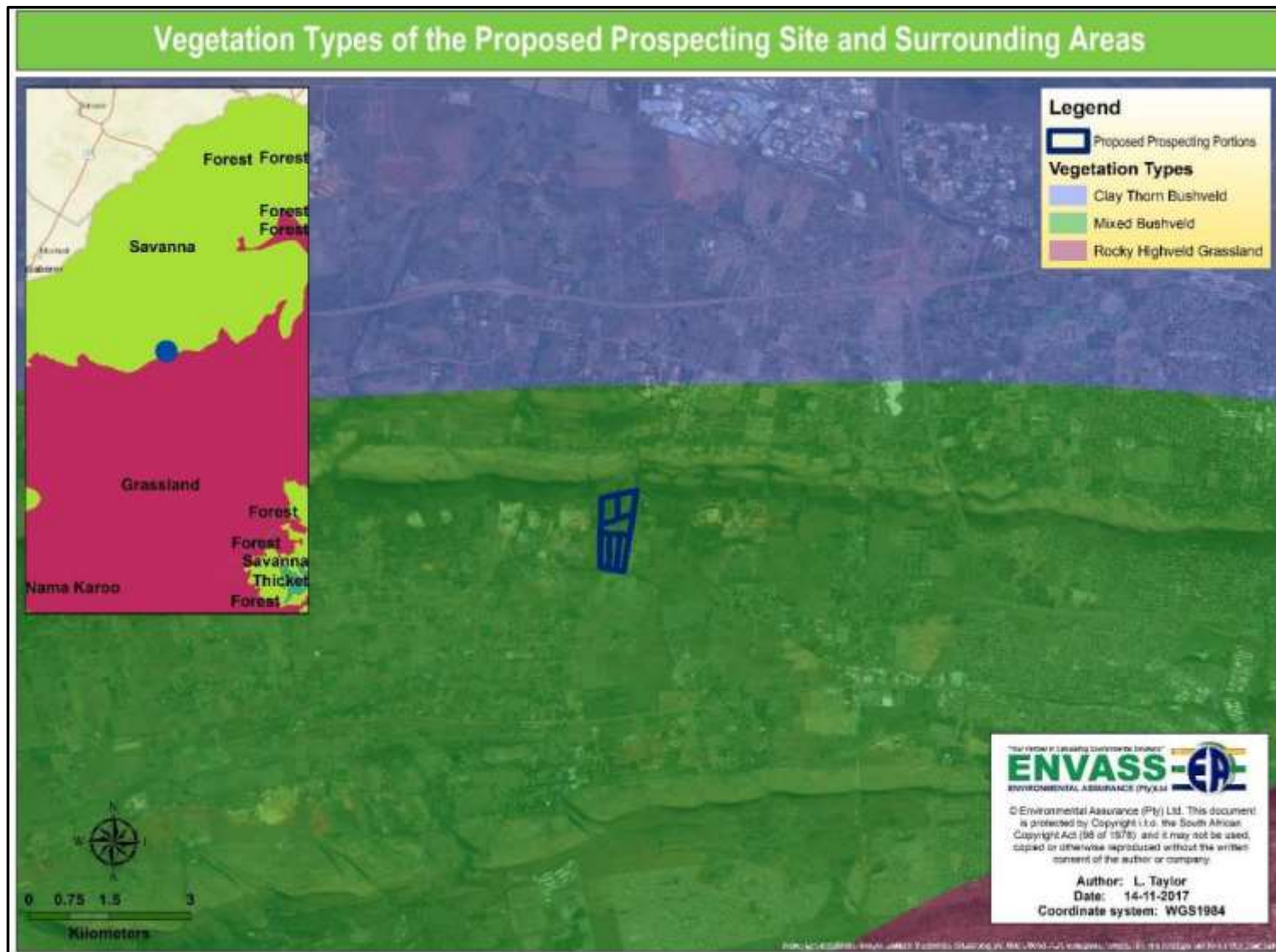



Figure 12: Vegetation types occurring on the study area

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Sensitivity Status

Protected Areas

The proposed site falls immediately to the south of the Magaliesberg Protected Natural Environment (Figure 13). This area has been protected under the Environment Protection Act since 1977 and more recently under the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003). Private landowners retain ownership; however, they are bound by restrictions on development. The Magaliesberg Protected Natural Environment is known to local landowners as the 'green belt' and all development is under the strict scrutiny of both provincial and national authorities.

Critical Biodiversity Areas

The Gauteng Conservation Plan 3.3 (2014) (C-Plan) focusses on the mapping and the management of biodiversity priority areas within the Gauteng Province. This conservation plan consists of Protected Areas, Important Sites and Irreplaceable Areas based on the presence of Red Data Species, Endemic Species and potential habitat for these species. Irreplaceable areas are essential in meeting targets set for the conservation of biodiversity in Gauteng Province. These areas, along with Ecological Support Areas (ESAs) are highly sensitive, and must be protected from transforming land uses.

Certain areas of the study site are classified as Irreplaceable, and others are identified as Ecological Support Areas in terms of the Gauteng Conservation Plan 3.3, 2014 (Figure 14). Irreplaceable areas have no replacements, and areas characterized by high irreplaceability values and high vulnerability ratings should receive priority conservation action.

Important Bird Areas

The study site is situated within the Magaliesberg Important Bird Area (IBA) (Figure 15). Most of this IBA falls within the Magaliesberg Protected Natural Environment. Previously known as the Magaliesberg and Witwatersberg IBA, this IBA consists mainly of the Magaliesberg range, which extends in an arc from just north-west of Rustenburg in the west to the N1 in the east near Pretoria (www.birdlife.org). To the south, the Witwatersberg range runs parallel to the Magaliesberg, extending from the town of Magaliesburg in the west to Hartbeespoort Dam in the east.

The most important trigger species in the IBA is the globally threatened Cape Vulture (*Gyps coprotheres*) which breeds at Nooitgedacht and at Skeerpoort. The Secretarybird is the other globally threatened species in the IBA. Regionally threatened species are Lanner Falcon (*Falco biarmicus*), Half-collared Kingfisher, African Grass Owl, African Finfoot and Verreauxs' Eagle. Biome-restricted species include White-bellied Sunbird (*Cinnyris talatala*), Kurrichane Thrush (*Turdus libonyanus*),

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White-throated Robin-chat (*Cossypha humeralis*), Kalahari Scrub Robin (*Erythropygia paena*) and Barred Wren-Warbler.

The most important threat to the trigger species in this IBA is the expansion of commercial, recreational and housing developments, which have decreased the area of land available for wild ungulates and domestic livestock, and hence the availability of food for vultures (www.birdlife.org). Collisions with man-made structures such as power lines is also a concern.

Ridges

Ridges are regarded as ecologically sensitive and must be protected from transforming land uses. The term “ridge” loosely refer to hills, mountains, koppies, gorges, etc. A Ridge is defined by the slope of the site. Any topographic feature in the landscape that is characterized by slopes of 5° or more (i.e. > 8.8%, > 1 in 11 gradient), as determined by means of a GIS digital elevation model, constitutes a ridge. According to the Departmental Policy: Development Guidelines for Ridges, all ridges in Gauteng have been classified into four classes based on the percentage of the ridge that has been transformed, mainly through urbanization, using the 1994 CSIR/ARC Landcover data.

The Importance of Ridges:

- Ridges form biodiversity hotspots - They provide resources needed for survival, reproduction and movement, and ideal refuges for wildlife in an urbanized landscape.
- Ridges provide vital habitat for many threatened, rare and endemic species of fauna and flora.
- Invertebrates are reliant on hilltops as thermal refugia from winter cold air drainage. Ridges provide important habitat required for the completion of the life cycles of many invertebrates, many of which provide essential ecosystem services (e.g. pollination).
- Ridges form naturally existing corridors that can functionally interconnect isolated natural areas and therefore play an important role in wildlife dispersal.
- Other ecological processes associated with ridges, which are important for the maintenance and generation of biodiversity, include evolutionary processes, hydrological processes and pollination.
- Ridges provide aesthetically pleasing environments for the surrounding inhabitants and attract tourists and recreational users.

The northern section of the study site is situated on a Class 2 Ridge area (Figure 16). The Departmental development policy for ridges in Gauteng provided the following development guidelines w.r.t. Class 2 Ridge areas (Table 7):


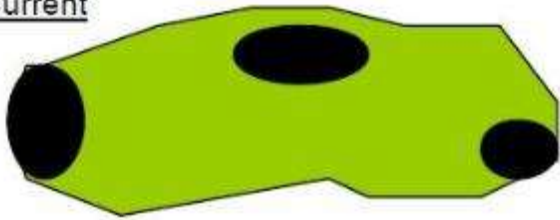
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Table 7: Policy Guideline for Developments within Class 2 Ridge Areas (Development Guidelines for Ridges 2001)

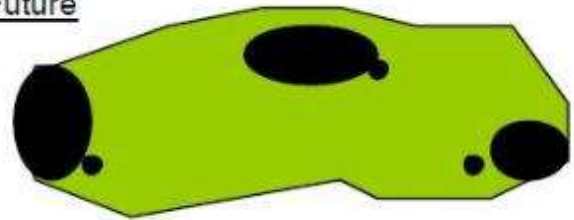
Ridge Type	% of Gauteng Ridges	Policy
<p>Class 2 (5-35% transformed) includes parts of Magaliesberg, World Heritage site, Klipriviersberg, Bronberg, Skurweberg</p>	<p>40%</p>	<p>No further subdivisions will be allowed and consolidation of subdivisions will be encouraged. No-go development policy; low impact (e.g. tourism developments) will be considered requiring full EIA (including public participation exercise) with full set of specialist reports including (but not limited to):</p> <ul style="list-style-type: none"> • An ecological study, including both functional (ecological processes including connectivity function of ridge at a landscape level perspective) and compositional (biodiversity) aspects • A Red Data study for both fauna and flora • An invertebrate study • A hydrological / geohydrological study • A geotechnical study • A pollution study, including both air and water pollution • A social study, including cultural, historical and open space value aspects • A visual study • A study of service provision and access <p>All specialist studies to examine cumulative impacts.</p> <p>Ecological footprint² of low impact developments to cover no more than 5% of a property. All impacts for these developments must be sufficiently mitigated. A management plan to maintain the ecological integrity of remaining property is required and implementation is the responsibility of the developer.</p> <p>A 200m buffer zone¹ of low impact development is required around class 2 ridges. Development proposals</p>

Ridge Type	% of Gauteng Ridges	Policy
		<p>within the buffer zone should proceed at least to the mini EIA stage.</p> <p>DACEL undertakes to conduct Strategic Environmental Assessments for these ridge systems.</p>

Current




Future



Undeveloped/untransformed
 Developed/transformed



Figure 13: Protected Areas in accordance with the Gauteng Province Environmental Management Framework (GEMF) associated with the Proposed Prospecting Site and Surrounding Areas

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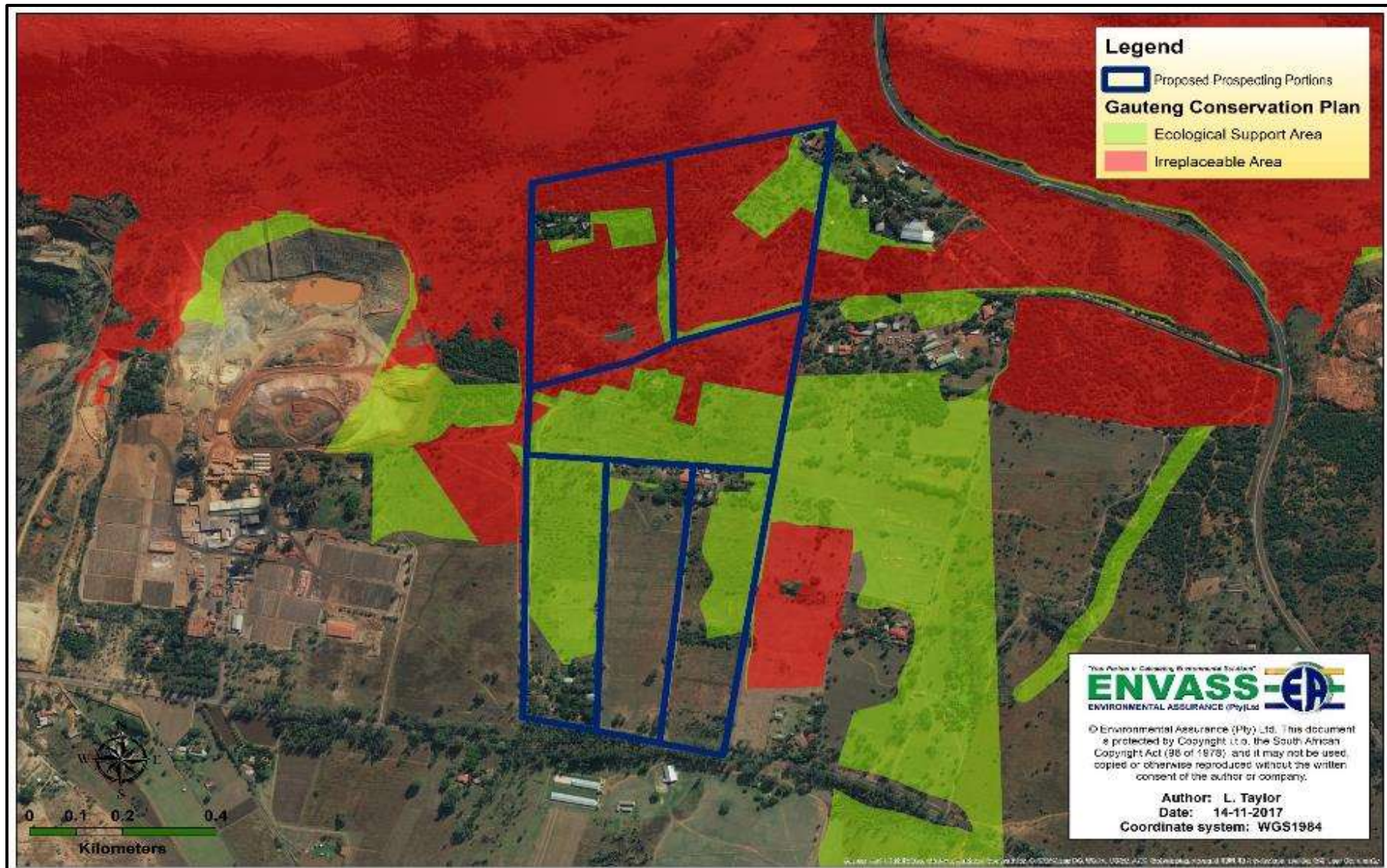


Figure 14: Sensitivity Status of the area according to the Gauteng C-plan



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Figure 15: Important Bird Areas (IBAs) associated with the Proposed Prospecting Site

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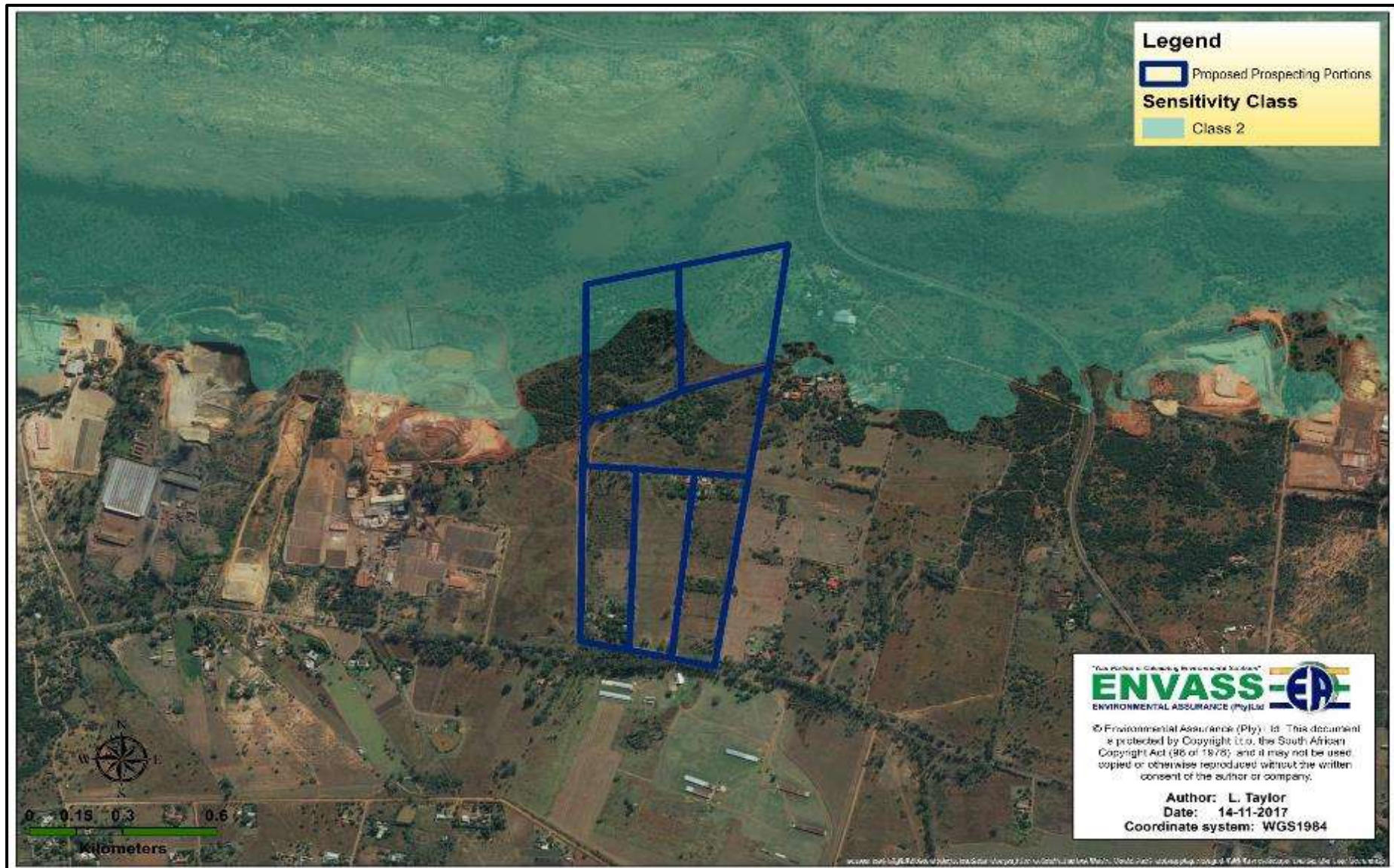



Figure 16: Ridge Sensitivity of the Proposed Prospecting Site and Surrounding Areas

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Conclusion of the ecological scan

The state of habitat on site was found to be predominantly natural, with some alien and invasive vegetation present. The site, especially towards the northern portions provide valuable shelter for animals. This section provides the findings of the various methodologies utilised during the assessment.

The study site is situated within a sensitive environment, including in close proximity to the Magaliesberg Protected Natural Environment which is protected under the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003). In terms of the Gauteng Conservation Plan, certain areas of the study site are classified as Irreplaceable, and others are identified as Ecological Support Areas. The study site is also situated within the Magaliesberg Important Bird Area (IBA). And the northern section of the study site is situated on a Class 2 Ridge area.


The results of this study indicate that the study area is deemed sensitive, due to the current state of the site and its location. Portion 36 and Portion 37 seems to be the most sensitive, the northern sites. Several Red Data mammals and avifauna probably occur on or in the vicinity of the site. Long-term impacts can be severe.

Cultural and Heritage

Cultural heritage desktop assessment (Coetzee 2017)

Coetzee (2017) conducted an archaeological desktop study. The aim of the report was to contextualise the general study area in terms of heritage resources to provide the developers with general information regarding potentially sensitive areas. The purpose of the study was to determine the scope of heritage resources that might be encountered during the prospecting phase and subsequent heritage studies, as well as to provide recommendations for the safeguarding of archaeological resources during prospecting. Information regarding heritage resources in the vicinity of the study area based on results from previous studies and written historical information is provided.

The Southern African archaeology is broadly divided in the Early, Middle and Later Stone Ages; Early, Middle and Late Iron Ages; and Historical or Colonial Periods. The earliest stone tool industry comprises tools such as cobble cores and pebble choppers (Toth & Schick 2007). The Early Iron Age marks the movement of farming communities into South Africa in the first millennium AD, or around 2500 years ago (Mitchell 2002:259, 260). The groups were agro-pastoralist communities that settled in the vicinity of water in order to provide subsistence for their cattle and crops. The Historical period mainly originates from European discovery, settlement and impact on Southern Africa. Some topics

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covered by the Historic period include the Dutch settlement in the Western Cape, early mission stations, Voortrekker routes and the Anglo Boer War.

Previous research in the area

Fort West Phase 1 Development


An archaeological survey was done for the development of a mixed-use township on Portion 1 of the Farm Fort 646 JR within the City of Tshwane Metropolitan Municipality. The site is located south of Daspoortrand, north of the suburb of Lotus Gardens and approximately 4.5 km south of the study area. J. van Schalkwyk (2012) surveyed the study area and located seven stone-walled Late Iron Age sites consisting of settlement structures, cattle enclosures and several other smaller enclosures. According to Van Schalkwyk (2012), these sites can most probably be linked to Tswana- or Ndebele speakers who settled in the area within the past 300 years. Other sites of heritage importance located in close vicinity are Fort Daspoort, built by the Zuid-Afrikaansche Republiek out of fear for British domination (Van Vollenhoven, 1999), and Westfort Hospital, which was erected in 1898.

HIA on the Farm Hartbeeshoek 301 JR

The National Cultural History Museum (2002) conducted a Heritage impact Assessment to identify graves on the Farm Hartbeeshoek 301 JR within the Akasia suburb in the City of Tshwane Metropolitan Municipality. The aim of the study was to identify graves within the road reserve of the Platinum Toll Highway. The study identified approximately 20 graves marked with stone cairns and a recommendation was made to relocate the graves. The identified graveyard was located approximately 5 km north-east of the study area.

Extension of the SABRIX quarry

Dr R. C. de Jong (2002) conducted a Heritage Scoping Study, conducted as part of the EIA/EMPR for the expansion of the Klei Minerale clay mine on Portion 19 of the farm Boekenhoutkloof 315 JR, Pretoria. The Klei Minerale clay mine is located immediately to the west of the study area. According to De Jong (2002) the Farm Boekenhoutkloof originally belonged to the Zuid-Afrikaansche Republiek and was subsequently leased to Willem Hendrik Boshoff Jr. from 26 July 1859. During the 1860s, the farm was transferred to G. P. J. Horn. The original farmhouse was built by Horn to the north-west of the Klei Minerale clay mine and a farm school was later erected approximately in the middle of the property. In June 1892, Arthur H. Walker surveyed the entire farm for G. P. J. Horn and in March 1912, the farm was subdivided. During the scoping study, two heritage sites were identified: one ruin consisting of stone-walls and clay mortar dating between 1930 and 1960, and one graveyard consisting of several graves (De Jong 2002).

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From this previous research records conducted in the area, the specialist concluded that the general region is significant from a heritage perspective. Heritage sites are likely to include graveyards, Iron Age/Farmer and Historical remains. Since heritage sites, e.g. graves, are not always clearly identifiable as it might consist of stone cairns, it is advised that a qualified archaeologist inspect the proposed prospecting sites prior to drilling to establish whether the sites might be sensitive from a heritage perspective.

Noise and Dust Sources

Noise sources and baseline

Prospecting and associated activities often emit significant noise levels which can become a nuisance or health risk when not properly managed. This impact may affect not only to the prospecting area, but also to the surrounding land users and occupiers. The most sensitive receptors identified for the project area is the landowners and lawful occupiers of the study area itself, surrounding communities including land users, mine workers, industry, residential areas and permanent small holding homesteads and settlements, as well as the natural protected environment of the Magaliesberg to the north of the study area. The local area is predominantly occupied by sand mining, agricultural and residential land uses.

The main noise generation activities of the proposed activities during all phases are:

Construction phase:

- Construction of temporary water handling infrastructure and other required infrastructure.


Operational phase:

- Transportation of materials;
- Excavations;
- Drilling; and
- Loading and off-loading of equipment and materials.

Closure or care and maintenance phase:

- Limited amount of vehicles moving around the site; and
- Decommissioning of temporary infrastructure.

Noise generation can be expected on the proposed site due to various activities and actions as indicated above. Noise levels may possibly exceed allowed limits for noise as indicated in SANS 10103: 2008. The closest sensitive receptor is the homesteads on and immediately adjacent to the

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study area. Due to the close proximity of the homesteads to prospecting activities, mitigation measures are required to be implemented to reduce this impact. Mitigation measures may include keeping noisy activities to normal working hours and not over weekends or public holidays, and maintaining machinery and vehicles in order to avoid unnecessary excessive noise emanating. It is also recommended that consultations be held with affected parties in order to establish an acceptable schedule of noisy activities.


Dust Sources and baseline

The following sensitive receptors of dust have been identified and it is expected that these receptors may be affected by dust fallout and other air pollutants, resulting from the proposed prospecting activities:

- Landowners and lawful occupiers of the study area;
- Landowners and lawful occupiers of the properties adjacent to the study area;
- Surrounding communities including land users, mine workers, industry, residential areas and permanent agricultural holding homesteads and settlements including *inter alia*:
 - Klei Minerale Boekenhoutkloof clay mine to the west of the study area;
 - Earlybird poultry farm to the south of the study area;
 - Klei Minerale Zandfontein clay mine approximately 1 km to the east of the study area;
 - Andeon Agricultural Holdings approximately 2.5 km to the east and south-east of the study area.
- The Magaliesberg Natural Protected environment to the north of the study area.

The main source of air pollution in the local area is the dust and other emissions emanating from the abovementioned Klei Minerale clay mines and the SABRIX brick making plants on Boekenhoutkloof and Zandfontein to the west and east of the study area respectively. The results of the measurement of current dust fallout levels indicates that the levels are below the allowed limits. The amount of dust fallout expected outside the study area is not significant. It is not expected that the air quality outside of the study area will deviate from its current condition during prospecting. Normal vehicular activity, as is already present, will most likely continue. There is, however, a risk that dust levels may increase as a result of the proposed activity and therefore mitigation measures will be recommended. Limiting the speed of vehicles on the gravel roads to 30km/h will have a threefold benefit in terms of health and safety: it will reduce dust fallout, reduce exhaust emissions and ensure the safety of workers. Another measure is to suppress dust by means of spraying water on the gravel roads.

Aesthetic Quality

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It is important to bear in mind that determining a visual resource in absolute terms is not achievable. Evaluating a landscape's visual quality is both complex and challenging, as many quality standards apply and it is largely subjective, with individuals basing evaluations on experiences, their social level and their cultural background. Furthermore, natural features are inherently variable. Climate, season, atmospheric conditions, region and sub-region all affect the attributes that comprise the landscape.

Visual Absorption Capacity (VAC) can be described as the ability of an area to absorb physical modifications. Factors affecting VAC include *inter alia*, vegetation, the built environment, existing infrastructure and topography. In terms of these factors the receiving environment is perceived to have a low to medium VAC.

The prospecting activities will not modify the physical characteristics of the landscape significantly, and can easily be rehabilitated upon completion. Sand and clay mining on the property will not be totally out of place in the local area, as there are already existing sand and clay mining activities occurring to the west and east of the study area and therefore, partially compatible with the surrounding land uses.


Socio-Economic Environment

Information in this section was obtained from the Integrated Development Plan of Tshwane (2017 – 2021)

The City of Tshwane was established on 5 December 2000, through the integration of various municipalities and councils throughout the greater Pretoria and surrounding areas. The municipality was again expanded in 2008 through the inclusion of the former Metsweding District Municipality, including the Dinokeng tsa Taemane (Cullinan) and Kungwini (Bronkhorstspuit) local municipalities. The new City of Tshwane was established after the May 2011 elections. The total extent of the City covers an area of 6 345 km². The City is the third largest city in the world in terms of land area and covers more than 30% of the Gauteng Province's land area of 19 055 km².

Demographics

The total estimated population for the Gauteng Province for 2016 was 13.5 million (StatsSA, 2016). This makes-up approximately 24% of the total population of South Africa, which is estimated at 55.91 million. Gauteng province is, therefore, the most populous province in the country. The City of Johannesburg and Ekurhuleni accommodates the largest portion of Gauteng's population. The CoT accommodates approximately 24% of the province's population, amounting to more than 3 million people. For the period of 2011 – 2015, Tshwane's population grew by 332 302 persons. However, it

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has grown with a declining rate. In 2011 the growth rate was estimated at 3.5% and 2.4% for 2015 as indicated in Figure 17.

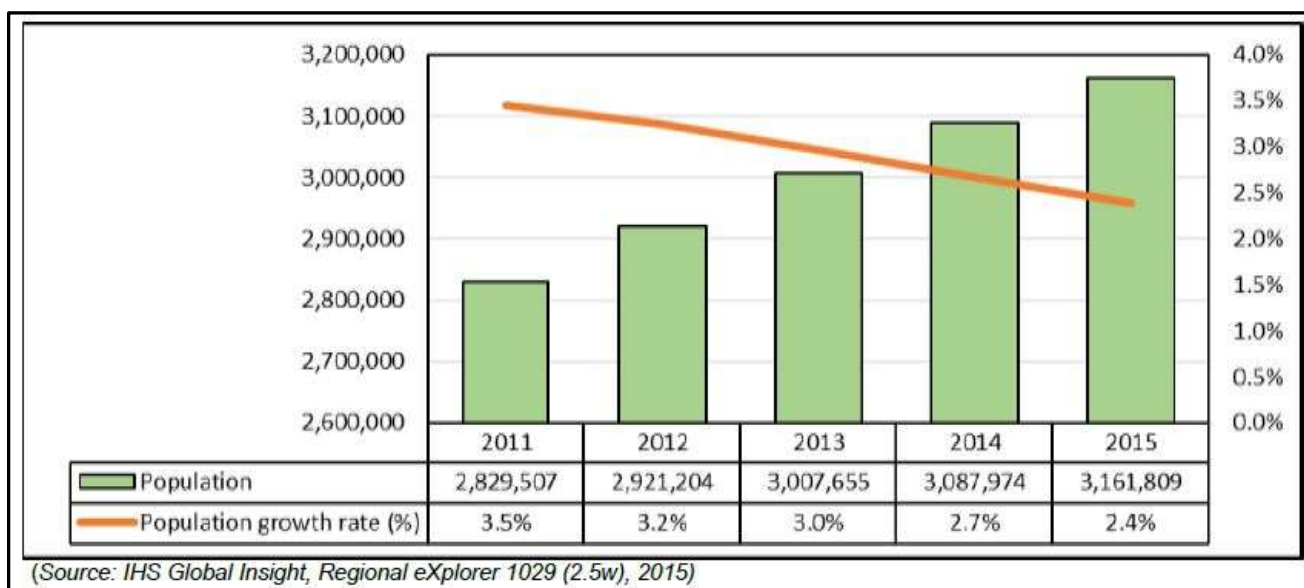


Figure 17: Tshwane’s population and population growth rate 2011 – 2015

Population groups in the CoT include the African population comprising 78.3% of the total population from 2011 to 2015, up from 76.5% in 2011, the white population group comprising 17.8% of the total population, down from 19.7% in 2011. The Coloured and Asian population group remained unchanged over the period from 2011 to 2015 from 2011 and comprise 3.8% of the total population (refer to Figure 18).

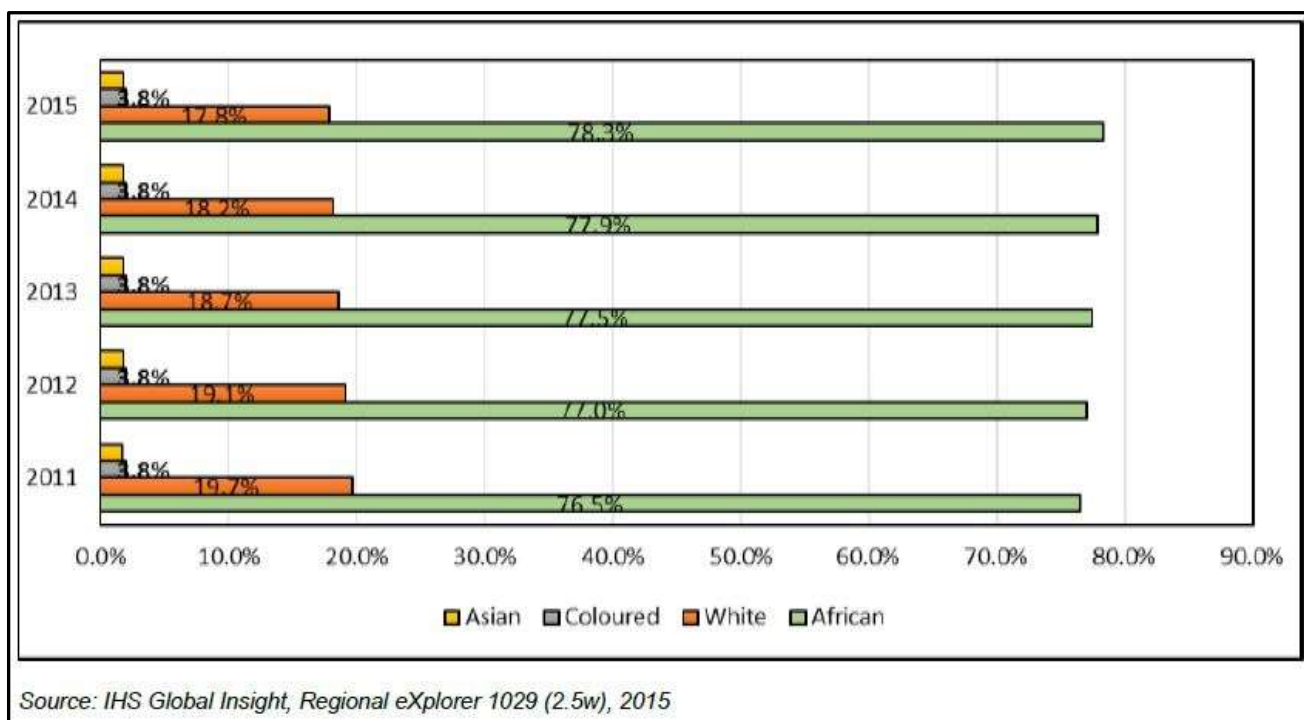


Figure 18: Tshwane population disaggregated by population group (% contribution) 2011 - 2015

The youth population (younger than 35 years) in the CoT accounts for 61% of the City's total population and senior residents (65+ year age group), accounts for only approximately 6% of the total population. The large percentage of approximately 61% of youth in the CoT can likely be contributed to the high concentration of institutions of higher learning in the City (refer to Figure 19).

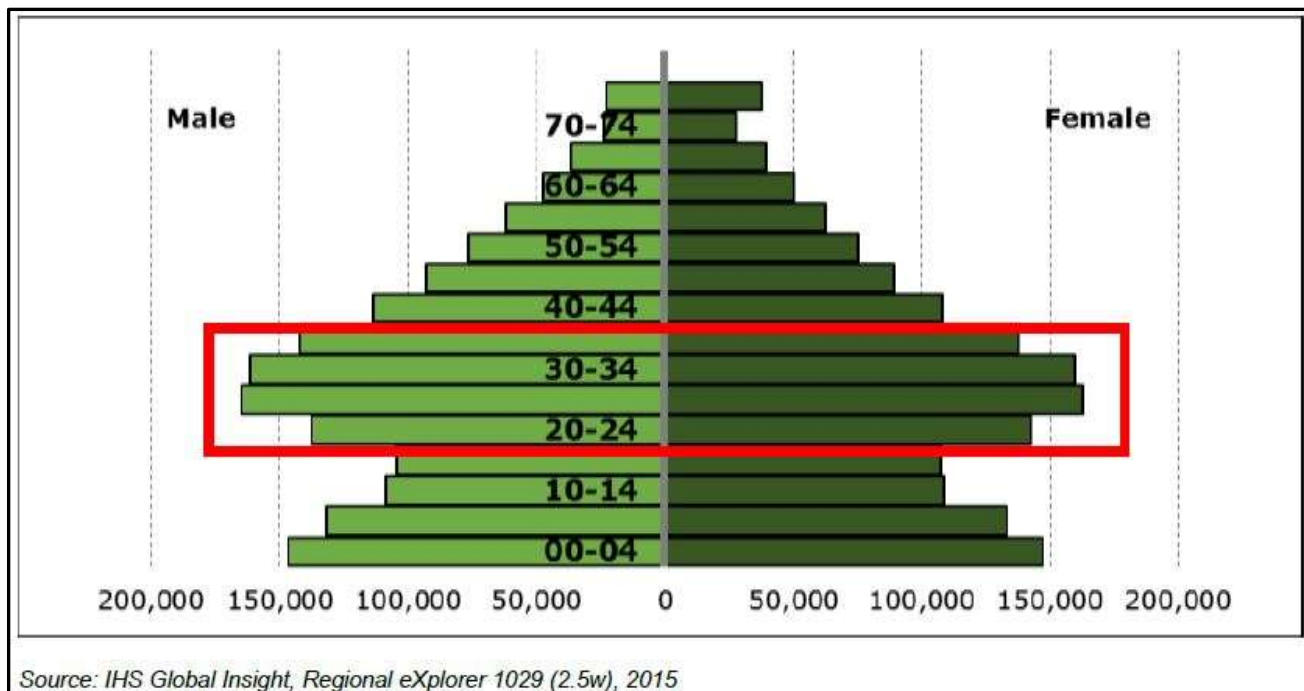


Figure 19: Tshwane population pyramid, 2015

The CoT has the highest percentage of persons (20 years and older) with post-matric qualifications in the country, amounting to approximately 23% in 2015, in comparison with the national average of approximately 12%. The percentage for the Gauteng Province is approximately 19%, with the other two major cities in the province, the City of Johannesburg (CoJ) and Ekurhuleni 19% and 15% respectively. The percentage of persons (20 years or older) with no schooling or with some primary schooling was estimated at 10 percent in 2015, amounting to 215 677 persons (refer to Figure 20).

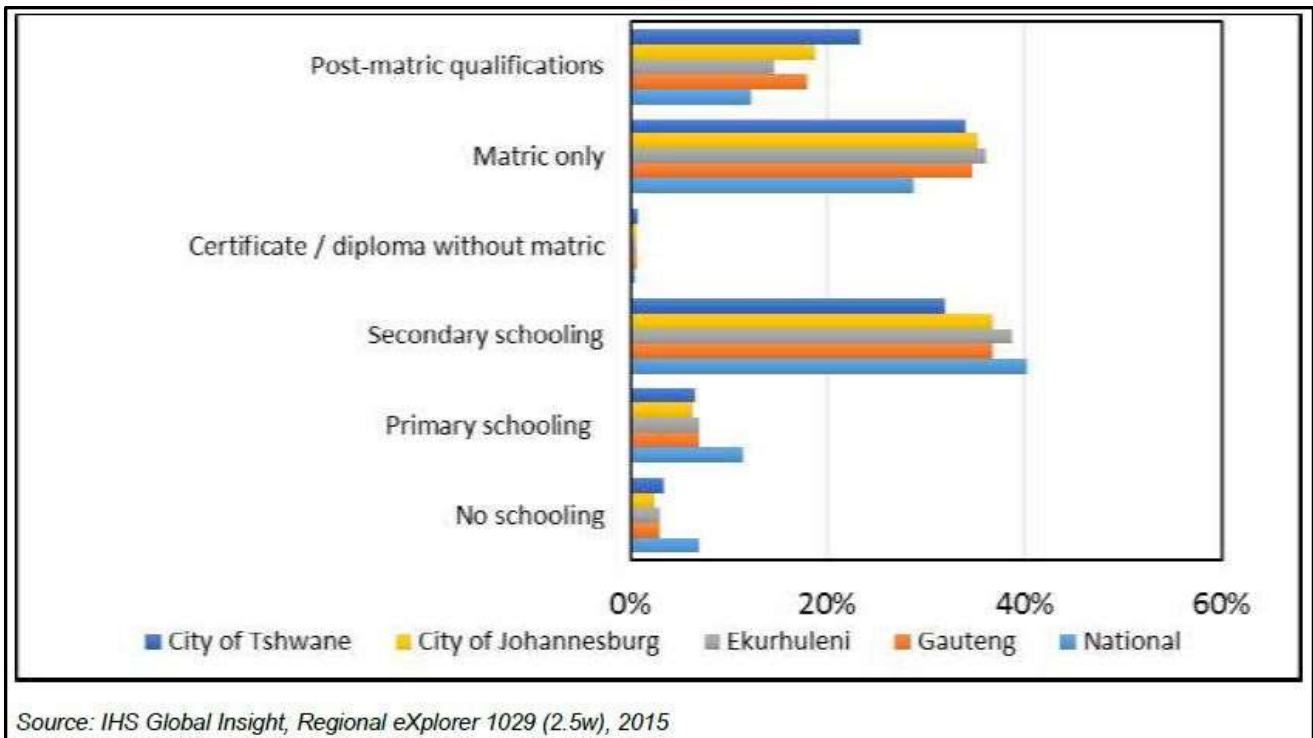


Figure 20: Highest levels of schooling for the population aged 20 years and older in Tshwane, 2015

Figure 21 provides an overview of the progress made in education levels for administrative Region 3, in which the study area falls, from 2011 – 2015. As can be seen in the figure, the percentage of people 20 years and older in Region 3 with no schooling has declined slightly from 2.3% in 2011 to 2.1 percent, whilst the percentage of people with at least matric, have marginally decreased from 37.8% in 2011 to 37.7% in 2015. The percentage of people 20 years and older in Region 3 with no schooling was the lowest amounting to 1.1% in 2011 and declined since to 1.0% in 2015.

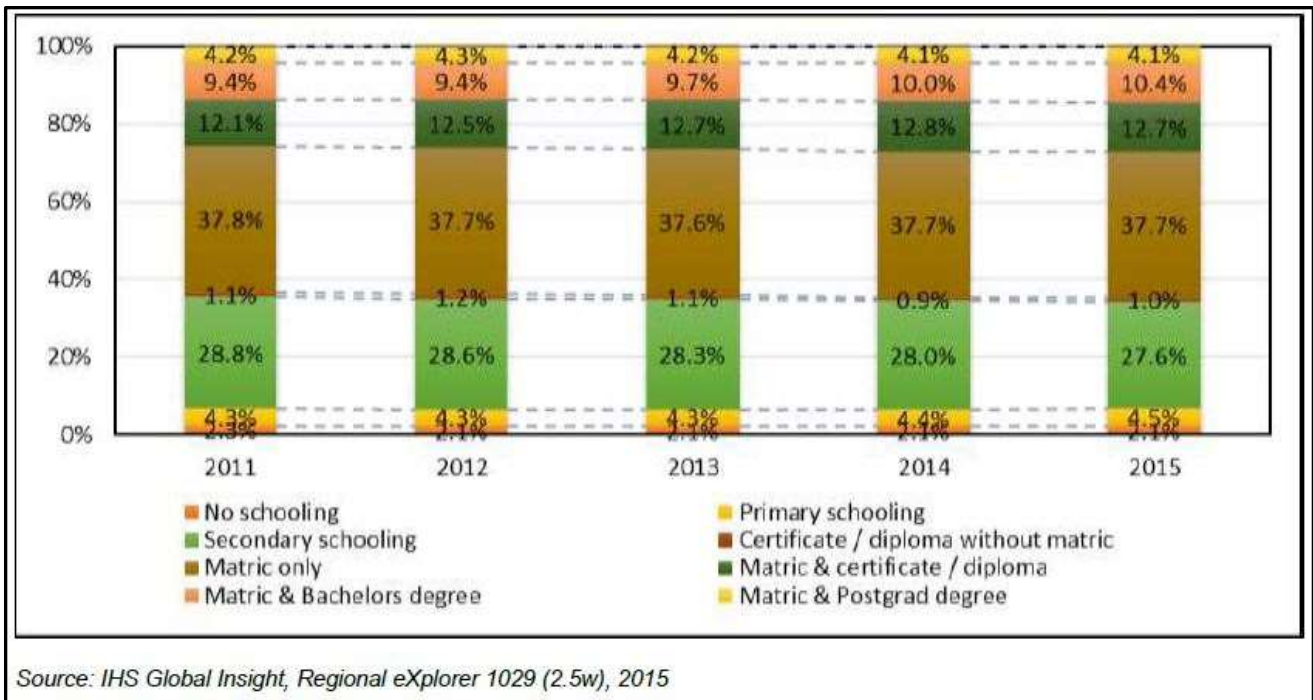


Figure 21: Education levels in Region 3

The economy

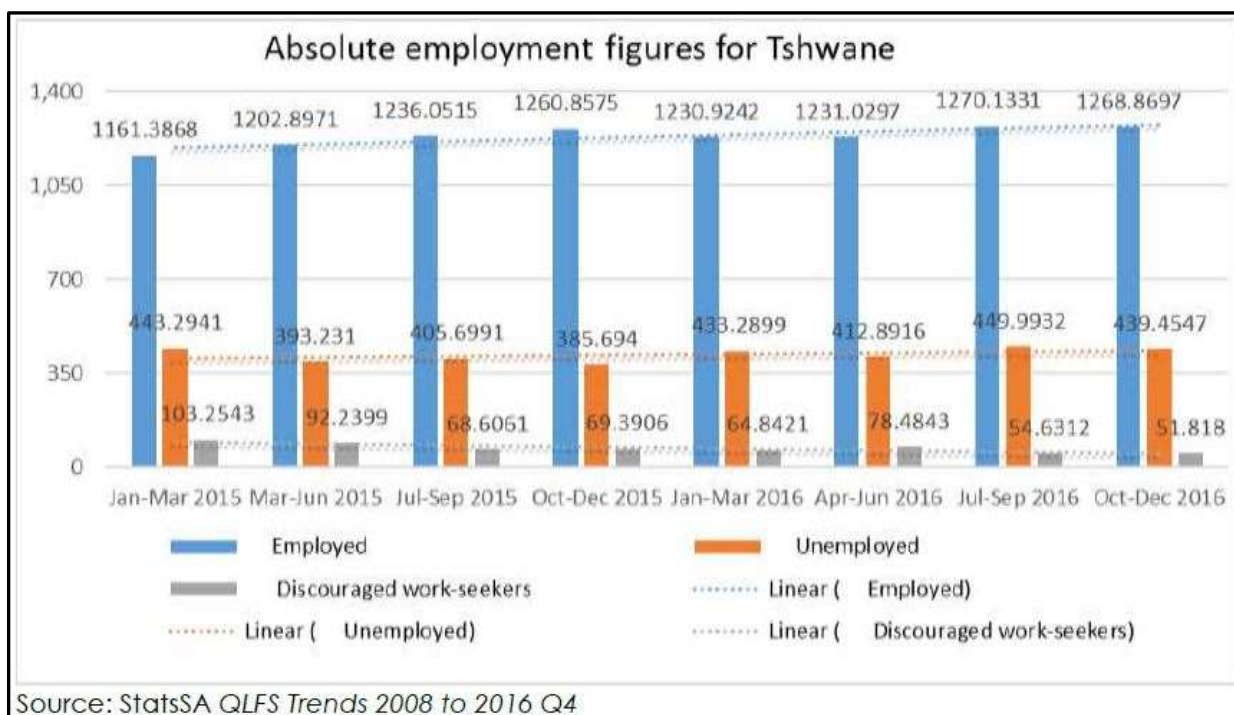
Tshwane’s annual growth figure has been more than Ekurhuleni and the CoJ over the period from 2011 to 2014. However, Johannesburg’s growth surpassed Tshwane’s growth in 2015 by 1.9 percentage points. Tshwane has a large government sector (community services), the sector’s estimated contribution to the Gross Value Added (GVA) value in 2015 is 33.4%, up from 32.8 percent in 2011. This is consistent with Tshwane being the government’s administrative capital. Other major contributors to Tshwane’s GVA in 2015 are the following:

- Finance sector (contributed approximately 24% in 2015, slightly down from 25.6 % in 2011);
- Trade sector (contributed approximately 12.1% in 2015, slightly up from 12.0% in 2011);
- Transport sector (contributed approximately 12.1% in 2015, slightly up from 11.7% in 2011); and
- Manufacturing sector (contributed approximately 9.4% in 2015, slightly down from 9.4%.

Labour market

The CoT is facing high levels of unemployment, exacerbating economic inequality and poverty in the City. The total number of unemployed persons in Tshwane shows a marginal decrease over the period i.e. from 443 000 persons in quarter 1 of 2015 to 439 000 persons in quarter 4 of 2016, an overall decrease of 4 000 unemployed people as is evident from the graph (Figure 22). It is clear from Tshwane’s employment figures for Quarter 1 2015 to Quarter 4 in 2016 that the unemployment rate

(Figure 23) fluctuated over the last two years. It reached the lowest level in the final quarter of 2015, but has since increased, although the overall trend for the period shows a marginal decrease.



Source: StatsSA QLFS Trends 2008 to 2016 Q4

Figure 22: Employment in Tshwane by formal and informal sector, 2011 - 2015

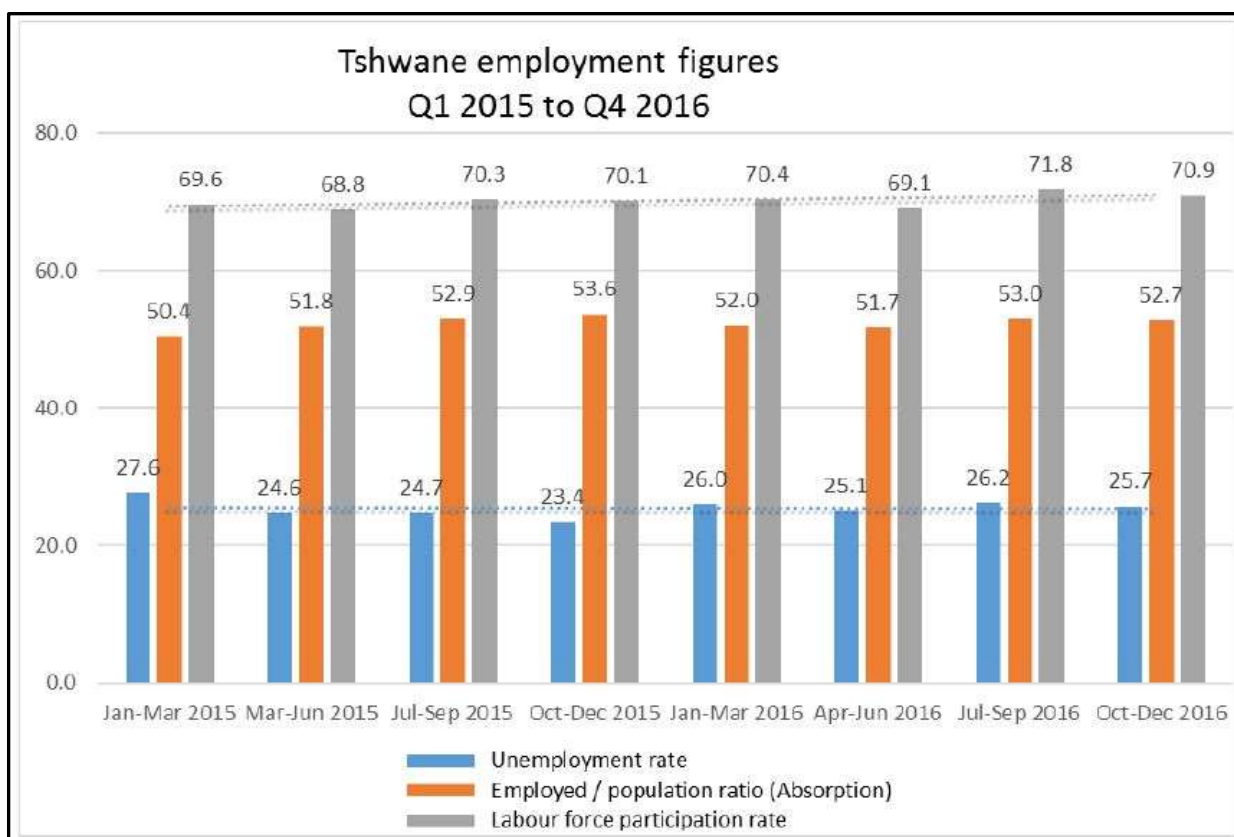


Figure 23: Tshwane employment figures Q1 2015 – Q4 2016 (Source: StatsSA QLFS Trends 2008 to Q4 2016)

The above information is notable when viewed in relation to the total number of employed persons, the number of discouraged workers and the size of the labour force in the City over the period.

A significant increase in the number of those employed, from 1 161 000 persons in Q1 of 2015 to 1 269 000 persons in Q4 of 2016, represents an increase of 108 000 new jobs; yet the total number of unemployed only decreased by 4 000 over this period. This is partly due to the decrease in discouraged work seekers over the period amounting to 51 000 persons, a portion of which may represent the increase in the absolute number of employed persons. This decrease could also be explained by the roughly proportional increase in the number of the labour force categorised as ‘other’ over this period. Another important factor to consider is the growth in the labour force over this period. In Q1 of 2015, Tshwane had a labour force of 1 605 000 persons, which increased by 103 000 over the period to 1 708 000 in Q 4 of 2016.

The above data shows that not enough employment opportunities are created in relation to the growing population, as approximately the same number of persons were unemployed at the start of 2015 as were at the end of 2016.

Figure 24 indicates the total employment in Tshwane disaggregated by formal or informal sector. Total employment figures across both sectors has been increasing steadily over the 2011 to 2015 period. In 2011, the total number of employed persons in Tshwane were approximately 1 008 387 and increased to 1 152 657 in 2015. The formal sector employment contributes the largest percentage of total employment. Formal sector employment in Tshwane grew from 871 086 in 2011 to 1 002 505 in 2015, and the informal sector from 137 300 in 2011 to 150 153 in 2015.

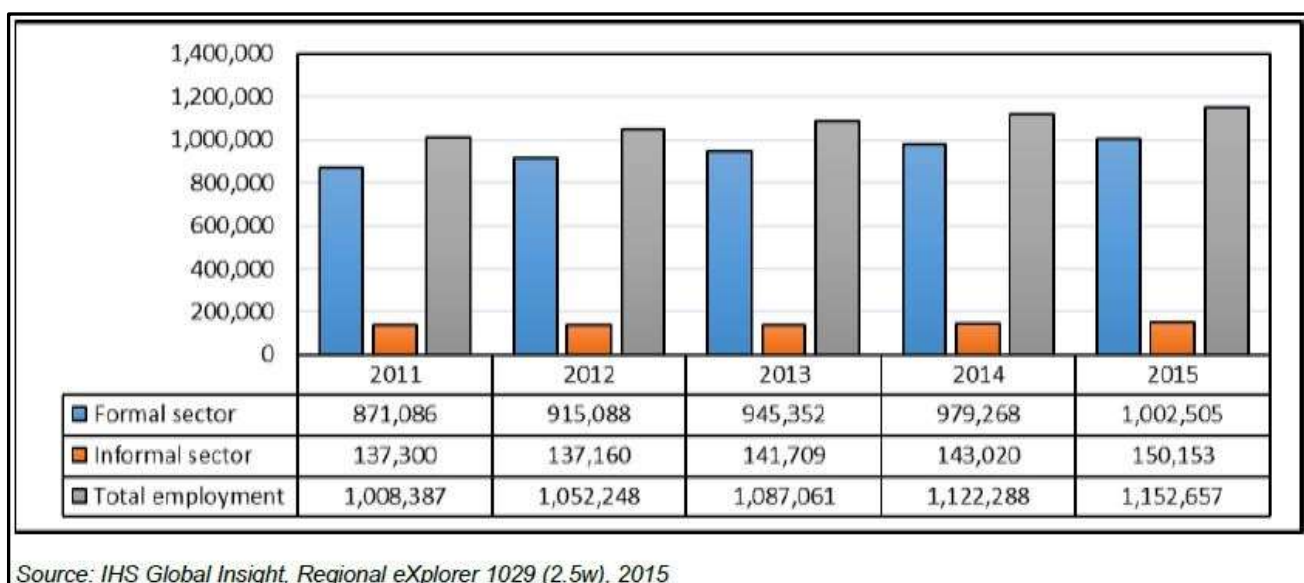


Figure 24: Employment in Tshwane by formal and informal sector 2011 – 2015

As indicated in the graph in Figure 25 **Figure 25**, the community services sector, the finance sector and the trade sector were the largest contributors to employment in the City over the 2011 to 2015 period, contributing approximately 24 percent, 22 percent and 20 percent in 2015, respectively.

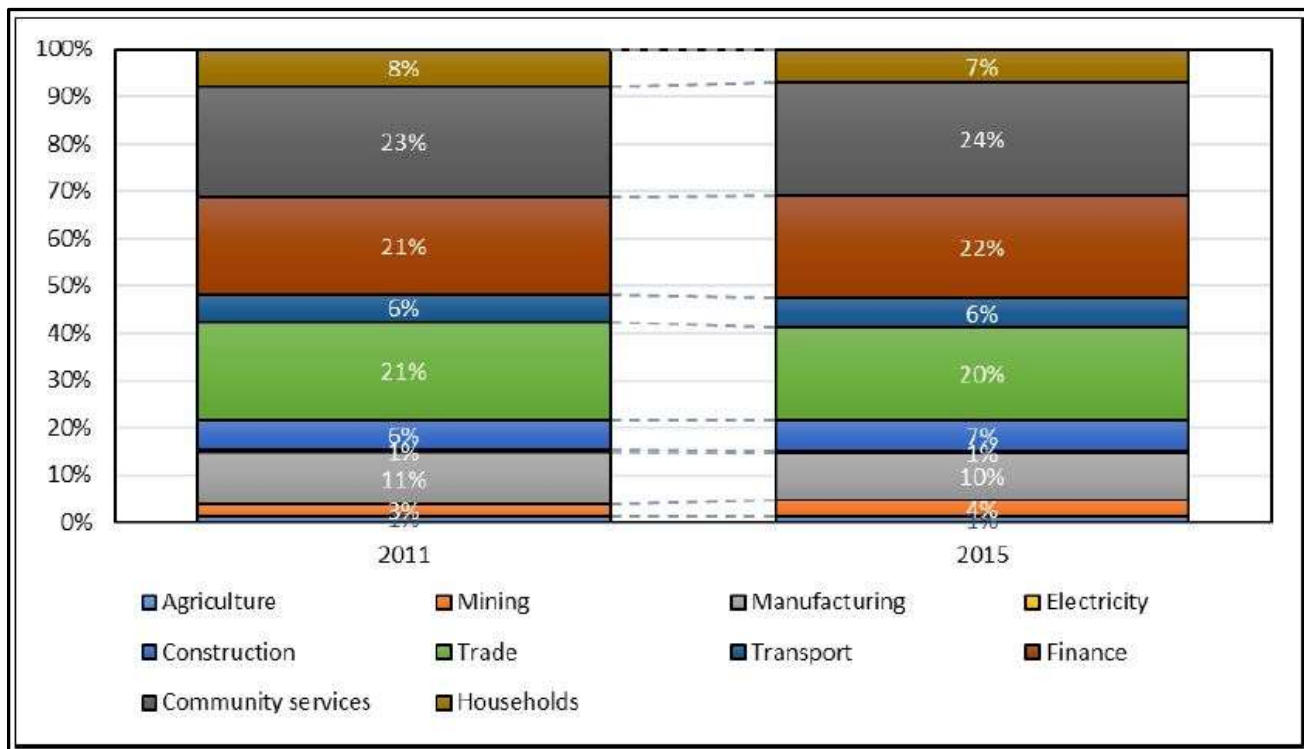


Figure 25: Tshwane’s year on year percentage change of total employment by industry (official definition), 2011 – 2015 (Source: IHS Global Insight, regional eXplorer 1029 (2.5w), 2015)

The socio-demographic and economic indicators of the CoT can be summarised as follows:

- The population growth rate for the CoT is declining;
- The large portion of the youth population (younger than 35 years of age) is the largest population group;
- The CoT has a relatively high percentage of persons with post-matric qualifications (23%), the highest in the country;
- Education levels in administrative Region 3 are high, with less than 7% of the population (20 years and older), with no schooling or only primary schooling;
- Tshwane has a large government sector (community services), the sector’s estimated contribution to the Gross Value Added (GVA) value in 2015 is 33.4%. Other major contributors to Tshwane’s GVA in 2015 were the Finance, Trade sector and Transport sectors; Manufacturing sector (contributed approximately 9.4% in 2015, slightly down from 9.4%.
- The unemployment rate in the CoT is high with 25.7% at the end of Q4 of 2016;

- The community services sector is the largest employment sector in the City with the finance and trade sectors are nearly the same percentages. Together these three sectors contributes approximately 66% to employment in the City. The mining sector contributed only 4% but and the manufacturing sector 10% in 2015.

Parties to be potentially affected by the prospecting activities:

The majority of the land owners and occupiers likely to be affected by the prospecting activities will be residents on agricultural holdings on and immediately adjacent to the study area. Other industries and landowners likely to be affected include *inter alia*:

- SABRIX Boekenhoutkloof quarry to the west of the study area;
- Earlybird poultry farm to the south of the study area;
- SABRIX Zandfontein quarry approximately 1 km to the east of the study area;
- Andeon Agricultural Holdings approximately 2.5 km to the east and south-east of the study area.

(b) Description of the current land uses

The majority of the study area is vacant with natural vegetation including thicket / dense bush and woodland / open bush. A few houses and outbuildings occurs on the urban smallholdings (refer to Figure 38. Surrounding land uses include *inter alia*:

- Klei Minerale Boekenhoutkloof clay mine to the west of the study area;
- Earlybird poultry farm to the south of the study area;
- Klei Minerale Zandfontein clay mine approximately 1 km to the east of the study area;
- Andeon Agricultural Holdings approximately 2.5 km to the east and south-east of the study area


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Figure 26: Natural veld make up the central part of the study site, towards the north more woodland vegetation is evident along the ridge.



Figure 27: Residential houses on small holdings (Portion 39) and their associated infrastructure.



Figure 28: Natural veld towards the north-western part of the site



Figure 29: View from Portion 39 towards the North of the proposed site.



Figure 30: Residential houses on small holdings and their associated infrastructure.



Figure 31: Natural veld towards the southern part of the site.



Figure 32: Maize crops on the site towards the South



Figure 33: Natural open veld towards the west (eastern fence of SABrix).



Figure 34: Roads and Residential fence walls on the northern portions of the site



Figure 35: Roads on the northern portions near houses



Figure 36: Ridge areas towards the North-western region of the site



Figure 37: Ridge areas on the Northern region of the site

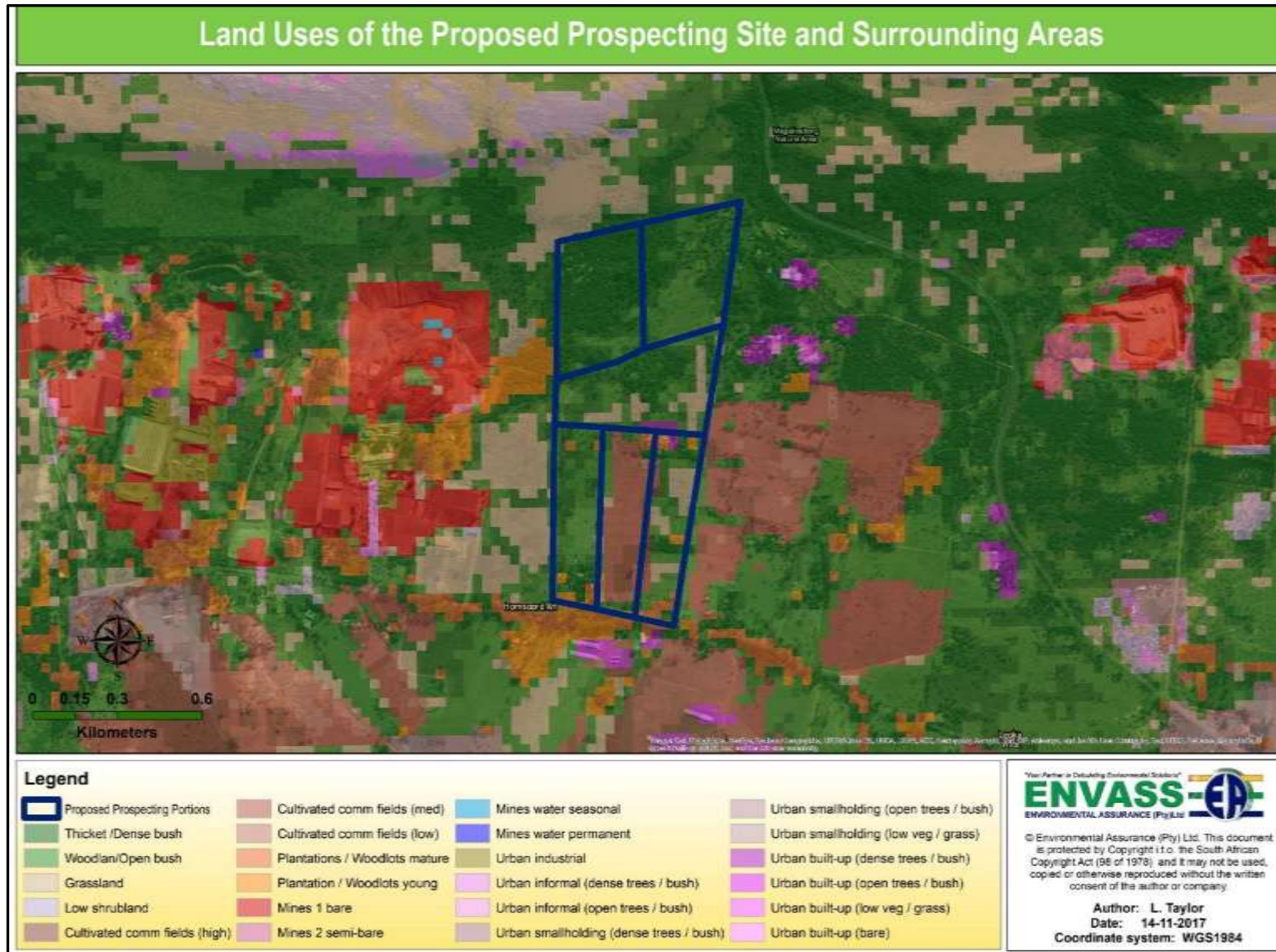


Figure 38: Land Use Classes of the Study and Surrounding Area

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(c) Description of specific environmental features and infrastructure on the site

Environmental Features

The major sensitive features within the study area include:

- Houses and residents on the small holdings;
- Potential heritage objects or buildings;
- Flora and fauna species and ridge ecosystem.

Infrastructure on the study area and in close proximity

Roads

Roads on the study area consists of gravel access roads to the various homesteads on the study area.

Kenneth Street – Pretoria Road


Kenneth Street is a single carriage way, local tar road providing access to the properties. The road runs from east to the west and links up with Hornsnek Road approximately 2.5 km south-east of the study area. Further west, at the Roux Street junction, approximately 3.5 km to the west, the name of the road changes to Pretoria Road. Pretoria road eventually links with the R511, single carriage way provincial road in the west, approximately 12 km from the study area.

M17 (Hornsnek Road)

Hornsnek Road is a single carriage way and runs south-east to north-west approximately 1 km east of the study area and provides a link from the south of the Magaliesberg, Pretoria city to Akasia and the N4 highway north of the study area and the Magaliesberg.

R 514

The R514 is a single carriage way provincial road running from the east to the west, approximately 2.5 km to the south of the study area. The R514 links the city of Pretoria with Brits and Hartbeespoort via the R 511.

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Future roads

The proposed PWV7 road runs from the south-west of the study area, through the study area to the north-east and the K16 runs from the east to the west to the south of the study area (refer to Figure 39).

The Gauteng Strategic Transportation Network namely, proposed Road(s): PWV7 K16 may be affected and as such, when an application for a change of land use, is lodged with the relevant authority, the said application must be lodged with the Gauteng Department of Roads and Transport.


An application must be submitted to the Department for a way leave if any part of a proposed service falls within 95, 0 m (measured from the centreline of any of the Department's existing or future road(s)/railway line or within a 500, 0 m radius of any intersection on said road(s)/railway line.

Where mining operations are to be undertaken, Section 49 of the Gauteng Transport Infrastructure Act, 2001 (Act No 8 of 2001) shall apply (Copy of said Section of said Act is attached for your information and use).

These conditions are laid down in terms of delegated authority in terms of the provisions of the Gauteng Transport Infrastructure Act, Act No. 8 of 2001 and do not exempt the applicant/ owner/ successor-in-title from the provisions of any other law.



Figure 39: Gauteng Strategic Transportation Network – extract from the CoT Region 3 SDF

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Powerlines

A powerline runs along Kenneth road providing electricity to the homesteads on the property.

(d) Environmental and current land use map

(Show all environmental, and current land use features)

Refer to Appendix 6, Figure 14, Figure 15, Figure 16 and Figure 40.

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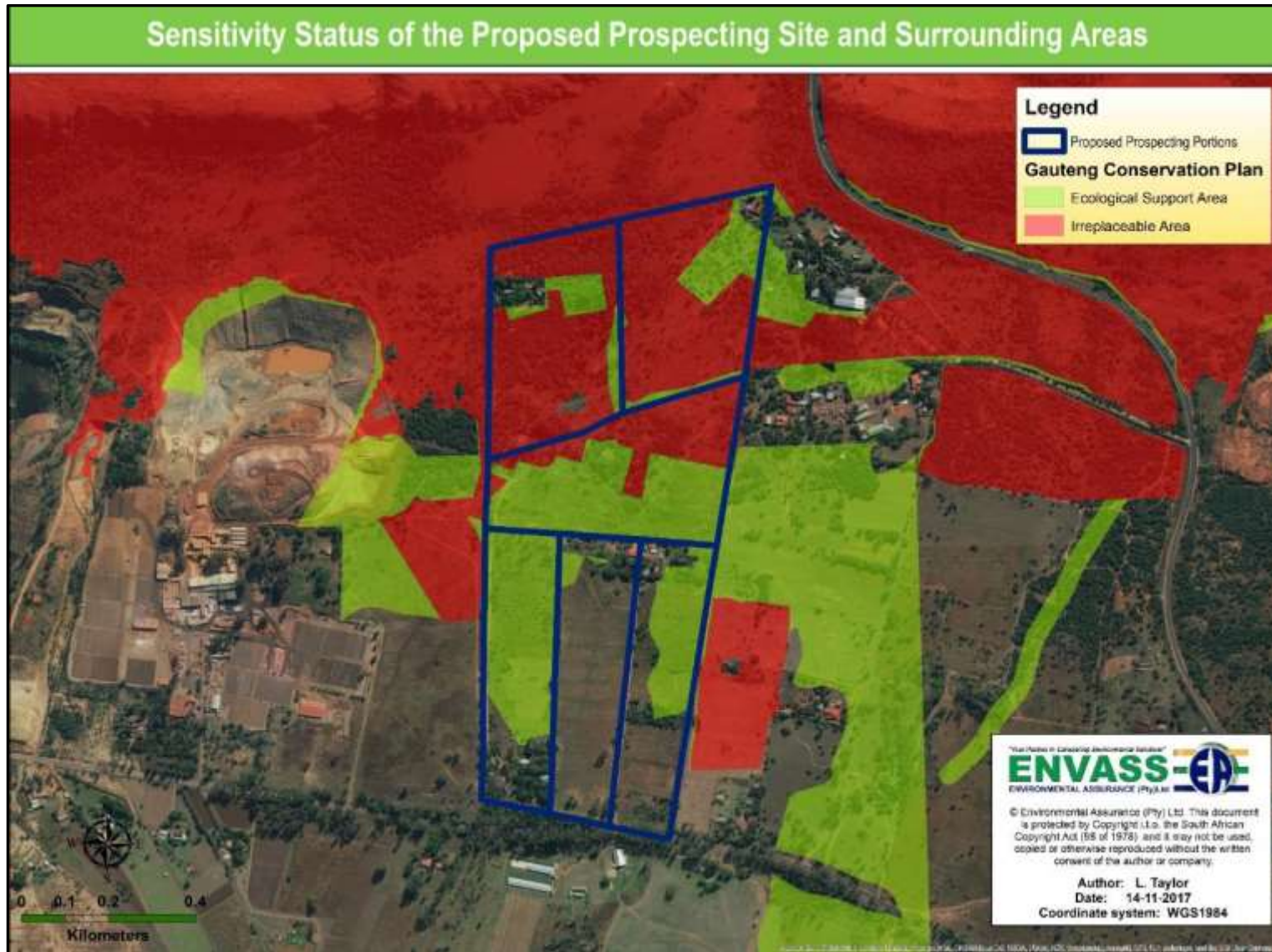



Figure 40: Sensitivity Map of the Study Area (Gauteng C-Plan V 3.3)

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10. Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).


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Table 8: Impact Significance Calculation – Construction, Operational and Rehabilitation Phase

ENVIRONMENTAL ASPECT	NATURE OF THE IMPACT	IMPACT STATUS	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	SIGNIFICANCE	MITIGATION POTENTIAL	SIGNIFICANCE	CONFIDENCE RATING	CUMULATIVE IMPACTS
									PRE-MITIGATION		POST-MITIGATION		
GEOLOGY AND SOILS	<p>Minor loss and disturbance to topsoil as a result of clearing of vegetation and drilling and trenching.</p> <p>When vegetation is cleared and the topsoil is stripped, the soils natural structure is disturbed and as a result the natural cycle is broken exposing the bare soil to erosion.</p> <p>Vehicles driving on these soils causes compaction of soils and reduces the soils ability to be penetrated by root growth. Compaction also increases erosion potential.</p> <p>When soils are not stripped and stockpiled according to the soil stripping guidelines these soils would have lost their natural physical and chemical properties, reducing the topsoil's ability to be a plant growth medium.</p> <p>The above factors all contribute to a loss of the topsoil's ability to be a resource through alterations and removal.</p>	-	3	2	1	2	8	5	40	Medium	20	Certain	Very Low
	<p>Hydrocarbon spills on soils can occur where heavy machinery and vehicles are parked such as the hard park area because they contain large volumes of lubricating oils, hydraulic oils, and diesel to run. There is always a chance of these breaking down and/or leaking.</p>	-	3	2	1	3	9	2	18	Medium	9	Sure	Very Low
HYDROLOGY GROUNDWATER SURFACE WATER	<p>Stormwater, erosion and siltation impacts due to a lack of implementing temporary measures to manage stormwater run-off quantity and quality.</p>	-	3	3	1	3	10	3	30	Medium	15	Sure	Very Low
	<p>Contamination of stormwater runoff and ground water, caused by chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from heavy vehicles and machinery and fuel storage area.</p>	-	3	2	1	3	9	2	18	Medium	9	Sure	Very Low
BIODIVERSITY	<p>Minor loss of natural vegetation and destruction of habitat will result in associated loss of fauna and flora species.</p>	-	3	3	1	3	10	4	40	Low	27	Sure	Very Low
	<p>Disruption in the movement patterns of fauna species may impact on biodiversity.</p> <p>Noise, dust and potential light pollution, as well as migration of pollutants such as hydrocarbons in the soils, dust and emissions from vehicle and machinery altering air quality will all have an impact on biodiversity.</p>	-	3	3	1	3	10	4	40	Low	27	Sure	Very Low
	<p>Introduction and spread of alien invasive species.</p> <p>The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in construction materials and on vehicles. Invasion of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse through stormwater, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system, alien plants can spread throughout the catchment. If allowed to seed before control</p>	-	4	3	1	3	11	4	44	Medium	22	Sure	Very Low

ENVIRONMENTAL ASPECT	NATURE OF THE IMPACT	IMPACT STATUS	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	SIGNIFICANCE	MITIGATION POTENTIAL	SIGNIFICANCE	CONFIDENCE RATING	CUMULATIVE IMPACTS
									PRE-MITIGATION		POST-MITIGATION		
	measures are implemented, alien plants can easily colonise and impact on downstream users.												
ARCHAEOLOGICAL / HERITAGE RESOURCES	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks and drilling.	-	2	1	5	5	13	2	26	Low	17	Sure	Very Low
VISUAL AND SENSE OF PLACE	Visibility from sensitive receptors / visual scarring of the landscape as a result of the prospecting activities.	-	3	3	1	1	8	5	40	Medium	20	Sure	Very Low
NOISE AND VIBRATION	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise and vibration impacts associated with the operation of vehicles, machinery and equipment.	-	4	3	1	2	10	5	50	Low	33	Sure	Very Low
AIR QUALITY	Increased dust pollution due to vegetation clearance and vehicles driving on gravel roads and drilling.	-	4	3	1	2	10	5	50	High	16	Sure	Very Low
	Gaseous emissions from vehicles and machinery may cause an impact on ambient air quality.	-	3	3	1	3	10	5	50	Low	33	Sure	Very Low
WASTE	Generation of additional general waste, litter and building rubble and hazardous waste.	-	3	3	1	5	12	5	60	Medium	30	Certain	Very Low
SERVICES	Minor impact caused by need for services i.e. water, electricity and sewerage systems during the prospecting phase causing additional strain on natural resources and service infrastructure.	-	2	2	1	3	8	5	40	Medium	20	Certain	Very Low
TRAFFIC	Minor change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic.	-	2	3	1	1	7	5	35	High	12	Sure	Very Low
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, and heavy vehicles.	-	5	3	5	5	18	3	54	High	18	Sure	Very Low
	Impact on future planned Road PWV7: Part of the future route traverses the applicant site.	-	1	3	1	1	6	5	30	High	10	Sure	Very Low
HEALTH AND SAFETY	Possibility of prospecting activities and workers causing veld fires, which can potentially cause injury and or loss of life to workers and surrounding landowners, visitors and workers.	-	5	4	5	5	19	3	57	High	19	Sure	Very Low
	Increased risk to public and worker safety: If not fenced off, the public and workers may fall into excavated areas and trenches.	-	5	3	5	5	18	3	54	High	18	Sure	Very Low
SOCIO-ECONOMIC	Potential creation of very limited extent short term employment opportunities for the local community, during the prospecting phase.	+	3	3	1	1	8	5	40	N/A	40	Certain	Very Low
	Multiplier effects on local economy will be positive, but very limited in extent and only short term.	+	2	3	1	1	7	5	35	N/A	35	Certain	Very Low

11. Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;


(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

A “significant impact” is defined as it is defined in the EIA Regulations (2014): “an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence”. The objective of this EIA methodology is to serve as a framework for accurately evaluating impacts associated with current or proposed activities in the biophysical, social and socio-economical spheres. It aims to ensure that all legal requirements and environmental considerations are met in order to have a complete and integrated environmental framework for impact evaluations.

The process of determining impacts to be assessed is one of the most important parts of the environmental impact assessment process. It is of such high importance because the environmental impacts identified can and are often linked to the same impact stream. In this method all impacts on the biophysical environment are assessed in terms of the overall integrity of ecosystems, habitats, populations and individuals affected. For example, the removal of groundcover for the sloping or scraping of an embankment, can lead to higher amounts of water runoff which increases the rate of erosion. Further down in the river the amount of sediment increases because of the increased erosion. A number of fish species cannot endure the high amount of sediment and moves off. The habitat is thus changed or in the process of changing. Thus one needs to understand that the root of the problem (removal of groundcover) is assessed in terms of the degree of change in the health of the environment and/or components in relation to their conservation value. Thus if the impact of removal of groundcover of a definable system is high and the conservation value is also high then the impact of removal of groundcover is highly significant.

Environmental Impact Assessment (EIA) Regulations, 2014 requirements

The Environmental Impact Assessment (EIA) 2014 Regulations promulgated in terms of Sections 24 (5), 24M and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA), requires that all identified potential impacts associated with the proposed project be assessed in terms of their overall potential significance on the natural, social and economic environments. The criteria identified in the EIA Regulations (2014) include the following:

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- Nature of the impact;
- Extent of the impact;
- Duration of the impact
- Probability of the impact occurring;
- Degree to which impact can be reversed;
- Degree to which impact may cause irreplaceable loss of resources;
- Degree to which the impact can be mitigated; and
- Cumulative impacts.


ENVASS has developed an impact assessment methodology (as defined below) whereby the Significance of a potential impact is determined through the assessment of the relevant temporal and spatial scales determined of the Extent, Magnitude and Duration criteria associated with a particular impact. This method does not explicitly define each of the criteria but rather combines them and results in an indication of the overall significance.

ENVASS Impact Assessment Methodology

By considering the root cause of the issue in this way, the probability that the activity undertaken does or may result in an impact, can be determined. The associated impact can then be assessed in order to determine its significance and to define mitigation measures or management measures to address the impact.

The following definitions therefore apply:

- An activity is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation;
- An environmental aspect is an ‘element of an organisation’s activities, products and services which can interact with the environment. The interaction of an aspect with the environment may result in an impact;
- Environmental impacts are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality;
- Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and palaeontology. Impacts on the environment can lead to changes in existing conditions; the impacts can be direct, indirect or cumulative;

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- Direct impacts refer to changes in environmental components that result from direct cause-effect consequences of interactions between the environment and project activities. Indirect impacts result from cause-effect consequences of interactions between the environment and direct impacts; and
- Cumulative impacts refer to the accumulation of changes to the environment caused by human activities.

Assessment of Impact Significance

The accumulated knowledge and the findings of the environmental investigations form the basis for the prediction of impacts. Once a potential impact has been determined, it is necessary to identify which project activity will cause the impact, the probability of occurrence of the impact, and its magnitude and extent (spatial and temporal). This information is important for evaluating the significance of the impact, and for defining mitigation and monitoring strategies. The aspects and impacts identified are therefore described according to the following:

(a) Nature of the impact

The NATURE of an impact can be defined as: “a *brief description of the impact being assessed, in terms of the proposed activity or project, including the socio-economic or environmental aspect affected by this impact*”.


(b) The status of the impact:

STATUS	Status	Description
	Positive (+)	A benefit to the holistic environment.
	Negative (-)	A cost to the holistic environment.
	Neutral (N)	No cost or benefit to the holistic environment.

(c) Magnitude of the impact

The MAGNITUDE of an impact can be defined as: “a *brief description of the intensity or amplitude of the impact on socio-economic or environmental aspects*”.

Determining the magnitude of an impact			
MAGNITUDE	Magnitude	Score	Description
Magnitude / intensity of impact (at the specified scale)	Zero	1	Natural and/or social functions and/or processes remain unaltered.
	Very low	2	Natural and/or social functions and/or processes are negligibly altered.

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	Low	3	Natural and/or social functions and/or processes are slightly altered.
	Medium	4	Natural and/or social functions and/or processes are notably altered.
	High	5	Natural and/or social functions and/or processes severely altered.

(d) Extent of the impact

The EXTENT of an impact can be defined as: “a brief description of the spatial influence of the impact or the area that will be affected by the impact”.

Determining the extent of an impact			
EXTENT	Extent	Score	Description
Extent or spatial influence of impact	Footprint	1	Only as far as the activity, such as footprint occurring within the total site area
	Site	2	Only the site and/or 500m radius from the site will be affected
	Local	3	Local area / district (neighbouring properties, transport routes and adjacent towns) is affected
	Region	4	Entire region / province is affected.
	National	5	Country is affected

(e) Duration of the impact

The DURATION of an impact can be defined as: “a short description of the period of time the impact will have an effect on aspects”.

Determining the duration of an impact			
DURATION	Extent	Score	Description
Duration of the impact	Short term	1	Less than 2 years
	Short to medium term	2	2 – 5 years
	Medium term	3	6 – 25 years
	Long term	4	26 – 45 years
	Permanent	5	46 years or more

(f) Degree to which impact can be reversed

The REVERSIBILITY of an impact can be defined as: “the ability of an impact to be changed from a state of affecting aspects to a state of not affecting aspects”.

Determining the reversibility of an impact			
REVERSIBILITY	Reversibility	Score	Description
	Completely reversible	1	Impacts can be reversed through the implementation of minimal mitigation measures and rehabilitation with negligible residual effects.
	Nearly completely reversible	2	Impacts can nearly be completely reversed through the implementation of mitigation measures and rehabilitation, with marginal residual effects.
	Partly reversible	3	Impacts can be partly reversed through the implementation of mitigation measures and rehabilitation with moderate residual effects.
	Nearly irreversible	4	Impacts can be mitigated, but only marginally reversed through the implementation of mitigation measures and rehabilitation with severe residual effects.
	Irreversible	5	Impacts are permanent and can't be reversed by the implementation of mitigation measures or rehabilitation is not viable.

(g) Degree to which impact may cause irreplaceable loss of resources

The irreplaceability of an impact can be defined as “the amount of resources that can/can't be replaced”.

Irreplaceability = Magnitude + Extent + Duration + Reversibility

Degree to which impact may cause irreplaceable loss of resources			
IRREPLACEABILITY	Irreplaceability	Score	Description
	No loss	0	No loss of any resources
	Very Low	1 - 5	
	Low	6 - 10	Marginal loss of resources
	Medium	11 - 15	Significant loss of resources
	High	16 - 20	Complete loss of resources

(h) Probability of the impact occurring

The PROBABILITY of an impact can be defined as: “the *estimated chance of the impact happening*”.

Determining the probability of an impact			
PROBABILITY	Probability	Score	Description
	Unlikely	1	Unlikely to occur (0 – 15% probability of impact occurring)
	Possible	2	May occur (15 – 40% chance of occurring)
	Probable	3	Likely to occur (40– 60% chance of occurring)
	Highly Probable	4	Between 60% and 85% sure that the impact will occur
	Definite	5	Will certainly occur (85 - 100% chance of occurring)

(i) Significance of Impacts - Pre-Mitigation

The SIGNIFICANCE can be defined as:” *the combination of the duration and importance of the impact, in terms of physical and socio-economic extent, resulting in an indicative level of mitigation required*”.

The significance of an impact is determined as follows:

Significance = Irreplaceability x Probability

The maximum value is 100 significance points (SP). Environmental impacts were rated as either of Very High (VH) High (H), Medium (M), Low (L) or Very Low (VL) significance on the following basis:

Table 9: Significance Rating (SR) Basis

Score	Significance
0	Neutral
1 to 20	Very low
21 to 40	Low
41 to 60	Medium
61 to 80	High
81 to 100	Very high

(j) Degree to which the impact can be mitigated

The degree to which an impact can be MITIGATED can be defined as: “the effect of mitigation measures on the impact and its degree of effectiveness”.

MITIGATION POTENTIAL	Determining the mitigation potential of an impact		
	Degree	Calculation	Description
	High	Pre-mitigation SR / 3 = Post Mitigation SR	Impact 100% mitigated
	Medium	Pre-mitigation SR / 2 = Post Mitigation SR	Impact >50% mitigated
	Low	Pre-mitigation SR / 3 = x Then: Pre-mitigation SR – x = Post Mitigation SR	Impact <50% mitigated

(k) Significance of Impacts Post-Mitigation

The SIGNIFICANCE can be defined as:” *the combination of the duration and importance of the impact, in terms of physical and socio-economic extent, resulting in an indicative level of mitigation required*”.

The significance of an impact is determined as follows:

Significance = Irreplaceability x Probability

Table 10: Significance Rating

Score	Significance
0	Neutral
1 to 20	Very low
21 to 40	Low
41 to 60	Medium
61 to 80	High
81 to 100	Very high

(l) Confidence rating

CONFIDENCE in the assessment of an impact can be defined as the:” *level of certainty of the impact occurring*”.

Determining the confidence rating of an impact			
CONFIDENCE RATING	CONFIDENCE	Certain	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is unlimited and sound
		Sure	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is reasonable and relatively sound
		Unsure	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is limited

(m)Cumulative impacts

The effect of CUMULATIVE impacts can be described as:” the effect the combination of past, present and “reasonably foreseeable” future actions have on aspects”.

Determining the confidence rating of an impact			
CUMULATIVE RATING	CUMULATIVE EFFECTS	Low	Minor cumulative effects
		Medium	Moderate cumulative effects
		High	Significant cumulative effects


The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties).

This section will be completed once comments have been received from interested and affected parties.

The possible mitigation measures that could be applied and the level of risk.

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

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This section will be completed once comments have been received from interested and affected parties.

Motivation where no alternative sites were considered

Prospecting is conducted in phases, where the activities and location of drilling and trenching to sample soil is dependent on the previous phase. Therefore, the specific locations and extent of soil sampling and diamond core drilling cannot be predetermined. The overall prospecting area is indicated in Figure 1. Areas to be avoided in terms of sensitivities are also indicated on the sensitivity maps in this report. Positioning of invasive prospecting planned in the sensitive areas and buffer zones should be conducted with a suitably qualified ecologist in order to avoid or minimise the destruction of any sensitive vegetation or habitats occurring in these areas. Klei Minerale (Pty) Ltd is an operating clay mining company, mining immediately west of the study area and also to the east of the study area. Therefore, infrastructure and resources are available in close proximity to the study area. In addition, geological information indicated that the area potentially contains shale that weathers to clay on surface. The clay present in the area can be used in various applications with numerous quarries and brickworks located in the region.

The site is therefore, the preferred site and alternative sites are not considered.

- Statement motivating the alternative development location within the overall site

(Provide a statement motivating the final site layout that is proposed)


The specific locations of intrusive drilling activities will be determined during Phase 1 of the Prospecting Work Programme. All infrastructure to be developed will be mobile and temporary. The ecologists, however, did recommend that no prospecting be conducted on the sensitive northern portions of the study area.

b) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity

(Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures).

- **Approach to the EIA**

An Environmental Impact Assessment (EIA) is a good planning tool. It identifies the environmental

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impacts of a proposed development and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.

The Basic Impact Assessment for this project complies with the National Environmental Management Act (1998) (as amended) and the NEMA EIA Regulations (2014) and guidelines of the Department of Environmental Affairs (DEA). The guiding principles of an EIA are listed below.

- **Guiding principles for an EIA**

The EIA must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and an open-door policy by the proponent. Technical information must be communicated to stakeholders in a way that is understood by them and that enables them to meaningfully comment on the project.

There should be ongoing consultation with interested and affected parties representing all walks of life. Sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis. There should be opportunities for input by specialists and members of the public. Their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

- **Information gathering**


Early in the Basic Assessment process, the Environmental Assessment Practitioner (EAP) identified the information that would be required for the impact assessment and the relevant data were obtained. In addition, available information about the receiving environment was gathered from reliable sources, interested and affected parties, previous documented studies in the area and previous EIA Reports. The project team visited the site to gain first-hand information and an understanding of the existing operations and the proposed project.

- **Specialist Assessments**

The following specialist studies have been conducted:

- Surface Water Assessment;
- Ecological and Biodiversity Scan; and
- Cultural heritage desktop assessment.

The main objective of the specialist studies is to provide independent scientifically sound information on issues of concern relating to the project proposal.

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The findings and recommendations identified by the various specialist studies undertaken, were incorporated into the Basic Impact Assessment.

- **Legislative Framework**

The legal requirements were described and assessed in detail.

- **Alternatives**

Various site alternatives and layouts have been assessed to determine the best socio-economical and biophysical option.

- **Description and assessment of impacts identified**

A comprehensive list of all potential impacts of the prospecting as identified by the EAP and the specialists, are provided and are assessed.

- **Environmental management programme**

An Environmental Management Programme containing mitigation, management and monitoring measures and specifying roles and responsibilities was compiled with specialist input and are included in this report.

- **Stakeholder engagement**


Registered interested and affected parties including relevant organs of state, are consulted with during the process. All their comments will be formally responded to and incorporated into the Basic Assessment Report and Environmental Management Programme that will be submitted to the competent authority.

c) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties)

Potential impacts that may be caused by the proposed development will be identified using input from the following:

- Views of I&APs;
- Existing information;
- Specialist investigations;
- Site visit with the project team; and

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- Legislation.

The following potential major direct, indirect and cumulative impacts were identified:

- Contamination and compaction of soils;
- Erosion;
- Contamination of ground- and surface water quality and decline in quantity;
- Impacts on biodiversity;
- Loss and displacement of fauna;
- Impacts on existing land use of the study and surrounding area;
- Destruction or loss of heritage features including graves and other historical sites of importance that may be uncovered during excavations;
- Decreased aesthetic value and impact on “Sense of Place”;
- Poor air quality and decreased visibility due to dust pollution;
- Increased noise levels;
- Waste generation;
- Increased demand on service infrastructure and resources;
- Slight increase in traffic and need for maintenance of road infrastructure;
- Potential injury and loss of health and life of humans; and
- Altered Socio-Economic Environment (Positive or negative).


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Table 11: Assessment of each identified potentially significant impact and risk

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
<ul style="list-style-type: none"> • Clearing of vegetation and topsoil. • Stockpiling of overburden positioned for later rehabilitation. • Prospecting including diamond core drilling, logging and sampling of the borehole core, trenching will involve the digging of excavation trenches down to approximately 3 metres below surface using graders and excavators. • Dust Suppression. 	<p>Minor loss and disturbance to topsoil as a result of clearing of vegetation and drilling and trenching.</p> <p>When vegetation is cleared and the topsoil is stripped, the soils natural structure is disturbed and as a result the natural cycle is broken exposing the bare soil to erosion.</p> <p>Vehicles driving on these soils causes compaction of soils and reduces the soils ability to be penetrated by root growth. Compaction also increases erosion potential.</p> <p>When soils are not stripped and stockpiled according to the soil stripping guidelines these soils would have lost their natural physical and chemical properties, reducing the topsoil's ability to be a plant growth medium.</p> <p>The above factors all contribute to a loss of</p>	Soil	Prospecting	Low (-)	<p>Prevent and reduce through management measures.</p> <p>Stripping of topsoil:</p> <ul style="list-style-type: none"> • Clearing of areas to take place a maximum of one month prior to intended prospecting in the area; • Stripping of topsoil will not take place during rain or excessive wind; and • The top 30 cm of vegetation and topsoil is to be stripped from the area to be prospected. <p>Storage of topsoil / overburden:</p> <ul style="list-style-type: none"> • Topsoil (top 30cm) is to be stored in predetermined topsoil berms, (+/- 5m) outside the boundary of the specific area; and • Topsoil stockpiles will be restricted to 1.5 to 2m in height. <p>Maintenance and monitoring of topsoil stockpiles:</p> <ul style="list-style-type: none"> • The stored topsoil should be used as soon as possible in concurrent rehabilitation; • Weekly visual inspections to be conducted. 	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	the topsoil's ability to be a resource through alterations and removal.					
	Hydrocarbon spills on soil can occur where heavy machinery and vehicles are parked such as the hard park area because they contain large volumes of lubricating oils, hydraulic oils, and diesel to run. There is always a chance of these breaking down and/or leaking.	Soil	Prospecting	Very Low (-)	<p>Prevent and reduce and remedy through management measures.</p> <ul style="list-style-type: none"> All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; All leaks will be cleaned up immediately using an absorbent material and spill kits, in the prescribed manner; and The approved Integrated Water and Waste Management Plan to be implemented. <p><u>Hydrocarbons and hazardous waste</u></p> <ul style="list-style-type: none"> All hazardous waste generated shall be kept separate and shall not be mixed with general waste; and All hazardous waste shall be stored within a sealed drum on an impermeable surfaced area within the central waste storage and transition area. 	Very Low (-)
	Stormwater, erosion and siltation impacts due to a lack of implementing temporary measures to manage stormwater run-off quantity and quality.	Surface water	Prospecting	Low (-)	<p>Prevent and reduce and remedy through management measures.</p> <ul style="list-style-type: none"> A Stormwater Management Plan (SMP) to be developed for the collective area where prospecting will occur, (or the existing SMP updated, where applicable for present and future activities) and should include the management of stormwater during excavation, as well as the installation of temporary stormwater and erosion control measures during prospecting, followed up by rehabilitation of the area; Temporary stormwater management systems (such as sand bags) will be installed to prevent 	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>stormwater from entering or exiting the area where prospecting will occur, which could result in silt laden surface water from draining into the valley south of the Magaliesberg (the origin of the Swartspruit is in close proximity);</p> <ul style="list-style-type: none"> • The slopes of the area where prospecting activities will occur, should be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scrub (hydrologic action by water that causes erosion). A maximum gradient of 1:3 is recommended; • If necessary, temporary diversion channels should be constructed ahead of the stockpiles (if relevant) to intercept clean run-off and divert it around disturbed areas into the natural drainage system downstream (down gradient) of the prospecting area; • Existing vegetation must be retained as far as possible to minimise erosion problems; • Rehabilitation of the prospecting area shall be planned and completed (after conclusion of the prospecting activities) in such a way that the run-off water (if any) will not cause erosion; • Visual inspections shall be done on a weekly basis with regard to the stability of the temporary water control structures, erosion and siltation (if required). • Sediment-laden run-off from cleared areas should be prevented from entering rivers and streams; • No river or surface water may be affected by silt emanating from the prospecting area (especially aimed at prevention of siltation of the nearby Swartspruit); and 	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> No wastewater may run freely into any of the surrounding naturally vegetated areas. 	
	Contamination of stormwater runoff and ground water, caused by chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from heavy vehicles and machinery and fuel storage area.	Surface water and ground water resources	Prospecting	Very Low (-)	<p>Prevent and reduce through management measures.</p> <p>In accordance with Government Notice 704 (GN 704), the onsite management should:</p> <ul style="list-style-type: none"> Keep clean and dirty water separated; Contain any dirty water within a system; and Prevent the contamination of clean water. <p>In order to achieve these objectives, the following stormwater management measures must be implemented on the site to ensure that that potential stormwater impacts are kept to a minimum:</p> <ul style="list-style-type: none"> Clean and dirty stormwater needs to be separated. Dirty stormwater may not be released into the environment and should be contained and treated on site; All temporary storm water infrastructure (if any) on-site shall be maintained and kept clean throughout the prospecting period; Immediate reporting of any polluting or potentially polluting incidents so that appropriate measures can be implemented; Fuel and oil spills shall be treated immediately by appropriate mop-up products. Several hydrocarbon absorption/remediation products (i.e. Spill kits) must be placed throughout the site; Use of bunds or traps to ensure full containment of hydrocarbon and other hazardous materials are mandatory; 	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> Any contaminated material is disposed of in an appropriate manner and the potential risks associated with such spills are limited; Stormwater leaving the site must in no way be contaminated; Ensure good housekeeping practices; Increased runoff should be managed using berms and other suitable structures as required to ensure flow velocities are reduced; and Removal of spills, rainwater and waste produced during clean-up of the bunds – shall be done in accordance to relevant specifications. 	
	Minor loss of natural vegetation and destruction of habitat will result in associated loss of fauna and flora species.	Surface water	Prospecting	Low (-)	Reduce through management measures. <ul style="list-style-type: none"> A suitably qualified specialist (ecologist) to accompany the site manager to demarcate areas for prospecting, in order to avoid damaging sensitive vegetation as identified during the specialist study and according to the sensitivity maps provided in this report; Only vegetation falling directly into demarcated access routes or project sites should be removed; No further vegetation clearance except for the removal of alien invasive species will be allowed; and All remaining indigenous vegetation should be conserved wherever possible. 	Low (-)
	Disruption in the movement patterns of fauna species may impact on biodiversity. Noise, dust and potential light pollution, as well as	Biodiversity	Prospecting	Low (-)	Prevent and reduce through management measures. <ul style="list-style-type: none"> Reduce the levels of disturbance on areas indicated by the Environmental Control Officer (ECO) as migratory routes, if any; 	Low (-)

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NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	migration of pollutants such as hydrocarbons in the soils, dust and emissions from vehicle and machinery altering air quality will all have an impact on biodiversity.				<ul style="list-style-type: none"> Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed; Any animals rescued or recovered will be relocated in a suitable habitat away from the mining operations and associated infrastructure; Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance. No reptile should be intentionally killed, caught or collected during any phase of the project; and General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area. 	
	Introduction and spread of alien invasive species. The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in construction materials and on vehicles. Invasion of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse through stormwater, and outcompete natural vegetation, decreasing the natural biodiversity.	Biodiversity Soils Surface water ecosystems	Prospecting	Medium (-)	<p>Prevent and control through management measures.</p> <ul style="list-style-type: none"> An alien vegetation management plan should be drawn up and implemented; Regular removal of invasive alien species should be undertaken. This should extend through to the closure phase of the project; and No spreading of alien vegetation onto adjacent properties should be allowed. 	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Once in a system, alien plants can spread throughout the catchment. If allowed to seed before control measures are implemented, alien plants can easily colonise and impact on downstream users.					
	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks and drilling.	Cultural Heritage	Prospecting	Low (-)	<p>Protect heritage resources through developing and implementing procedures.</p> <ul style="list-style-type: none"> • Prior to any development, construction or prospecting, a qualified archaeologist should conduct a site inspection on the areas demarcated for geotechnical drilling/prospecting. Proposed access roads to the drill sites should also be surveyed in order to avoid the destruction of heritage material; • Should the prospecting outcome result in further development or construction and mining, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered; • Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (see National Heritage Resources 	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>Act (Act No. 25 of 1999) Section 36 (6), Should culturally significant material or skeletal remains be exposed during prospecting all activities must be suspended pending further investigation by a qualified archaeologist (Refer to the National Heritage and Resources Act, 25 of 1999 section 36 (6));</p> <ul style="list-style-type: none"> Should any objects of archaeological or palaeontological remains be found during activities, work must immediately stop in that area and the Environmental Control Officer (ECO) must be informed; The ECO must inform SAHRA and contact an archaeologist and / or palaeontologist, depending on the nature of the find, to assess the importance and rescue them if necessary (with the relevant SAHRA permit). No work may be resumed in this area without the permission of the ECO and SAHRA. 	
	Visibility from sensitive receptors / visual scarring of the landscape as a result of the prospecting activities.	Aesthetic quality and sense of place	Prospecting	Low (-)	<p>Reduce through controlling management measures.</p> <ul style="list-style-type: none"> Unnecessary lights should be switched off during the day and / or night to avoid light pollution; If lighting is required, the lighting will be located in such a place and such a manner so as to minimise any impact on the surrounding community and fauna; Install temporary lights that will not create a night sky glow; Security lighting should be designed in such a way as to minimise emissions onto undisturbed areas on site and neighbouring properties. Light fittings should face downwards; 	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> Housekeeping on site should be enforced; Rehabilitation measures such as re-vegetation and plan to be implemented; Reduce the prospecting period through careful planning and productive implementation of resources; Plan the placement of lay-down areas and any potential temporary prospecting camps in order to minimise vegetation clearing; Restrict the activities and movement of workers and vehicles to the immediate prospecting site and existing access roads; Ensure that rubble, litter and issued materials are managed and removed regularly; Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way; and Reduce and control dust through the use of approved dust suppression techniques. 	
	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise and vibration impacts associated with the operation of vehicles, machinery and equipment.	Health of land owners and occupiers Biodiversity	Prospecting	Medium (-)	<p>Reduce through controlling measures.</p> <ul style="list-style-type: none"> Vehicles and machinery will be regularly serviced to ensure acceptable noise levels are not exceeded; Silencers will be utilised where possible; Heavy vehicle traffic should be routed away from noise sensitive areas where possible; Noise levels should be kept within acceptable limits. All noise and sounds generated should adhere to South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies; With regard to unavoidable very noisy activities in the vicinity of noise sensitive 	Low (-)

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NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>areas, the Site Manager (SM) should liaise with local residents and a suitably qualified ecologist and how best to minimise impacts, and the local population should be kept informed of the nature and duration of intended activities;</p> <ul style="list-style-type: none"> The SM should take measures to discourage labourers from loitering in the area, causing noise disturbance; Noise impacts should be minimised by restricting the hours (between 06h00 and 18h00 on Monday to Friday, and 06h00 and 13h00 on Saturdays), during which the offending activities are carried out and, where possible, by insulating machinery and/or enclosing areas of activity; No noisy activities to occur on Sundays or public holidays; Personal Protective Equipment to all persons working in areas where high levels of noise can be expected; Signs where it is compulsory; Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise. 	
	Increased dust pollution due to vegetation clearance and vehicles driving on gravel roads and drilling.	Aesthetic environment Sense of Place Air quality Biodiversity	Prospecting	Medium (-)	<p>Reduce through controlling measures.</p> <ul style="list-style-type: none"> Dust suppression shall be implemented during dry periods and windy conditions; All exposed surfaces should be minimised in terms of duration of exposure to wind and stormwater; Excavation, handling and transportation of erodible materials shall be avoided under high wind conditions (excess of 35km/hr) or when a visible dust plume is present; 	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> Ensure that the shortest routes are used for material transport; Ensure that stockpile height is kept to a minimum; Minimise travel speed on unpaved roads; Implement and actively monitor dust fallout generated in the 8 major wind directions on the borders of the site; Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed; Spray areas to be cleared with water; Ensure minimum travel distance between working areas and stockpiles; Ensure that topsoil for stockpiles is sprayed with water before tipping to prevent dust generation; Ensure graded areas are sprayed with water; Minimise the amount of graded areas; Ensure that shortest routes is used for material transport; Load and offload material, as far as possible, downwind of topsoil stockpiles. 	
	Gaseous emissions from vehicles and machinery may cause an impact on ambient air quality.	Health of land owners and occupiers	Prospecting	Medium (-)	<ul style="list-style-type: none"> All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; Proper planning of movements (vehicle trips) and working of machinery should take place, in order to avoid unnecessary trips and hours of operation. 	Low (-)
	Generation of additional general waste, litter and building rubble and hazardous waste.	Biodiversity Health and safety Soil	Prospecting	Medium (-)	<p>Control through management measures.</p> <ul style="list-style-type: none"> A central waste storage and transition area shall be established within the site camp; The central waste storage and transition area shall be surfaced and demarcated appropriately; 	Low (-)

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NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
		Surface water systems			<ul style="list-style-type: none"> Portable wheelie bins shall be placed throughout the site camp as well as at the remainder of the site and at all working areas in the field; Wheelie bins shall be colour coded and labelled to identify the waste stream for which it is intended; All portable wheelie bins and other containers shall be emptied at the central waste storage and transition area a minimum of once a week or when filled, as to avoid waste build up; The waste shall be removed (within 30 days) by a licensed waste service provider as shall be disposed of at a licensed waste landfill site and records of safe disposal (as required for hazardous wastes) shall be supplied to the Contractor. These records shall be kept on site by the ESM; Wherever possible and practical, waste materials generated on site must be recycled; and Waste specific (hazardous, timber, steel etc.) mitigation measures to be implemented. 	
	Minor impact caused by need for services i.e. water, electricity and sewerage systems during the prospecting phase causing additional strain on natural resources and service infrastructure.	Natural resources including water and energy resources	Prospecting	Low (-)	<p>Reduce through controlling management measures.</p> <ul style="list-style-type: none"> Energy savings measures to be implemented at the site e.g.: <ul style="list-style-type: none"> ➤ No lights to be switched on unnecessarily; ➤ Only security lights to be switched on at night; Energy saving bulbs to be installed; and Water should be recycled as far as possible to avoid any additional water usage. 	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Minor change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic.	Traffic	Prospecting	Low (-)	<p>Reduce through controlling management measures.</p> <ul style="list-style-type: none"> Where feasible heavy vehicles should not operate on public roads during peak hours; and Heavy vehicles should adhere to the speed limit of the road. 	Very Low (-)
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, and heavy vehicles.	Safety of workers, contractors and land owners and occupiers	Prospecting	Medium (-)	<p>Prevent through controlling management measures.</p> <ul style="list-style-type: none"> Drivers will be enforced to keep to set speed limits; Trucks will be in a road-worthy condition; Roads and intersections will be signposted clearly. Only main roads should be used; Where feasible vehicles should not operate on public roads during peak hours; Vehicles should adhere to the speed limit of the road; Heavy vehicles should always travel with their head lights switched on; Heavy vehicles should not stop on the road to pick up hitchhikers – No stopping on the road approaching the site will be allowed; Single directional traffic shall be controlled through a stop-go system or any other appropriate traffic control method; Klei Minerale (Pty) Ltd shall be responsible for ensuring that suitable access is maintained for public traffic to all relevant businesses and properties; and All traffic accommodation measures are to conform to the latest edition of the South African Road Signs Manual. 	Very Low (-)
	Impact on future planned Road PWV7: Part of the	Traffic	Prospecting	Low (-)	<ul style="list-style-type: none"> The Gauteng Strategic Transportation Network namely, provincial Road(s): PWV7, K16 and K67 may be affected and as such, 	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	future route traverses the applicant site.				<p>when an application for a change of land use, is lodged with the relevant authority, the said application must be lodged with the Gauteng Department of Roads and Transport;</p> <ul style="list-style-type: none"> An application must be submitted to the Department for a way leave if any part of a proposed service falls within 95,0 m (measured from the centreline of any of the Department's existing or future road(s)/railway line or within a 500,0 m radius of any intersection on said road(s)/railway line; Where mining operations are to be undertaken, Section 49 of the Gauteng Transport Infrastructure Act, 2001 (Act No 8 of 2001) shall apply (Copy of said Section of said Act is attached for your information and use). 	
	Possibility of prospecting activities and workers causing veld fires, which can potentially cause injury and or loss of life to workers and surrounding landowners, visitors and workers.	Biodiversity Health and safety of landowners, occupiers, visitors and workers	Prospecting	Medium (-)	<p>Prevent through controlling management measures.</p> <ul style="list-style-type: none"> All workers will be sensitised to the risk of fire; Smoking is only allowed in designated smoking areas and disposal of cigarette butts safely in sand buckets; The Applicant shall ensure that the basic fire-fighting equipment is available on the site; Extinguishers should be located outside hazardous materials and chemicals storage containers; Fire response and evacuation: <ul style="list-style-type: none"> An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the Applicant and conveyed to all staff on the site' Identify major risks to minimise the environmental impacts e.g., air pollution and contaminated effluent runoff. 	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Increased risk to public and worker safety: If not fenced off, the public and workers may fall into excavated areas and trenches.	Health and safety of landowners, occupiers of land, workers, visitors and the general public.	Prospecting	Medium (-)	<ul style="list-style-type: none"> A health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996) should be drawn up and implemented to ensure worker safety; A health and safety control officer should monitor the implementation of the health and safety plan for the operational phase; Regular health and safety audits should be conducted and documented; and a record of health and safety incidents should be kept on site and made available for inspection; Any health and safety incidents should be reported to the Site Manager (SM) immediately; First aid facilities should be available on site at all times; Workers have the right to refuse work in unsafe conditions; Material stockpiles or stacks should be stable and well secured to avoid collapse and possible injury to site workers. Access to excavation must be controlled; Excavated areas should be temporarily fenced-off; and Excavations will be backfilled and landscaped as soon as possible. 	Very Low (-)
	Potential creation of very limited extent short term employment opportunities for the local community, during the prospecting phase.	Socio-economic	Prospecting	Low (+)	<ul style="list-style-type: none"> Local labour to be sourced where possible. 	Low (+)
	Multiplier effects on local economy will be positive, but very limited in extent and only short term.	Socio-economic	Prospecting	Low (+)	<ul style="list-style-type: none"> Supplies to be bought locally as far as possible. 	Low (+)

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*The supporting impact assessment conducted by the EAP must be attached as an appendix, marked Appendix 7 – Please refer to Table 8: **Impact Significance Calculation – Construction, Operational and Rehabilitation Phase** for the full impact assessment.*

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d) Summary of specialist reports

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):-

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Ecological and Biodiversity Scan	<ul style="list-style-type: none"> • Care must be taken to reduce impacts on the adjacent properties through the implementation of all the mitigation measures proposed by the specialists; • No vegetation clearance except for the removal of alien invasive species will be allowed; • An Alien and Invasive Species Management Plan must be implemented; • Alien and weed species encountered on the property should be removed in order to comply with existing legislation (National Environmental Management: Biodiversity Act 2004 (act no. 10 of 2004) [as amended in 2014] alien and invasive species regulations, 2014); • All remaining indigenous vegetation should be conserved where possible; • A suitably qualified specialist (ecologist) to accompany the site manager to demarcate areas for prospecting, in order to avoid damaging sensitive vegetation; • Only vegetation falling directly into demarcated access routes or project sites should be removed; • Strict management of clean and dirty water systems needs to be undertaken in line with Government Notice Regulation 704 of the National Water Act to 	X	Basic Assessment Report and EMPR Part B (EMPR)

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	<p>prevent impacts on the surrounding area. This is to prevent established ecosystems, whether microbial or visible, to degenerate due to contaminated water entering surface or groundwater sources;</p> <ul style="list-style-type: none"> • Should any sensitive or Red Data animal or bird species be encountered during the construction, operation and decommissioning activities, these should be relocated to natural areas in the vicinity. Any sensitive fauna that are inadvertently killed during earthmoving operations should be preserved as museum voucher specimens; • Reduce the levels of disturbance on areas indicated by the Environmental Control Officer (ECO) as migratory routes of animals to minimise the negative impact on biodiversity; • Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed; • Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance; • No animal should be intentionally killed, caught or collected during any phase of the project; • General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area; 		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	<ul style="list-style-type: none"> • According to the Departmental Policy: Development Guidelines for Ridges (2001), a 200m buffer zone is required around class 2 ridges (Refer to Figure 16). Development proposals within the buffer zone should proceed at least to EIA stage; • Any stormwater cut-off channels should be kept as a natural as possible with gentle slopes (angle 45° or less) on the side away from the prospecting activities. These channels should enable, small animals, reptiles and amphibians which have fallen into the channel accidentally to escape easily. If not, they could drown if the channels contain water or they may die of exposure when the channels are dry; • For the safety of the animals it is not so much the width and depth of a drainage/storm water channel that are important, but the shape. If it has curved, smooth walls the animals that have fallen in will find it impossible to obtain purchase and will slip back time and time again and fall to the bottom of the channel. The channel must be designed in such a way as to prevent the smaller creatures from blundering in and dying. Safety features that could be incorporated into the drainage/storm water channel are the use of rough surfaces and rocks to allow trapped animals purchase, less curvature on the walls, a “step” in the slope of the wall and a “lip” along the edges of the channel which would either act as a deterrent to small animals or as an absolute physical barrier; • Measures to prevent erosion should be implemented during all phases; 		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	<ul style="list-style-type: none"> • During the Rehabilitation Phase, the following should be implemented: <ul style="list-style-type: none"> - All areas should be reshaped and levelled to resemble the pre-construction environment as far as possible. - All disturbed areas should be revegetated during the rehabilitation phase. - Re-profiling and sloping of areas at risk of erosion and incision as a result of construction activities should take place in order to maintain the ecological functionality of the area. <p>After conclusion of this Baseline Ecological Scan, it is the recommendation of the ecologists that the northern portions (Portion 36 and 37) be excluded from the prospecting activities. The remaining portions may be utilised for prospecting purposes provided that the recommendations are adhered to.</p>		
Surface Water Assessment	The hydrologic functions ran for a digital elevation model (DEM) created from the 1:50000 topographical map series data of South Africa (grid reference 2528) showed that, based on elevation data, no major streams were expected to accumulate through or near the site. Data obtained from the Department of Water and Sanitation (DWS, 2017) showed that the Swartspruit (a former tributary of the Crocodile River (West) and now flowing into the Hartbeespoort Dam) has its origin +- 1.5 km south of the outer boundary of the Boekenhoutkloof proposed prospecting area.	X	Basic Assessment Report and EMPR Part B (EMPR)

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	<p>From the results, findings and conclusion of this study, the proposed recommendations that follow for the area, are aimed at the management and prevention of impacts on surface water hydrology. Please note that these recommendations are for the attention of the environmental control officer (ECO) on site and that further recommendations from an engineer may be required.</p> <ul style="list-style-type: none"> • A Stormwater Management Plan (SMP) to be developed for the collective area where prospecting will occur, (or the existing SMP updated, where applicable for present and future activities) and should include the management of stormwater during excavation, as well as the installation of temporary stormwater and erosion control measures during prospecting, followed up by rehabilitation of the area; • Temporary stormwater management systems (such as sand bags) will be installed to prevent stormwater from entering or exiting the area where prospecting will occur, which could result in silt laden surface water from draining into the valley south of the Magaliesberg (the origin of the Swartspruit is in close proximity); • The slopes of the area where prospecting activities will occur, should be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scrub (hydrologic action by water that causes erosion). A maximum gradient of 1:3 is recommended; 		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	<ul style="list-style-type: none"> • If necessary, temporary diversion channels should be constructed ahead of the stockpiles (if relevant) to intercept clean run-off and divert it around disturbed areas into the natural drainage system downstream (down gradient) of the prospecting area; • Existing vegetation must be retained as far as possible to minimise erosion problems; • Rehabilitation of the prospecting area shall be planned and completed (after conclusion of the prospecting activities) in such a way that the run-off water (if any) will not cause erosion; • Visual inspections shall be done on a weekly basis with regard to the stability of the temporary water control structures, erosion and siltation (if required). • Sediment-laden run-off from cleared areas should be prevented from entering rivers and streams; • No river or surface water may be affected by silt emanating from the prospecting area (especially aimed at prevention of siltation of the nearby Swartspruit); and • These measures and recommendations should be included in the Environmental Management Programme. 		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Cultural heritage desktop assessment	<p>From the previous research records conducted in the area, the specialist concluded that the general region is significant from a heritage perspective. Heritage sites are likely to include graveyards, Iron Age/Farmer and Historical remains. Since heritage sites, e.g. graves, are not always clearly identifiable as it might consist of stone cairns, it is advised that a qualified archaeologist inspect the proposed prospecting sites prior to drilling to establish whether the sites might be sensitive from a heritage perspective.</p> <p>The following recommendations were made in terms of the National Heritage Resources Act (Act No. 25 of 1999) in order to avoid the destruction of heritage remains in areas demarcated for prospecting:</p> <ul style="list-style-type: none"> - Prior to any development, construction or prospecting, a qualified archaeologist should conduct a site inspection on the areas demarcated for geotechnical drilling/prospecting. Proposed access roads to the drill sites should also be surveyed in order to avoid the destruction of heritage material; - Should the prospecting outcome result in further development or construction and mining, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered; - Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development 	X	Basic Assessment Report and EMPR Part B (EMPR)

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (see National Heritage Resources Act (Act No. 25 of 1999) Section 36 (6)).		

Attach copies of Specialist Reports as appendices (Please refer to **Appendix 7 - 9**)

e) Environmental impact statement


(i) Summary of the key findings of the environmental impact assessment;

Table 12: Summary of the Possible Impacts Associated with the Proposed Prospecting

Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
<p>Minor loss and disturbance to topsoil as a result of clearing of vegetation and drilling and trenching.</p> <p>When vegetation is cleared and the topsoil is stripped, the soils natural structure is disturbed and as a result the natural cycle is broken exposing the bare soil to erosion.</p> <p>Vehicles driving on these soils causes compaction of soils and reduces the soils ability to be penetrated by root growth. Compaction also increases erosion potential.</p>	<p>Low (-)</p>	<p>Prevent and reduce through management measures.</p> <p>Stripping of topsoil:</p> <ul style="list-style-type: none"> • Clearing of areas to take place a maximum of one month prior to intended prospecting in the area; • Stripping of topsoil will not take place during rain or excessive wind; and • The top 30 cm of vegetation and topsoil is to be stripped from the area to be prospected. <p>Storage of topsoil / overburden:</p> <ul style="list-style-type: none"> • Topsoil (top 30cm) is to be stored in predetermined topsoil berms, (+/- 5m) outside the boundary of the specific area; and 	<p>Very Low (-)</p>

Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
<p>When soils are not stripped and stockpiled according to the soil stripping guidelines these soils would have lost their natural physical and chemical properties, reducing the topsoil's ability to be a plant growth medium.</p> <p>The above factors all contribute to a loss of the topsoil's ability to be a resource through alterations and removal.</p>		<ul style="list-style-type: none"> Topsoil stockpiles will be restricted to 1.5 to 2m in height. <p>Maintenance and monitoring of topsoil stockpiles:</p> <ul style="list-style-type: none"> The stored topsoil should be used as soon as possible in concurrent rehabilitation; Weekly visual inspections to be conducted. 	
<p>Hydrocarbon spills on soil can occur where heavy machinery and vehicles are parked such as the hard park area because they contain large volumes of lubricating oils, hydraulic oils, and diesel to run. There is always a chance of these breaking down and/or leaking.</p>	Very Low (-)	<p>Prevent and reduce and remedy through management measures.</p> <ul style="list-style-type: none"> All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; All leaks will be cleaned up immediately using an absorbent material and spill kits, in the prescribed manner; and The approved Integrated Water and Waste Management Plan to be implemented. <p><u>Hydrocarbons and hazardous waste</u></p> <ul style="list-style-type: none"> All hazardous waste generated shall be kept separate and shall not be mixed with general waste; and <p>All hazardous waste shall be stored within a sealed drum on an impermeable surfaced area within the central waste storage and transition area.</p>	Very Low (-)
<p>Stormwater, erosion and siltation impacts due to a lack of implementing temporary measures to manage stormwater run-off quantity and quality.</p>	Low (-)	<p>Prevent and reduce and remedy through management measures.</p> <ul style="list-style-type: none"> A Stormwater Management Plan (SMP) to be developed for the collective area where prospecting will occur, (or the existing SMP updated, where applicable for present and future activities) and should include the management of stormwater during excavation, as well as the installation of temporary stormwater and erosion control measures during prospecting, followed up by rehabilitation of the area; Temporary stormwater management systems (such as sand bags) will be installed to prevent stormwater from entering or exiting the area where prospecting will occur, which could result in silt laden surface water from draining into the valley south of the Magaliesberg (the origin of the Swartspruit is in close proximity); The slopes of the area where prospecting activities will occur, should be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scrub (hydrologic action 	Very Low (-)

Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
		<p>by water that causes erosion). A maximum gradient of 1:3 is recommended;</p> <ul style="list-style-type: none"> • If necessary, temporary diversion channels should be constructed ahead of the stockpiles (if relevant) to intercept clean run-off and divert it around disturbed areas into the natural drainage system downstream (down gradient) of the prospecting area; • Existing vegetation must be retained as far as possible to minimise erosion problems; • Rehabilitation of the prospecting area shall be planned and completed (after conclusion of the prospecting activities) in such a way that the run-off water (if any) will not cause erosion; • Visual inspections shall be done on a weekly basis with regard to the stability of the temporary water control structures, erosion and siltation (if required). • Sediment-laden run-off from cleared areas should be prevented from entering rivers and streams; • No river or surface water may be affected by silt emanating from the prospecting area (especially aimed at prevention of siltation of the nearby Swartspruit); and <p>No wastewater may run freely into any of the surrounding naturally vegetated areas.</p>	
Contamination of stormwater runoff and ground water, caused by chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from heavy vehicles and machinery and fuel storage area.	Very Low (-)	<p>Prevent and reduce through management measures.</p> <p>In accordance with Government Notice 704 (GN 704), the onsite management should:</p> <ul style="list-style-type: none"> • Keep clean and dirty water separated; • Contain any dirty water within a system; and • Prevent the contamination of clean water. <p>In order to achieve these objectives, the following stormwater management measures must be implemented on the site to ensure that that potential stormwater impacts are kept to a minimum:</p>	Very Low (-)

Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
		<ul style="list-style-type: none"> • Clean and dirty stormwater needs to be separated. Dirty stormwater may not be released into the environment and should be contained and treated on site; • All temporary storm water infrastructure (if any) on-site shall be maintained and kept clean throughout the prospecting period; • Immediate reporting of any polluting or potentially polluting incidents so that appropriate measures can be implemented; • Fuel and oil spills shall be treated immediately by appropriate mop-up products. Several hydrocarbon absorption/remediation products (i.e. Spill kits) must be placed throughout the site; • Use of bunds or traps to ensure full containment of hydrocarbon and other hazardous materials are mandatory; • Any contaminated material is disposed of in an appropriate manner and the potential risks associated with such spills are limited; • Stormwater leaving the site must in no way be contaminated; • Ensure good housekeeping practices; • Increased runoff should be managed using berms and other suitable structures as required to ensure flow velocities are reduced; and Removal of spills, rainwater and waste produced during clean-up of the bunds – shall be done in accordance to relevant specifications. 	
Minor loss of natural vegetation and destruction of habitat will result in associated loss of fauna and flora species.	Low (-)	<p>Reduce through management measures.</p> <ul style="list-style-type: none"> • A suitably qualified specialist (ecologist) to accompany the site manager to demarcate areas for prospecting, in order to avoid damaging sensitive vegetation as identified during the specialist study and according to the sensitivity maps provided in this report; • Only vegetation falling directly into demarcated access routes or project sites should be removed; • No further vegetation clearance except for the removal of alien invasive species will be allowed; and <p>All remaining indigenous vegetation should be conserved wherever possible.</p>	Low (-)
Disruption in the movement patterns of fauna species may impact on biodiversity.	Low (-)	<p>Prevent and reduce through management measures.</p> <ul style="list-style-type: none"> • Reduce the levels of disturbance on areas indicated by the Environmental Control Officer (ECO) as migratory routes, if any; 	Low (-)
Noise, dust and potential light pollution, as well as migration of			
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Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
pollutants such as hydrocarbons in the soils, dust and emissions from vehicle and machinery altering air quality will all have an impact on biodiversity.		<ul style="list-style-type: none"> Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed; Any animals rescued or recovered will be relocated in a suitable habitat away from the mining operations and associated infrastructure; Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance. No reptile should be intentionally killed, caught or collected during any phase of the project; and General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area. 	
Introduction and spread of alien invasive species. The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in construction materials and on vehicles. Invasion of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse through stormwater, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system, alien plants can spread throughout the catchment. If allowed to seed before control measures are implemented, alien plants can easily colonise and impact on downstream users.	Medium (-)	<p>Prevent and control through management measures.</p> <ul style="list-style-type: none"> An alien vegetation management plan should be drawn up and implemented; Regular removal of invasive alien species should be undertaken. This should extend through to the closure phase of the project; and No spreading of alien vegetation onto adjacent properties should be allowed. 	Low (-)
Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks and drilling.	Low (-)	<p>Protect heritage resources through developing and implementing procedures.</p> <ul style="list-style-type: none"> Prior to any development, construction or prospecting, a qualified archaeologist should conduct a site inspection on the areas demarcated for geotechnical drilling/prospecting. Proposed access roads to the drill sites should also be surveyed in order to avoid the destruction of heritage material; Should the prospecting outcome result in further development or construction and mining, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered; Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during 	Very Low (-)

Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
		<p>the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (see National Heritage Resources Act (Act No. 25 of 1999) Section 36 (6)). Should culturally significant material or skeletal remains be exposed during prospecting all activities must be suspended pending further investigation by a qualified archaeologist (Refer to the National Heritage and Resources Act, 25 of 1999 section 36 (6));</p> <ul style="list-style-type: none"> Should any objects of archaeological or palaeontological remains be found during activities, work must immediately stop in that area and the Environmental Control Officer (ECO) must be informed; The ECO must inform SAHRA and contact an archaeologist and / or palaeontologist, depending on the nature of the find, to assess the importance and rescue them if necessary (with the relevant SAHRA permit). No work may be resumed in this area without the permission of the ECO and SAHRA. 	
<p>Visibility from sensitive receptors / visual scarring of the landscape as a result of the prospecting activities.</p>	<p>Low (-)</p>	<p>Reduce through controlling management measures.</p> <ul style="list-style-type: none"> Unnecessary lights should be switched off during the day and / or night to avoid light pollution; If lighting is required, the lighting will be located in such a place and such a manner so as to minimise any impact on the surrounding community and fauna; Install temporary lights that will not create a night sky glow; Security lighting should be designed in such a way as to minimise emissions onto undisturbed areas on site and neighbouring properties. Light fittings should face downwards; Housekeeping on site should be enforced; Rehabilitation measures such as re-vegetation and plan to be implemented; Reduce the prospecting period through careful planning and productive implementation of resources; 	<p>Very Low (-)</p>

Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
		<ul style="list-style-type: none"> Plan the placement of lay-down areas and any potential temporary prospecting camps in order to minimise vegetation clearing; Restrict the activities and movement of workers and vehicles to the immediate prospecting site and existing access roads; Ensure that rubble, litter and issued materials are managed and removed regularly; Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way; and <p>Reduce and control dust through the use of approved dust suppression techniques.</p>	
<p>Nuisance and health risks caused by an increase in the ambient noise level as a result of noise and vibration impacts associated with the operation of vehicles, machinery and equipment.</p>	<p>Medium (-)</p>	<p>Reduce through controlling measures.</p> <ul style="list-style-type: none"> Vehicles and machinery will be regularly serviced to ensure acceptable noise levels are not exceeded; Silencers will be utilised where possible; Heavy vehicle traffic should be routed away from noise sensitive areas where possible; Noise levels should be kept within acceptable limits. All noise and sounds generated should adhere to South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies; With regard to unavoidable very noisy activities in the vicinity of noise sensitive areas, the Site Manager (SM) should liaise with local residents and a suitably qualified ecologist and how best to minimise impacts, and the local population should be kept informed of the nature and duration of intended activities; The SM should take measures to discourage labourers from loitering in the area, causing noise disturbance; Noise impacts should be minimised by restricting the hours (between 06h00 and 18h00 on Monday to Friday, and 06h00 and 13h00 on Saturdays), during which the offending activities are carried out and, where possible, by insulating machinery and/or enclosing areas of activity; 	<p>Low (-)</p>

Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
		<ul style="list-style-type: none"> No noisy activities to occur on Sundays or public holidays; Personal Protective Equipment to all persons working in areas where high levels of noise can be expected; Signs where it is compulsory; Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise.	
Increased dust pollution due to vegetation clearance and vehicles driving on gravel roads and drilling.	Medium (-)	Reduce through controlling measures. <ul style="list-style-type: none"> Dust suppression shall be implemented during dry periods and windy conditions; All exposed surfaces should be minimised in terms of duration of exposure to wind and stormwater; Excavation, handling and transportation of erodible materials shall be avoided under high wind conditions (excess of 35km/hr) or when a visible dust plume is present; Ensure that the shortest routes are used for material transport; Ensure that stockpile height is kept to a minimum; Minimise travel speed on unpaved roads; Implement and actively monitor dust fallout generated in the 8 major wind directions on the borders of the site; Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed; Spray areas to be cleared with water; Ensure minimum travel distance between working areas and stockpiles; Ensure that topsoil for stockpiles is sprayed with water before tipping to prevent dust generation; Ensure graded areas are sprayed with water; Minimise the amount of graded areas; Ensure that shortest routes is used for material transport; Load and offload material, as far as possible, downwind of topsoil stockpiles.	Very Low (-)
Gaseous emissions from vehicles and machinery may cause an impact on ambient air quality.	Medium (-)	<ul style="list-style-type: none"> All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; Proper planning of movements (vehicle trips) and working of machinery should take place, in order to avoid unnecessary trips and hours of operation.	Low (-)

Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
Generation of additional general waste, litter and building rubble and hazardous waste.	Medium (-)	<p>Control through management measures.</p> <ul style="list-style-type: none"> • A central waste storage and transition area shall be established within the site camp; • The central waste storage and transition area shall be surfaced and demarcated appropriately; • Portable wheelie bins shall be placed throughout the site camp as well as at the remainder of the site and at all working areas in the field; • Wheelie bins shall be colour coded and labelled to identify the waste stream for which it is intended; • All portable wheelie bins and other containers shall be emptied at the central waste storage and transition area a minimum of once a week or when filled, as to avoid waste build up; • The waste shall be removed (within 30 days) by a licensed waste service provider as shall be disposed of at a licensed waste landfill site and records of safe disposal (as required for hazardous wastes) shall be supplied to the Contractor. These records shall be kept on site by the ESM; • Wherever possible and practical, waste materials generated on site must be recycled; and <p>Waste specific (hazardous, timber, steel etc.) mitigation measures to be implemented.</p>	Low (-)
Minor impact caused by need for services i.e. water, electricity and sewerage systems during the prospecting phase causing additional strain on natural resources and service infrastructure.	Low (-)	<p>Reduce through controlling management measures.</p> <ul style="list-style-type: none"> • Energy savings measures to be implemented at the site e.g.: <ul style="list-style-type: none"> ➢ No lights to be switched on unnecessarily; ➢ Only security lights to be switched on at night; • Energy saving bulbs to be installed; and <p>Water should be recycled as far as possible to avoid any additional water usage.</p>	Very Low (-)
Minor change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic.	Low (-)	<p>Reduce through controlling management measures.</p> <ul style="list-style-type: none"> • Where feasible heavy vehicles should not operate on public roads during peak hours; and <p>Heavy vehicles should adhere to the speed limit of the road.</p>	Very Low (-)

Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, and heavy vehicles.	Medium (-)	<p>Prevent through controlling management measures.</p> <ul style="list-style-type: none"> • Drivers will be enforced to keep to set speed limits; • Trucks will be in a road-worthy condition; • Roads and intersections will be signposted clearly. Only main roads should be used; • Where feasible vehicles should not operate on public roads during peak hours; • Vehicles should adhere to the speed limit of the road; • Heavy vehicles should always travel with their head lights switched on; • Heavy vehicles should not stop on the road to pick up hitchhikers – No stopping on the road approaching the site will be allowed; • Single directional traffic shall be controlled through a stop-go system or any other appropriate traffic control method; • Klei Minerale (Pty) Ltd shall be responsible for ensuring that suitable access is maintained for public traffic to all relevant businesses and properties; and <p>All traffic accommodation measures are to conform to the latest edition of the South African Road Signs Manual.</p>	Very Low (-)
Impact on future planned Road PWV7: Part of the future route traverses the applicant site.	Low (-)	<ul style="list-style-type: none"> • The Gauteng Strategic Transportation Network namely, provincial Road(s): PWV7, K16 and K67 may be affected and as such, when an application for a change of land use, is lodged with the relevant authority, the said application must be lodged with the Gauteng Department of Roads and Transport; • An application must be submitted to the Department for a way leave if any part of a proposed service falls within 95,0 m (measured from the centreline of any of the Department's existing or future road(s)/railway line or within a 500,0 m radius of any intersection on said road(s)/railway line; Where mining operations are to be undertaken, Section 49 of the Gauteng Transport Infrastructure Act, 2001 (Act No 8 of 2001) shall apply (Copy of said Section of said Act is attached for your information and use). 	Very Low (-)
Possibility of prospecting activities and workers causing veld fires, which can potentially cause injury and or loss of life to workers and surrounding landowners, visitors and workers.	Medium (-)	<p>Prevent through controlling management measures.</p> <ul style="list-style-type: none"> • All workers will be sensitised to the risk of fire; • Smoking is only allowed in designated smoking areas and disposal of cigarette butts safely in sand buckets; 	Very Low (-)
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Description of Impact	Significance Pre-Mitigation	Mitigation Measures	Significance Post-Mitigation
		<ul style="list-style-type: none"> • The Applicant shall ensure that the basic fire-fighting equipment is available on the site; • Extinguishers should be located outside hazardous materials and chemicals storage containers; • Fire response and evacuation: <ul style="list-style-type: none"> ➢ An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the Applicant and conveyed to all staff on the site' <p>Identify major risks to minimise the environmental impacts e.g., air pollution and contaminated effluent runoff.</p>	
Increased risk to public and worker safety: If not fenced off, the public and workers may fall into excavated areas and trenches.	Medium (-)	<ul style="list-style-type: none"> • A health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996) should be drawn up and implemented to ensure worker safety; • A health and safety control officer should monitor the implementation of the health and safety plan for the operational phase; • Regular health and safety audits should be conducted and documented; and a record of health and safety incidents should be kept on site and made available for inspection; • Any health and safety incidents should be reported to the Site Manager (SM) immediately; • First aid facilities should be available on site at all times; • Workers have the right to refuse work in unsafe conditions; • Material stockpiles or stacks should be stable and well secured to avoid collapse and possible injury to site workers. • Access to excavation must be controlled; • Excavated areas should be temporarily fenced-off; and Excavations will be backfilled and landscaped as soon as possible. 	Very Low (-)
Potential creation of very limited extent short term employment opportunities for the local community, during the prospecting phase.	Low (+)	Local labour to be sourced where possible.	Low (+)
Multiplier effects on local economy will be positive, but very limited in extent and only short term.	Low (+)	Supplies to be bought locally as far as possible.	Low (+)

(ii) Final Site Map

*(Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. Attach as **Appendix 6**)*

The specific locations of intrusive drilling activities will be determined during Phase 1 of the Prospecting Work Programme. All infrastructure to be developed will be mobile and temporary. The ecologists, however, did recommend that no prospecting be conducted on the sensitive northern portions of the study area (refer to Figure 1).

(iii) Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

Please refer to Table 12.

f) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR;

(Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPR as well as for inclusion as conditions of authorisation).


The following management objectives and impact management outcomes are recommended for inclusion in the EMPR:

- Biodiversity: Prevent and / or restrict the loss of indigenous fauna and flora as far as possible;
- Physical aspects: Prevent and / or restrict the impact on soils and surface water;
- Social Aspects: Ensure the health and safety of employees of Klei Minerale (Pty) Ltd and any contractors associated with the development and operation of the proposed activity as well as the surrounding community and visitors;
- Heritage: Ensure the protection of any potential heritage features or objects that may be excavated during the proposed development.

g) Aspects for inclusion as conditions of Authorisation

(Any aspects which must be made conditions of the Environmental Authorisation)

The following aspects are recommended to be included as conditions in the Environmental Authorisation:

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- The EMPR is a contractual document and must be implemented at all times during the prospecting phase;
- An independent environmental control officer (ECO) must be appointed to monitor the implementation of the EMPR and audit reports to be kept by the applicant;
- All contractors and employees of Klei Minerale (Pty) Ltd must be made aware of the EMPR and its requirements as well as the impact of not implementing the measures of the EMPR;
- Copies of the EMPR, Integrated Environmental Authorisation and any emergency procedures and method statements, must be kept on site and be available on request of the Competent Authority.

h) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)


- All information provided to the environmental team by the applicant and I&APs was correct and valid at the time that it was provided;
- The investigations undertaken by specialists during the BA process, indicate the development site as suitable and technically acceptable, except for the northern portions, which are sensitive and recommended to be excluded from prospecting;
- It is not always possible to involve all I&APs individually, however, every effort has been made to involve as many affected stakeholders as possible;
- The information provided by the applicant and specialists was accurate and unbiased; and
- The scope of this investigation is limited to assessing the environmental impacts associated with the construction, operation and closure phases of the proposed activity.

i) Reasoned opinion as to whether the proposed activity should or should not be authorised

i) Reasons why the activity should be authorised or not

In general, it is recognised that the proposed prospecting activities have the potential to pose various risks to the environment as well as to the residents or businesses in the surrounding area. However, based on the findings of this BA documented in this report, all impacts can be mitigated to insignificant levels.

This report shows that the proposed development has the potential to provide socio-economic benefits to the local and regional communities. The EAP therefore recommends that the proposed activities be approved on condition that the EMPR is strictly implemented and monitored for compliance and that the northern portions of the study area are excluded from prospecting.

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Not implementing the prospecting activities will result in a loss of information of mineral reserves present on the study area. Should economically feasible reserves exist on the study area and the applicant cannot prospect, the opportunity to utilise the reserves for future mining and brick-making will be lost, i.e. the minerals will be sterilised and resultant socio-economic benefits will be lost.

The proposed prospecting activities have the potential to have a negative impact on the ecological environment as well as the social environment of the area. These impacts, however, can potentially be prevented, minimised, mitigated and managed to low and very low levels, as shown through the impact assessment.

ii) Conditions that must be included in the authorisation

- The EMPR is a contractual document and must be implemented at all times during the prospecting phase;
- An independent environmental control officer (ECO) must be appointed to monitor the implementation of the EMPR and audit reports to be kept by the applicant;
- All contractors and employees of Klei Minerale (Pty) Ltd must be made aware of the EMPR and its requirements as well as the impact of not implementing the measures of the EMPR;
- Copies of the EMPR, Integrated Environmental Authorisation and any emergency procedures and method statements, must be kept on site and be available on request of the Competent Authority.

12. Period for which the Environmental Authorisation is required.

This Environmental Authorisation is therefore required for a period 5 years.

13. Undertaking


(Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the Basic assessment report and the Environmental Management Programme report).

Please refer to the EMPR in Part B of this document.

14. Financial Provision

(State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation).

The closure cost assessment will be conducted, if required. The report will be submitted to the Department of Mineral Resources together with the Final Basic Impact Assessment report, if required.

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iii) Explain how the aforesaid amount was derived

The financial provision amount will be calculated utilising the methodology as prescribed by the Guideline Documents for the Evaluation of the Quantum of Closure Related Financial Provision Provided by a Mine issued by the DMR.

iv) Confirm that this amount can be provided for from operating expenditure

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

The applicant submits that it is an operating clay mining company and is able to fund the planned prospecting from its operational budget. It is confirmed that the amount for financial provision is anticipated to be an operating cost and is provided for as such in the Prospecting Work Programme.

15. Specific Information required by the competent Authority


v) Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the:-

(1) Impact on the socio-economic conditions of any directly affected person

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an Appendix).

Potential impacts on landowners, land occupiers, communities or individuals or competing land uses in the area include:

- Potential soil pollution which may result from any hydrocarbon spills where heavy machinery and vehicles are parked such as the hard park area because they contain large volumes of lubricating oils, hydraulic oils, and diesel to run. There is always a chance of these breaking down and/or leaking;
- Contamination of stormwater runoff and ground water, caused by chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from heavy vehicles and machinery and fuel storage area.

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- Visual impacts: Visibility from sensitive receptors / visual scarring of the landscape as a result of the prospecting activities.
- Nuisance and health risks caused by an increase in the ambient noise level as a result of noise and vibration impacts associated with the operation of vehicles, machinery and equipment.
- Increased dust pollution due to vegetation clearance and vehicles driving on gravel roads and drilling.
- Gaseous emissions from vehicles and machinery may cause an impact on ambient air quality.
- Generation of additional general waste, litter and building rubble and hazardous waste.
- Minor impact caused by need for services i.e. water, electricity and sewerage systems during the prospecting phase causing additional strain on natural resources and service infrastructure.
- Minor change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic.
- Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, and heavy vehicles.
- Impact on future planned Road PWV7: Part of the future route traverses the applicant site.
- Possibility of prospecting activities and workers causing veld fires, which can potentially cause injury and or loss of life to workers and surrounding landowners, visitors and workers.
- Increased risk to public and worker safety: If not fenced off, the public and workers may fall into excavated areas and trenches.
- Potential creation of very limited extent short term employment opportunities for the local community, during the prospecting phase.
- Multiplier effects on local economy will be positive, but very limited in extent and only short term.

Mitigation measures are included in this report, as well as the EMPR.

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

From this previous research records conducted in the area, the specialist concluded that the general region is significant from a heritage perspective. Heritage sites are likely to include graveyards, Iron Age/Farmer and Historical remains. Since heritage sites, e.g. graves, are not always clearly

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identifiable as it might consist of stone cairns, it is advised that a qualified archaeologist inspect the proposed prospecting sites prior to drilling to establish whether the sites might be sensitive from a heritage perspective.


The following recommendations were made in terms of the National Heritage Resources Act (Act No. 25 of 1999) in order to avoid the destruction of heritage remains in areas demarcated for prospecting:

- Prior to any development, construction or prospecting, a qualified archaeologist should conduct a site inspection on the areas demarcated for geotechnical drilling/prospecting. Proposed access roads to the drill sites should also be surveyed in order to avoid the destruction of heritage material;
- Should the prospecting outcome result in further development or construction and mining, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered;
- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (see National Heritage Resources Act (Act No. 25 of 1999) Section 36 (6)).

16. Other matters required in terms of sections 24(4)(a) and (b) of the Act

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix 4).

The EAP included all aspects as required by the EIA regulations, 2014 for the EIA and EMPR as described in the Executive Summary of this report. Please refer to Part A Section 3 (g) .

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PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Draft environmental management programme

a) Details of the EAP

(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).

Herewith, it is confirmed that the requirement for the provision of the details and expertise of the EAP are already included in PART A, Section 1(a) of this report.

b) Description of the Aspects of the Activity

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1) (h) herein as required).

Herewith, it is confirmed that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1) (h) herein as required.

c) Composite Map


(Provide a map (Attached as an Appendix) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers).

Refer to Appendix 6.

d) Description of Impact management objectives including management statements

i) Determination of closure objectives

(Ensure that the closure objectives are informed by the type of environment described).

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The prospecting activities is dependent on the preceding phase (non-invasive).Prospecting is conducted in phases, where the activities and location of drilling and trenching to sample soil is dependent on the previous phase. Therefore, the specific locations and extent of soil sampling and diamond core drilling cannot be predetermined. Mapping of prospecting activities can also not be conducted.

The closure objectives include:


- Ensure that there are no safety risks associated with the drill boreholes through drill hole capping and backfilling;
- Rehabilitate any pollution that occurred through hazardous spills or waste materials and remove the source of the pollution;
- Establish an area that is not susceptible to soil erosion;
- Re-vegetate disturbed areas with endemic plant species that occur naturally within the area.

ii) **Volumes and rate of water use required for the operation**

The project will received water from water trucks that will transport the prospecting site. The water will be received from Rand Water supply. The small scale and the type of activity make the estimation of the amounts of water to be used imposable.

iii) **Has a water use licence been applied for?**

It is not required from the applicant to apply for a water use license, due to the low volume of water required for prospecting.

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iv) Impacts to be mitigated in their respective phases

e) Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			•		

Please refer to **Table 13** for the above requested information.

f) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ());

Table 13: Measures to rehabilitate the environment affected by the undertaking of any listed activity, impact management outcomes, and impact management actions for

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
<ul style="list-style-type: none"> Clearing of vegetation and topsoil. Stockpiling of overburden positioned for later rehabilitation. 	<p>Minor loss and disturbance to topsoil as a result of clearing of vegetation and drilling and trenching.</p> <p>When vegetation is cleared and the topsoil is stripped, the soils natural structure is disturbed and as a result the natural cycle is broken exposing the bare soil to erosion.</p>	<p>Prevent and reduce through management measures.</p> <p>Stripping of topsoil:</p> <ul style="list-style-type: none"> Clearing of areas to take place a maximum of one month prior to intended prospecting in the area; Stripping of topsoil will not take place during rain or excessive wind; and 	<p>Impact avoided. All topsoil used in concurrent rehabilitation.</p> <p>Rehabilitation objectives and standards</p>	<p>Rehabilitation objectives and standards</p>	<p>Prospecting Invasive Phase</p>

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
<ul style="list-style-type: none"> Prospecting including diamond core drilling, logging and sampling of the borehole core, trenching will involve the digging of excavation trenches down to approximately 3 metres below surface using graders and excavators. Dust Suppression. 	<p>Vehicles driving on these soils causes compaction of soils and reduces the soils ability to be penetrated by root growth. Compaction also increases erosion potential.</p> <p>When soils are not stripped and stockpiled according to the soil stripping guidelines these soils would have lost their natural physical and chemical properties, reducing the topsoil's ability to be a plant growth medium.</p> <p>The above factors all contribute to a loss of the topsoil's ability to be a resource through alterations and removal.</p>	<ul style="list-style-type: none"> The top 30 cm of vegetation and topsoil is to be stripped from the area to be prospected. <p>Storage of topsoil / overburden:</p> <ul style="list-style-type: none"> Topsoil (top 30cm) is to be stored in predetermined topsoil berms, (+/- 5m) outside the boundary of the specific area; and Topsoil stockpiles will be restricted to 1.5 to 2m in height. <p>Maintenance and monitoring of topsoil stockpiles:</p> <ul style="list-style-type: none"> The stored topsoil should be used as soon as possible in concurrent rehabilitation; Weekly visual inspections to be conducted. 			
	<p>Hydrocarbon spills on soil can occur where heavy machinery and vehicles are parked such as the hard park area because they contain large volumes of lubricating oils, hydraulic oils, and diesel to run. There is always a chance of these breaking down and/or leaking.</p>	<p>Prevent and reduce and remedy through management measures.</p> <ul style="list-style-type: none"> All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; All leaks will be cleaned up immediately using an absorbent material and spill kits, in the prescribed manner; and The approved Integrated Water and Waste Management Plan to be implemented. <p><u>Hydrocarbons and hazardous waste</u></p> <ul style="list-style-type: none"> All hazardous waste generated shall be kept separate and shall not be mixed with general waste; and All hazardous waste shall be stored within a sealed drum on an impermeable surfaced area 	<p>Impact avoided. No signs of soil contamination and loss of topsoil due to contamination.</p> <p>Meet rehabilitation objectives and standards.</p>	<p>Rehabilitation objectives and standards</p> <p>Spill procedure</p> <p>Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended]</p> <ul style="list-style-type: none"> Section 2 Declaration of grouped hazardous substances; Section 9 (1) 	<p>Prospecting Invasive Phase</p>

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		within the central waste storage and transition area.		Storage and handling of hazardous chemical substances - Section 18 Offences Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995) - Section 4 Duties of persons who may be exposed to hazardous chemical substances SANS 10234: 2008: Globally Harmonized System of classification and labelling of • chemicals (GHS)	
	Stormwater, erosion and siltation impacts due to a lack of implementing temporary measures to manage stormwater run-off quantity and quality.	Prevent and reduce and remedy through management measures. <ul style="list-style-type: none"> A Stormwater Management Plan (SMP) to be developed for the collective area where prospecting will occur, (or the existing SMP 	Impact avoided. No signs of soil contamination and loss of topsoil due to contamination.	Rehabilitation objectives and standards Spill procedure	Prospecting Invasive Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<p>updated, where applicable for present and future activities) and should include the management of stormwater during excavation, as well as the installation of temporary stormwater and erosion control measures during prospecting, followed up by rehabilitation of the area;</p> <ul style="list-style-type: none"> • Temporary stormwater management systems (such as sand bags) will be installed to prevent stormwater from entering or exiting the area where prospecting will occur, which could result in silt laden surface water from draining into the valley south of the Magaliesberg (the origin of the Swartspuit is in close proximity); • The slopes of the area where prospecting activities will occur, should be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scrub (hydrologic action by water that causes erosion). A maximum gradient of 1:3 is recommended; • If necessary, temporary diversion channels should be constructed ahead of the stockpiles (if relevant) to intercept clean run-off and divert it around disturbed areas into the natural drainage system downstream (down gradient) of the prospecting area; • Existing vegetation must be retained as far as possible to minimise erosion problems; • Rehabilitation of the prospecting area shall be planned and completed (after conclusion of the prospecting activities) in such a way that the run-off water (if any) will not cause erosion; • Visual inspections shall be done on a weekly basis with regard to the stability of the temporary 	<p>Meet rehabilitation objectives and standards.</p>	<p>GN704 Regulations in terms of the National Water Act, 1998 (Act No 36 of 1998)</p> <p>Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended]</p> <ul style="list-style-type: none"> • Section 2 Declaration of grouped hazardous substances; - Section 9 (1) Storage and handling of hazardous chemical substances - Section 18 Offences <p>Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995)</p> <ul style="list-style-type: none"> - Section 4 	

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<p>water control structures, erosion and siltation (if required).</p> <ul style="list-style-type: none"> • Sediment-laden run-off from cleared areas should be prevented from entering rivers and streams; • No river or surface water may be affected by silt emanating from the prospecting area (especially aimed at prevention of siltation of the nearby Swartspruit); and • No wastewater may run freely into any of the surrounding naturally vegetated areas. 		<p>Duties of persons who may be exposed to hazardous chemical substances</p> <p>SANS 10234: 2008: Globally Harmonized System of classification and labelling of</p> <ul style="list-style-type: none"> • chemicals (GHS) 	
	<p>Contamination of stormwater runoff and ground water, caused by chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from heavy vehicles and machinery and fuel storage area.</p>	<p>Prevent and reduce through management measures.</p> <p>In accordance with Government Notice 704 (GN 704), the onsite management should:</p> <ul style="list-style-type: none"> • Keep clean and dirty water separated; • Contain any dirty water within a system; and • Prevent the contamination of clean water. <p>In order to achieve these objectives, the following stormwater management measures must be implemented on the site to ensure that that potential stormwater impacts are kept to a minimum:</p> <ul style="list-style-type: none"> • Clean and dirty stormwater needs to be separated. Dirty stormwater may not be released into the environment and should be contained and treated on site; • All temporary storm water infrastructure (if any) on-site shall be maintained and kept clean throughout the prospecting period; 	<p>Impact avoided. No signs of soil contamination and loss of topsoil due to contamination.</p> <p>Meet rehabilitation objectives and standards.</p>	<p>Rehabilitation objectives and standards</p> <p>Spill procedure GN704</p> <p>Regulations in terms of the National Water Act, 1998 (Act No 36 of 1998)</p> <p>Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended]</p> <ul style="list-style-type: none"> • Section 2 Declaration of grouped 	<p>Prospecting Invasive Phase</p>

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<ul style="list-style-type: none"> • Immediate reporting of any polluting or potentially polluting incidents so that appropriate measures can be implemented; • Fuel and oil spills shall be treated immediately by appropriate mop-up products. Several hydrocarbon absorption/remediation products (i.e. Spill kits) must be placed throughout the site; • Use of bunds or traps to ensure full containment of hydrocarbon and other hazardous materials are mandatory; • Any contaminated material is disposed of in an appropriate manner and the potential risks associated with such spills are limited; • Stormwater leaving the site must in no way be contaminated; • Ensure good housekeeping practices; • Increased runoff should be managed using berms and other suitable structures as required to ensure flow velocities are reduced; and • Removal of spills, rainwater and waste produced during clean-up of the bunds – shall be done in accordance to relevant specifications. 		<p>hazardous substances;</p> <ul style="list-style-type: none"> - Section 9 (1) Storage and handling of hazardous chemical substances - Section 18 Offences <p>Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995)</p> <ul style="list-style-type: none"> - Section 4 Duties of persons who may be exposed to hazardous chemical substances <p>SANS 10234: 2008: Globally Harmonized System of classification and labelling of</p> <ul style="list-style-type: none"> • chemicals (GHS) 	

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	<p>Minor loss of natural vegetation and destruction of habitat will result in associated loss of fauna and flora species.</p>	<p>Reduce through management measures.</p> <ul style="list-style-type: none"> • A suitably qualified specialist (ecologist) to accompany the site manager to demarcate areas for prospecting, in order to avoid damaging sensitive vegetation as identified during the specialist study and according to the sensitivity maps provided in this report; • Only vegetation falling directly into demarcated access routes or project sites should be removed; • No further vegetation clearance except for the removal of alien invasive species will be allowed; and • All remaining indigenous vegetation should be conserved wherever possible. 	<p>Meet rehabilitation objectives and standards.</p> <p>Alien and invasive vegetation management plan implemented and outcomes achieved.</p>	<p>Meet rehabilitation objectives and standards.</p> <p>Alien and invasive vegetation management plan implemented and outcomes achieved.</p>	<p>Prospecting Invasive Phase</p>
	<p>Disruption in the movement patterns of fauna species may impact on biodiversity.</p> <p>Noise, dust and potential light pollution, as well as migration of pollutants such as hydrocarbons in the soils, dust and emissions from vehicle and machinery altering air quality will all have an impact on biodiversity.</p>	<p>Prevent and reduce through management measures.</p> <ul style="list-style-type: none"> • Reduce the levels of disturbance on areas indicated by the Environmental Control Officer (ECO) as migratory routes, if any; • Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed; • Any animals rescued or recovered will be relocated in a suitable habitat away from the mining operations and associated infrastructure; • Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance. • No reptile should be intentionally killed, caught or collected during any phase of the project; and • General avoidance of snakes is the best policy if encountered. Snakes should not be 	<p>NEMBA: National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</p>	<p>NEMBA: National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</p>	<p>Prospecting Invasive Phase</p>

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	<p>Introduction and spread of alien invasive species.</p> <p>The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in construction materials and on vehicles. Invasion of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse through stormwater, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system, alien plants can spread throughout the catchment. If allowed to seed before control measures are implemented, alien plants can easily colonise and impact on downstream users.</p>	<p>intentionally harmed or killed and allowed free movement away from the area.</p> <p>Prevent and control through management measures.</p> <ul style="list-style-type: none"> • An alien vegetation management plan should be drawn up and implemented; • Regular removal of invasive alien species should be undertaken. This should extend through to the closure phase of the project; and • No spreading of alien vegetation onto adjacent properties should be allowed. 	<p>Rehabilitation Objectives and Standards</p> <p>Alien and invasive vegetation management plan implemented and outcomes achieved.</p> <p>Proof of alien vegetation control. No listed species visible on the site.</p>	<p>Alien and Invasive Species Management Plan Rehabilitation Objectives and Standards</p> <p>Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2014 in terms of NEMBA (Government Notice 599 of 2014)</p> <ul style="list-style-type: none"> - Notice 2 Exempted Alien Species in terms of Section 66 (1) - Notice 3 National Lists of Invasive Species in terms of Section 70(1) – List 1, 3-9 & 11 - Notice 4 	<p>Prospecting Invasive Phase</p>

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
				<ul style="list-style-type: none"> Prohibited Alien Species in terms of Section 67 (1) – List 1, 3-7, 9-10 & 12 	
	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks and drilling.	<p>Protect heritage resources through developing and implementing procedures.</p> <ul style="list-style-type: none"> Prior to any development, construction or prospecting, a qualified archaeologist should conduct a site inspection on the areas demarcated for geotechnical drilling/prospecting. Proposed access roads to the drill sites should also be surveyed in order to avoid the destruction of heritage material; Should the prospecting outcome result in further development or construction and mining, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered; Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (see National Heritage Resources Act (Act No. 25 of 1999) Section 36 (6)). Should culturally significant material or skeletal remains be exposed during prospecting all activities must be 	No loss of newly discovered material.	<p>National Heritage Resources Act, 1999 (Act No. 25 of 1999) and associated regulations.</p> <ul style="list-style-type: none"> South African Heritage Resources Agency Guidelines. 	Prospecting Invasive Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<p>suspended pending further investigation by a qualified archaeologist (Refer to the National Heritage and Resources Act, 25 of 1999 section 36 (6));</p> <ul style="list-style-type: none"> • Should any objects of archaeological or palaeontological remains be found during activities, work must immediately stop in that area and the Environmental Control Officer (ECO) must be informed; • The ECO must inform SAHRA and contact an archaeologist and / or palaeontologist, depending on the nature of the find, to assess the importance and rescue them if necessary (with the relevant SAHRA permit). No work may be resumed in this area without the permission of the ECO and SAHRA. 			
	<p>Visibility from sensitive receptors / visual scarring of the landscape as a result of the prospecting activities.</p>	<p>Reduce through controlling management measures.</p> <ul style="list-style-type: none"> • Unnecessary lights should be switched off during the day and / or night to avoid light pollution; • If lighting is required, the lighting will be located in such a place and such a manner so as to minimise any impact on the surrounding community and fauna; • Install temporary lights that will not create a night sky glow; • Security lighting should be designed in such a way as to minimise emissions onto undisturbed areas on site and neighbouring properties. Light fittings should face downwards; • Housekeeping on site should be enforced; • Rehabilitation measures such as re-vegetation and plan to be implemented; 	<p>Rehabilitation objectives and standards</p>	<ul style="list-style-type: none"> • Rehabilitation objectives and standards 	<p>Prospecting Invasive Phase</p>

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<ul style="list-style-type: none"> • Reduce the prospecting period through careful planning and productive implementation of resources; • Plan the placement of lay-down areas and any potential temporary prospecting camps in order to minimise vegetation clearing; • Restrict the activities and movement of workers and vehicles to the immediate prospecting site and existing access roads; • Ensure that rubble, litter and issued materials are managed and removed regularly; • Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way; and • Reduce and control dust through the use of approved dust suppression techniques. 			
	<p>Nuisance and health risks caused by an increase in the ambient noise level as a result of noise and vibration impacts associated with the operation of vehicles, machinery and equipment.</p>	<p>Reduce through controlling measures.</p> <ul style="list-style-type: none"> • Vehicles and machinery will be regularly serviced to ensure acceptable noise levels are not exceeded; • Silencers will be utilised where possible; • Heavy vehicle traffic should be routed away from noise sensitive areas where possible; • Noise levels should be kept within acceptable limits. All noise and sounds generated should adhere to South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies; • With regard to unavoidable very noisy activities in the vicinity of noise sensitive areas, the Site Manager (SM) should liaise with local residents and a suitably qualified ecologist and how best 	<p>Impact reduced.</p> <p>Records of service of all operational vehicles.</p> <p>Silencers utilised where applicable.</p> <p>All employees wears PPE where required.</p>	<p>Meet the South African National Standard SANS 10103:2008</p> <p>Meet South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites.</p> <ul style="list-style-type: none"> • Meet the requirements of the Mine Health and Safety Act 	<p>Prospecting Invasive Phase</p>

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<p>to minimise impacts, and the local population should be kept informed of the nature and duration of intended activities;</p> <ul style="list-style-type: none"> • The SM should take measures to discourage labourers from loitering in the area, causing noise disturbance; • Noise impacts should be minimised by restricting the hours (between 06h00 and 18h00 on Monday to Friday, and 06h00 and 13h00 on Saturdays), during which the offending activities are carried out and, where possible, by insulating machinery and/or enclosing areas of activity; • No noisy activities to occur on Sundays or public holidays; • Personal Protective Equipment to all persons working in areas where high levels of noise can be expected; Signs where it is compulsory; • Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise. 		(Act 29 of 1996)	
	Increased dust pollution due to vegetation clearance and vehicles driving on gravel roads and drilling.	<p>Reduce through controlling measures.</p> <ul style="list-style-type: none"> • Dust suppression shall be implemented during dry periods and windy conditions; • All exposed surfaces should be minimised in terms of duration of exposure to wind and stormwater; • Excavation, handling and transportation of erodible materials shall be avoided under high wind conditions (excess of 35km/hr) or when a visible dust plume is present; • Ensure that the shortest routes are used for material transport; 	<p>Impact reduced.</p> <p>Speed limit roads signs, complying with the South African Road Signs Manual on site.</p> <p>Dust fall monitoring programme</p>	<p>South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution</p> <p>Meet the requirements of the National Dust Control regulations, 2013, as published in</p>	Prospecting Invasive Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<ul style="list-style-type: none"> • Ensure that stockpile height is kept to a minimum; • Minimise travel speed on unpaved roads; • Implement and actively monitor dust fallout generated in the 8 major wind directions on the borders of the site; • Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed; • Spray areas to be cleared with water; • Ensure minimum travel distance between working areas and stockpiles; • Ensure that topsoil for stockpiles is sprayed with water before tipping to prevent dust generation; • Ensure graded areas are sprayed with water; • Minimise the amount of graded areas; • Ensure that shortest routes is used for material transport; • Load and offload material, as far as possible, downwind of topsoil stockpiles. 	<p>should be implemented.</p> <p>Dust fallout and Particulate Matter (PM) levels may not exceed the limits as set out in the Dust Control Regulations above.</p> <p>Monitoring dust stands occurring on site.</p>	<p>the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in terms of the National Environmental Management: Air Quality Act 39 of 2004</p> <ul style="list-style-type: none"> • 	
	Gaseous emissions from vehicles and machinery may cause an impact on ambient air quality.	<ul style="list-style-type: none"> • All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; • Proper planning of movements (vehicle trips) and working of machinery should take place, in order to avoid unnecessary trips and hours of operation. 	Rehabilitation objectives and standards	<ul style="list-style-type: none"> • Rehabilitation objectives and standards 	Prospecting Invasive Phase
	Generation of additional general waste, litter and building rubble and hazardous waste.	<p>Control through management measures.</p> <ul style="list-style-type: none"> • A central waste storage and transition area shall be established within the site camp; • The central waste storage and transition area shall be surfaced and demarcated appropriately; • Portable wheelie bins shall be placed throughout the site camp as well as at the 	Waste management on site visible.	<p>Waste management on site visible.</p> <p>Waste Classification and Management Regulations and</p>	Prospecting Invasive Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<p>remainder of the site and at all working areas in the field;</p> <ul style="list-style-type: none"> • Wheelie bins shall be colour coded and labelled to identify the waste stream for which it is intended; • All portable wheelie bins and other containers shall be emptied at the central waste storage and transition area a minimum of once a week or when filled, as to avoid waste build up; • The waste shall be removed (within 30 days) by a licensed waste service provider as shall be disposed of at a licensed waste landfill site and records of safe disposal (as required for hazardous wastes) shall be supplied to the Contractor. These records shall be kept on site by the ESM; • Wherever possible and practical, waste materials generated on site must be recycled; and • Waste specific (hazardous, timber, steel etc.) mitigation measures to be implemented. 		<p>Norms and Standards for the assessment of for landfill disposal and for disposal of waste to landfill, 2013 (Government Notice 634 – 635 of 2013) promulgated in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended] and:</p> <p>Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation (GN R. 632 of 2015)</p>	

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
				SANS 10234: 2008: Globally Harmonized System of classification and labelling of <ul style="list-style-type: none"> chemicals (GHS) 	
	Minor impact caused by need for services i.e. water, electricity and sewerage systems during the prospecting phase causing additional strain on natural resources and service infrastructure.	Reduce through controlling management measures. <ul style="list-style-type: none"> Energy savings measures to be implemented at the site e.g.: <ul style="list-style-type: none"> No lights to be switched on unnecessarily; Only security lights to be switched on at night; Energy saving bulbs to be installed; and Water should be recycled as far as possible to avoid any additional water usage. 	Impact avoided. Recycling of used and contaminated water through waste water and sewage treatment and reuse.	<ul style="list-style-type: none"> - 	Prospecting Invasive Phase
	Minor change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic.	Reduce through controlling management measures. <ul style="list-style-type: none"> Where feasible heavy vehicles should not operate on public roads during peak hours; and Heavy vehicles should adhere to the speed limit of the road. 	Impact reduced. Speed limit roads signs, complying with the South African Road Signs Manual on site.	Reduce through controlling measures <ul style="list-style-type: none"> Set Speed Limits South African Road Signs Manual 	Prospecting Invasive Phase
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, and heavy vehicles.	Prevent through controlling management measures. <ul style="list-style-type: none"> Drivers will be enforced to keep to set speed limits; Trucks will be in a road-worthy condition; Roads and intersections will be signposted clearly. Only main roads should be used; 	Impact reduced. Speed limit roads signs, complying with the South African Road Signs Manual on site.	Reduce through controlling measures <ul style="list-style-type: none"> Set Speed Limits 	Prospecting Invasive Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<ul style="list-style-type: none"> • Where feasible vehicles should not operate on public roads during peak hours; • Vehicles should adhere to the speed limit of the road; • Heavy vehicles should always travel with their head lights switched on; • Heavy vehicles should not stop on the road to pick up hitchhikers – No stopping on the road approaching the site will be allowed; • Single directional traffic shall be controlled through a stop-go system or any other appropriate traffic control method; • Klei Minerale (Pty) Ltd shall be responsible for ensuring that suitable access is maintained for public traffic to all relevant businesses and properties; and • All traffic accommodation measures are to conform to the latest edition of the South African Road Signs Manual. 	<p>South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution</p> <p>Meet the requirements of the National Dust Control regulations, 2013, as published in the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in terms of the National Environmental Management: Air Quality Act 39 of 2004</p> <p>Dust fall monitoring programme should be implemented.</p> <p>Dust fallout and Particulate Matter (PM) levels may</p>	<p>South African Road Signs Manual</p> <p>South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution</p> <p>National Dust Control regulations, 2013, as published in the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in terms of the National Environmental Management: Air Quality Act 39 of 2004</p> <p>Approved dust fall monitoring programme</p>	

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
			not exceed the limits as set out in the Dust Control Regulations above. Monitoring dust stands occurring on site.		
	Impact on future planned Road PWV7: Part of the future route traverses the applicant site.	<ul style="list-style-type: none"> The Gauteng Strategic Transportation Network namely, provincial Road(s): PWV7, K16 and K67 may be affected and as such, when an application for a change of land use, is lodged with the relevant authority, the said application must be lodged with the Gauteng Department of Roads and Transport; An application must be submitted to the Department for a way leave if any part of a proposed service falls within 95,0 m (measured from the centreline of any of the Department's existing or future road(s)/railway line or within a 500,0 m radius of any intersection on said road(s)/railway line; Where mining operations are to be undertaken, Section 49 of the Gauteng Transport Infrastructure Act, 2001 (Act No 8 of 2001) shall apply. 	<ul style="list-style-type: none"> Approval obtained from GDRT to continue Mining. 	<ul style="list-style-type: none"> Gauteng Transport Infrastructure Act, 2001 (Act No. 8 of 2001) [as amended]; 	Prospecting Invasive Phase
	Possibility of prospecting activities and workers causing veld fires, which can potentially cause injury and or loss of life to workers and surrounding landowners, visitors and workers.	<p>Prevent through controlling management measures.</p> <ul style="list-style-type: none"> All workers will be sensitised to the risk of fire; Smoking is only allowed in designated smoking areas and disposal of cigarette butts safely in sand buckets; The Applicant shall ensure that the basic fire-fighting equipment is available on the site; 	Mine Health and Safety Act (Act 29 of 1996) An Emergency Plan (including Fire Protection, Response and Evacuation Plan)	Impact avoided. No incidents of fires occurring on site. No one smoking in unauthorised areas.	Prospecting Invasive Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<ul style="list-style-type: none"> • Extinguishers should be located outside hazardous materials and chemicals storage containers; • Fire response and evacuation: <ul style="list-style-type: none"> ➢ An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the Applicant and conveyed to all staff on the site; ➢ Identify major risks to minimise the environmental impacts e.g., air pollution and contaminated effluent runoff. 	<p>Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) [as amended] - Section 12 (1)</p> <p>Duty of the landowner to prevent fire from spreading to neighbouring properties.</p>	<p>Proof / records of training in terms of the risk of fire and of the emergency management plan.</p> <ul style="list-style-type: none"> • Basic fire-fighting equipment located in the correct locations on site. 	
	<p>Increased risk to public and worker safety: If not fenced off, the public and workers may fall into excavated areas and trenches.</p>	<ul style="list-style-type: none"> • A health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996) should be drawn up and implemented to ensure worker safety; • A health and safety control officer should monitor the implementation of the health and safety plan for the operational phase; • Regular health and safety audits should be conducted and documented; and a record of health and safety incidents should be kept on site and made available for inspection; • Any health and safety incidents should be reported to the Site Manager (SM) immediately; • First aid facilities should be available on site at all times; • Workers have the right to refuse work in unsafe conditions; • Material stockpiles or stacks should be stable and well secured to avoid collapse and possible injury to site workers. 	<p>Mine Health and Safety Plan available on site and proof that it is being implemented.</p> <p>Proof of training in awareness of health and safety procedures.</p> <p>Proof / records of health and safety audits available on request.</p> <p>No health and safety incidents reported.</p>	<p>Health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996)</p> <ul style="list-style-type: none"> • 	<p>Prospecting Invasive Phase</p>

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		<ul style="list-style-type: none"> • Access to excavation must be controlled; • Excavated areas should be temporarily fenced-off; and • Excavations will be backfilled and landscaped as soon as possible. 	<p>Proof / record of stockpile and stacks inspections taking place.</p> <p>Health and safety signs on site at appropriate locations.</p>		
	Potential creation of very limited extent short term employment opportunities for the local community, during the prospecting phase.	Local labour to be sourced where possible.	-	•	Prospecting Invasive Phase
	Multiplier effects on local economy will be positive, but very limited in extent and only short term.	Supplies to be bought locally as far as possible.	-	•	Prospecting Invasive Phase

g) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved)

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS

Please refer to **Table 13** for the above requested information.

i) Financial Provision

(1) Determination of the amount of Financial Provision

(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation

The closure objectives include:

- Ensure that there are no safety risks associated with the drill boreholes through drill hole capping and backfilling;
- Rehabilitate any pollution that occurred through hazardous spills or waste materials and remove the source of the pollution;
- Establish an area that is not susceptible to soil erosion;
- Re-vegetate disturbed areas with endemic plant species that occur naturally within the area.


(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

This Basic Assessment Report and Environmental Management Programme will be subjected to a public consultation period, whereby I&APs are given 30 days to comment.

(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure

The prospecting activities are dependent on the preceding phase (non-invasive). Prospecting is conducted in phases, where the activities and location of drilling and trenching to sample soil is dependent on the previous phase. Therefore, the specific locations and extent of soil sampling and diamond core drilling cannot be predetermined. Mapping of prospecting activities can also not be conducted.

Due to the small extent and fairly short term period of the prospecting activities and as shown in the Environmental Impact Assessment, the impacts will be of a low or very low significance. Rehabilitation will be conducted concurrently and will include borehole capping and re-vegetation.

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(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives

Due to the small extent and fairly short term period of the prospecting activities and as shown in the Environmental Impact Assessment, the impacts will be of a low or very low significance. Rehabilitation will be conducted concurrently and will include borehole capping and re-vegetation. Detailed mitigation measures are provided in the EMPR to ensure the closure objectives are met.


(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline

The closure cost assessment will be conducted, if required. The report will be submitted to the Department of Mineral Resources together with the Final Basic Impact Assessment report, if required.

(f) Confirm that the financial provision will be provided as determined.

The financial provision will be provided as determined.

The applicant submits that it is an operating clay mining company and is able to fund the planned prospecting from its operational budget. It is confirmed that the amount for financial provision is anticipated to be an operating cost and is provided for as such in the Prospecting Work Programme.

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Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

- h) Monitoring of Impact Management Actions**
- i) Monitoring and reporting frequency**
- j) Responsible persons**
- k) Time period for implementing impact management actions**
- l) Mechanism for monitoring compliance**

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
PROSPECTING PHASE				
<ul style="list-style-type: none"> • Clearing of vegetation and topsoil. • Stockpiling of overburden positioned for later rehabilitation. • Prospecting including diamond core drilling, logging and sampling of the borehole core, trenching will involve the digging of excavation trenches down to approximately 3 metres below surface 	Surface Water	<ul style="list-style-type: none"> • A Stormwater Management Plan (SMP) to be developed for the collective area where prospecting will occur, (or the existing SMP updated, where applicable for present and future activities) and should include the management of stormwater during excavation, as well as the installation of temporary stormwater and erosion control measures during prospecting, followed up by rehabilitation of the area. This Stormwater Management Plan to be monitored for implementation; • Visual inspections shall be done on a weekly basis with regard to the stability of the temporary water control structures, erosion and siltation. 	Applicant Engineer	After rain / storm events; and Weekly

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
using graders and excavators. • Dust Suppression.	Dust and air quality pollution	<p>Dust shall be controlled in accordance with the requirements of the National Dust Control Regulations (GN 827, November 2013). This shall include compliance with regards to: A: Dust fall out standards- (b) 1200 mg/m²/day averaged over 30 days in areas other than residential and light commercial areas measured using reference method ASTM 01739.</p> <ul style="list-style-type: none"> • A Gravimetric Dust Monitoring program must be implemented on the site as stipulated in section 4 of GN 827 – National Dust Control Regulations, in terms of section 53(o), read with section 32 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004). • A minimum of eight dust buckets must be erected around the site in the eight main wind directions. <p>Monthly air quality report will be required as per the regulations to:</p> <ul style="list-style-type: none"> • Ensure that the environmental mitigation and control measures are implemented; • Monitor environmental performance of the mining operations; 	Applicant Environmental Specialist	Monthly

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> • Tracking of progress due to pollution control measure implementation; • Verify compliance with all relevant legal and statutory requirements; • Promote environmental education and protection; and • Determine sources of significant pollution. 		
	Spreading of alien invasive vegetation and impacts on habitat and vegetation.	<p>Specialist monitoring on Faunal and Floral aspects include the monitoring of effects operational processes have on vegetation and accompanied animal life within the immediate or surrounding areas of the operations.</p> <ul style="list-style-type: none"> • Alien vegetation control and management; • Habitat and vegetation management; • Rehabilitation services include the rehabilitation of operational disturbed areas and hydrocarbon spill areas; • Sloping and re-vegetation of disturbed area to surrounding landscape; and • Remediation of soil at spill sites. 	Environmental Specialist	Visual inspections during all phases of the activities.

m) Indicate the frequency of the submission of the performance assessment/ environmental audit report.

A Performance Assessment Review of the EMPR should be conducted annually and the environmental audit report will be submitted annually.

n) Environmental Awareness Plan


(1) Manner in which the applicant intends to inform his or her employees of any the environmental risk which may result from their work

The environmental awareness plan will include the following:

- Induction of all staff and workers;
- Monthly 'toolbox' talks (awareness talks);
- Risk assessments for specific tasks with supervisors and staff involved in the task on a daily basis, or as often as the task is taking place.

The following principles and training will apply to the Environmental Awareness Plan (safety, health and environmental (SHE) training and the Environmental Management System (EMS) training):

- All personnel, including contactors will as a minimum undergo general SHE induction and awareness training;
- The Safety, Health, Environmental and Quality (SHEQ) Manager will identify the SHE training requirements for all personnel and contractors. The training requirements will be recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and contractors. The training matrix will be administered by the Training Department; and Development of the Training Programme, which will include:
 - Job specific training – training for personnel performing tasks which could cause potentially significant environmental impacts;
 - Assessment of extent to which personnel are equipped to manage environmental impacts;
 - Basic environmental training;
 - EMS training;
 - Comprehensive training – on emergency response, spill management, etc;
 - Specialised skills;
 - Training verification and record keeping; and

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- Periodic re-assessment of training needs, with specific reference to new developments, newly identified issues and impacts and associated mitigation measures.

General Awareness Training


- The HR Manager, together with the SHEQ Manager, will be responsible for the development of, or facilitating the development of, the required general SHE induction and awareness training. A general environmental awareness training module will be developed and integrated into the general induction programme. The general awareness training must include the Environmental Policy, a description of the environmental impacts and aspects and the importance of conformance to requirements, general responsibilities of personnel and contractors with regard to the environmental requirements and a review of the emergency procedures and corrective actions; and
- A Training Practitioner will conduct the general awareness training. The training presenter will keep a record of the details of all persons attending general awareness training. Such attendance registers shall indicate the names of attendants and their organisations, the date and the type of training received.

Specific Environmental Training

- Specific environmental training will be in line with the requirements identified in the training matrix; and
- Personnel whose work tasks can impact on the environment will be made aware of the requirements of appropriate procedures/work instructions. The SHEQ Manager will communicate training requirements to responsible supervisors to ensure that personnel and contractors are trained accordingly.

Training Evaluation and Re-training

- Effectiveness of the environmental training will be reflected by the degree of conformance to EMPR requirements, the result of internal audits and the general environmental performance achieved;
- Incidents and non-conformances will be assessed through the Internal Incident Investigation and Reporting System, to determine the root cause, including the possible lack of awareness/training;
- Should it be evident that re-training is required, the SHEQ Manager will inform the managers of the need and take the appropriate actions;
- General awareness training of all personnel shall be repeated every year; and

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- The re-induction shall take into consideration changes made in the EMPR, changes in legislation, current levels of environmental performance and areas of improvement.

Emergency Procedures

- Emergency procedures, as relevant to this project, shall be implemented;
- The SHEQ Manager shall define emergency reporting procedures for the project;
- All personnel shall be made aware of emergency reporting procedures and their responsibilities;
- Any spills will be cleaned up immediately in accordance with relevant legislation; and
- Telephone numbers of emergency services, including the local firefighting service, shall be conspicuously displayed.

(2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

The procedure for dealing with environmental risk including the objectives, identification and calculation of environmental risks is described in the existing approved EMPR. A spill procedure should be developed and implemented by the applicant.

o) Specific information required by the Competent Authority


(Among others, confirm that the financial provision will be reviewed annually)

No specific information has been required by the Competent Authority at this point in time.

2) UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports
- b) the inclusion of comments and inputs from stakeholders and I&APs ;
- c) the inclusion of inputs and recommendations from the specialist reports where relevant; ; and
- d) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.


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Signature of the environmental assessment practitioner:


Name of company:

Date:

-END-

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Appendix 1 : The qualifications of the EAP

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herewith certifies that

Cornelius Johannes Retief

Registration number: 113960

is registered as a

Professional Natural 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 I of the Act)

Environmental Science

09 March 2016



09 March 2016

Pretoria

A handwritten signature in black ink, appearing to read 'Batha', written over a horizontal line.

President

A handwritten signature in black ink, written over a horizontal line.

Executive Director

SUID-AFRIKAANSE POLISIEDIENS
GARSFONTEIN
2014 -03- 0 8
CLIENT SERVICE CENTRE
SOUTH AFRICAN POLICE SERVICE

I CERTIFY THAT THIS DOCUMENT IS A TRUE REPRODUCTION (COPY) OF THE ORIGINAL DOCUMENT WHICH WAS PRESENTED TO ME FOR AUTHENTICATION. I FURTHER CERTIFY THAT, IF ANY CHANGES OR AMENDMENTS WERE MADE TO THE ORIGINAL DOCUMENT, I WILL BE SO ADVISED.
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UNISA
UNIVERSITY OF SOUTH AFRICA

Ons verklaar dat

Cornelius Johannes Retief

op 10 Mei 2005

by 'n kongregasie van die Universiteit

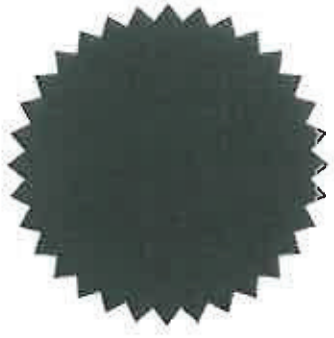
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BACCALAUREUS ARTIUM
met spesialisering in Omgewingsbestuur

*aangesien aan die Wet op Hoër Onderwys
en die Institusionele Statuus voldoen is*

Visekanselier

Registrateur (Akademies)



Uitvoerende Dekaan

SUID-AFRIKAANSE WETSTREK
GARSFONTEIN
2014-03-08
CLIENT SERVICE CENTRE
SOUTH AFRICAN POLICE SERVICE



UNISA
UNIVERSITY OF SOUTH AFRICA

Handwritten notes and stamps on the left side of the diploma, including a circular stamp and the name 'Cornelius Retief'.

We certify that

Cornelius Johannes Retief

having completed with the requirements of the Higher Education Act

and the Institutional Statute, was admitted to the degree of

HONOURS BACHELOR OF ARTS
in Geography

at a congregation of the University

on 5 June 2007


Vice-Chancellor

Executive Dean

University Registrar



Appendix 2 : EAP's curriculum vitae

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Environmental Assurance (Pty) Ltd

Employee Curriculum Vitae

CORRIE RETIEF
SENIOR ENVIRONMENTAL
CONSULTANT
 Environmental Assurance
 Environmental consulting

ENVIRONMENTAL ASSURANCE (PTY) LTD

394 Tram Street, New Muckleneuk, Pretoria, 0181

T : 012 460 9768 ; M : 082 852 2134; F : 012 460 3071 ; E mail : corrie@envass.co.za

Date of Birth : 24 August 1982; Place of Birth : South Africa

Ethnic Group and Gender : White Male ; Disabilities : None

AREAS OF EXPERTISE

- Basic Assessment Reports
- Mining Right Applications
- Public Participation Processes
- Sustainable Project Delivery
- Environmental Impact Assessments
- Waste License Applications
- Project Management
- Environmental Audit Reports
- Environmental Management Plans
- Report Writing

WORK EXPERIENCE AND SKILLS

Corrie Retief is an Environmental Scientist with more than 10 years of experience in applying the principles of Integrated Environmental Management, and in applying the Environmental Legislation to a number of development projects and initiatives in Southern Africa. He has co-ordinated and managed number of diverse projects and programs related to the Environment and Waste within both the public and private sectors and for national, multi-national and international companies. His interpersonal and organisational skills have enabled him to efficiently direct these projects from initiation to implementation. Furthermore his training in sustainability and sustainable project delivery has helped him to deliver profitable sustainability into customers operations throughout the asset lifecycle.

A significant element of public participation is required throughout the life cycle of an EIA process. Corrie has successfully liaised with interested and affected parties, ensuring that all communication procedures and dialogues are open and transparent, and that capacity building is conducted where necessary. His proficient report-writing skills have been utilised for the compilation of a wide variety of reports, which include but is not limited to Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports, Environmental Management Plans (Planning, Construction, Operation and Decommissioning), Environmental Audit Reports, Opportunities and Constraints Analyses, Feasibility studies, Waste License Applications, Water-Use Application Reports and Mining Right Applications.

CAREER HISTORY

Employer
 Period

ENVIRONMENTAL ASSURANCE (PTY) LTD

May 2015– Current



Environmental Assurance (Pty) Ltd

Employee Curriculum Vitae

Position Responsibilities

Senior Environmental Consultant

Responsible for the management of the environmental authorisations department. This include but is not limited to :

- Project management
- Financial management
- Business development
- Liaising with clients
- Liaising with relevant authorities
- Procurement and management of Sub-consultants
- Ensure Health and Safety Compliance of project teams
- Conducting Environmental risk assessments
- Environmental site screening, investigation and evaluations
- Environmental legal screenings
- Environmental feasibility studies
- Environmental impact assessments
- Basic assessments
- Environmental compliance auditing
- Compilation, implementation and monitoring of environmental management plans.
- Waste Management
- Waste Disposal site selection screenings
- Waste license applications
- Water-Use License Applications
- Mining Right applications
- Managing and facilitating public participation
- Sustainability and Sustainable project delivery
- Teams sustainability Software
- Virtual Mining Solutions

EDUCATION AND QUALIFICATIONS

University of South Africa, BA Hons Geography - 2007
University of South Africa, BA Environmental - 2005

PROFESSIONAL STATUS Registration Membership

SACNASP - Professional Natural Scientist



Environmental Assurance (Pty) Ltd

Employee Curriculum Vitae

CONTINUED PROFESSIONAL DEVELOPMENT

COURSE	INSTITUTION	COMPLETED
Integrated Waste Management (Awaiting Certificate)	Centre for Environmental Management, University of Potchefstroom	2017
Environmental Legal Update Training	MacRobert Attorneys	2017
Environmental Management	University of Pretoria	2014
SEAL Sustainable Design Lead Practitioner Course	Worley Parsons RSA	2013
Environmental Compliance	University of Pretoria	2013
ISO14001 Requirements	Training in Quality Management Systems	2009
ISO14001 Internal Auditor	Training in Quality Management Systems	2009

PROJECT EXPERIENCE

Project Name:	Afrisam Dudfield WULA Audit
Client	Afrisam
Project Summary:	Externa Water Use License Audit for the Dudfield Factory
Involvement:	2017 - 2017
Location:	Lichtenburg, Northwest Province, SA
Project Name:	Lomoteng Specialist Studies
Client	Lomoteng Mine
Project Summary:	Rehabilitation Strategy and Implementation Plan (RSIP) and Update of Integrated Waste and Water Management Plan (IWWMP).
Involvement:	2017- Current
Location:	Postmasburg, Northern Cape Province, SA
Project Name:	Evraz Vametco
Client	Evraz
Project Summary:	EMPr Performance Assessment for Evraz Vametco Mine
Involvement:	2017- 2017
Location:	Brits, Northwest Province, SA
Project Name:	Black Chrome Mine



Environmental Assurance (Pty) Ltd

Employee Curriculum Vitae

Client	Sail Minerals (Pty) Ltd
Project Summary:	EMPr Performance Assessment for Black Chrome Mine
Involvement:	2017- 2017
Location:	Burgersfort, Limpopo Province, SA
Project Name:	Eastplats Crocodile River Mine Tailings Storage Facility GN704 Audit
Client:	Barplats Limited
Project Summary:	GN704 Audit if the Crocodile River Mine Tailings Storage Facility
Involvement:	2016- 2016
Location:	Brits, Northwest Province, SA
Project Name:	Harmony Kusasalethu and Deelkraal Mines GN704 Audit
Client:	Harmony Gold
Project Summary:	GN704 Audit of the Kusasalethu and Deelkraal Mines
Involvement:	2016- 2016
Location:	Carletonville, Gauteng, Republic of SA
Project Name:	Amandelbult Mine Complex EMPr and ROD Audit
Client:	Anglo Platinum
Project Summary:	EMPr Performance assessment and ROD compliance audit of the Amandelbult mining complex
Involvement:	2016- 2016
Location:	Northam, Limpopo, SA
Project Name:	Union Mine EMPr Performance Assessment
Client:	Anglo Platinum
Project Summary:	EMPr Performance assessment Union Mine Complex
Involvement:	2016- 2016



Environmental Assurance (Pty) Ltd

Employee Curriculum Vitae

Location:	Northam, Limpopo, SA
Project Name: Consultant	Gautrain Independent Environmental
Client:	Bombela Concession Company
Project Summary:	Independent Environmental Consultant for the Gautrain Rapid Rail System
Role and Responsibilities:	Responsible monthly compliance audits and the annual yearly compliance audits.
Involvement:	2015- <u>Current</u>
Location:	Johannesburg/Pretoria, SA
Project Name: Assessment	Hudson Rubber Contaminated Land
Client:	Hudson Rubber
Project Summary:	Contaminated Land Assessment of Hudson Rubber Plant
Role and Responsibilities:	Contaminated Land Assessment and Overall Project Management
Involvement:	2016- 2016
Location:	Pretoria, Gauteng, SA
Project Name:	Paling Mine Waste Assessment
Client:	PMG (Pty) Ltd
Project Summary:	Waste Assessment for the proposed Paling Mine Waste Rock Dumps.
Role and Responsibilities:	Responsible for the Waste Assessment of waste rock samples
Involvement:	2016- 2016
Location:	Postmansburg, Northern Cape, SA
Project Name:	Paling Mine WULA
Client	PMG (Pty) Ltd
Project Summary:	Water use license application for the proposed Paling Mine.



Environmental Assurance (Pty) Ltd

Employee Curriculum Vitae

Role and Responsibilities:	Responsible for the water use license application and overall project management.
Involvement:	2015- 2017
Location:	Postmansburg, Northern Cape, SA
Project Name:	Eastplats Waste Classification
Client:	Eastern Platinum Limited
Project Summary:	Waste Classification of all waste facilities for the Zandfontein, Crocette and Maroelabuilt mine sections.
Role and Responsibilities:	Responsible for the waste classification and overall project management.
Involvement:	2015- 2015
Location:	Brits, Northwest Province, SA
Project Name:	Milsell Tailings Facility
Client:	SAMANCOR Chrome Limited
Project Summary:	EIA, waste license and water-use license for the expansion of the Millsell Tailings facility.
Role and Responsibilities:	Responsible for the overall project management.
Involvement:	2015- 2017t
Location :	Marikana, Northwest Province , SA
Project Name:	De Beers Voorspoed Diamond Mine
Client:	De Beers
Project Summary:	Internal ISO14001 Audit for the Voorspoed Diamond Mine.
Role and Responsibilities:	Co-Auditor for internal ISO14001 compliance audit.
Involvement:	2015-2015
Location:	Kroonstad, Free State Province , SA
Project Name:	Mamatwan EIA
Client:	ENRC Africa
Project Summary:	Environmental Impact Assessment for a new manganese mine section.



Environmental Assurance (Pty) Ltd

Employee Curriculum Vitae

Role and Responsibilities:	Responsible for the overall project management.
Involvement:	2015- <u>Current</u>
Location:	Near Hotazel, Gauteng, SA
Project Name:	Elansdrif WULA
Client:	SAMANCOR Chrome Limited
Project Summary:	Integrated water-use license for a new opencast mine section.
Role and Responsibilities:	Responsible for the overall project management.
Involvement:	2015- <u>Current</u>
Location:	Marikana, Northwest Province, SA
Project Name:	Kongoni WULA
Client:	ENRC Africa
Project Summary:	Integrated water-use license application for new proposed manganese mine.
Role and Responsibilities:	Responsible for the overall project management.
Involvement:	2015- <u>Current</u>
Location:	Near Hotazel, Northern Cape Province, SA
Project Name:	Lynca Meats EIA
Client:	Lynca Meats
Project Summary:	Environmental Impact Assessment for the expansion of abattoir facility.
Role and Responsibilities:	Responsible for the overall project management.
Involvement:	2015- 2016
Location:	Meyerton, Gauteng, SA
Project Name:	Blinkpan Audits
Client:	Makoya Group
Project Summary:	Quarterly legal and compliance audits for Highveld and Blinkpan coal sidings.
Role and Responsibilities:	Responsible for the quarterly environmental compliance audits.
Involvement:	2015- <u>Current</u>



Environmental Assurance (Pty) Ltd

Employee Curriculum Vitae

Location:	Near Hendrina, Mpumalanga, SA
Project Name:	Blinkpan Siding
Client	Makoya Group
Project Summary:	Basic Assessment and water-use licence for Coal Siding.
Role and Responsibilities:	Responsible for the overall project management.
Involvement:	2015- 2016
Location:	Near Hendrina, Mpumalanga , SA
Project Name:	Argent Siding
Client	Canyon Resources
Project Summary:	Basic Assessment and water-use license for a new proposed Coal Siding.
Role and Responsibilities:	Responsible for the overall project management.
Involvement:	2015- 2016
Location:	Delmas, Mpumalanga, SA
Project Name:	Eastplats WULA
Client:	Eastern Platinum Limited
Project Summary:	Integrated water-use licensing for the Zandfontein, Crocette and Maroelabuilt mine sections.
Role and Responsibilities:	Responsible for the overall project management.
Involvement:	2015- 2017
Location:	Brits, Northwest Province, SA

REFERENCES

CONTACT NAME	COMPANY	RELATIONSHIP	CONTACT NR
Christiaan Oosthuizen	Dr Ruth S Mompoti District Municipality	Client	072 119 1488 053 927 0260
Ina Botha	Naledi Local Municipality	Client	082 847 4575



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CERTIFICATION

I, **CORRIE RETIEF**

Declare that, to the best of my knowledge, all the information contained herein is true.

Signature: 

On the 09 day of July 2015.



APPENDIX A: Detailed Project Experience

PROJECT EXPERIENCE WITH WORLEYPARSONS RSA :

Project Name : **Uitvalfontein Landfill Audit**
Client : **Randfontein Local Municipality**
Project Summary : Compliance Audit of the Uitvalfontein landfill.
Role and Responsibilities : Responsible for the compliance audit.
Involvement : 2014- 2014
Location : Randfontein, Gauteng , Republic of South Africa

Project Name : **Luvuvu Letaba Water Scheme**
Client : **Department of Water Affairs**
Project Summary : Development of a Reconciliation Strategy for the Luvuvhu and Letaba Water Supply Systems.
Role and Responsibilities : Responsible for Environmental feasibility studies.
Involvement : 2014- 2015
Location : Limpopo, Republic of South Africa

Project Name : **Assmang Chrome Machadodorp**
Client : **Assmang Chrome**
Project Summary : ECO Audits for the Relocation of the Baghouse Dust Disposal Facility to the Existing Licensed slag disposal facility.
Role and Responsibilities : Responsible for the monthly environmental compliance audits for the construction.
Involvement : 2014- 2015
Location : Machadodorp, Mpumalanga, Republic of South Africa

Project Name : **Syferbult WULA**



Client : Rustenburg Local Municipality
Project Summary : Water-use License Application (WULA) for the construction of water supply network.
Role and Responsibilities : Responsible for the WULA application of the project.
Involvement : 2014 - 2015
Location : Rustenburg, Northewest, Republic of South Africa

Project Name : Zeekoegat Waste Water Treatment Construction Audit
Client : Bigen Africa
Project Summary : Construction compliance audits for the Zeekoegat phase 2 WWTW construction.
Role and Responsibilities : Responsible for the monthly environmental compliance audits for the construction phase.
Involvement : 2013 - 2015
Location : Pretoria, Gauteng, Republic of South Africa

Project Name : Basic Assessment Apex Benoni
Client : Halewood International South Africa (Pty) Ltd
Project Summary : Basic Assessment for the rezoning and establishment of additional parking.
Role and Responsibilities : Responsible for the Basic Assessment application of the project.
Involvement : 2014 - 2014
Location : Benoni, Gauteng, Republic of South Africa

Project Name : Water-use License SA Bank Note Company
Client : SA Bank Note
Project Summary : Water-use License Application for new stormwater culvert.
Role and Responsibilities : Responsible for the water-use application of the project.
Involvement : 2014 - 2015
Location : Pretoria, Gauteng, Republic of South Africa

Project Name : Basic Assessment Transnet Tug Jetty
Client : Transnet
Project Summary : Basic Assessment for the establishment of new Tug Jetty at Durban Harbour.
Role and Responsibilities : Responsible for the Basic Assessment application of the project.
Involvement : 2013 - 2015



Location : Durban, KZN, Republic of South Africa

Project Name : **Jupiter B Substation WULA**

Client : **Eskom**

Project Summary : Water-use License Application (WULA) for the construction of the Jupiter B Substation.

Role and Responsibilities : Responsible for the WULA application of the project.

Involvement : 2013 - 2014

Location : Johannesburg, Gauteng, Republic of South Africa

Project Name : **SWT Health Care Risk Waste Facility Audit**

Client : **Solid Waste Technologies (Pty) Ltd**

Project Summary : Compliance audit for the City Deep healthcare risk waste facility.

Role and Responsibilities : Responsible for the compliance audit.

Involvement : 2013 - 2014

Location : Johannesburg, Gauteng, Republic of South Africa

Project Name : **Environmental Management Plan (EMP) Update for Jupiter B Substation**

Client : **Eskom**

Project Summary : Update of the EMP for the construction of the Jupiter B Substation.

Role and Responsibilities : Responsible for the update and approval of the EMP for the project.

Involvement : 2013 - 2014

Location : Johannesburg, Gauteng, Republic of South Africa

Project Name : **Taung Road Upgrade**

Client : **Northwest Department Public Works, Roads and Transport**

Project Summary : Application for environmental authorisation for the Upgrade of the Road D221 from Road P25/1 Via Maphoitsile to end of Tar Magogong.

Role and Responsibilities : Compilation of detailed environmental management plan for the authorisation of the project.

Involvement : 2013 - 2014

Location : Taung, Northwest, Republic of South Africa

Project Name : **Goeboegoeboe Salt Mine**



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Client **Geoboegoeboe Salt Works**

Project Summary : Mining Right application for salt mining.
Role and Responsibilities : Responsible for the mining right application of the project.
Involvement : 2013- 2015
Location : Upington, Northern Cape, Republic of South Africa

Project Name : **Assmang Chrome Machadodorp**

Client **Assmang Chrome**

Project Summary : Compilation of EMP for the rehabilitation works on the hazardous H: H waste facility.
Role and Responsibilities : Responsible for the compilation of the EMP and audit documentation.
Involvement : 2013- 2013
Location : Machadodorp, Mpumalanga, Republic of South Africa

Project Name : **ArcelorMittal Newcastle Works – GSB Rehab EMP**

Client **ArcelorMittal SA**

Project Summary : Compilation of EMP for the rehabilitation works on the GSB waste facility.
Role and Responsibilities : Responsible for the compilation of an EMP and Audit documentation.
Involvement : 2012- 2012
Location : Newcastle, KZN, Republic of South Africa

Project Name : **DR George Mukhari Hospital**

Client **Driver Group**

Project Summary : Private Public Partnership project for the establishment of the new Dr George Mukhari Hospital.
Role and Responsibilities : Responsible for the environmental screening and fatal flaw analysis.
Involvement : 2011- 2012
Location : Ga-Rankuwa, Gauteng, Republic of South Africa

Project Name : **Molopo Landfills**

Client **Dr Ruth Segomotso Mompoti District Municipality**

Project Summary : The Identification and licencing of new regional waste disposal facility for the towns of Tosca, Bray and Pomfret.



Role and Responsibilities : Responsible for the environmental impact assessment and waste licensing process of the project.
 Involvement : 2011- 2014
 Location : Tosca, Northwest, Republic of South Africa

Project Name : **Kagisano Landfills**
Client : **Dr Ruth Segomotso Mompoti District Municipality**
 Project Summary : The Identification and licencing of new general waste disposal facilities for the towns of Piet Plessis, Ganyesa, Thlakgameng and Morokweng.
 Role and Responsibilities : Responsible for the environmental impact assessment and waste licensing process of the project.
 Involvement : 2011- 2014
 Location : Ganyesa, Thlakgameng, Morokweng and Piet Plessis, Northwest, Republic of South Africa

Project Name : **Lephalale Landfills**
Client : **Lephalale Local Municipality**
 Project Summary : The Identification and licencing of a new general waste disposal facility for the Lephalale Local Municipality.
 Role and Responsibilities : Responsible for the environmental impact assessment and waste licensing process of the project.
 Involvement : 2011- 2014
 Location : Lephalale, Limpopo, Republic of South Africa

Project Name : **Rooipunt Solar Power Project**
Client : **SolarReserve South Africa**
 Project Summary : Establishment of a Solar power park consisting of a 100MW concentrated solar power plant and three 75MW photovoltaic solar power developments.
 Role and Responsibilities : Responsible for the Environmental impact assessment, Water-use Licensing and Waste Licensing process of the project.
 Involvement : 2010- 2015
 Location : Upington, Northern Cape, Republic of South Africa

Project Name : **ArcelorMittal Newcastle Works – Basic Oxygen Furnace (BOF) Slag Dump Design and EIA**



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Client : **ArcelorMittal SA**

Project Summary : The closure of the existing hazardous BOF slag disposal facility and establishment of a new hazardous BOF slag disposal facility.

Role and Responsibilities : Responsible for the environmental impact assessment and waste licensing process for the project.

Involvement : 2010- 2012

Location : Newcastle, KZN, Republic of South Africa

Project Name : **Environmental Assessment Sebenza Substation**

Client : **Johannesburg City Power**

Project Summary : The establishment of a 1,000 MVA substation.

Role and Responsibilities : Responsible for the Basic assessment process.

Involvement : 2009- 2012

Location : Johannesburg, Gauteng, Republic of South Africa

Project Name : **Goedemoed Prison Farm Landfill and Incinerator**

Client : **Department of Public Works**

Project Summary : Identify, design, environmental impact assessment for closure of existing landfill and establishment of new landfill and Incinerator.

Role and Responsibilities : Responsible for the environmental impact assessment, waste licensing and Air Emission licensing process.

Involvement : 2009- 2011

Location : Aliwal North, Free State, Republic of South Africa

Project Name : **Nkangala Regional Landfill**

Client : **Mpumalanga Department Economic Development, Environment and Tourism**

Project Summary : Project entails the identification of a new landfill by means of a site selection process, the Environmental Impact Process and the design of the landfill including the design of a transfer station.

Role and Responsibilities : Responsible for the environmental impact assessment and waste licensing process of the project.

Involvement : 2009- 2014

Location : Middelburg, Mpumalanga, Republic of South Africa

Project Name : **Naledi Landfills**



Client : **Naledi Local Municipality**
: Identify, design and licensing of new municipal landfill site.

Role and Responsibilities : Responsible for the environmental impact assessment process for the new site and a basic assessment process for the closure of the old site.

Involvement : 2009- 2010

Location : Vryburg, Northwest , Republic of South Africa

PROJECT EXPERIENCE WITH RETIEF ENVIRONMENTAL CONSULTANTS:

Project Name : **Sodwana Bay Boat Lockers EMP**

Client : **Sodwana Bay Boat Lockers**

Project Summary : The establishment of a boat locker facility to store 30 boats.

Role and Responsibilities : Project Leader and responsible for the compilation of an environmental management plan for the boat locker facility.

Involvement : 2009- 2009

Location : Durban, KZN, Republic of South Africa

Project Name : **Steenkamp Broiler Farms**

Client : **Steenkamp Farms**

Project Summary : The establishment of a broiler farming operation consisting of six broiler houses and associated infrastructure.

Role and Responsibilities : Project Leader, and responsible for public participation, data gathering and the compilation of the basic assessment for the establishment of the broiler farm.

Involvement : 2008- 2009

Location : Brits, Northwest, Republic of South Africa

Project Name : **Glowing Autumn Sand Quarries**

Client : **GCL Construction Sand**

Project Summary : Mining permits application for the establishment of a sand quarry.

Role and Responsibilities : Project Leader, public participation, compilation of an environmental management plan for the establishment of the mining operation.

Involvement : 2006- 2007

Location : Rustenburg, Northwest , Republic of South Africa




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Project Name : **Dos Ramos Broiler Farm**
Client : **Dos Ramos Farms**
Project Summary : The establishment of a broiler farming operation consisting of four broiler houses.
Role and Responsibilities : Project Leader and responsible for public participation, completions of basic assessment and application for water-use license.
Involvement : 2005- 2006
Location : Brits, Northwest, Republic of South Africa

Project Name : **Grand Palace Granite Mine**
Client : **Grand Palace Trading (Pty) Ltd**
Project Summary : The establishment of a granite mining operation.
Role and Responsibilities : Responsible for the amendment and completions of the environmental impact assessment and the establishment of a social and labour plan for the mining operation.
Involvement : 2004- 2005
Location : Brits, North West Province, Republic of South Africa


Appendix 3 : Locality Map

Document No: Revision: Date:	NEMA-BA-EMPr-186-17_18_Draft 0.0_Draft January 2018	 Draft Basic Impact Assessment and Environmental Management Programme	Client Restricted Author: Monica Niehof 165
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Klei Minerale (Pty) Ltd: Proposed Prospecting Area in the Tshwane District, Gauteng Province




Legend

 Proposed Prospecting Portions

"Your Partner in Calculating Environmental Solutions"

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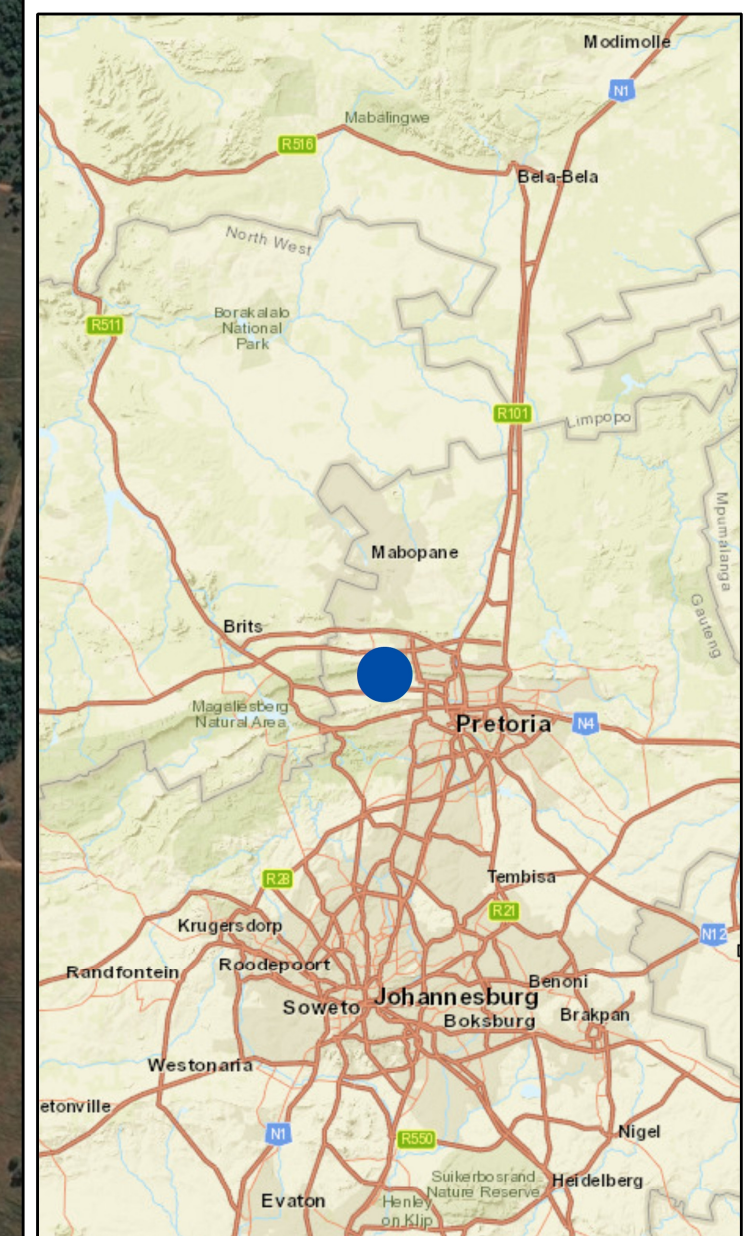
ENVIRONMENTAL ASSURANCE (Pty)Ltd 

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Author: L. Taylor
Date: 19-10-2017
Coordinate system: WGS1984



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Appendix 4 : Prospecting Work Programme and Site Plan

Document No:	NEMA-BA-EMPr-186-17_18_Draft		Client Restricted
Revision:	0.0_Draft	Draft Basic Impact Assessment and Environmental Management	Author: Monica Niehof
Date:	December 2017	Programme	166



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

NAME OF APPLICANT:

Klei Minerale (Pty) Ltd, Reg. No. 1997/005698/07

REFERENCE NUMBER:

PROSPECTING WORK PROGRAMME

**SUBMITTED FOR A PROSPECTING RIGHT APPLICATION
WITHOUT BULK SAMPLING**

AS REQUIRED IN TERMS OF SECTION 16 READ TOGETHER WITH REGULATION 7(1) OF THE
MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (ACT 28 of 2002)

STANDARD DIRECTIVE

All applicants for mining rights are herewith, in terms of the provisions of Section 16 and in terms of Regulation 7(1) of the Mineral and Petroleum Resources Development Act, directed to submit a Prospecting Work Programme, strictly under the following headings and in the following format together with the application for a prospecting right.

1. REGULATION 7.1.(a): FULL PARTICULARS OF THE APPLICANT

Table 1: Applicant's Contact Details

ITEM	COMPANY CONTACT DETAILS
Name of Applicant	Klei Minerale (Pty) Ltd, registration number 1997/005698/07
Tel no	(012) 372 9502
Fax no:	086 657 3338
Contact Person	Elfranco Swart
Cellular no	082 782 9381
E-mail address	elfranco@sabrix.co.za
Postal address	P.O. Box 48357 Hercules, Pretoria, 0030
Physical address	Plot 95 Boekenhoutkloof Hercules, Pretoria West

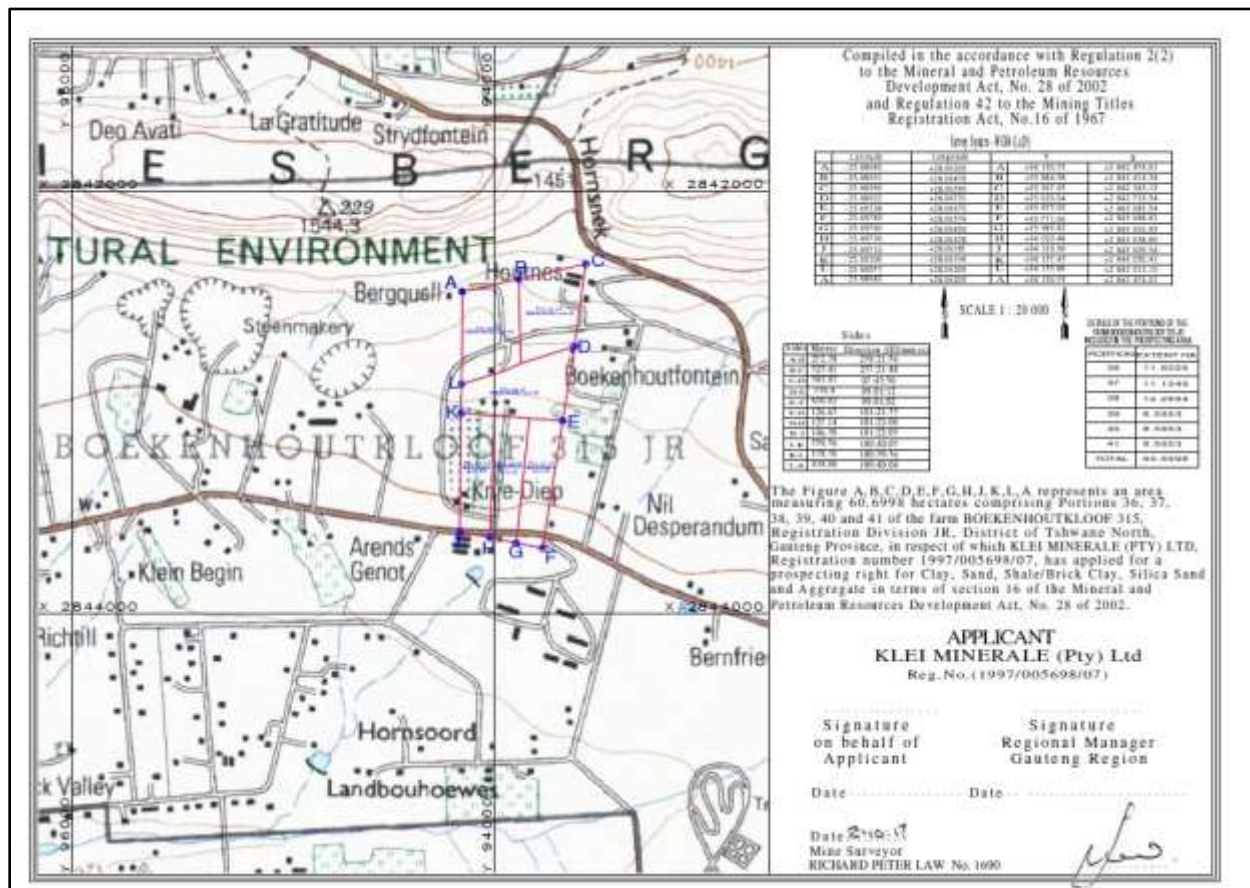
1.1 A copy of the Applicant's Certificate of Incorporation is **Annexe A** hereto.

1.2 A copy of the Applicant's Certificate to Commence Business is **Annexe B** hereto.

Table 2: Consultant's Details

ITEM	CONSULTANT CONTACT DETAILS (If applicable)
<u>Name of Company</u>	Gemecs (Pty) Ltd, registration number 1979/004409/07
Name	K Dippenaar
Tel no	013 243 0869
Fax no:	031 243 0869
Cellular no	082 773 2698
E-mail address	kobus.dippenaar@gemecs.co.za
Postal address	P.O. BOX 13520 Middelburg 1050

2. REGULATION 7(1)(b): PLAN CONTEMPLATED IN REGULATION 2(2) SHOWING THE LAND TO WHICH THE APPLICATION RELATES



Proposed Prospecting Area in the Tshwane District, Gauteng Province

2.1 A copy of the above Plan is **Annexe C** hereto.

3. REGULATION 7(1)(c): THE REGISTERED DESCRIPTION OF THE LAND TO WHICH THE APPLICATION RELATES

Farm	Reg Div	Portion	Extent Ha	District	Province
Boekenhoutkloof 315	JR	36	11.6026	Tshwane North	Gauteng
Boekenhoutkloof 315	JR	37	11.1349	Tshwane North	Gauteng
Boekenhoutkloof 315	JR	38	12.2664	Tshwane North	Gauteng
Boekenhoutkloof 315	JR	39	8.5653	Tshwane North	Gauteng
Boekenhoutkloof 315	JR	40	8.5653	Tshwane North	Gauteng
Boekenhoutkloof 315	JR	41	8.5653	Tshwane North	Gauteng

PORTIONS OF BOEKENHOUTKLOOF 315 JR INCLUDED IN PROSPECTING RIGHT AREA					
Portion	Extent Ha	Reg Div	Province	Registered Owner	Title Deed
36	11.6026	JR	Gauteng	Hartig, Frieda Elizabeth Lydia ID 190804	T9836/1965
37	11.1349	JR	Gauteng	Brauchle, Peter ID671219	T44103/2017
38	12.2664	JR	Gauteng	Sabrix Eiendomme (Pty) Ltd, Reg. No. 2006/032537/07	T42489/2017
39	8.5653	JR	Gauteng	Minnaar, Antonie Johannes Jurgens ID 2812315032009	T6419/1969
40	8.5653	JR	Gauteng	Econobiz Investments (Pty) Ltd Reg. No. 2004/023483/07	T66285/2013
41	8.5653	JR	Gauteng	Du Toit, Johan Carlo ID 7011105060081 and Anna Magaretha ID 7104130436085	T26333/2004
Total	60.6998				

Detailed list of Boekenhoutkloof 315 JR Prospecting Area Polygon (which includes Portions 36, 37, 38, 39, 40 and 41) boundary co-ordinates:

Boundary Point Co-ordinates		
No.	LATITUDE	LONGITUDE
A	-25.68683	28.06205
B	-25.68631	28.06470
C	-25.68569	28.06785
D	-25.68922	28.06731
E	-25.69238	28.06673
F	-25.69783	28.06574
G	-25.69760	28.06450
H	-25.69736	28.06328
J	-25.69710	28.06187
K	-25.69206	28.06194
L	-25.69077	28.06200
A	-25.68683	28.06205
Survey Datum: WGS84 Lat/Long Decimal Degrees		

4. REGULATION 7(1)(d) and (e): THE MINERAL OR MINERALS TO BE PROSPECTED FOR

4.1 Minerals to be prospected for

ITEM	DETAIL
Type of mineral(s)	(CS) Shale/Brick Clay; (Cy) Clay (General); (Q) Silica Sand (General); (Qy) Sand (General); (Rm) Aggregate
Locality (Direction and distance from nearest town)	14 km south-west of Pretoria CBD, Gauteng
Extent of the area required for prospecting	60.6998 ha
Geological formation	Sedimentary rocks of the Silverton Formation of the Pretoria Group (which forms part of the Transvaal Supergroup) and Diabase Intrusions are the main lithologies present. Sedimentary rocks of the Magaliesberg Formation of the Pretoria Group (which forms part of the Transvaal Supergroup) and Igneous rocks of the Lower Zone of the Rustenburg Layered Suite (which forms part of the Bushveld Complex) are found to the north of the proposed prospecting area.

4.2 Description why the Geological formation substantiates the minerals to be prospected for

The surface geology of Boekenhoutkloof 315 JR, Portions 36, 37, 38, 39, 40 and 41 (located roughly 14 km south-west of Pretoria CBD) is dominated by rocks of the Silverton Formation of the Pretoria Group (which forms part of the Transvaal Supergroup) and Diabase Intrusions (of Transvaal Supergroup age). Magaliesberg Formation lithologies (of the Pretoria Group) and rocks of the Lower Zone of the Rustenburg Layered Suite are found to the north of the proposed prospecting area, as indicated by the 1:250 000 geological map (see Figure 2). The Silverton Formation (indicated in light brown with the code "Vsi" on the geological map) is composed predominantly of shale (with some minor occurrences of hornfels and

chert). Diabase (indicated as light green with the code “di” on the geological map) intruded the Silverton Formation and Magaliesberg Formations as dykes and sills (see Figure 1). The Magaliesberg Formation (shown in hatched purple on the geological map with the code “Vm”) consists mainly of quartzite with some minor hornfels present.

The shale contained within the Silverton Formation weathers to clay on surface. This clay present in the area can be used in various applications with numerous quarries and brickworks located in the region (Figure 3). Several operating clay mines and clay deposits are shown on the geological map in the vicinity of the proposed prospecting area. These clay mines and clay deposits are indicated with the code “CL” on the geological map.

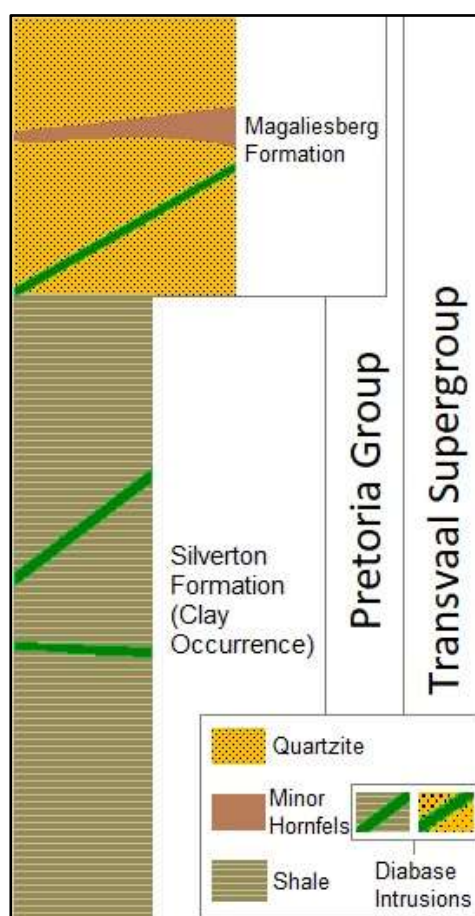


Figure 1: General Stratigraphic Column of region (After Eriksson et al, 2006)

- 4.3 Attach a geological map that justifies the description why there is a possibility that the minerals applied for could occur on the land concerned.

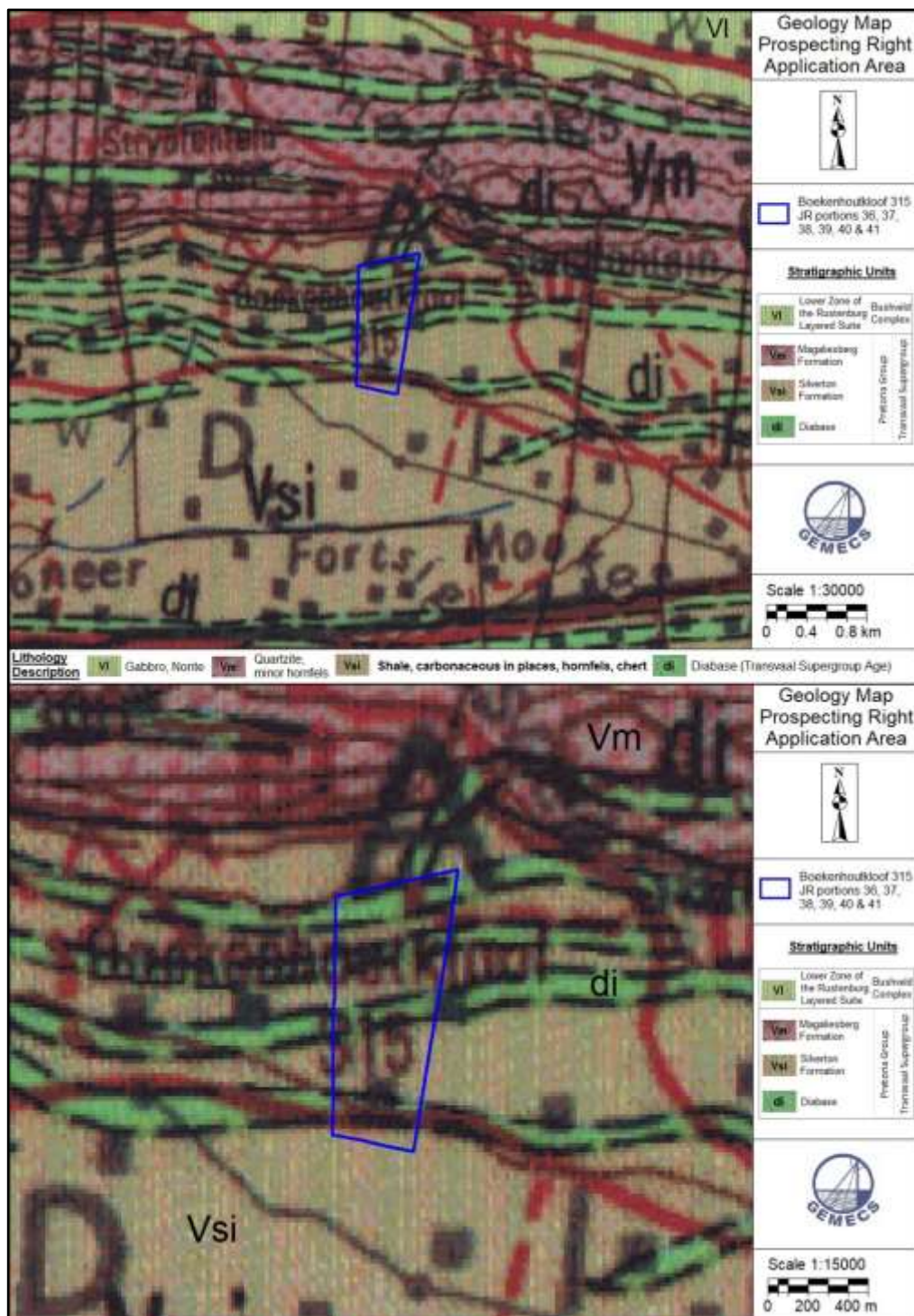


Figure 2: Maps indicating the locality of the proposed prospecting area (in blue), overlain on to the 1:250 000 Geological Map of Pretoria (Map Sheet 2528).



Figure 3: Positions of relevant adjacent and nearby properties in relation to Boekenhoutkloof 315 JR (Portions 36, 37, 38, 39, 40 and 41)

5. REGULATION 7(1)(f): A DESCRIPTION OF HOW THE MINERAL RESOURCE AND MINERAL DISTRIBUTION OF THE PROSPECTING AREA WILL BE DETERMINED

5.1 Prospecting work to be performed

Prospecting work will initially entail a high-level desktop study and potential desktop resource evaluation. This will include a data search of any previous drilling, trenching, sampling activities, exploration activities, existing maps and relevant historical data. On successful completion of this desktop study, further possible exploration drilling, trenching and resource estimations will be performed if the results warrant it.

5.2 Geochemical survey

No geochemical survey is planned.

5.3 Geophysical survey

No geophysical survey is planned.

6 REGULATION 7(1)(g): A DESCRIPTION OF THE PROSPECTING METHOD OR METHODS TO BE IMPLEMENTED

6.1 Description of planned non-invasive activities

(These activities do not disturb the land where prospecting will take place e.g. aerial photography, desktop studies, aeromagnetic surveys, etc)

Desktop studies to be undertaken over the area would include studying of geological reports, prospecting data, plans/maps, aerial photographs, topography maps and any other related geological information about this area.

6.2 Description of planned invasive activities

(These activities result in land disturbances e.g. sampling, drilling, bulk sampling, etc)

Diamond core drilling is planned to be executed on a phase by phase basis. Planned borehole depths will be determined during the desktop study, but it is estimated that drilling activities will done down to relatively shallow depths. Logging and sampling of the borehole core will be performed to evaluate the area. Trenching will involve the digging of excavation trenches down to approximately 3 metres below surface using graders and excavators. Mapping of the trench walls will then be performed.

6.3 DESCRIPTION OF PRE-/FEASIBILITY STUDIES

(Activities in this section includes but are not limited to: initial, geological modelling, resource determination, possible future funding models, etc)

Geological modelling of gathered existing geological data and prospecting data will be performed, if the results warrant it.

6.4 COMMITMENT TO PROVIDE ADDENDUMS IN RESPECT OF ADDITIONAL PROSPECTING ACTIVITIES

I herewith commit to provide the Department of Mineral Resources with an Addendum(s) in respect of both the EM Plan and Prospecting Work Programme regarding any future in-fill prospecting required but not described above, prior to undertaking such activities. Such Addendum(s) will cover all the Regulations as per the Prospecting Work Programme.

I agree that the Addendum(s) will provide for similar activities only and if the scope changes I would be required to apply in terms of Section 102 of the MPRDA for an amendment of the Prospecting Work Programme.

Mark with X

ACCEPT	X
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7. REGULATION 7(1)(h): ALL PLANNED PROSPECTING ACTIVITIES MUST BE CONDUCTED IN PHASES AND WITHIN SPECIFIC TIMEFRAMES

See Table 3

8. REGULATION 7(1)(i): TECHNICAL DATA DETAILING THE PROSPECTING METHOD OR METHODS TO BE IMPLEMENTED AND THE TIME REQUIRED FOR EACH PHASE OF THE PROPOSED PROSPECTING OPERATION

See Table 3

The table below incorporates the information required in respect of Regulations 7(1)(f), 7(1)(h) and 7(1)(i):

Table 3

Phase	Activity (what are the activities that are planned to achieve optimal prospecting)	Skill(s) required (refers to the competent personnel that will be employed to achieve the required results)	Timeframe (in months) for the activity)	Outcome (What is the expected deliverable, e.g. Geological report, analytical results, feasibility study, etc.)	Timeframe for outcome (deadline for the expected outcome to be delivered)	What technical expert will sign off on the outcome? (e.g. geologist, mining engineer, surveyor, economist, etc)
Year 1	Non-Invasive Prospecting					
	Search and collect all relevant existing and historical data	Geologist	3 months	Historical data and reports collection	Month 3	Geologist
	Review relevant existing and historical data gathered	Geologist	3 months	Review gathered relevant existing and historical data for compilation of a desktop study	Month 6	Geologist
	Compile high-level desktop study and potential desktop resource evaluation using sourced data	Geologist	6 months	High-Level Desktop Report of the prospecting area	Month 12	Geologist

Year 1	Invasive Prospecting					
	None					
Year 2	Invasive Prospecting					
	Drilling (1-2 Boreholes)	Geologist	6 months	Prospecting Drilling Results	Month 24	Geologist
Year 2	Non-Invasive Prospecting					
	Prospecting Results Report	Geologist	3 months	Update of geological report with prospecting results	Month 24	Geologist
Year 3	Invasive Prospecting					
	Drilling (1-3 Boreholes)	Geologist	6 months	Prospecting Drilling Results	Month 36	Geologist
	Trenching (1-3 trenches)	Geologist	6 months	Trenching results and resource extents	Month 36	Geologist
Year 3	Non-Invasive Prospecting					
	Prospecting Results Report and geological modelling	Geologist	3 months	Update of geological report with prospecting results and geological modelling	Month 36	Geologist
Year 4	Invasive Prospecting					

	None					
Year 4	Non-Invasive Prospecting					
	Compile geological model and perform resource estimation	Geologist	3 months	Geological Model and Resource Report	Month 48	Geologist
Year 5	Non-Invasive Prospecting					
	Compile geological model and perform resource estimation	Geologist	3 months	Geological Model and Resource Report	Month 60	Geologist

9. REGULATION 7(1)(j)(i):DETAILS WITH DOCUMENTARY PROOF OF THE APPLICANT'S TECHNICAL ABILITY OR ACCESS THERETO TO CONDUCT THE PROPOSED PROSPECTING OPERATION

9.1 Competencies to be employed in terms of the Mine Health and Safety Act

COMPETENCIES TO BE EMPLOYED *(List the legal appointments that will be made in terms of the Mine Health and Safety Act, appropriate for the type of operation)*

Geologists (no legal appointment necessary)

The applicant's technical ability and access thereto to conduct the proposed prospecting operation involves the following members:

K Dippenaar; Geological Consultant; B.Sc (Hons). Gemecs (Pty) Ltd (CV included below)

Gemecs (Pty) Ltd is a medium size geological company that renders geological and mining consulting services to the mining industry. Gemecs' office is situated in Middelburg within South Africa. The team of consultants have experience over a large range of commodities in South Africa and the Southern Africa region. These include coal, platinum group of metals, manganese, chrome, iron ore, mineral sands, coal-bed methane and uranium.

Our experience ranges over all geological aspects of geology. This includes target generation, prospecting permit applications, exploration management, drilling core description, core sampling, geophysical data capture, underground and surface mapping, geological databases, geological resource and ore body modelling, project management, grade control, conceptual studies, pre-feasibility studies, feasibility studies, due diligence studies, review and auditing of geological models, geological report writing, and Competent Person's Reports (SAMREC, JORC and CANADIAN NI43-101). With our vast experience and knowledge we can add significant value to prospecting, project approvals, execution phases and operations.

Summary CV Kobus Dippenaar

Educational Qualifications

Bachelor of Science, Honours (B.Sc Hons.) University of Pretoria, 1990.
 Bachelor of Science, (B.Sc). University of Pretoria, 1989.

Experience:

Kobus has over 25 years of experience in the mining industry, mainly on coal and environmental issues. During his career he was employed as mine, project and exploration geologist, as well as environmental manager at different operations. When he was working as a consultant, he did get exposure to different commodities in South Africa, Mozambique and in Madagascar.

Career History and main responsibilities associated with appointment:

2010 – Present. Gemecs (Pty) Ltd. Geological Consultant
 2008 – 2010: Geological Consultant
 2005 – 2008: DNZ Holdings (Pty) Ltd Manager Exploration Geology
 2004 – 2005: Geologist and Environmental Manager, Polmaise Colliery
 2001 – 2004: Environmental Superintendent and Environmental Manager Middelburg Mine Services (Ingwe Coal Corporation Ltd)
 1997 -- 2001: Senior Mine Geologist, Middelburg Mine Services (Ingwe Coal Corporation Ltd.)
 1996 – 1997: Exploration Geologist, Togara South, Queensland Australia (Trans Natal Australia)
 1991 – 1996: Mine, Exploration and Project Geologist Trans Natal Coal Corporation Ltd/ Ingwe Coal Corporation Ltd.)

Affiliations

Member of the South African Council for Natural Scientific Professions (SACNASP) and of the GSSA

Registration Number: 400079/94

Publications

In 1992 Kobus' Honours project was published in the South African Journal of Geology. "***The geology of the Greenview lamprophyric breccia vent***" *S.Afr.J. Geol.*, 1992, 95, p194-202.

I herewith confirm that the Applicant, in Table 9.1, has budgeted and financially provided for the required skills listed above.

CONFIRMED (Mark with an X)	X
----------------------------	---

9.2 List of Appropriate equipment at your disposal (If Applicable)

Table 4: Appropriate Equipment Available

All equipment needed for any prospecting work will be sourced or contracted from suitable and qualified contractors.

9.3 Technical skills provided Free of Charge

- 9.3.1 Information (CV's) in respect of skills already acquired (*append*)
- 9.3.2 Copy of the relevant contractual agreements between the service provider and the applicant relative to the duration of the planned prospecting period, where applicable. (*append*)
- 9.3.3 All other evidence of Technical Ability (*append*)

10. REGULATION 7(1)(j)(ii):DETAILS WITH DOCUMENTARY PROOF OF A BUDGET AND DOCUMENTARY PROOF OF THE APPLICANT'S FINANCIAL ABILITY OR ACCESS THERETO

The Applicant submits that it is an operating clay mining company and is able to fund the planned prospecting from its operational budget. Also kindly see the funding letter from the Applicant's bankers which is enclosed as **Annexe D** and the Applicant's Board Resolution which is enclosed as **Annexe E**. A copy of the Applicant's latest audited annual financial statements is enclosed as **Annexe F**.

11. REGULATION 7(1)(k) A COST ESTIMATE OF THE EXPENDITURE TO BE INCURRED FOR EACH PHASE OF THE PROPOSED PROSPECTING OPERATION *(remember to also include prospecting fees)*

Table 5

ACTIVITY	YEAR 1 Expenditure (R')	YEAR 2 Expenditure (R')	YEAR 3 Expenditure (R')	YEAR 4 Expenditure (R')	YEAR 5 Expenditure (R')	Totals
PHASE 1 (12 months)	R60 000					R60 000
PHASE 2 (12 months)		R100 000				R100 000
PHASE 3 (36 months)			R80 000	R30 000	R30 000	R140 000
Annual Totals	R60 000	R100 000	R80 000	R30 000	R30 000	R300 000
				Total Budget		R300 000

NOTE! *If any person (including the applicant) provides services in any job or skills category at a reduced rate or free of charge, then such person's Curriculum Vitae (CV) must be attached as documentary proof of the technical ability available to the applicant.*

10. FINANCIAL ABILITY TO GIVE EFFECT TO THE WORK PROGRAMME

10.1 The amount required to finance the Work Programme.

(State the amount required to complete the work)

R300 000

10.2 Detail regarding the financing arrangements

The Applicant submits that it is an operating clay mining company and is able to fund the planned prospecting from its operational budget. Also kindly see the funding letter from the Applicant's bankers, which letter is enclosed as **Annexe D** and the Applicant's Board Resolution which is enclosed as **Annexe E**. A copy of the Applicant's latest audited annual financial statements is enclosed as **Annexe F**.

(Elaborate on the financing arrangements, in terms of where the finance will be sourced, extent to which the financing has been finalized and on the level of certainty that such financing can be secured.)

10.3 Confirmation of supporting evidence appended

The Applicant submits that it is an operating clay mining company and is able to fund the planned prospecting from its operational budget. Also kindly see the funding letter from the Applicant's bankers, which letter is enclosed as **Annexe D** and the Applicant's Board Resolution which is enclosed as **Annexe E**. A copy of the Applicant's latest audited annual financial statements is enclosed as **Annexe F**.

*(Attach evidence of available funding and or financing arrangements such as balance sheets, agreements with financial institutions, underwriting agreements, etc. and **specifically confirm** in this regard what documentation has been attached as appendices).*

11 Confirmation of the availability of funds to implement the proposed project.

The Applicant submits that it is an operating clay mining company and is able to fund the planned prospecting from its operational budget. Also kindly see the funding letter from the Applicant's bankers, which letter is enclosed as **Annexe D** and the Applicant's Board Resolution which is enclosed as **Annexe E**. A copy of the Applicant's latest audited annual financial statements is enclosed as **Annexe F**.

12 I herewith confirm that the Applicant has budgeted and financially provided for the total budget as identified in Regulation 7(1)(k).

Confirmed <i>(Mark with an X)</i>	X
-----------------------------------	---

13 REGULATION 7(1) (m): UNDERTAKING, SIGNED BY THE APPLICANT, TO ADHERE TO THE PROPOSALS AS SET OUT IN THE PROSPECTING WORK PROGRAMME**Table 6**

Herewith I, the person whose name and identity number is stated below, confirm that I am authorised to act as representative of the Applicant in terms of the resolution submitted with the application as Annexe E and on behalf of the Applicant undertake to implement this prospecting work programme and adhere to the proposals set out herein.	
Full Names and Surname	Elfranco Swart
Identity Number	730512 5026 084
Signature	
Date	

Copy of Applicant's Certificate of Incorporation

Annexe A

Copy of Applicant's Certificate to Commence Business

Annexe B

Copy of Regulation 2(2) Plan

Annexe C

Bank Funding Letter

Annexe D



Commercial Banking

The Regional Manager
The Department of Mineral resources

12 September 2017

(012) 366 9950

FJ/NB

Dear Sir / Madam

**EXPLORATION FUNDING - KLEI MINERALE EDMS BPK
REGISTRATION NUMBER 1997/005698/07**

This letter confirms that a business current account is held in the books of our SBSA, Pretoria branch. The account forms part of the J Robbertse Group.

The company has conducted a satisfactory account with our Institution since inception on the 30th May 1997. A mutually beneficial relationship has been enjoyed with the entity and the account has strong characteristics of well managed and stable business.

The Company is considered good for normal business engagement, and the Directors (well known to the Bank), are unlikely to over-commit the Business.

We consider the company good for an amount of R300 000.00 and provide a Bank Code Rating "C".

This information and the opinion provided herein are given in confidence for your private use only and are furnished as a matter of business courtesy on the expressed understanding that no responsibility or guarantee is assumed on the part of the Bank or any of its officers or informants. Please feel free to contact the writer hereof should you require any further information.

Yours faithfully


F Joosub
Portfolio Manager

177 Dyer Street Hillcrest Office Park Barbiet Place Hillcrest Pretoria
P.O. Box 12396 Hillcrest Pretoria SWIFT address: SBZA ZA JJ www.standardbank.co.za
Tel: 012 366 9930 Fax: 086 201 7159

The Standard Bank of South Africa Limited (Reg. No. 1982/000738/09) Authorized financial services and registered credit provider (NCRPFI)

Directors: Thabo Mokoena (Chairman) M. M. Mokoena (Chief Executive Officer) R. M. Mokoena (Chief Financial Officer) J. M. Mokoena (Chief Risk Officer) Dr. M. Mokoena (Chief Compliance Officer)
IC-Permit: 984/Permit/2011/1111 3P/11/11 11/11/11 11/11/11 11/11/11 11/11/11 11/11/11 11/11/11 11/11/11 11/11/11


Board Resolution

Annexe E


Applicant's Latest Audited Annual Financial Statements

Annexe F

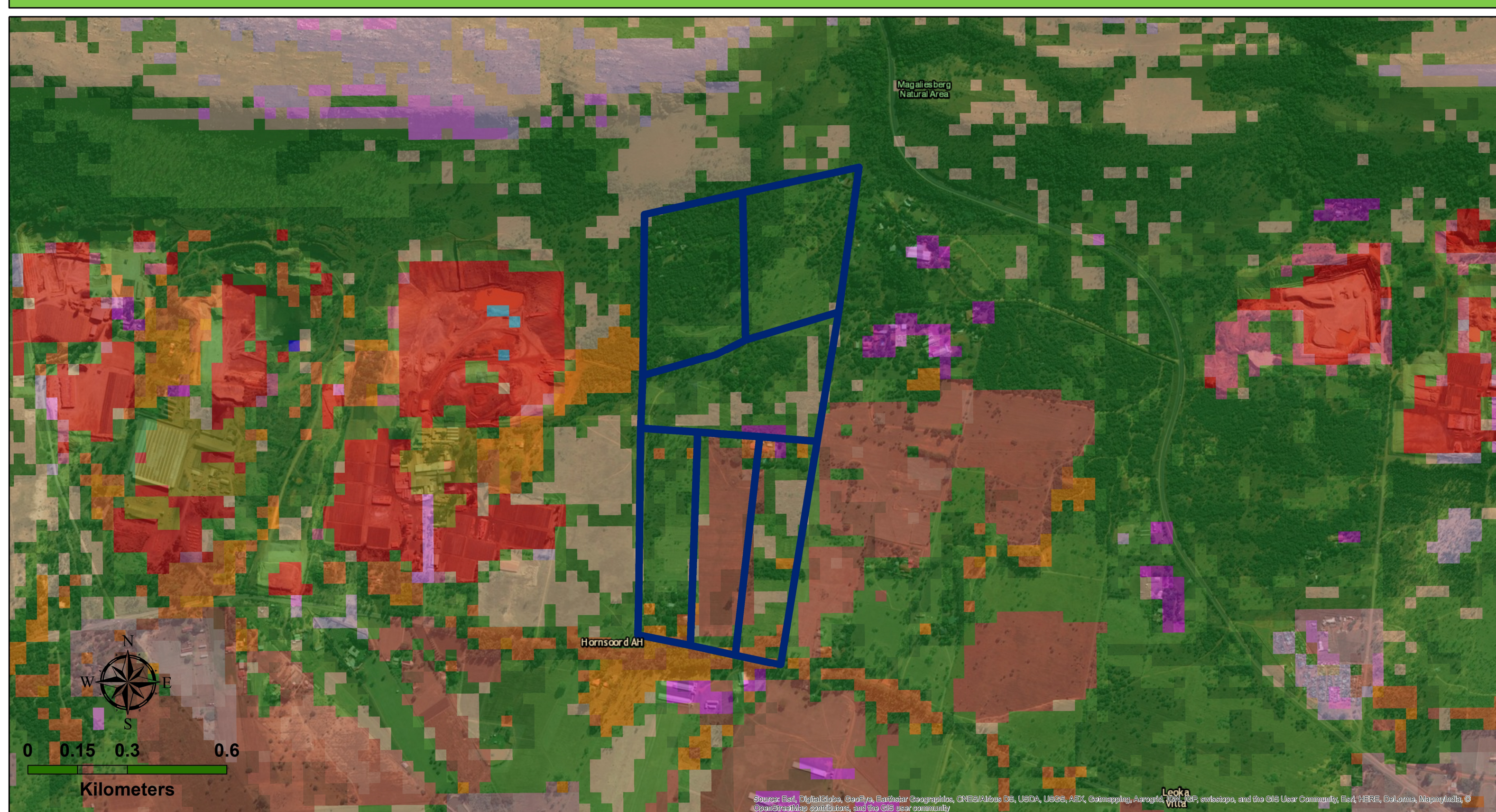
Appendix 5 : Public Participation (Included in Final EIA)

Document No:	NEMA-BA-EMPr-186-17_18_Draft		Client Restricted
Revision:	0.0_Draft	Draft Basic Impact Assessment and Environmental Management	Author: Monica Niehof
Date:	January 2018	Programme	167

Appendix 6 : Current environmental and land use maps

Document No:	NEMA-BA-EMPr-186-17_18_Draft		Client Restricted
Revision:	0.0_Draft	Draft Basic Impact Assessment and Environmental Management	Author: Monica Niehof
Date:	December 2017	Programme	168

Land Uses of the Proposed Prospecting Site and Surrounding Areas



Legend

Proposed Prospecting Portions	Cultivated comm fields (med)	Mines water seasonal	Urban smallholding (open trees / bush)
Thicket /Dense bush	Cultivated comm fields (low)	Mines water permanent	Urban smallholding (low veg / grass)
Woodlan/Open bush	Plantations / Woodlots mature	Urban industrial	Urban built-up (dense trees / bush)
Grassland	Plantation / Woodlots young	Urban informal (dense trees / bush)	Urban built-up (open trees / bush)
Low shrubland	Mines 1 bare	Urban informal (open trees / bush)	Urban built-up (low veg / grass)

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ENVIASS

ENVIRONMENTAL ASSURANCE (Pty) Ltd

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Author: L. Taylor

Appendix 7 : Surface Water Assessment

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SURFACE WATER HYDROLOGY

GEOGRAPHIC INFORMATION SYSTEMS (GIS) BASED DESKTOP SURFACE WATER HYDROLOGICAL ASSESSMENT FOR KLEI MINERALE (PTY) LTD FOR THE APPLICATION OF A PROSPECTING RIGHT ON PORTIONS 36, 37, 38, 39, 40 AND 41 OF THE FARM BOEKENHOUTKLOOF 315 JR, PRETORIA

Report number: SPS-REP-186-17-18

Submitted to:

Wika Esterhuizen

Klei Minerale (Pty) Ltd.

Email: wika@sabrix.co.za




November 2017

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DOCUMENT CONTROL			
Document Title	GIS-based desktop surface water hydrological assessment for the application of a prospecting right on portions 36, 37, 38, 39, 40 and 41 of the Farm Boekenhoutkloof 315 JR, Pretoria		
Report Number	SPS-REP-186-17-18		
Version	0.0		
Date	December 2017		
Submitted to	Wika Esterhuizen SHE Advisor Klei Minerale (Pty) Ltd. wika@sabrix.co.za		
Distribution	Klei Minerale (Pty) Ltd. Environmental Assurance (Pty) Ltd.		
QUALITY CONTROL			
	Originated By	Reviewed By	Approved By
Name	Johan P. Nortje Pr.Sci.Nat	DuToit Wilken	Carl Schoeman Pr.Sci.Nat
Designation	Environmental Consultant and Specialist	Senior Operations Manager	Environmental Consultant and Projects Coordinator
Signature			
Date	09-12-2017	11-12-2017	13-12-2017
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Document No:	SPS-REP-186-17_18	Surface Water Hydrology Assessment	Client Restricted
Revision:	0.0		Author: J.P. Nortje
Date:	December 2017		i

DECLARATION OF OBJECTIVENESS

I, **Johan P. Nortje**, in my capacity as a specialist consultant and registered professional environmental scientist, hereby declare that I:

- Act as an independent consultant;
- Do not have any financial interest in the undertaking of this project, other than remuneration for the work performed in terms of the National Environmental Management Act 107 of 1998;
- Have and will not have vested interest in the proposed activity nor will I engage myself in any conflicting interest associated with this project;
- I undertake to disclose and provide to the competent authority any material or information at my disposal regarding this project as required in terms of National Environmental Management Act 107 of 1998;
- Based on the information provided to me by the client and in addition to information obtained during the course of this study, I have presented the results and conclusion with regard to this project to the best of my professional ability;
- I reserve the right to modify aspects pertaining to this study should additional information become available through ongoing research and further work on this field;
- I undertake to have my work peer reviewed on a regular basis by a competent specialist in the field of study;
- I am duly qualified and experienced to undertake the work at hand;
- I am compulsorily and legally registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP) with registration number 400166/17.
- I am bound by and committed to the professional and ethical Code of Conduct of the SACNASP.



Johan P. Nortje, Pr.Sci.Nat (SACNASP Registration: 400166/17)

Specialist	Affiliation	Relevant expertise
Johan P. Nortje	Environmental Assurance (Pty) Ltd. SACNASP SAGIC	B.Sc (Biological Science) (NWU), B.Sc (Hons) (NWU) (Environmental Science), practical environmental scientific experience – work as consultant at ENVASS. Compulsorily and legally registered with SACNASP to conduct work on this project.

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EXECUTIVE SUMMARY

Environmental Assurance (Pty) Ltd – hereafter referred to as ENVASS, was appointed by Klei Minerale (Pty) Ltd to undertake a surface water hydrology assessment on Portions 36, 37, 38, 39, 40 and 41 of the Boekenhoutkloof 315 JR (see Figure 2), City of Tshwane Metropolitan Municipality in the Gauteng Province: The study area is located 13 km northwest of the Pretoria CBD and between Akasia and Atteridgeville. The aim of this report is to contextualise the general study area in terms of surface water hydrology and will provide the proposed prospecting activity with general information on possible surface water hydrological impacts including preventative mitigation measures.

Hydrology is concerned with the natural water cycle and is the earth science of water on or near the land surface. Prospecting can impact on surface water hydrology through the introduction of structures and by disturbing the natural characteristics of a watercourse and its catchment. Watercourses may be affected by direct runoff from the mining area itself. As a result, the natural magnitude, direction and timing of flood events can become significantly altered. Alterations to surface water hydrology could have associated implications for the local ecology, society and economy.

This report presents the assessment, through Geographic Information System (GIS) analysis, of surface water hydrological features on the Farm Boekenhoutkloof and possible impacts associated with the proposed prospecting. Recommendations (as mitigation measures) to avoid or reduce impacts of the proposed prospecting on the hydrology of local watercourses and/or drainage lines are provided.

The study area falls within the A21H Quaternary Catchment that forms part of the Crocodile (West) and Marico Management Area. The closest major river to the study area is the Swartspruit, a perennial river flowing roughly 1.5 km to the south of the area. To the north of the Boekenhoutkloof proposed prospecting area is the Magaliesberg. The mountain forms a separation between two catchment areas. As the gradient of the site is toward the south of the Magaliesberg, no impacts on surface water (explicitly excluding groundwater) in the northern catchment area is envisioned.

The hydrologic functions ran for a digital elevation model (DEM) created from the 1:50000 topographical map series data of South Africa (grid reference 2528) showed that no major streams were expected to accumulate through or near the site. Please refer to the methodologies utilised in Section 4 for context on how flow accumulation was determined. Data obtained from the Department of Water and Sanitation (DWS, 2017) showed that the Swartspruit (a former tributary of the Crocodile River (West) and now confluence with the Hartbeespoort Dam) has its origin +- 1.5 km south of the outer boundary of the Boekenhoutkloof proposed prospecting area.

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LIST OF ABBREVIATIONS AND ACCRONYMS

CTMM	City of Tshwane Metropolitan Municipality
DEM	Digital Elevation Model
GIS	Geographic Information Systems
LUDS	Land Use Decision Support Tool
MAMSL	Meters Above Mean Sea Level
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
NEMA	National Environmental Management Act
PES	Present Ecological State
SMP	Stormwater Management Plan
TEMP	Temperature
USEPA	United States Environmental Protection Agency
WMA	Water Management Area
WUL	Water Use Licence

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1. INTRODUCTION

Environmental Assurance (Pty) Ltd – hereafter referred to as ENVASS, was appointed by Klei Minerale (Pty) Ltd to undertake a surface water hydrology assessment on Portions 36, 37, 38, 39, 40 and 41 of the Boekenhoutkloof 315 JR (see Figure 2), City of Tshwane Metropolitan Municipality in the Gauteng Province. The study area is located 13 km northwest of the Pretoria CBD and between Akasia and Atteridgeville. The aim of this report is to contextualise the general study area in terms of surface water hydrology and will provide the developers with general information on possible surface water hydrological impacts including preventative mitigation measures.

Hydrology is concerned with the natural water cycle and is the earth science of water on or near the land surface. Prospecting can impact on surface water hydrology through the introduction of structures or excavations and by disturbing the natural characteristics of a watercourse and its catchment. Watercourses may be affected by direct runoff from the mining area itself. As a result, the natural magnitude, direction and timing of flood events can become significantly altered. Alterations to surface water hydrology could have associated implications for the local ecology, society and economy.

Impacts on hydrology are intrinsically linked to hydrogeology, water quality, geomorphology and freshwater ecology (see an illustration of how surface water hydrology is typically linked with other environmental aspects in the figure below).

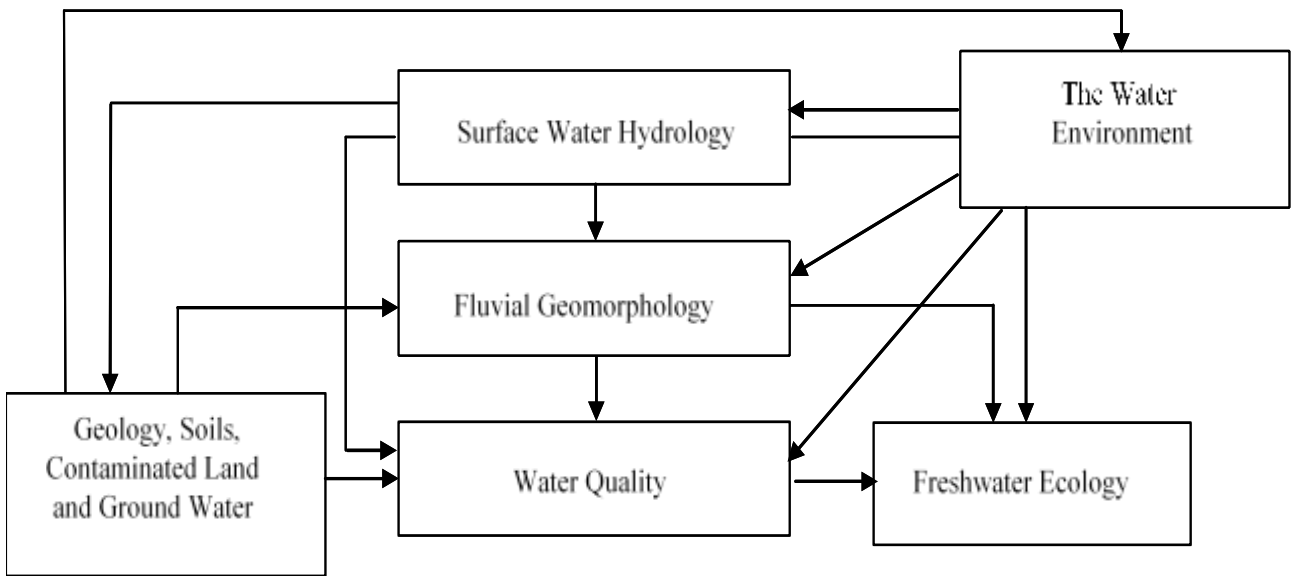


Figure 1: Typical interrelationship of surface water hydrology with other environmental aspects

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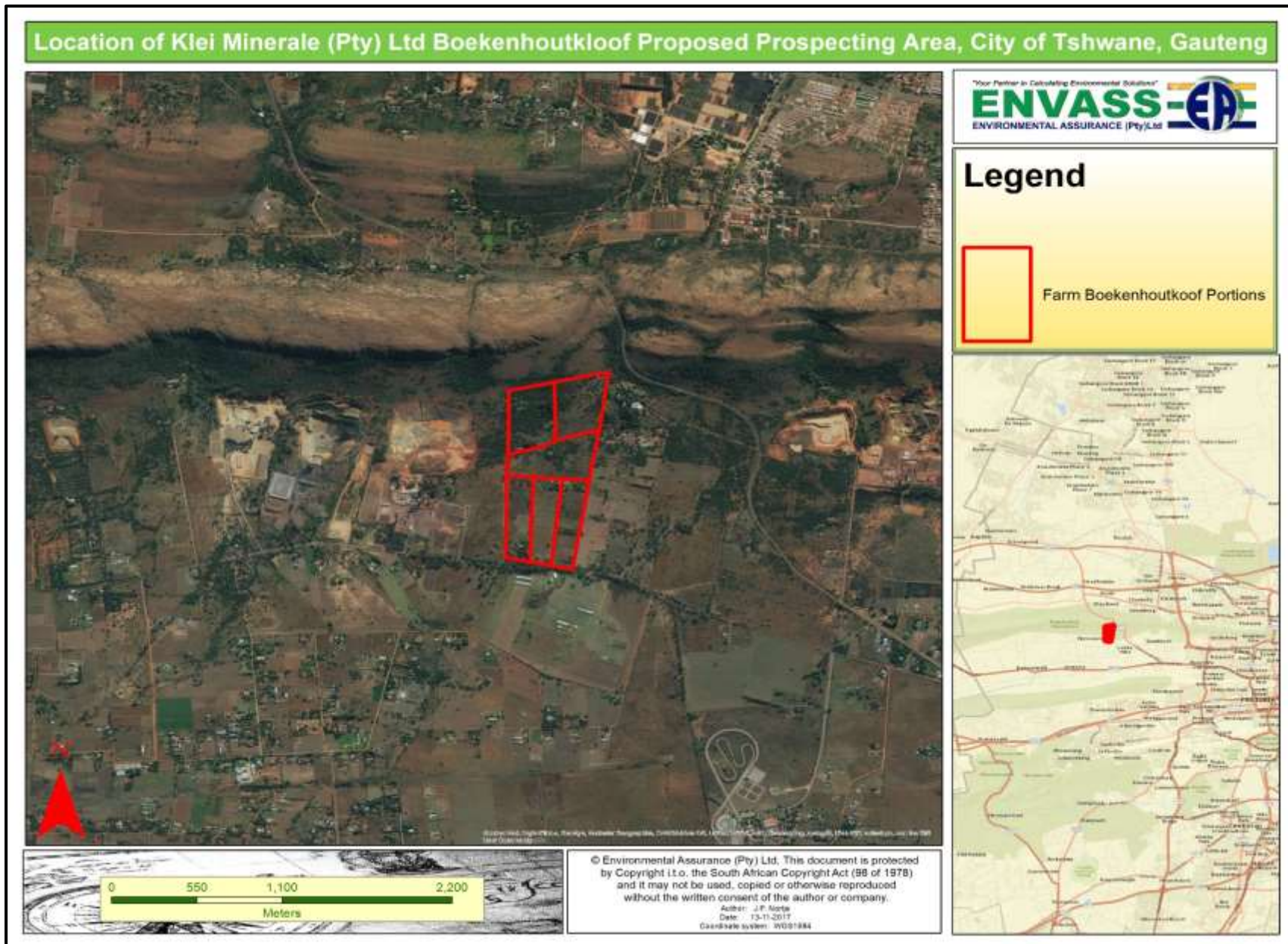


Figure 2: Locality map of the surveyed study area.

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2. SCOPE OF WORK

This report presents the assessment, through Geographic Information System (GIS) analysis, of surface water hydrological features on the Farm Boekenhoutkloof and possible impacts of prospecting. Recommendations (as mitigation measures) to avoid or reduce impacts of the proposed prospecting on the hydrology of local watercourses and/or drainage lines are provided.

3. LEGISLATION AND GUIDELINES

The following legislation, standards and guidelines have been taken into account:

3.1. The Constitution of South Africa, 1996 (Act No. 108 of 1996) [as amended]

Section 24

Environment - Everyone has the right- [Constitution of the Republic of South Africa, 1996 (No. 108 of 1996)]

- (a) to an environment that is not harmful to their health or well-being; and
- (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that-
 - i) prevent pollution and ecological degradation;
 - ii) promote conservation; and
 - iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The proposed development has the potential to harm the environment and may, in different ways, pose a risk to the health and wellbeing of people, if impacts are not prevented, mitigated or managed correctly. The Applicant has the overall responsibility to ensure that the rights of people in terms of Section 24 of the Constitution is protected in terms of the proposed development activity.

3.2. National Water Act, 1998 (Act 36 of 1998)

Provides for the protection of the quality of water and water resources in South Africa and provides for the establishment of Water Management.

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3.3. The National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended]

Section 28 (1)

Duty of Care and responsibilities to minimise, prevent and remediate environmental degradation. The applicant is the developer and overall responsibility of the developer of the proposed prospecting area rests with the proponent, especially in terms of liabilities associated with the operational phase.

3.4. National Policy / Guidelines

National policy and guidelines applicable to surface water management includes:

- South African Water Quality Guidelines, First Edition, 1996 – These guidelines set out the minimum water quality requirements for a range of water quality parameters for each water user.
- Development of a Waste Discharge Charge System: Framework Document. Second Edition, 2000 – Provides a framework for the implementation of a system to charge for water use such as the discharge of waste that impacts on water resources.
- Framework for a Water Quality Management Performance Assessment System: (WQMPAS), First Edition, 2000 – Reports results on an initial investigation into a performance management system to enable a more effective WQPMAS in future.
- Best Practice Guidelines for the mining sector, DWAF 2006, 2008 dealing with aspects of DWA's water management hierarchy and deals with integrated mine water management, pollution prevention and minimisation of impacts, water reuse and reclamation and water treatment.
- Best Practice Guidelines for the mining sector, DWAF 2006, 2008 dealing with general water management strategies, techniques and tools which could be applied cross – sectorial and deals with storm water management, water and salt balances, water monitoring systems, impact prediction.
- Best Practice Guidelines for the mining sector, DWAF 2006-2008 dealing with specific mining activities and addresses the prevention and management of impacts from small scale mining, water management for Mine Residue Deposits, pollution control dams, water management for surface mines, and water management for underground mines.

4. GIS-BASED HYDROLOGIC FUNCTION METHODOLOGIES

- The first step in any of the hydrologic modelling tools in ArcGIS is to fill the elevation grid. One starts with a surface that has no sinks. Sinks are areas of internal drainage, that is, areas that do not drain out anywhere. The reason that sinks need to be filled in is because a drainage network is built that finds the flow path of every cell, eventually off the edge of the grid. If cells do not drain off the edge of the grid, they may attempt to drain into each other, which will lead to an endless processing loop.

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- Determining the direction of flow. To calculate a drainage network or watersheds, a grid must exist that is coded for the direction in which each cell in a surface drains. Flow direction is important in hydrologic modelling because in order to determine where and how a landscape drains, it is necessary to determine the direction of flow for each cell in the landscape.
- Determining flow accumulation (streams). Flow accumulation is the next step in hydrologic modelling. Watersheds are defined spatially by the geomorphological property of drainage. In order to generate a drainage network, it is necessary to determine the ultimate flow path of every cell on the landscape grid. Flow accumulation is used to generate a drainage network, based on the direction of flow of each cell. By selecting cells with the greatest accumulated flow, we are able to create a network of high-flow cells. These high-flow cells should lie on stream channels and at valley bottoms. The results from flow accumulation modelling is then verified against existing streams data to ensure accuracy of the models.
- The next step in the process is to determine the catchment areas for each stream modelled. This can either be done manually or automatically. For the purposes of this study, the catchment delineation was first done automatically and then compared with existing data. Should the result from automatic delineation differ too much from existing data, the delineation would have to be done manually. Catchment areas can be automatically delineated using the Basin command in ArcGIS. Pour points are automatically selected from where the grid drains at its edges, and catchments are delineated. Automatic watershed delineation uses a flow accumulation value which is specified. ArcGIS searches for cells at the edge of the grid that have this amount of flow accumulation, and turns these cells into pour points.

5. BACKGROUND INFORMATION

5.1. Location & Physical Environment

The closest city to the study area is Pretoria, located about 13 km to the southeast. The suburbs of Akasia is located about 4 km northeast of the area demarcated for prospecting and Atteridgeville 6 km to the south. The study area falls within the City of Tshwane Metro Municipality in the Gauteng Province. In terms of vegetation, the study area falls within the Grassland Biome, Central Bushveld Bioregion and Moot Plains Bushveld vegetation unit. A small section along the northern boundary of the study area falls on Gold Reef Mountain Bushveld.

The Grassland Biome covers approximately 28% of South Africa. According to Mucina & Rutherford (2006), the conservation status for Moot Plains Bushveld is considered vulnerable. The conservation target for this vegetation unit is 19% and about 13% is conserved in in the Magaliesberg Nature Reserve. Moot Plains Bushveld is found in the North-West and Gauteng Provinces, with the main belt occurring immediately south of the Magaliesberg from the Selons River Valley in the west to Pretoria in the east. A narrow belt is also found immediately north of the Magaliesberg and Daspoort mountain ranges from Rustenburg in the west to the Crocodile River in the east. Cultivation, urban and built-up areas have transformed about 28% of this vegetation unit. Erosion in these areas is generally very low.

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Date:	December 2017		5

Gold reef Mountain Bushveld, on the other hand, is found in the North-West, Gauteng, Free State and Mpumalanga Provinces and occurs along the quartzite ridges of the Magaliesberg from Boshhoek and Koster in the west to Bronkhorstspuit in the east. Other areas include the west-east ridges of the Witwatersrand, the inner ridges of the Vredefort Dome and part of the Suikerbosrand and hills around Heidelberg. In terms of conservation, Gold Reef Mountain Bushveld is considered least threatened with a conservation target of 24%. About 22% is conserved mainly in the Magaliesberg Nature Reserve and a small portion in other nature reserves. Cultivation, urban and built-up areas transformed about 15% and erosion is generally very low (Mucina & Rutherford 2006).

The average elevation for Moot Plains Bushveld varies between 1050 and 1450 MASL, while the elevation for Gold Reef Mountain Bushveld varies between 1200 and 1750 MASL. The average elevation of the project area is 1320 MASL and it is noted that the northern boundary is more elevated as it borders the Magaliesberg.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 573 mm per year. The average maximum temperature for the study area ranges from 18.3 °C in June to 27.5 °C in January. The lowest temperatures occur during July when an average of 1.7 °C is reached during the night (SA Explorer accessed 24/10/2017).

The study area falls within the A21H Quaternary Catchment that forms part of the Crocodile (West) and Marico Management Area. The closest major river to the study area is the Swartspruit, a perennial river flowing roughly 1.5 km to the south of the area demarcated for prospecting.

5.2. Project description

The area demarcated for the prospecting of Shale/Brick Clay, Clay, Silica Sand, Sand and Aggregate covers an area of approximately 60.428 ha (Table 1 & Figure 3). Prospecting will initially consist of a high-level desktop study and potential desktop resource evaluation. Activities will include studying previous drilling, trenching, sampling and exploration data. Historical data and existing maps will be studied as well. Should the results of the desktop study be favourable, further exploration drilling, trenching and resource estimations will be performed on selected sites.

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Table 1: Property name & coordinates

Property	Portion	Map Reference (1:50 000)	Coordinates
Boekenhoutkloof 315 JR	36	2528CA	S: -25.688399 E: 28.063330
Boekenhoutkloof 315 JR	37	2528CA	S: -25.687947 E: 28.066328
Boekenhoutkloof 315 JR	38	2528CA	S: -25.691207 E: 28.064781
Boekenhoutkloof 315 JR	39	2528CA	S: -25.694705 E: 28.062592
Boekenhoutkloof 315 JR	40	2528CA	S: -25.694705 E: 28.064234
Boekenhoutkloof 315 JR	41	2528CA	S: -25.694800 E: 28.065400

6. LIMITATIONS AND ASSUMPTIONS

- The steps that were followed for modelling hydrologic characteristics in the area are based on freely obtainable national topographic map series data (1:50000) (NGI, 2017). This data is meant to be accurate on a rough scale, whereas the Boekenhoutkloof Mine of Klei Minerale is much smaller in area and consequently on a finer scale. This means that only high-level hydrological functions for an area of the scale 1:50000 could be ran as finer scale data is not currently publicly available.
- To obtain finer-scaled data, a surveyor needs to be appointed to survey and create data (topographical information containing z-values or height values in metre).

7. RESULTS AND FINDINGS

- To the north of the Boekenhoutkloof proposed prospecting area is the Magaliesberg. The mountain forms a separation between two catchment areas. As the gradient of the site is toward the south of the Magaliesberg, no impacts on surface water (explicitly excluding groundwater) in the northern catchment area is envisioned.
- The hydrologic functions ran for a digital elevation model (DEM) created from the 1:50000 topographical map series data of South Africa (grid reference 2528) showed that, based on elevation data, no major streams were expected to accumulate through or near the site.
- Data obtained from the Department of Water and Sanitation (DWS, 2017) showed that the Swartspruit (a former tributary of the Crocodile River (West) and now confluencing with the Hartbeespoort Dam) has its origin +/- 1.5 km south of the outer boundary of the Boekenhoutkloof proposed prospecting area.

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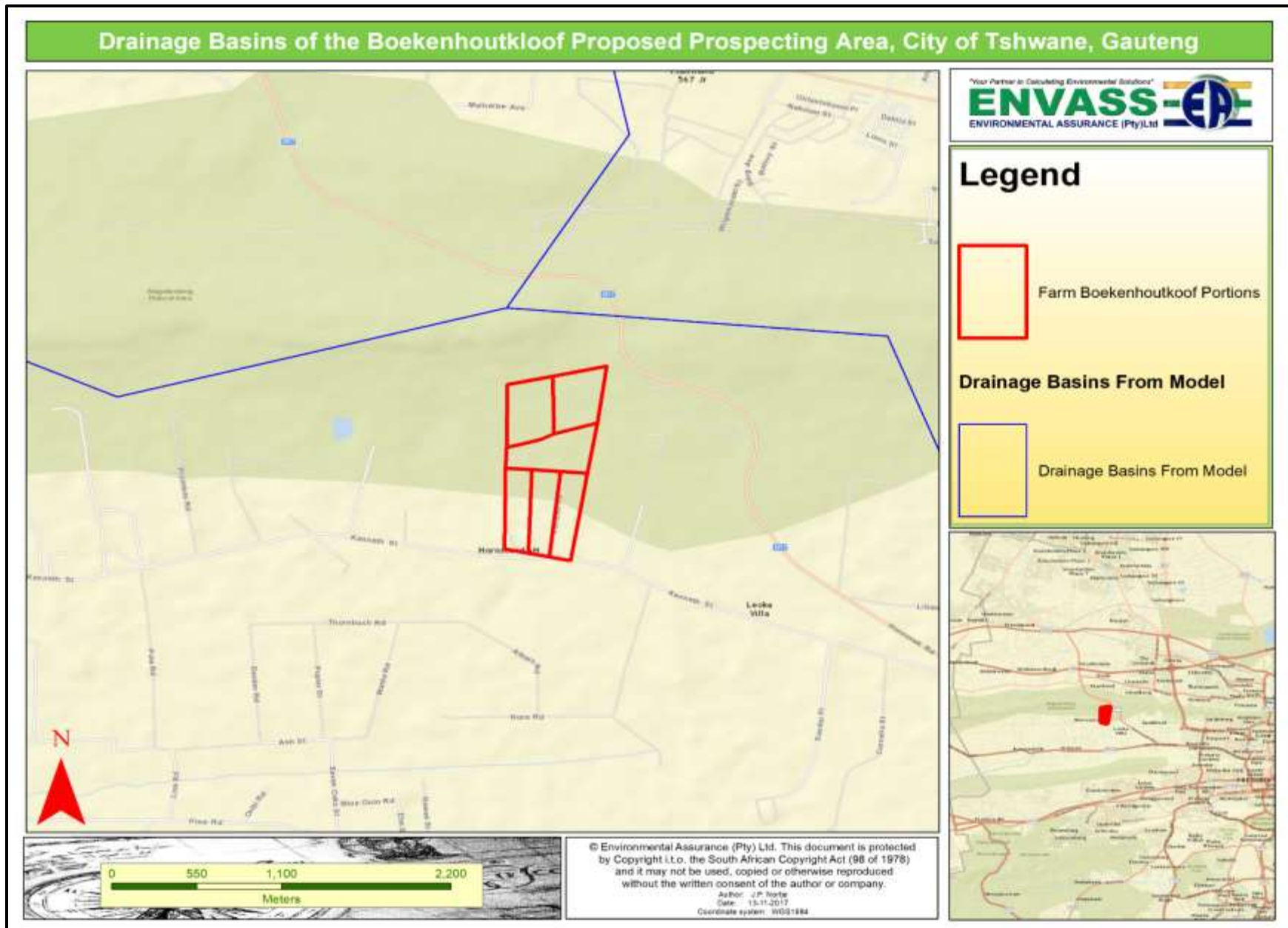


Figure 3: Drainage basins from hydrologic modelling

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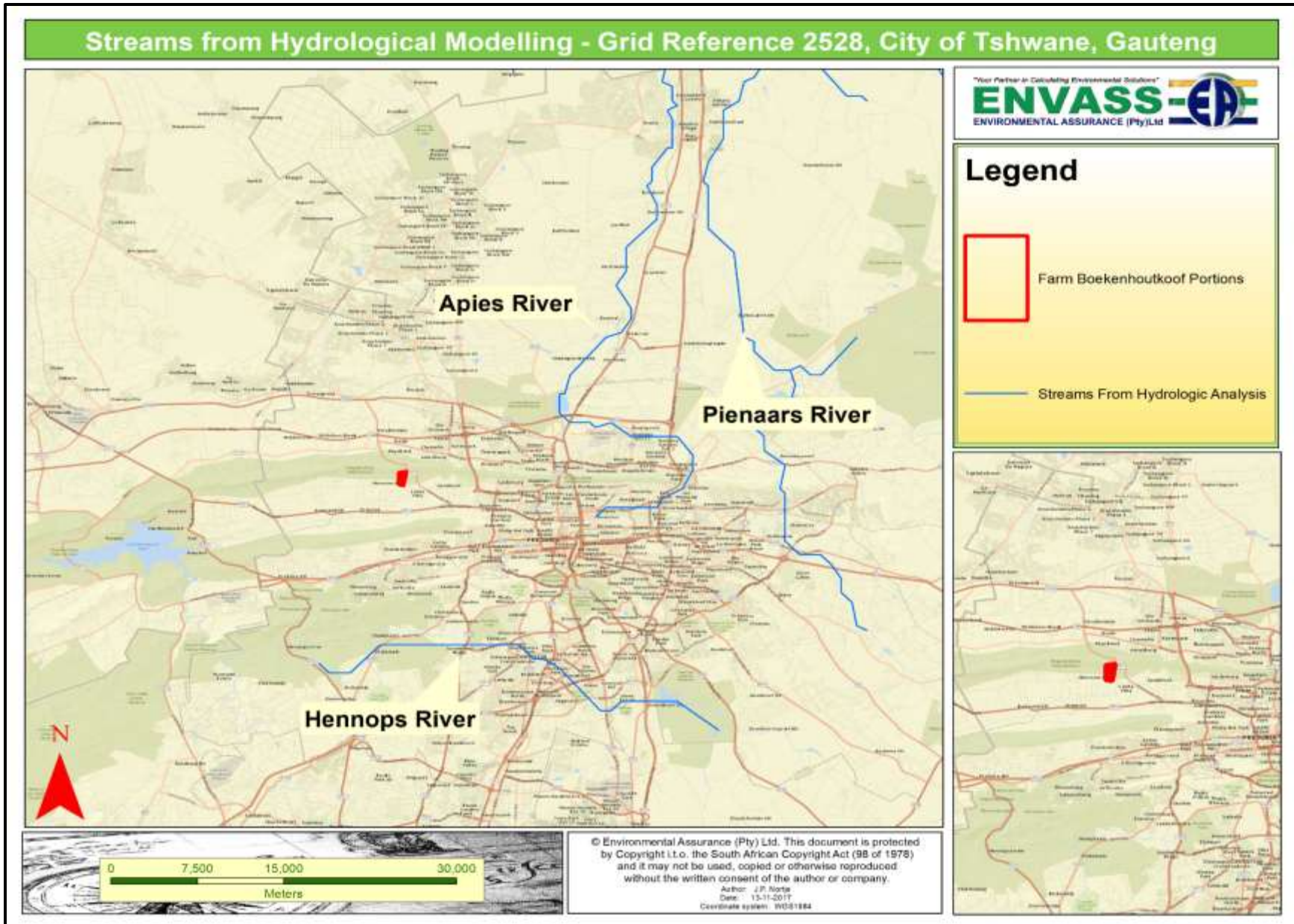


Figure 4: Streams (flow accumulation) from hydrologic modelling

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Streams from DWS in Comparison with Model - Grid Reference 2528, City of Tshwane, Gauteng

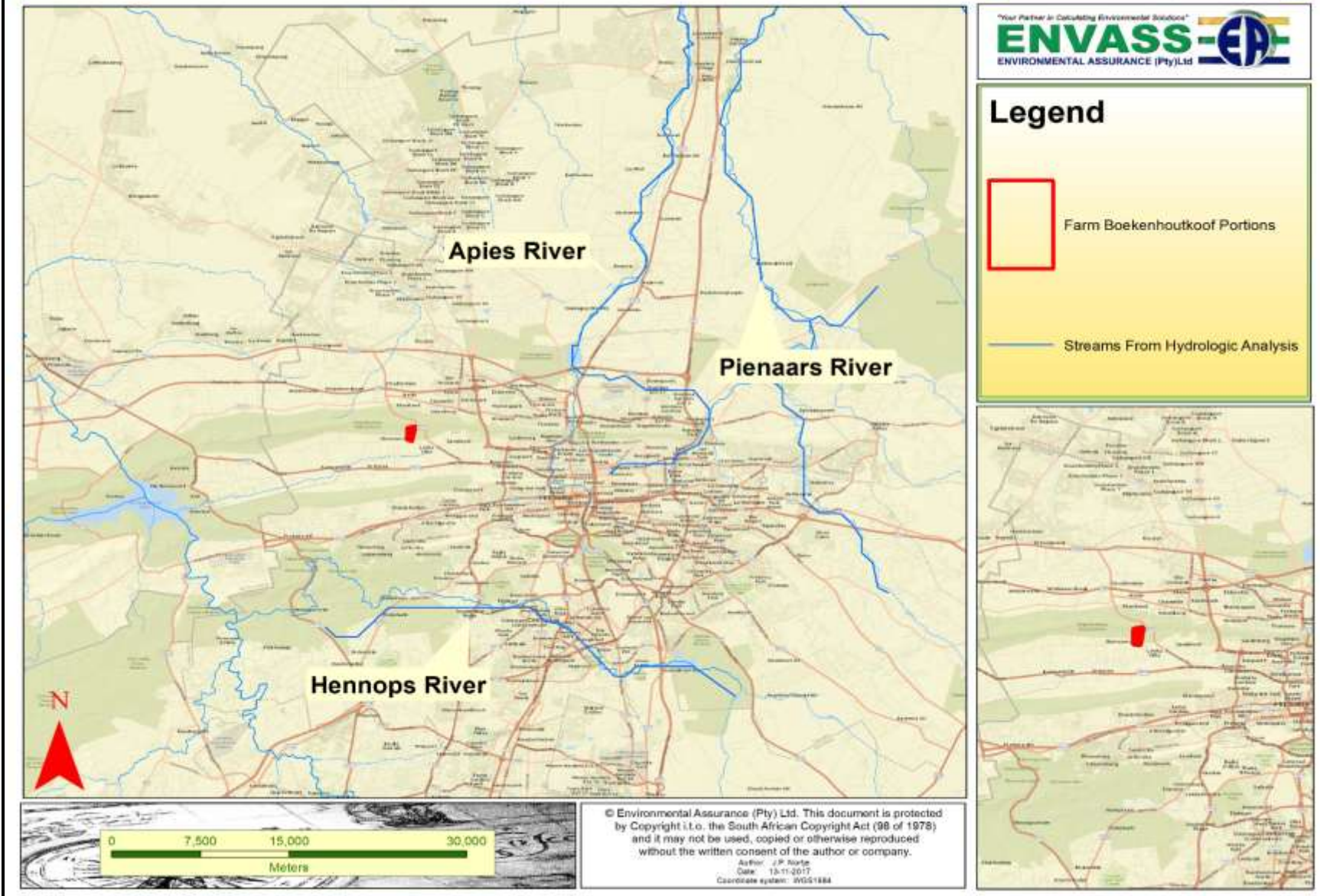


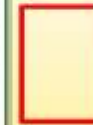
Figure 5: Streams from hydrologic modelling in comparison with actual streams (DWS, 2017)

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Proximity of the Swartspruit Downstream of Boekenhoutkloof, City of Tshwane, Gauteng



Legend



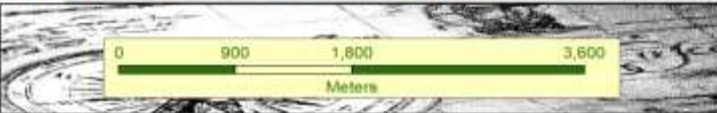
Farm Boekenhoutkloof Portions



Streams From Hydrologic Analysis



Swartspruit (1.5 km downstream of site)



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 Author: J.P. Nortje
 Date: 15-11-2017
 Coordinate system: WGS1984

Figure 6: Proximity of the Swartspruit to the proposed prospecting area

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8. INFORMATION FOR A STORMWATER MANAGEMENT PLAN

Klei Minerale (Pty) Ltd should make all effort to separate clean and dirty water on the site of the proposed prospection activities. A stormwater management plan (SMP) is recommended for this purpose. Please see information derived from this assessment that may assist in compiling a SMP for the site:

Clean and Dirty Catchment Identification and Separation:

- Stormwater will flow from north to south based on GIS results (basin delineation and flow accumulation);
- Clean stormwater will likely be generated to the east of the site (considering the area to the east is less disturbed);
- Dirty storm water is likely generated to the east of the site from the open cast mine on other portions of Boekenhoutkloof.
- The life of mine (LOM) of the opencast clay mine to the west of the site will influence the short to long-term water quality of runoff in the proposed area. The SMP should be planned accordingly.

9. CONCLUSION

The study area falls within the A21H Quaternary Catchment that forms part of the Crocodile (West) and Marico Management Area. The closest major river to the study area is the Swartspruit, a perennial river flowing roughly 1.5 km to the south of the area demarcated for prospecting. To the north of the Boekenhoutkloof proposed prospecting area is the Magaliesberg. The mountain forms a separation between two catchment areas. As the gradient of the site is toward the south of the Magaliesberg, no impacts on surface water (explicitly excluding groundwater) in the northern catchment area is envisioned.

The hydrologic functions ran for a digital elevation model (DEM) created from the 1:50000 topographical map series data of South Africa (grid reference 2528) showed that, based on elevation data, no major streams were expected to accumulate through or near the site. Data obtained from the Department of Water and Sanitation (DWS, 2017) showed that the Swartspruit (a former tributary of the Crocodile River (West) and now flowing into the Hartbeespoort Dam) has its origin +- 1.5 km south of the outer boundary of the Boekenhoutkloof proposed prospecting area.

10. RECOMMENDATIONS

From the results, findings and conclusion of this study, the proposed recommendations that follow for the area, are aimed at the management and prevention of impacts on surface water hydrology. Please note that these recommendations are for the attention of the environmental control officer (ECO) on site and that further recommendations from an engineer may be required.

- A Stormwater Management Plan (SMP) to be developed for the collective area under prospecting (or the existing SMP updated, where applicable for present and future activities) and should include the management of stormwater during

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excavation, as well as the installation of temporary stormwater and erosion control measures during prospecting followed up by rehabilitation of the area.

- Temporary stormwater management systems (such as sand bags) will be installed to prevent stormwater from entering or exiting the area under prospecting, which could result in silt laden surface water from draining into the valley south of the Magaliesberg below (origin of the Swartspruit in close proximity).
- The area under prospecting's slopes should be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scrub (hydrologic action by water that causes erosion). A maximum gradient of 1:3 is recommended.
- If necessary, temporary diversion channels should be constructed ahead of the emplacement areas and stockpiles (if relevant) to intercept clean run-off and divert it around disturbed areas into the natural drainage system downstream (down gradient) of the area under prospecting.
- All existing mined areas (where works are taking place) will be rehabilitated to control erosion and sedimentation over the surface area of the location under prospecting.
- Existing vegetation must be retained as far as possible to minimise erosion problems.
- Rehabilitation of the area under prospecting shall be planned and completed (after conclusion of the prospecting activities) in such a way that the run-off water (if any) will not cause erosion.
- Visual inspections shall be done on a regular basis with regard to the stability of the temporary water control structures, erosion and siltation (if required).
- Sediment-laden run-off from cleared areas should be prevented from entering rivers and streams;
- No river or surface water may be affected by silt emanating from the area under prospecting (especially aimed at prevention of siltation of the nearby Swartspruit).

These measures and recommendations should be included in the Environmental Management Programme.

Respectfully submitted,



J.P. Nortje, Pr.Sci.Nat
Electronic Copy Signed

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Appendix 8 : Ecological and Biodiversity Scan

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Revision:	0.0_Draft	Draft Basic Impact Assessment and Environmental Management	Author: Monica Niehof
Date:	December 2017	Programme	170

ECOLOGICAL REPORT

ECOLOGICAL SCAN FOR THE PROPOSED PROSPECTING ON PORTIONS 38, 39
and 40 OF THE FARM BOEKENHOUTKLOOF 315, GAUTENG PROVINCE

Submitted to:

Dr. Wika Esterhuizen
Safety, Health & Environmental Advisor
Klei Minerale (Pty) Ltd.
Email: wika@sabrix.co.za

Date: January 2018
Report Number: EBA-REP-186-17_18
Revision: 0.0

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PROJECT DETAILS

Responsible Person: L. Taylor

Reviewed by: J.P. Nortje, J. Schrijvershof




Physical address: 394 Tram Street, Nieuw Muckleneuk, 0181, Pretoria, Gauteng Province

Postal Address: PO Box 594, Hartbeespoort, 0216, North West Province

Telephone: 012 460 9768

E-mail: liezl@envass.co.za

Expertise of Specialist: B.Sc. (Hons) Wildlife Management (UFS), M.Sc. Environmental Ecology (5) (UP), Cand.Sci.Nat. (SACNASP 118084).

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Name	Liezl Taylor, Cand.Sci.Nat.	Joppie Schrijvershof, Cand.Sci.Nat.	Johan Nortje Pri.Sci.Nat.
Designation	Environmental Consultant	Environmental Consultant	Environmental Consultant and Divisional Coordinator
Signature			
Date	08-01-2018	09-01-2018	09-01-2018
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Statement of Competence

I, **Liezl Taylor**, in my capacity as an environmental consultant, hereby declare that I:-

- Act as an independent consultant;
- Do not have any financial interest in the undertaking of this project or projects, other than remuneration for the work performed in terms of the National Environmental Management Act 107 of 1998;
- Have and will not have vested interest in the proposed activity nor will I engage myself in any conflicting interest associated with this project;
- I undertake to disclose and provide to the competent authority any material or information at my disposal regarding this project as required in terms of National Environmental Management Act 107 of 1998;
- Based on the information provided to me by the client and in addition to information obtained during the course of this study, I have presented the results and conclusion with regard to this project to the best of my professional ability;
- I reserve the right to modify aspects pertaining to this study should additional information become available through ongoing research and further work on this field;
- I undertake to have my work peer reviewed on a regular basis by a competent specialist in the field of study;
- I am duly qualified and experienced to undertake the work at hand;
- I am compulsorily registered as a Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), registration number 118084.



Liezl Taylor (Cand. Sci. Nat.) Reg. 118084

Executive Summary

PURPOSE AND OBJECTIVE:

This document reports on an ecological scan completed for Klei Minerale (Pty) Ltd. – Boekenhoutkloof. The aim of this study is to provide guidance toward the possible incorrect removal of protected plants, the destruction of protected habitats and/or threatened fauna as well as to serve as a proactive management measure against ecological degradation that may be caused during the proposed prospecting for clay and sand mining purposes. This independent assessment forms part of the supporting documents of a prospecting rights application on Portions 38, 39 and 40 of the Farm Boekenhoutkloof Nr. 315 in the Gauteng Province.

The baseline ecological survey was conducted during a site visit on 20 November 2017. The study focus is to determine the current ecological state of the affected area, and how this might be affected during the construction, operational and decommissioning phases of the proposed project.

This report makes recommendation on how best to preserve *those observed* facets of ecological importance relevant to the study area.

The baseline survey included an ecological scan which specifically aimed to deliver the following scope of works:

- Habitat and community classification including description of ecological state of the property;
- Faunal and floral inventories for the property;
- Determine the presence of any red data species (fauna and flora) and the potential for such species to occur on the property;
- Delineate any sensitive areas found within the assessment site, e.g. wetlands and rocky outcrops; and
- Discuss the spatial significance of the property and provide recommendations for preventing and mitigating environmental impacts.

METHOD AND APPROACH:

The study approach was a desktop assessment from which the required background information related to the physical habitat as well as probable fauna and flora biodiversity lists were established. This was achieved by utilizing the SANBI BGIS interface approach, inclusive of;

- A field assessment to identified and record (if any) the tree, grass, forb and exotic species that occur on the property on the area for soil stripping.
- A Red Data List Assessment which identified (if any) listed plant species.

LEGAL REFERENCES:

- National Environmental Management Act of 1998 (Act 107 of 1998)
- National Water Act of 1998 (Act 36 of 1998)
- National Environmental Management: Biodiversity Act 2004 (Act No. 10 of 2004)

KEY FINDINGS:

The main conclusions of the report are summarized in the subsections below.

Sensitivity Status

The study site is situated within a sensitive environment, including in close proximity to the Magaliesberg Protected Natural Environment which is protected under the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003). In terms of the Gauteng Conservation Plan, certain areas of the study site are classified as Irreplaceable, and others are identified as Ecological Support Areas. The study site is also situated within the Magaliesberg Important Bird Area (IBA). And the northern section of the study site is situated on a Class 2 Ridge area.

Vegetation

The study area is regionally located within the Savanna Biome and associated with the Moot Plains Bushveld vegetation type (Mucina & Rutherford, 2006). During the field visit it was noted that the majority of the assessment site is still natural vegetation, with some areas transformed into homesteads. Refer to Section 5.2.2 for a full description of the species present. Several Alien Invasive Species were also recorded on site (Table 7).

Fauna

Based on the predominantly natural state of the study area, various vegetation suitable as faunal habitats were observed, especially towards the northern region of the site. Various bird fauna diversity was observed on the day of the assessment. The area of concern has the correct attributes to successfully house a variety of animal species, especially in the northern woodland area. Free species migration is possible, even though some habitat fragmentation occurs.

No red data flora or fauna species were found during the assessment.

Wetlands

No wetlands or associated watercourses are present on the study area.

KEY RECOMMENDATIONS:

- Care must be taken to reduce impacts on the adjacent properties through the implementation of all the mitigation measures proposed by the specialists;
- No vegetation clearance except for the removal of alien invasive species will be allowed;
- An Alien and Invasive Species Management Plan must be implemented;
- Alien and weed species encountered on the property should be removed in order to comply with existing legislation (National Environmental Management: Biodiversity Act 2004 (act no. 10 of 2004) [as amended in 2014] alien and invasive species regulations, 2014);
- All remaining indigenous vegetation should be conserved where possible;
- A suitably qualified specialist (ecologist) to accompany the site manager to demarcate areas for prospecting, in order to avoid damaging sensitive vegetation;
- Only vegetation falling directly into demarcated access routes or project sites should be removed;
- Strict management of clean and dirty water systems needs to be undertaken in line with Government Notice Regulation 704 of the National Water Act to prevent impacts on the surrounding area. This is to prevent established ecosystems, whether microbial or visible, to degenerate due to contaminated water entering surface or groundwater sources;
- Should any sensitive or Red Data animal or bird species be encountered during the construction, operation and decommissioning activities, these should be relocated to natural areas in the vicinity. Any sensitive fauna that are inadvertently killed during earthmoving operations should be preserved as museum voucher specimens;
- Reduce the levels of disturbance on areas indicated by the Environmental Control Officer (ECO) as migratory routes of animals to minimise the negative impact on biodiversity;
- Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed;
- Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance;
- No animal should be intentionally killed, caught or collected during any phase of the project;
- General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area;
- According to the Departmental Policy: Development Guidelines for Ridges (2001), a 200m buffer zone is required around class 2 ridges (Refer to Figure 22). Development proposals within the buffer zone should proceed at least to EIA stage;

- Any stormwater cut-off channels should be kept as a natural as possible with gentle slopes (angle 45° or less) on the side away from the prospecting activities. These channels should enable, small animals, reptiles and amphibians which have fallen into the channel accidentally to escape easily. If not, they could drown if the channels contain water or they may die of exposure when the channels are dry;
- For the safety of the animals it is not so much the width and depth of a drainage/storm water channel that are important, but the shape. If it has curved, smooth walls the animals that have fallen in will find it impossible to obtain purchase and will slip back time and time again and fall to the bottom of the channel. The channel must be designed in such a way as to prevent the smaller creatures from blundering in and dying. Safety features that could be incorporated into the drainage/storm water channel are the use of rough surfaces and rocks to allow trapped animals purchase, less curvature on the walls, a “step” in the slope of the wall and a “lip” along the edges of the channel which would either act as a deterrent to small animals or as an absolute physical barrier;
- Measures to prevent erosion should be implemented during all phases;
- During the Rehabilitation Phase, the following should be implemented:
 - All areas should be reshaped and levelled to resemble the pre-construction environment as far as possible.
 - All disturbed areas should be revegetated during the rehabilitation phase.
 - Re-profiling and sloping of areas at risk of erosion and incision as a result of construction activities should take place in order to maintain the ecological functionality of the area.

After conclusion of this Baseline Ecological Scan, it is the opinion of the ecologists that the northern portions (Portion 36 and 37) be excluded from the prospecting activities. The remaining portions may be utilised for prospecting purposes provided that the recommendations are adhered to.

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LIST OF ABBREVIATIONS AND ACCRONYMS

DWS:	Department of Water and Sanitation
DWAF:	Department of Water Affairs and Forestry
EcoMP:	Ecological Management Plan
EMPr:	Environmental Management Programme
EMPrPA:	Environmental Management Programme Performance Assessment
EMSM:	Environmental Monitoring Systems Manual
MAMSL:	Meters Above Mean Sea Level
LUDS:	Land Use Decision Tool
MAP:	Mean Annual Precipitation
NEMA:	National Environmental Management Act
IUA:	Integrated Units of Analysis
PES:	Present Ecological State
RHP:	The River Health Programme
SASS:	South African Scoring System
TEMP:	Temperature
WMA:	Water Management Area

1. INTRODUCTION

Environmental Assurance (Pty) Ltd. – hereafter referred to as “ENVASS” - was appointed by Klei Minerale (Pty) Ltd. – hereafter referred to as “Klei Minerale” to undertake an ecological baseline assessment for the remaining semi-natural area on Portions 38, 39 and 40 of the Farm Boekenhoutkloof 315 JR, where proposed prospecting is to take place (Refer to Figure 1). The site is situated approximately 10 km west of Pretoria, and falls within the City of Tshwane Metropolitan Municipality in the Gauteng Province.

2. OBJECTIVES OF THE ECOLOGICAL REPORT

This report focuses on the current ecological state of the region where the proposed prospecting area is located. This report makes recommendations on how best to preserve current facets of ecological importance, as observed during the assessment. It is consequently not to be seen as an impact assessment or audit report, but an objective baseline study of the ecology of the site.

This report will attempt to define the overall expected ecological impacts on the study area by assessing the resident fauna and flora within the associated habitat – with specific focus on the general impact(s) associated with prospecting activities. It will also provide a detailed summary of the findings and will assist in providing recommendations to management in order to minimise the impacts on the ecological resources of the area.

3. METHODOLOGY

This section details the different techniques and methods utilised to obtain the data for this report in order to assess the ecological integrity of the site based on the various inputs explained below.

3.1. Wetland Assessment

For the purpose of this assessment, wetlands are considered as those ecosystems defined by the National Water Act No. 36 of 1998 as:

“land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.”

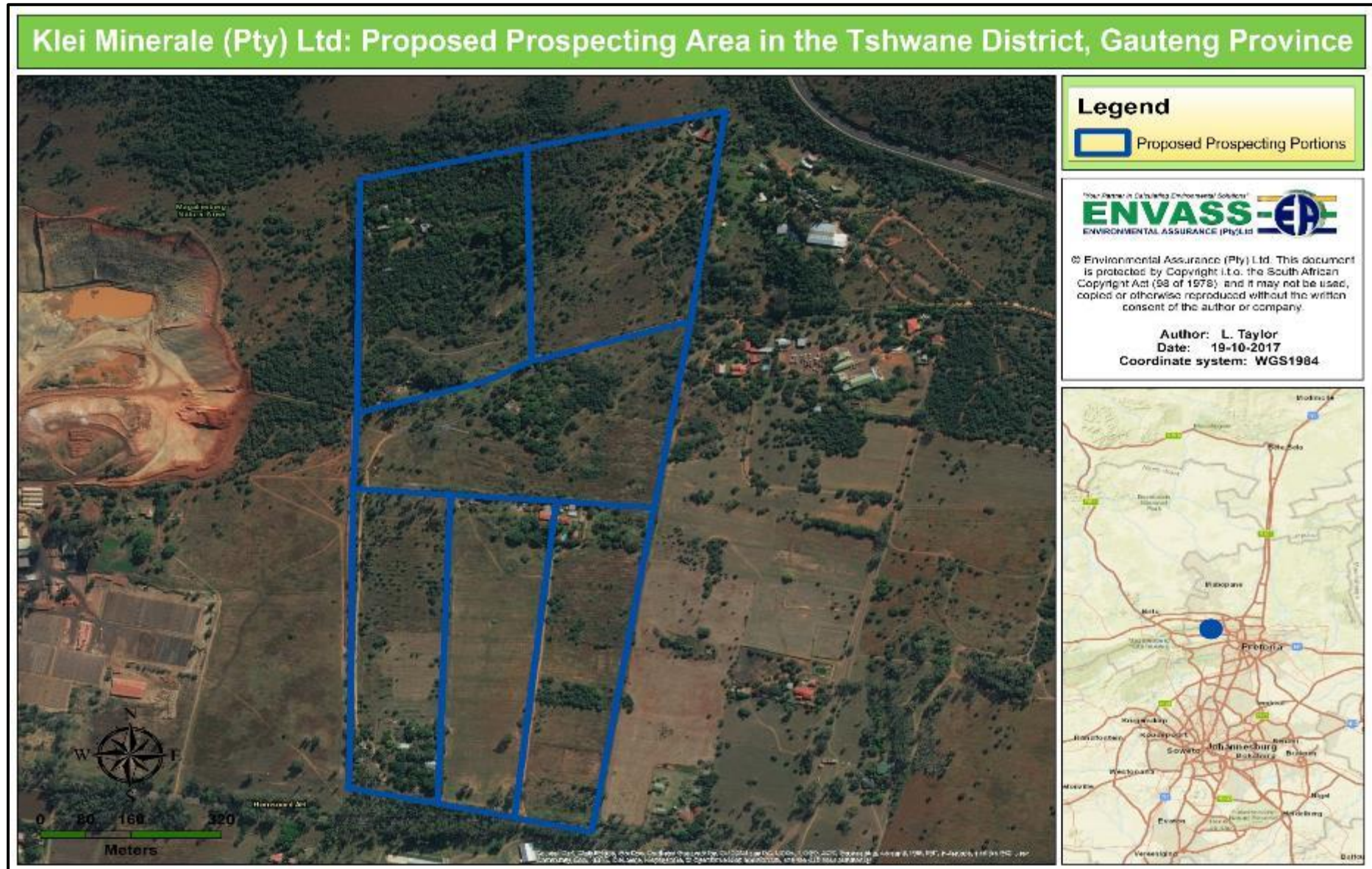


Figure 1: Locality Map of the Proposed Prospecting Site

3.1.1. Desktop Assessment

Examination of the National Freshwater Ecosystem Priority Areas (NFEPA)'s databases were undertaken for the proposed project. The NFEPA project aims to produce maps which provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. These strategic spatial priorities are known as Freshwater Ecosystem Priority Areas, or FEPAs. FEPAs are determined through a process of systematic biodiversity planning and involved collaboration of over 100 freshwater researchers and practitioners. They are identified based on a range of criteria dealing with the maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries (Macfarlane *et al.*, 2009).

The assessment of the study site involved the investigation of aerial photography, GIS databases including the NFEPA and South African National Wetland maps as well as literature reviews of the study site in order to determine the likelihood of wetland areas within this site.

The following data sources and GIS information provided in **Table 1** was utilised.

Table 1: Information used to inform the desktop wetland assessment.

Data	Use	Source
Latest and Historic Google Earth TM imagery	Used to assist with identifying potential areas within the study boundary for the presence of wetland systems.	Google Earth PRO TM On- line
River line	Mapping of watercourses outside of the study site.	Surveyor General
National Wetland Classification System	Assistance with information collection about the site and surrounding areas.	SANBI
National Freshwater Ecosystem Priority Area maps and database	Information gathering regarding the presence of FEPA wetlands on the site and within surrounding areas.	Water Research Commission, Implementation: Manual and Maps for FEPA area

3.2. Vegetation Assessment

A comprehensive study was carried out to document all species recorded in the area and to predict vegetation characteristics. This was augmented by a site visit and comprised of the following:

A walkover field survey of the site verifying the presence or absence of species predicted to occur on the site included:

- a. Identification and location of keystone or indicator species that may be impacted;
- b. Identify important habitats, including wetlands, grasslands and Savannah;
- c. Identify areas of conservation and/or ecological importance;
- d. Consider invasive alien plant status and rehabilitation potential of natural areas; and
- e. An overall condition of the vegetation found in the area, including an assessment of cover and vegetation structure and were classified as vegetation communities

3.2.1. Conservation Priority and Sensitivity

The vegetation types were evaluated in terms of conservation priority according to the following categories:

- **High:** Ecologically sensitive and valuable land with high species richness and/or sensitive ecosystems and/or red data species that should be conserved. No development is to be allowed.
- **Medium-high:** Land that is partially disturbed but that is generally ecologically sensitive to development / disturbances.
- **Medium:** Land on which developments with a limited / low impact on the vegetation / ecosystem can be considered. It is recommended that certain portions of the natural vegetation be maintained in open spaces.
- **Medium-low:** Land of which small sections could be considered to be conserved, but where the area in general has little conservation value.
- **Low:** Land that has little conservation value where development will have an insignificant or no impact on the vegetation.

Sensitivity Areas that are of High and Medium-high conservation priority are regarded as High sensitivity areas in which developments should not be allowed

Areas that fall in the Medium, Medium-low and Low conservation priority categories are regarded as Low sensitivity areas in which development may be allowed.

Areas where other environmental factors such as high erodibility and steep slopes that play a significant role are regarded as Moderate sensitivity areas. Developments can be allowed in these areas if suitable mitigation measures can be implemented.

3.2.2. Alien and Invasive Species

Alien and Invasive plants are described as species which are 'non-indigenous' to an area and which have been introduced from other countries either intentionally (for domestic or commercial use) or accidentally; furthermore, they have the ability

to reproduce and spread without the direct assistance of people into natural or semi-natural habitats and are destructive to biodiversity and human interests (WESSA-KZN, 2008).

The defining legislation on Alien and Invasive Species in South Africa is the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) and the Alien and Invasive Species Regulations (Government Notice Regulation No. 598) (As amended in 2016). Each species is assigned to one of three categories based on the level of threat posed by the species and the legal status assigned to each:

- **Category 1a** – Plant species that must be combatted or eradicated.
- **Category 1b** – Plant species that must be controlled.
- **Category 2** – Plant species that must not be allowed to spread outside any property.
- **Category 3** – Plant species that when occurring in riparian areas must be considered to be category 1b Listed Invasive Species and must be managed according to regulation 3 of NEM:BA.

3.3. Faunal Assessment

The faunal investigation was focused on mammals, reptiles, amphibians and bird species. The following methodology was applied:

3.3.1. Mammals, Reptiles and Amphibians

- The data sets discussed above under “sources of information” were collected/collated and examined to determine the focus species for this study;
- The data was examined to determine the possible occurrence of any Red Data and non-Red Data species;
- The site was comprehensively assessed during a field investigation to determine fauna and faunal micro habitats present within the site. This included:
 - All animals (mammals, reptiles and amphibians) seen or heard; were recorded.
 - Use was also made of indirect evidence such as animal tracks (footprints, droppings and various burrow types) to identify animals.
 - Reptiles were actively searched for under suitable refuges such as loosely embedded flat rocks, logs and stumps and identified by actual specimens observed.
- Information was supplemented by historical records, personal accounts from residents within the study area and a comprehensive literature review; and
- The impacts of the proposed study on faunal species were predicted and mitigation measures were proposed.

3.3.2. Avifauna (Birds Species)

Generally, when predicting the impacts of a proposed study on birds, a combination of science, field experience and knowledge from the specialist is required. More specifically the methodology used to predict impacts of the proposed mine was as follows:

- The various data sets discussed above under “sources of information”, were collected/collated and examined with the aim of determining the focal species for this study.
- The data were examined to determine the location and abundance of species which may be susceptible to impacts from the proposed mine including both Red Data and non-Red Data species.
- The broader study area was visited during a one-day site visit. The site was thoroughly traversed to obtain a first-hand perspective of the proposed study, and to determine which bird micro habitats are present within the study site. This involved walking, taking photographs, and the use of bird call playbacks to identify bird life present within the proposed study area. Further to this, the observation of feathers and nests were used as species identification tools.
- All opportunist sightings were recorded throughout the study area.
- Avian micro-habitats and sensitive habitats for avifaunal communities were identified and mapped.
- The impacts of the proposed study on the avifaunal populations were then predicted by analysing data on impacts on wildlife around mining areas throughout South Africa.
- The likely occurrence of key avifaunal species was verified according to avifaunal distribution records obtained from the current SABAP2 project which commenced on 1 July 2007.

4. BACKGROUND INFORMATION AND DESKTOP ASSESSMENT

4.1. Surrounding Land Uses

The predominant land uses identified on the day of the assessment for the study area and surrounds included mining, industrial and residential areas, permanent agricultural holdings homesteads and informal settlements. The Klei Minerale Boekenhoutkloof mine and brick-making plant is situated to the West of the study area, Earlybird Poultry Farm to the South, and the Magaliesberg Natural Protected Area lies directly North of the study site. Situated approximately one-kilometre (1 km) East is the Klei Minerale Zandfontein Mine and brick-making plant. The land has been significantly disturbed by agriculture and mining activities, however, in the northern region large areas of natural land is protected.

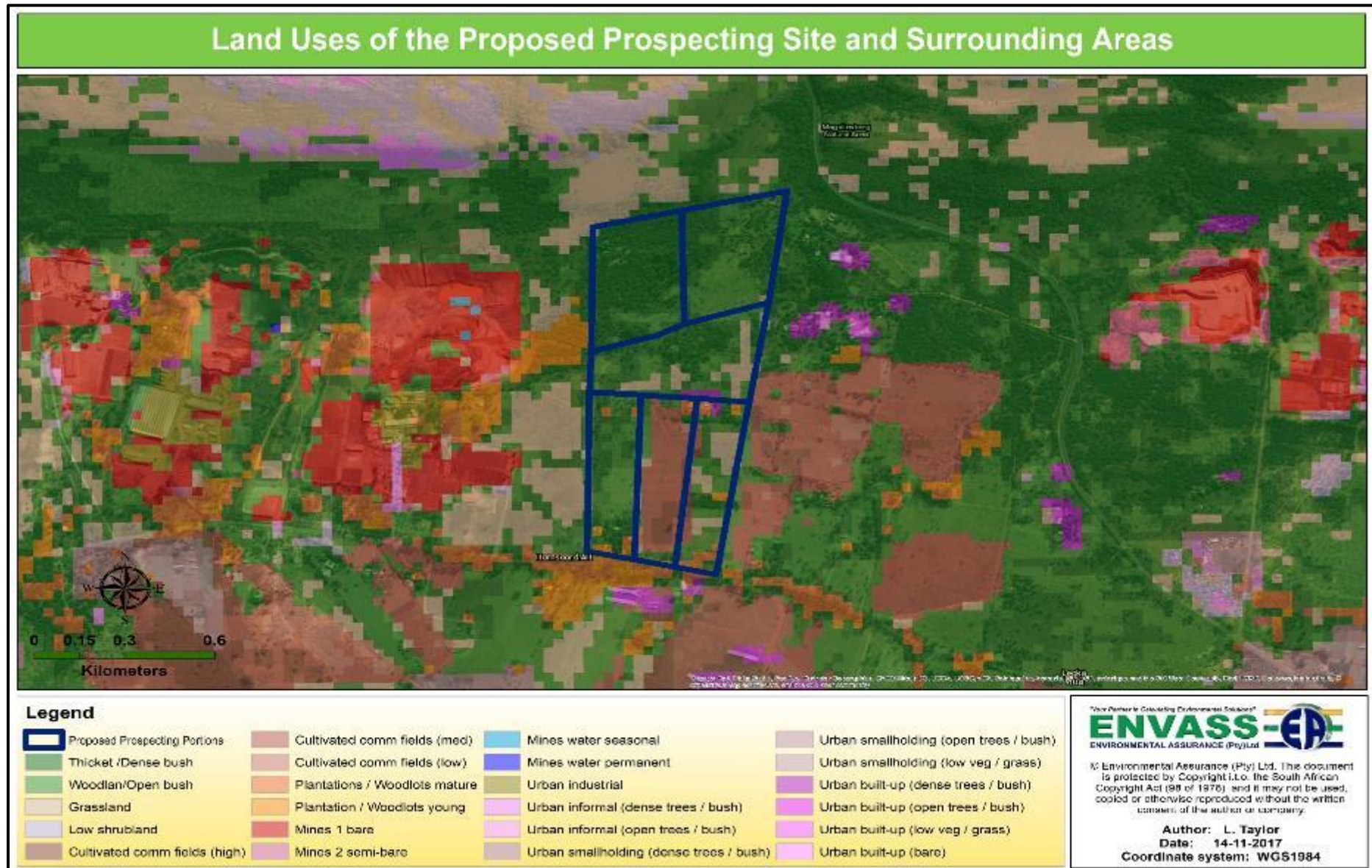


Figure 2: Surrounding Land Uses

4.2. Current Status

The proposed prospecting site is situated to the east of the existing Boekenhoutkloof operations. The area consists mostly of natural vegetation with a few residential houses and their associated structures present. The study site falls on six (6) portions of land. Each contains houses and their associated structures. The main land use is residential, with roads, fences and power lines present on site. The following figures show views of the site from different angles.



Figure 3: Natural veld make up the central part of the study site, towards the north more woodland vegetation is evident along the ridge.



Figure 4: Residential houses on small holdings (Portion 39) and their associated infrastructure.



Figure 5: Natural veld towards the north-western part of the site



Figure 6: View from Portion 39 towards the North of the proposed site.



Figure 7: Residential houses on small holdings and their associated infrastructure.



Figure 8: Natural veld towards the southern part of the site.



Figure 9: Maize crops on the site towards the South.



Figure 10: Natural open veld towards the west (eastern fence of Boekenhoutkloof).



Figure 11: Roads and Residential fence walls on the northern portions of the site.



Figure 12: Roads on the northern portions near houses.



Figure 13: Ridge areas towards the North-western region of the site



Figure 14: Ridge areas on the Northern region of the site

4.3. Ecoregion

According to the delineation provided by Dallas (2005), the Level 1 Ecoregions of the area, are the Western Bankenveld (7) and Bushveld Basin (8) (Figure 15).

The Western Bankenveld region consist of a complex topography, varying from lowlands, hills and mountains to closed hills and mountains and relief ranging from moderate to high (Kleynhans *et al.* 2005). Mixed bushveld is the most definitive vegetation type, with several other Bushveld and Grassland types occurring in the region. This ecoregion measures approximately 19 365.5 km² in size. The Marico-, the Crocodile- (west), the Elands- (west) and the Pienaars river traverse this region and the perennial tributary of the Sand River has its source in the northern part of the ecoregion. Table 2 summarises the Western Bankenveld ecoregion environment

Table 2: Western Bankenveld Ecoregion Attributes (Department of Water Affairs, 2012)

Main Attributes	Western Bankenveld
Terrain morphology: Broad division (dominant types in bold) (Primary)	Plains; Low Relief; Plains; Moderate Relief; Lowlands; Hills and Mountains; Moderate and High Relief; Open Hills; Lowlands; Mountains; Moderate to High Relief; Closed Hills; Mountains; Moderate and High Relief;
Vegetation types (Dominant types in bold) (Primary)	Waterberg Moist Mountain Bushveld; Mixed Bushveld;

Main Attributes	Western Bankenveld
	Kalahari Plains Thorn Bushveld (limited); Clay Thorn Bushveld; (limited) Rocky Highveld Grassland; Dry Clay Highveld Grassland; (limited)
Altitude (m.a.m.s.l) (secondary)	900-1700
MAP (mm) (modifying)	400 to 700
Coefficient of Variation (% of annual precipitation)	20 to 35
Rainfall concentration index	60 to >65
Rainfall seasonality	Early to mid-summer
Mean annual temp. (°C)	14 to 22
Mean daily max temp. (°C) February	24 to 32
Mean daily max temp. (°C) July	14 to 24
Mean daily min. temp. (°C): February	12 to 20
Mean daily min. temp. (°C): July	0 to 6
Median annual simulated runoff (mm) for quaternary catchment	20 to 80, 80 to 100 (limited)

Kleynhans *et al.* (2005) describes the Bushveld Basin a region consisting predominantly of plains with a low relief. Mixed bushveld is the definitive vegetation type, while in the eastern area, plains with a moderate relief and lowlands with a moderate relief occur. The Bushveld Basin ecoregion measures approximately 32 460.1 km² in size. Several perennial rivers traverse the region, including the Olifants, Marico, Crocodile (West), Elands (West) and Pienaars. **Table 3** summarises the Bushveld Basin ecoregion environment:

Table 3: Bushveld Basin Ecoregion Attributes (Department of Water Affairs, 2012)

Main Attributes	Bushveld Basin
Terrain morphology: Broad division (dominant types in bold (Primary))	Plains; Low Relief; Plains; Moderate Relief; Lowlands; Hills and Mountains: Moderate and High Relief;

Main Attributes	Bushveld Basin
	Open Hills; Lowlands; Mountains: Moderate to High Relief; Closed Hills; Mountains: Moderate and High Relief (limited)
Vegetation types (Dominant types in bold) (Primary)	Mixed Bushveld ; Clay Thorn Bushveld; Waterberg Moist Mountain Bushveld (limited)
Altitude (m.a.m.s.l) (secondary)	700-1700 (1700-1900 very limited)
MAP (mm) (modifying)	400 to 600
Coefficient of Variation (% of annual precipitation)	25 to 35
Rainfall concentration index	55 to >65
Rainfall seasonality	Early to mid-summer
Mean annual temp. (°C)	14 to 22
Mean daily max temp. (°C) February	22 to 32
Mean daily max temp. (°C) July	14 to 24
Mean daily min. temp. (°C): February	12 to 20
Mean daily min. temp. (°C): July	0 to 6
Median annual simulated runoff (mm) for quaternary catchment	20 to 100

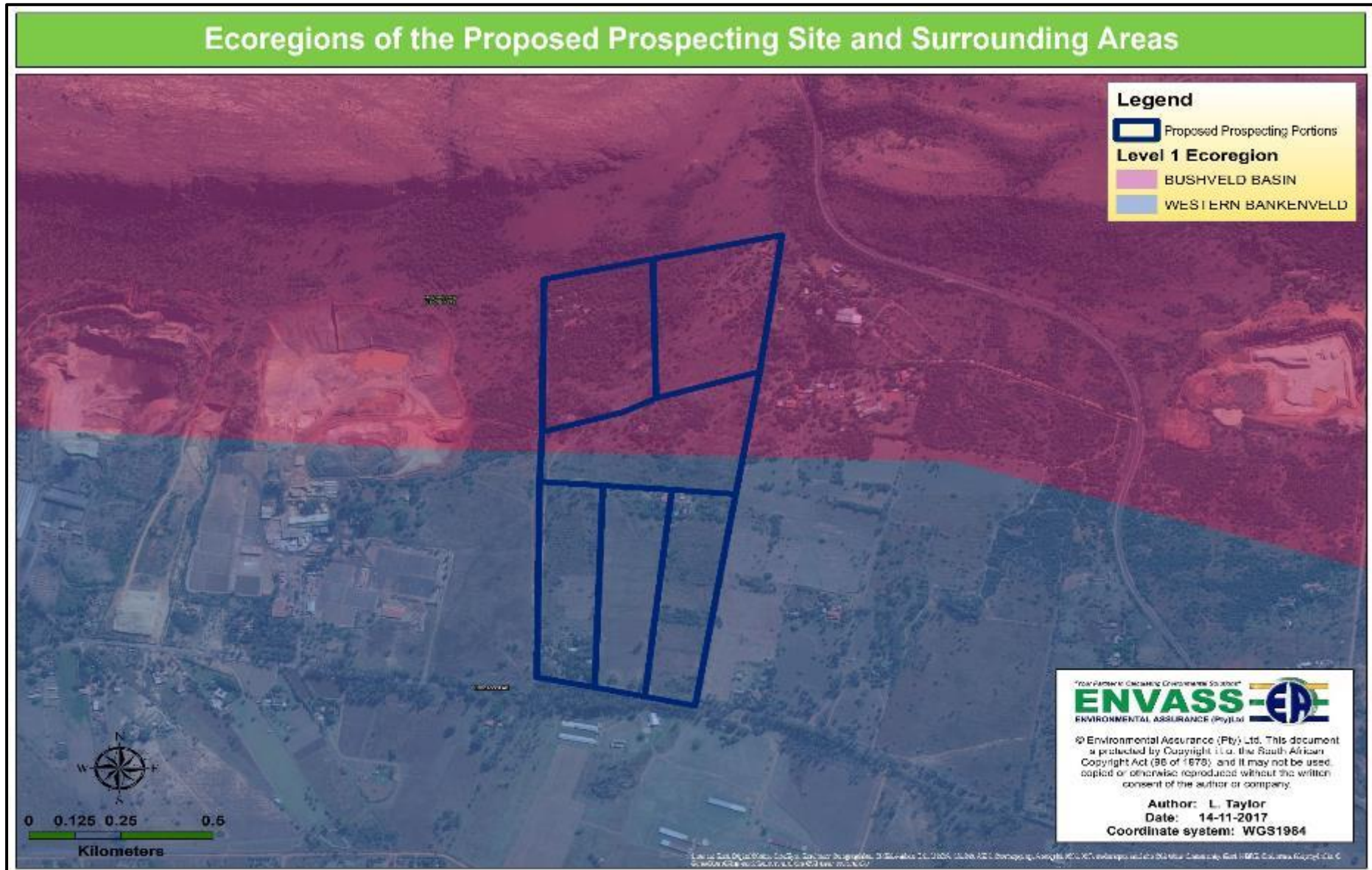


Figure 15: Ecoregions of the Proposed Prospecting Site

4.4. Quaternary Catchments and Associated Watercourses

The study area falls within the A21H Quaternary Catchment (**Figure 16**), and forms part of the newly formed Limpopo Water Management Area (WMA) (DWS 2016). The area previously fell within the Crocodile (West) and Marico Water Management Area (WMA), however, the Crocodile (West), Marico and Luvuvhu catchments were consolidated in the Limpopo WMA as per the Second Edition of the National Water Resource Strategy (NWRS-2, 2012).

4.5. The Biotic Environment

The natural characteristics and ecological importance of the various biotic ecosystems are described in the segments below.

4.5.1. Vegetation and Ecosystems

The proposed site for prospecting falls within the Savanna Biome (Mucina & Rutherford 2006), which is characterised by strong summer rainfall and dry winters. The Savanna Biome mainly comprises of an herbaceous layer dominated by grass species and a discontinuous to sometimes very open tree layer. Biomes are further divided into bioregions, which are spatial terrestrial units possessing similar biotic and physical features, and processes at a regional scale. The study area is situated within the Central Bushveld Bioregion and the Moot Plains Bushveld (SVcb 8) vegetation type (**Figure 17**). The northern portions of the study site are situated on an ecotone (a transitional area between two vegetation types or plant communities). This ecotone therefore consists of species from both Moot Plains Bushveld and Gold Reef Mountain Bushveld (SVcb9), however, the Gold Reef Mountain Bushveld will not be discussed in detail as the majority of the site is not situated within it. This vegetation type is Least Threatened with 22% of the 24% target already conserved, mainly in the Magaliesberg Nature Area. The succulent shrub *Aloe peglerae* and the succulent herb *Frithia pulchra* are both endemic to this vegetation type (Mucina & Rutherford 2006). The following species are known to occur within the Gold Reef Mountain Bushveld:

Small Trees

- *Acacia caffra*
- *Combretum mole*
- *Protea caffra*
- *Celtis africana*
- *Dombeya rotundifolia*
- *Englerophytum magalismontanum*
- *Ochna pretoriensis*
- *Rhus leptodictya*
- *Vangueria infausta*

Low Shrubs

- *Athrixia elata*
- *Pearsonia cajanifolia*
- *Rhus magalismontana* subsp. *magalismontana*
- *Rhus rigida* var. *rigida*

Woody Climber

- *Ancylobotrys capensis*

Graminoids

- *Loudetia simplex*
- *Panicum natalense*

- *Tristachya leucothrix*

Herbs

- *Helichrysum nudifolium*
- *Helichrysum rugulosum*
- *Pentanisia angustifolia*
- *Senecio venosus*
- *Xerophyta retinervis*

Geophytic Herbs

- *Cheilanthes hirta*
- *Hypoxis hemerocallidea*

- *Vangueria parvifolia*
- *Ziziphus mucronata*
- Tall Shrubs**
- *Grewia occidentalis*
- *Canthium gilfillanii*
- *Mystroxydon aethiopicum* subsp. *burkeanum*
- *Ehretia rigida* subsp. *rigida*
- *Gymnosporia buxifolia*
- *Schizachyrium sanguineum*
- *Trachypogon spicatus*
- *Alloteropsis semialata* subsp. *eckloniana*
- *Bewsia biflora*
- *Digitaria tricholaenoides*
- *Diheteropogon amplexans*
- *Sporobolus pectinatus*
- *Tristachya biseriata*
- *Pellaea calomelanos*

The main vegetation belt of the Moot Plains Bushveld occurs in the North-West and Gauteng Provinces, immediately south of the Magaliesberg from the Selons River Valley in the west through Maanhaarrand, filling the valley bottom of the Magalies River, proceeding east of the Hartbeestpoort Dam between the Magaliesberg and Daspoort mountain ranges to Pretoria (Mucina & Rutherford 2006). The Moot Plains Bushveld vegetation is classified as Vulnerable, with about 13% conserved in the statutory Magaliesberg Nature Area. Approximately 28% has been transformed by cultivation, urbanisation, and built-up areas. The following species are known to occur within this vegetation type (Mucina & Rutherford 2006):

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> <li style="text-align: center;"><u>Small Trees</u> • <i>Acacia nilotica</i> • <i>Acacia tortilis</i> subsp. <i>heteracantha</i> • <i>Rhus lancea</i> | <ul style="list-style-type: none"> <li style="text-align: center;"><u>Succulent Shrub</u> • <i>Kalanchoe paniculata</i> <li style="text-align: center;"><u>Woody Climber</u> • <i>Jasminum breviflorum</i> <li style="text-align: center;"><u>Graminoids</u> • <i>Heteropogon contortus</i> • <i>Cynodon dactylon</i> • <i>Setaria sphacelata</i> • <i>Themeda triandra</i> • <i>Aristida congesta</i> • <i>Chloris virgata</i> • <i>Sporobolus nitens</i> | <ul style="list-style-type: none"> <li style="text-align: center;"><u>Herbs</u> • <i>Achyrocline satureioides</i> • <i>Corchorus asplenifolius</i> • <i>Evolvulus alsinoides</i> • <i>Helichrysum nudifolium</i> • <i>Helichrysum undulatum</i> • <i>Hermannia depressa</i> • <i>Osteospermum muricatum</i> • <i>Phyllanthus maderaspatensis</i> |
| <ul style="list-style-type: none"> <li style="text-align: center;"><u>Tall Shrubs</u> • <i>Buddleja saligna</i> • <i>Euclea undulata</i> • <i>Olea europaea</i> subsp. <i>africana</i> • <i>Grewia occidentalis</i> • <i>Gymnosporia polyacantha</i> • <i>Mystroxydon aethiopicum</i> subsp. <i>burkeanum</i> | | |
| <ul style="list-style-type: none"> <li style="text-align: center;"><u>Low Shrubs</u> | | |

- *Aptosimum elongatum*
- *Felicia fascicularis*
- *Lantana rugosa*
- *Teucrium trifidum*
- *Tragus racemosus*
- **Herbaceous Climber**
- *Lotononis bainesii*

4.5.2. Geology and Soils

The most significant rock formations of the area include Clastic sediments and minor carbonates and volcanics of the Pretoria Group, including the Silverton Formation, and some Malmani dolomites in the west. All of which are from the Transvaal Supergroup (Vaalian) (Mucina & Rutherford 2006). Soils are often stony with colluvial clay-loam but varied, and are typical of the Ae, Ba, Ea, Bc, Ac and less typical Fb land types.



Figure 16: Quaternary Catchments

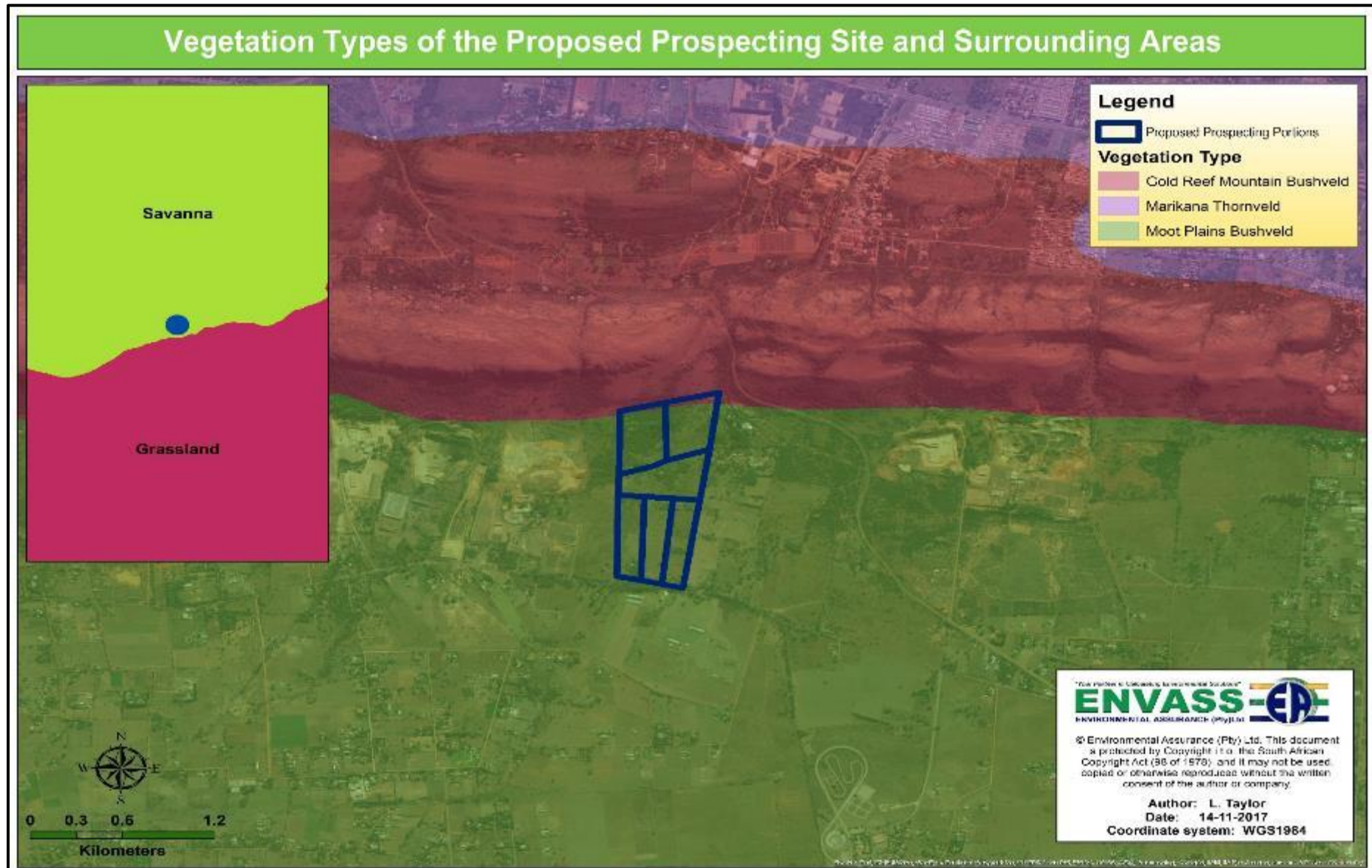


Figure 17: Vegetation Classification

4.6. Sensitivity Status

4.6.1. Protected Areas

The proposed site falls within the Magaliesberg Protected Natural Environment (**Figure 18**). This area has been protected under the Environment Protection Act since 1977 and more recently under the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003). Private landowners retain ownership; however, they are bound by restrictions on development. The Magaliesberg Protected Natural Environment is known to local landowners as the 'green belt' and all development is under the strict scrutiny of both provincial and national authorities.

4.6.2. Critical Biodiversity Areas

The Gauteng Conservation Plan 3.3 (2014) (C-Plan) focusses on the mapping and the management of biodiversity priority areas within the Gauteng Province. This conservation plan consists of Protected Areas, Important Sites and Irreplaceable Areas based on the presence of Red Data Species, Endemic Species and potential habitat for these species. Irreplaceable areas are essential in meeting targets set for the conservation of biodiversity in Gauteng Province. These areas, along with Ecological Support Areas (ESAs) are highly sensitive, and must be protected from transforming land uses.

Certain areas of the study site are classified as Irreplaceable, and others are identified as Ecological Support Areas in terms of the Gauteng Conservation Plan 3.3, 2014 (**Figure 19**). Irreplaceable areas have no replacements, and areas characterized by high irreplaceability values and high vulnerability ratings should receive priority conservation action.

4.6.3. Important Bird Areas

The study site is situated within the Magaliesberg Important Bird Area (IBA) (**Figure 20**). Most of this IBA falls within the Magaliesberg Protected Natural Environment. Previously known as the Magaliesberg and Witwatersberg IBA, this IBA consists mainly of the Magaliesberg range, which extends in an arc from just north-west of Rustenburg in the west to the N1 in the east near Pretoria (www.birdlife.org). To the south, the Witwatersberg range runs parallel to the Magaliesberg, extending from the town of Magaliesburg in the west to Hartbeespoort Dam in the east.

The most important trigger species in the IBA is the globally threatened Cape Vulture (*Gyps coprotheres*) which breeds at Nooitgedacht and at Skeerpoort. The Secretarybird is the other globally threatened species in the IBA. Regionally threatened species are Lanner Falcon (*Falco biarmicus*), Half-collared Kingfisher, African Grass Owl, African Finfoot and Verreaux's Eagle. Biome-restricted species include White-bellied Sunbird (*Cinnyris talatala*), Kurrichane Thrush (*Turdus libonyanus*), White-throated Robin-chat (*Cossypha humeralis*), Kalahari Scrub Robin (*Erythropygia paena*) and Barred Wren-Warbler.

The most important threat to the trigger species in this IBA is the expansion of commercial, recreational and housing developments, which have decreased the area of land available for wild ungulates and domestic livestock, and hence the availability of food for vultures (www.birdlife.org). Collisions with man-made structures such as power lines is also a concern.

4.6.4. Ridges

Ridges are regarded as ecologically sensitive and must be protected from transforming land uses. The term “ridge” loosely refer to hills, mountains, koppies, gorges, etc. A Ridge is defined by the slope of the site. Any topographic feature in the landscape that is characterized by slopes of 5° or more (i.e. > 8.8%, > 1 in 11 gradient), as determined by means of a GIS digital elevation model, constitutes a ridge. According to the Departmental Policy: Development Guidelines for Ridges, all ridges in Gauteng have been classified into four classes based on the percentage of the ridge that has been transformed, mainly through urbanization, using the 1994 CSIR/ARC Landcover data.

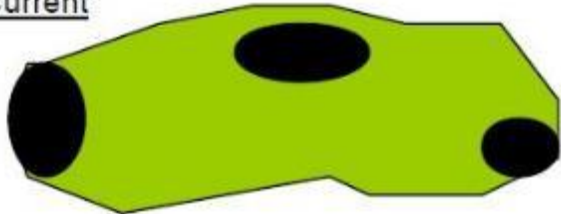
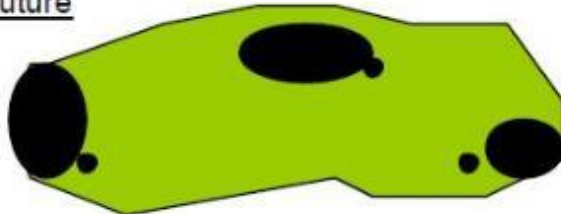
The Importance of Ridges:

- Ridges form biodiversity hotspots - They provide resources needed for survival, reproduction and movement, and ideal refuges for wildlife in an urbanized landscape.
- Ridges provide vital habitat for many threatened, rare and endemic species of fauna and flora.
- Invertebrates are reliant on hilltops as thermal refugia from winter cold air drainage. Ridges provide important habitat required for the completion of the life cycles of many invertebrates, many of which provide essential ecosystem services (e.g. pollination).
- Ridges form naturally existing corridors that can functionally interconnect isolated natural areas and therefore play an important role in wildlife dispersal.
- Other ecological processes associated with ridges, which are important for the maintenance and generation of biodiversity, include evolutionary processes, hydrological processes and pollination.
- Ridges provide aesthetically pleasing environments for the surrounding inhabitants and attract tourists and recreational users.

The northern section of the study site is situated on a Class 2 Ridge area (**Figure 21**). The Departmental development policy for ridges in Gauteng provided the following development guidelines w.r.t. Class 2 Ridge areas (Table 4):

Table 4: Policy Guideline for Developments within Class 2 Ridge Areas (Development Guidelines for Ridges 2001).

Ridge Type	% of Gauteng Ridges	Policy
Class 2 (5-35% transformed) includes parts of Magaliesberg, World Heritage site, Klipriviersberg, Bronberg, Skurweberg	40%	No further subdivisions will be allowed and consolidation of subdivisions will be encouraged. No-go development policy; low impact (e.g. tourism developments) will be considered requiring full EIA (including public participation exercise) with full set of specialist reports including (but not limited to): <ul style="list-style-type: none"> • An ecological study, including both functional (ecological processes including connectivity function of

Ridge Type	% of Gauteng Ridges	Policy
		<p>ridge at a landscape level perspective) and compositional (biodiversity) aspects</p> <ul style="list-style-type: none"> • A Red Data study for both fauna and flora • An invertebrate study • A hydrological / geohydrological study • A geotechnical study • A pollution study, including both air and water pollution • A social study, including cultural, historical and open space value aspects • A visual study • A study of service provision and access <p>All specialist studies to examine cumulative impacts.</p> <p>Ecological footprint² of low impact developments to cover no more than 5% of a property. All impacts for these developments must be sufficiently mitigated. A management plan to maintain the ecological integrity of remaining property is required and implementation is the responsibility of the developer.</p> <p>A 200m buffer zone¹ of low impact development is required around class 2 ridges. Development proposals within the buffer zone should proceed at least to the mini EIA stage.</p> <p>DACEL undertakes to conduct Strategic Environmental Assessments for these ridge systems.</p>
<p><u>Current</u></p> 		<p><u>Future</u></p> 
<p> Undeveloped/untransformed Developed/transformed </p>		

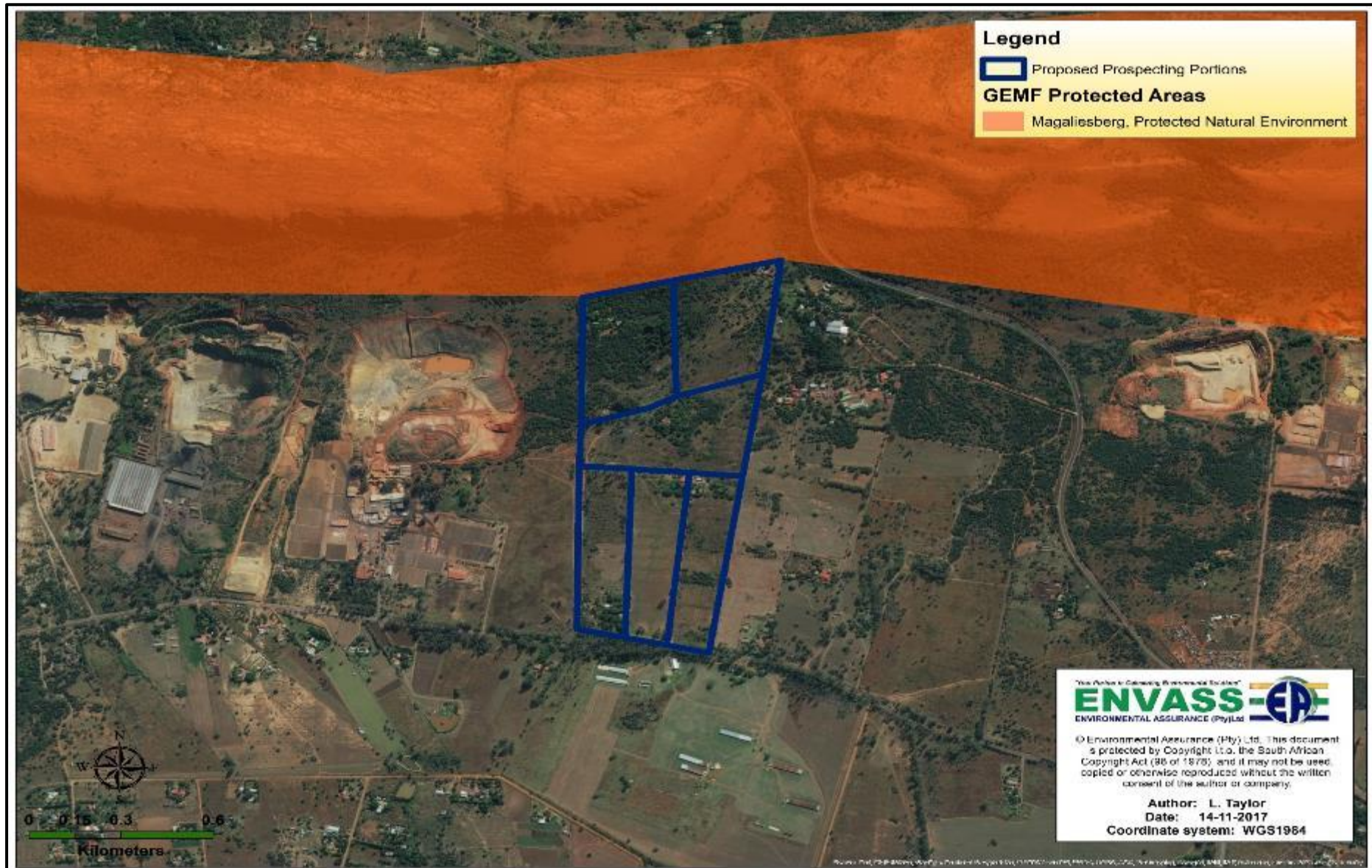


Figure 18: Protected Areas in accordance with the Gauteng Province Environmental Management Framework (GEMF) associated with the Proposed Prospecting Site and Surrounding Areas

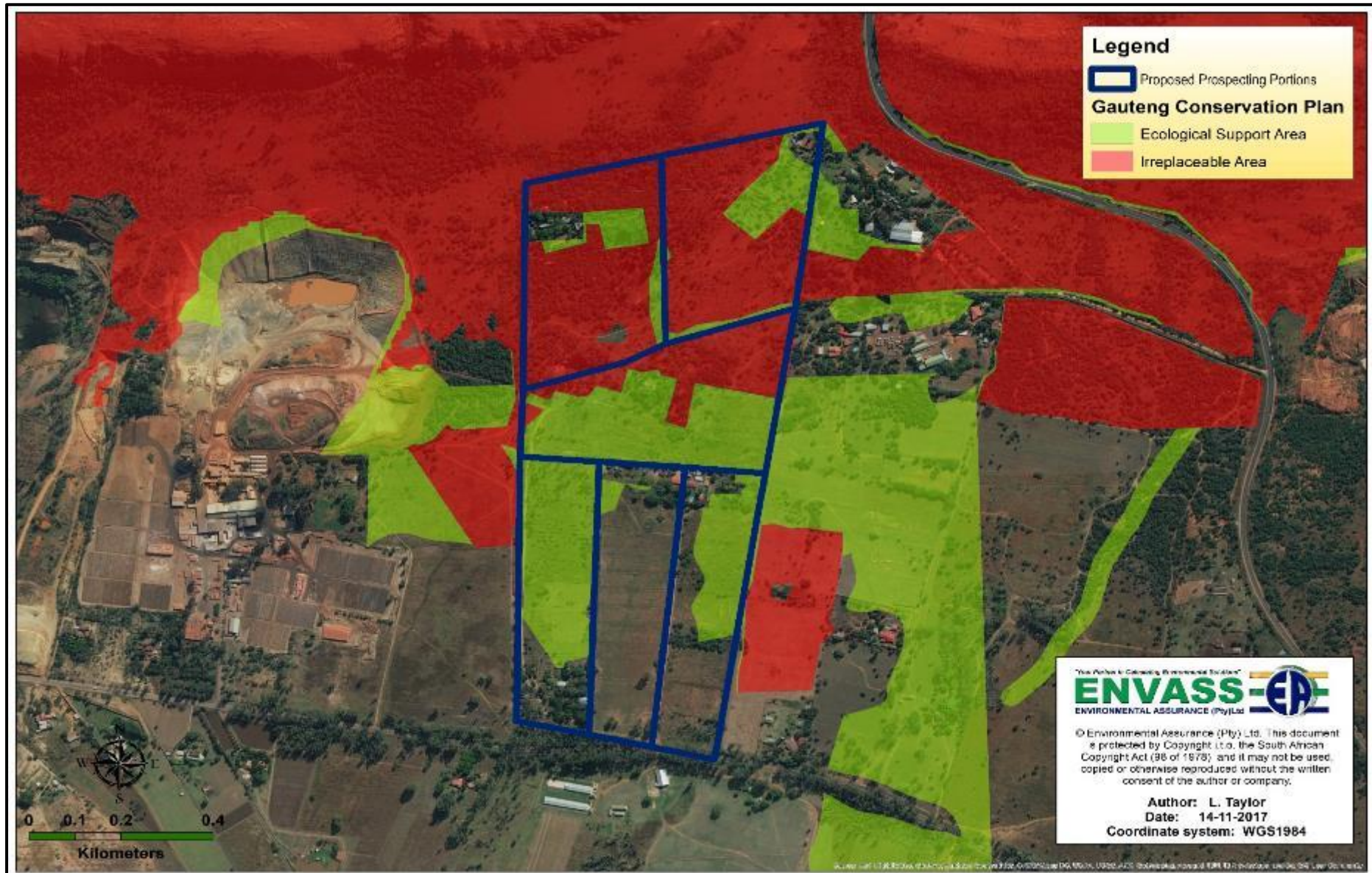


Figure 19: Sensitivity Status of the area according to the Gauteng C-plan.

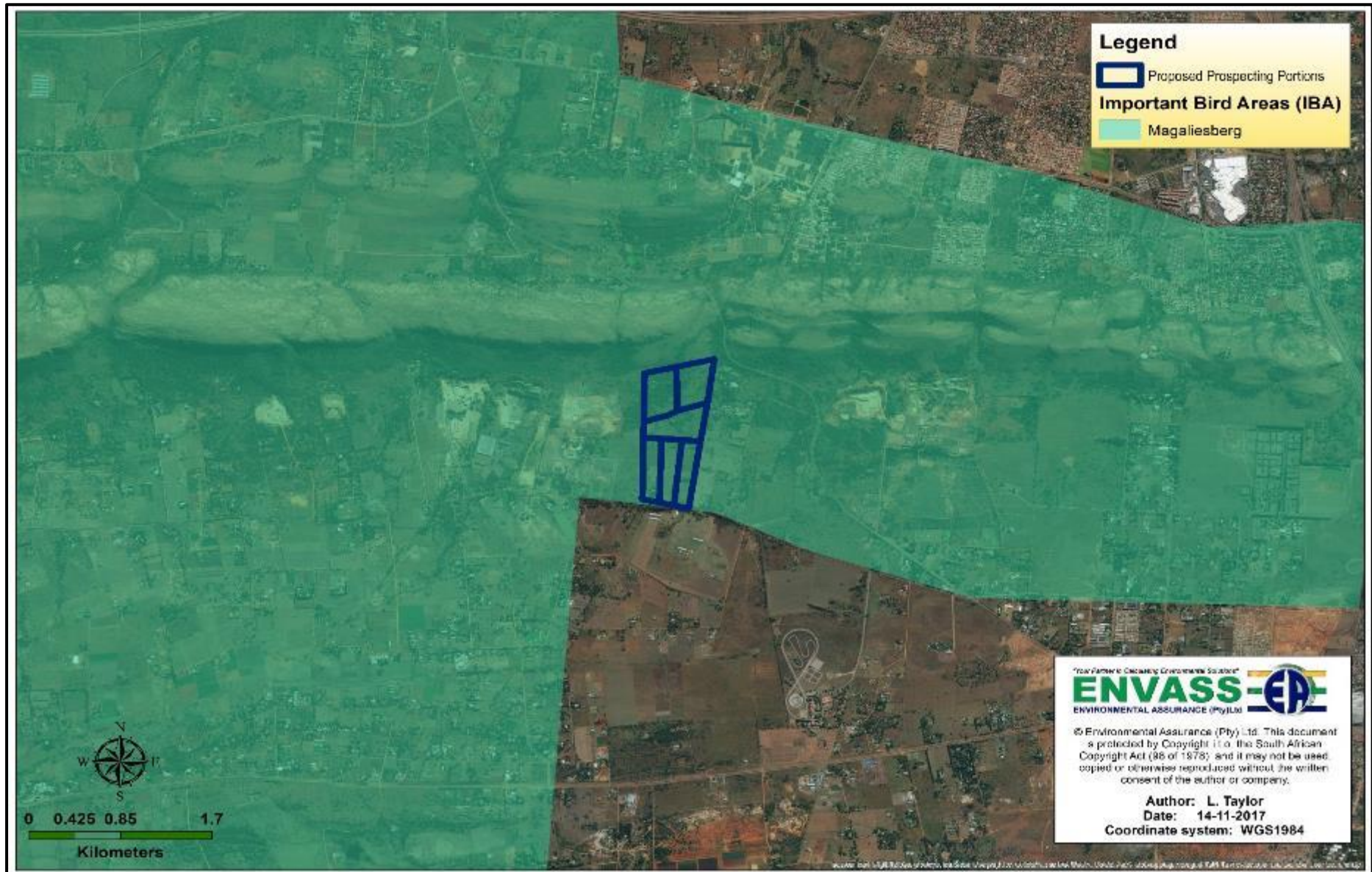


Figure 20: Important Bird Areas (IBAs) associated with the Proposed Prospecting Site.

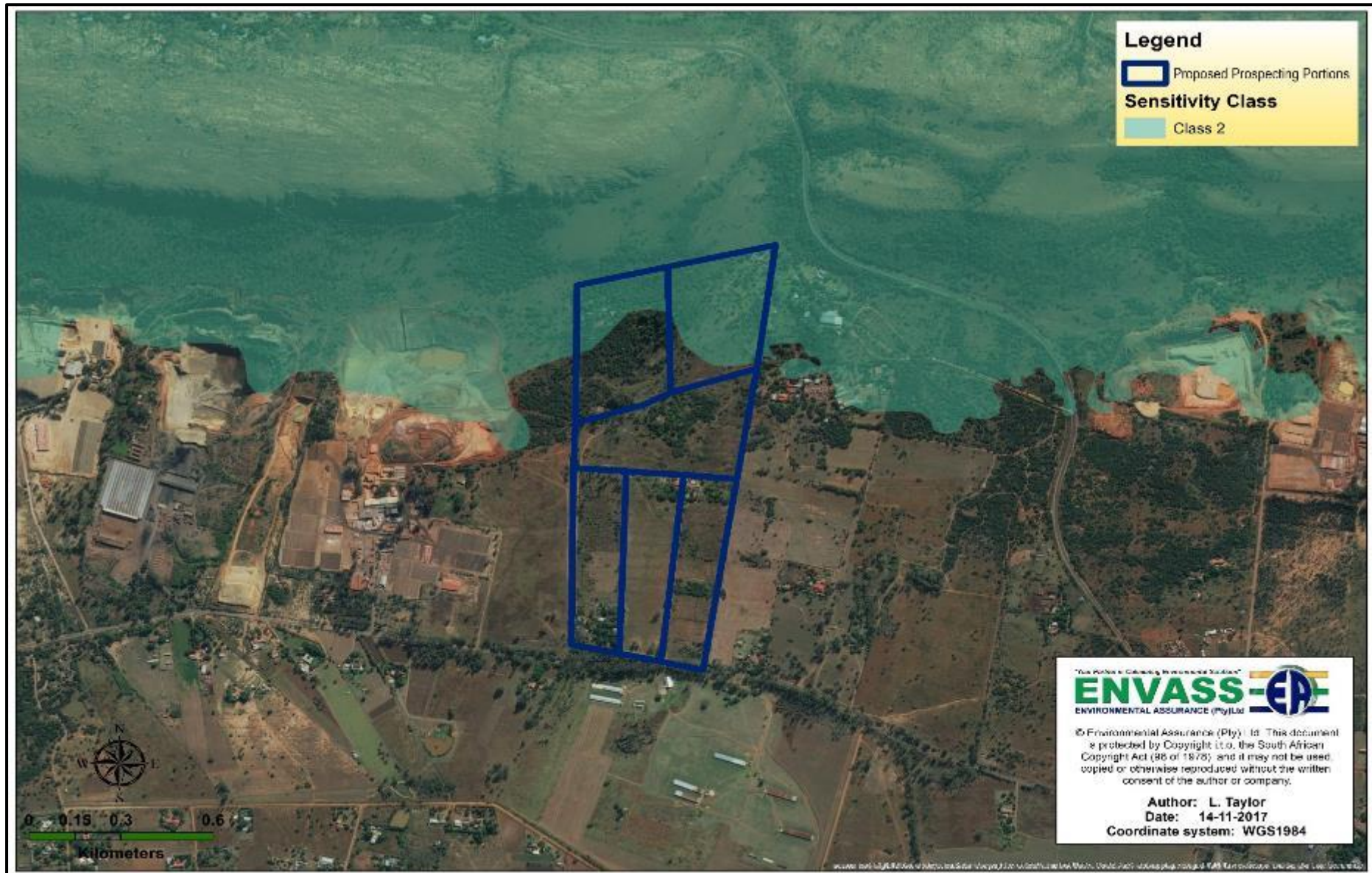


Figure 21: Ridge Sensitivity of the Proposed Prospecting Site and Surrounding Areas.

5. RESULTS

The field assessment took place on the 20th of November 2017. The state of habitat on site was found to be mostly natural, with some alien and invasive vegetation present. The site, especially towards the northern portions provide valuable shelter for animals. This section provides the findings of the various methodologies utilised during the assessment.

5.1. Wetland Delineation and Assessment

No wetlands or associated watercourses are present on the study area.

5.2. Ecological Assessment

5.2.1. Vegetation

The entire proposed mining site falls within the Moot Plains Bushveld vegetation type (Refer to **Figure 17**) which is classified as Vulnerable. The vegetation is predominantly natural with some houses present and a few roads and footpaths. Situated immediately north of the study site, is the Magaliesberg Protected Natural Environment. This area is protected, providing habitat to various faunal species of conservation concern.

Table 5: Description of the Vegetation Type Specific to the Study Area

Vegetation Type	Moot Plains Bushveld
Status	Vulnerable
Conservation Priority	High
Species Richness	Medium
Sensitivity	High
Need for Rehabilitation	Medium
Red Data Species	<i>Xerophyta adendorffii</i> Behnke – Vulnerable (VU)

5.2.2. Floral Assessment

Eleven (11) species of Alien and Invasive vegetation were recorded in the study area (**Table 7**). A full list of plant species identified during the assessment is presented in **Table 6**:

Table 6: Plant Species Recorded within the Study Area (SANBI 2017)

Plant Species	Alien and Invasive Species	Indigenous	Red List of Plants
<i>Agave americana</i>	X		
<i>Agave sisalana</i>	X		
<i>Aloe maculata</i>		X	Least Concern (LC)
<i>Aloe marlothii</i>		X	Least Concern (LC)
<i>Ammi majus</i>		X	Least Concern (LC)
<i>Asparagus africanus</i>		X	Least Concern (LC)
<i>Campuloclinium macrocephalum</i>	X		
<i>Cereus jamacaru</i>	X		
<i>Convolvulus farinosus</i>		X	Least Concern (LC)
<i>Dimorphotheca jucunda</i>		X	Least Concern (LC)
<i>Echinopsis spachiana</i>		X	Least Concern (LC)
<i>Eucalyptus grandis</i>	X		
<i>Harrisia martinii</i>	X		
<i>Hypoxis rigidula</i>		X	Least Concern (LC)
<i>Jacaranda mimosifolia</i>	X		
<i>Lantana camara</i>	X		
<i>Leonotis ocymifolia</i>		X	Least Concern (LC)
<i>Melenis repens</i>		X	Least Concern (LC)
<i>Opuntia ficus-indica</i>	X		
<i>Pennisetum setaceum</i>	X		
<i>Phragmites australis</i>		X	Least Concern (LC)
<i>Pinus pinaster</i>	X		
<i>Scaevola plumieri</i>		X	Least Concern (LC)
<i>Searsia lancea</i>		X	Least Concern (LC)
<i>Senecio ilicifolius</i>		X	Least Concern (LC)
<i>Solanum elaeagnifolium</i>	X		
<i>Tagetes minuta</i>		X	Least Concern (LC)
<i>Vachellia karroo</i>		X	Least Concern (LC)
<i>Verbena bonariensis</i>	X		

Category 1 a & b NEMBA invasive species and the removal of these plants are **compulsory** in terms of the regulations formulated under the, National Environmental Management: Biodiversity Act 2004 (act no. 10 of 2004) Alien and Invasive Species Regulations, 2014, as amended. Alien Invasive Plant infestation on site, could become a problem if not management accordingly.

Table 7: Alien Invasive Species Observed on Site

Plant Species	Common Name	Category (GNR-864 Alien and Invasive Species Lists, 2016)
<i>Agave americana</i>	Spreading century-plant	a. 3 in Western Cape b. Not listed elsewhere.
<i>Agave sisalana</i>	Sisal hemp, Sisal	2
<i>Campuloclinium macrocephalum</i>	Pompom Weed	1b
<i>Cereus jamacaru</i>	Queen of the night	1b
<i>Eucalyptus grandis</i>	Saligna gum, Rose gum	a. Category 1b within- i. riparian areas; ii. a Protected Area declared in terms of the Protected Areas Act; or, iii. within a Listed Ecosystem or an ecosystem identified for conservation in terms of a Bioregional Plan or Biodiversity Management Plans published under the Act. b. Not listed within Nama-Karoo, Succulent Karoo and Desert biomes, excluding within any area mentioned in (a) above. c. Category 1b in Fynbos, Grassland, Savanna, Albany Thicket, Forest and Indian Ocean Coastal Belt biomes, but- i. Category 2 for plantations, woodlots, bee-forage areas, wind-rows and the lining of avenues. ii. Not listed within cultivated land that is at least 50 metres away from untransformed land, but excluding within any area in (a) above. iii. Not listed within 50 metres of the main house on a farm, but excluding in (a) above. iv. Not listed in urban areas for trees with a diameter of more than 400 mm at 1000 mm height at the time of publishing of this Notice, but excluding in (a) above.
<i>Harrisia martinii</i>	Moon cactus	1b
<i>Jacaranda mimosifolia</i>	Jacaranda	a. 1b in Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga and North-West.

Plant Species	Common Name	Category (GNR-864 Alien and Invasive Species Lists, 2016)
		b. Not listed for urban areas in Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga and North-West. b. Not listed within 50 metres of the main house on a farm in Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga and North-West, for trees with a diameter of more than 400 mm at 1000mm height at the time of publishing of this Notice, provided such trees are located outside riparian areas. c. d. Not listed elsewhere.
<i>Lantana camara</i>	Lantana, Tickberry, Cherry pie	1b
<i>Opuntia ficus-indica</i>	Mission prickly pear, Sweet prickly pear	a. 1b b. Spineless cactus pear cultivars and selections are not listed. c. The fruit of the sweet prickly pear is not listed if used for human consumption.
<i>Pennisetum setaceum</i>	Fountain grass	a. 1b b. Sterile cultivars or hybrids are not listed.
<i>Pinus pinaster</i>	Cluster pine	a. 2 for plantations and wind-rows. b. 1b elsewhere. c. National Heritage Trees or National Monument Trees in terms of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), are not listed. d. Except for “a” above, specimens with a circumference greater than 1.256 m at a height of 1000 mm at the date of publication of this Notice are not listed for urban areas in Cape Town, the Overberg District Council and Winelands District Council, except when in riparian areas or in a protected area or any property directly abutting a protected area, where they remain listed as Category 1b.
<i>Solanum elaeagnifolium</i>	Silver-leaf bitter apple	1b
<i>Verbena bonariensis</i>	Wild verbena, Tall verbena, Purple top	1b

5.3. Faunal Assessment

The most transformed areas are comprised of homesteads and roads. Based on the predominantly natural state of the study area, various vegetation suitable as faunal habitats were observed, especially towards the northern region of the site. Various bird fauna diversity was observed on the day of the assessment. The area of concern has the correct attributes to successfully house a variety of animal species, especially in the northern woodland area. Free species migration is possible, even though some habitat fragmentation occurs.

5.3.1. Mammals

Table 8 lists all the mammal species of conservation concern which could possibly occur on the study site in the Gauteng Province – several of these species have the potential to occur on site, especially on the northern region of the site due to its location next to the Magaliesberg Nature Area and the natural state of this part of the study area.

Table 8: List of Threatened Mammals Possibly Occurring on Site (IUCN, 2017)

Species	Red Listed Status	Recorded at Site During Survey	Likely to be Found Based on Habitat Assessment
<i>Felis nigripes</i> Black-Footed Cat	Vulnerable (VU)	No	Yes
<i>Panthera pardus</i> Leopard	Vulnerable (VU)	No	No
<i>Aonyx capensis</i> African Clawless Otter	Near Threatened (NT)	No	No
<i>Hydrictris maculicollis</i> Spotted-Necked Otter	Near Threatened (NT)	No	No
<i>Ceratotherium simum</i> White Rhinoceros	Near Threatened (NT)	No	No
<i>Parahyaena brunnea</i> Brown Hyena	Near Threatened (NT)	No	Yes
<i>Equus quagga</i> Plains Zebra	Near Threatened (NT)	No	No
<i>Eidolon helvum</i> Straw-Coloured Fruit Bat	Near Threatened (NT)	No	Yes
<i>Mystromys albicaudatus</i> White-Tailed Rat	Endangered (EN)	No	Yes
<i>Diceros bicornis</i> Black Rhinoceros	Critically Endangered (CR)	No	No
<i>Chrysospalax villosus</i> Rough-haired Golden Mole	Vulnerable (VU)	No	Yes
<i>Neamblysomus julianae</i> Juliana’s Golden Mole	Endangered (EN)	No	Yes
<i>Giraffa Camelopardalis</i> Giraffe	Vulnerable (VU)	No	No

* All other species which could possibly occur are of Least Concern (LC)

5.3.2. Herpetofauna

The local occurrences of reptiles and amphibians are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock dwelling) and wetland-associated vegetation cover. Three of these habitat types for Herpetofauna were present, namely, terrestrial, arboreal and rupicoluous habitat. The presence or absence of reptile and amphibian species was deduced based on their known distribution ranges. No individuals of Herpetofauna were recorded on the day of the assessment. **Table 9** lists all species of Herpetofauna which could possibly occur on the study site. All species are of Least Concern (LC).

Table 9: List of Threatened Herpetofauna Possibly Occurring on Site (IUCN, 2017)

Species	Red Listed Status
Amphibians	
<i>Tomopterna cryptotis</i> Common Sand Frog	Least Concern (LC)
<i>Tomopterna tandyi</i> Tandy's Sand Frog	Least Concern (LC)
<i>Tomopterna natalensis</i> Natal Sand Frog	Least Concern (LC)
<i>Strongylopus fasciatus</i> Striped Stream Frog, Striped Grass Frog	Least Concern (LC)
<i>Pyxicephalus adspersus</i> African Bullfrog	Least Concern (LC)
<i>Amietia angolensis</i> Angola River Frog	Least Concern (LC)
<i>Xenopus laevis</i> African Clawed Frog	Least Concern (LC)
<i>Phrynobatrachus natalensis</i> Natal Dwarf Puddle Frog	Least Concern (LC)
<i>Cacosternum boettgeri</i> Boettger's Dainty Frog	Least Concern (LC)
<i>Breviceps adspersus</i>	Least Concern (LC)
<i>Semnodactylus wealii</i> Weale's Running Frog	Least Concern (LC)
<i>Kassina senegalensis</i> Senegal Running Frog	Least Concern (LC)
<i>Sclerophrys capensis</i>	Least Concern (LC)
<i>Sclerophrys gutturalis</i> Guttural Toad	Least Concern (LC)
<i>Sclerophrys garmani</i> Eastern Olive Toad	Least Concern (LC)

<i>Poyntonophrynus fenoulheti</i> Fenoulhet's Toad, Northern Pygmy Toad	Least Concern (LC)
<i>Phrynomantis bifasciatus</i> Banded Rubber Frog	Least Concern (LC)
<i>Schismaderma carens</i> African Red Toad	Least Concern (LC)
<i>Ptychadena porosissima</i> Ridged Frogs & Grass Frogs	Least Concern (LC)
<i>Sclerophrys poweri</i>	Least Concern (LC)
<i>Ptychadena anchietae</i> Anchietta's Ridged Frog	Least Concern (LC)
<i>Pyxicephalus adspersus</i> Giant Bullfrog	Least Concern (LC)
Reptiles	
<i>Chamaeleo dilepis</i> Flap-Necked Chameleon	Least Concern (LC)
<i>Afroedura nivaria</i> Drakensberg Flat Gecko	Least Concern (LC)
<i>Lamprophis aurora</i> Aurora House Snake	Least Concern (LC)
<i>Acontias gracilicauda</i> Slendertail Lance Skink	Least Concern (LC)
<i>Trachylepis punctatissima</i> Montane Speckled Skink	Least Concern (LC)
<i>Aparallactus capensis</i> Cape Centipede-Eater	Least Concern (LC)
<i>Prosymna ambigua</i> Angolan Shovel-Snout	Least Concern (LC)
<i>Psammophis subtaeniatus</i> Western Stripe-Bellied Sand Snake	Least Concern (LC)
<i>Psammophylax tritaeniatus</i> Striped Skaapsteker, Striped or Three-Lined Grass Snake	Least Concern (LC)
<i>Dasypeltis scabra</i> Common Egg Eater	Least Concern (LC)
<i>Philothamnus semivariiegatus</i> Spotted Bush Snake	Least Concern (LC)
<i>Hemachatus haemachatus</i> Rinkhals	Least Concern (LC)
<i>Bitis arietans</i> Puff Adder	Least Concern (LC)
<i>Dendroaspis polylepis</i> Black Mamba	Least Concern (LC)

5.3.3. Avifauna

The avifaunal species listed in **Table 10** are the species of conservation concern that are likely to occur on the study site. Refer to Annexure A for a full list containing all avifaunal species likely to occur on the study site. Approximately 370 potential bird species occur within the area, however none of the species of conservation concern were recorded on site. The bird species observed on the study site are the more common bird species associated with the various habitat systems and species that are able to adapt to areas transformed by man. However, the habitat systems on site will favour many of the mentioned Red Data avifaunal species due to the presence of suitable breeding, roosting and/or foraging habitat on and surrounding the study site and its close proximity to the Magaliesberg Nature Area, all forming part of the Magaliesberg IBA.

Table 10: Threatened Bird Species That Are Likely to Occur on Site (Birdlife SA 2017; IUCN 2017)

Species	Conservation Status		Recorded at Site During Survey
	Birdlife (2017)	IUCN (2017)	
<i>Anthropoides paradiseus</i> Blue Crane	Near Threatened (NT)	Vulnerable (VU)	No
<i>Aquila rapax</i> Tawny Eagle	Endangered (EN)	Least Concern (LC)	No
<i>Aquila verreauxii</i> Verreaux's Eagle	Vulnerable (VU)	Least Concern (LC)	No
<i>Falco biarmicus</i> Lanner Falcon	Vulnerable (VU)	Least Concern (LC)	No
<i>Falco vespertinus</i> Red-footed Falcon	Near Threatened (NT)	Near Threatened (NT)	No
<i>Phoenicopterus roseus</i> Greater Flamingo	Near Threatened (NT)	Least Concern (LC)	No
<i>Alcedo semitorquata</i> Half-coloured Kingfisher	Near Threatened (NT)	Least Concern (LC)	No
<i>Certhilauda brevirostris</i> Agulhas Long-billed Lark	Near Threatened (NT)	Not Recognised by BirdLife International (NR)	No
<i>Circus ranivorus</i> African Marsh Harrier	Endangered (EN)	Least Concern (LC)	No
<i>Rostratula benghalensis</i> Grater Painted Snipe	Near Threatened (NT)	Least Concern (LC)	No
<i>Coracias garrulous</i> European Roller	Near Threatened (NT)	Least Concern (LC)	No
<i>Calidris ferruginea</i> Curlew Sandpiper	Least Concern (LC)	Near Threatened (NT)	No
<i>Sagittarius serpentarius</i> Secretary Bird	Vulnerable (VU)	Vulnerable (VU)	No
<i>Ciconia abdimii</i> Abdim's Stork	Near Threatened (NT)	Least Concern (LC)	No

<i>Ciconia nigra</i> Black Stork	Vulnerable (VU)	Least Concern (LC)	No
<i>Mycteria ibis</i> Yellow-Billed Stork	Endangered (EN)	Least Concern (LC)	No
<i>Leptoptilos crumeniferus</i> Marabou Stork	Near Threatened (NT)	Least Concern (LC)	No
<i>Gyps coprotheres</i> Cape Vulture	Endangered (EN)	Endangered (EN)	No

6. CONCLUSION & RECOMMENDATIONS

This report focuses on the current ecological state of the area where the proposed site for future prospecting rights are located. The report makes recommendations on how best to preserve current facets of ecological importance, as observed during the assessment. It is consequently not to be seen as an impact assessment or audit report, but an objective baseline study of the ecology of the site.

The study site is situated within a sensitive environment, including in close proximity to the Magaliesberg Protected Natural Environment which is protected under the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003). In terms of the Gauteng Conservation Plan, certain areas of the study site are classified as Irreplaceable, and others are identified as Ecological Support Areas. The study site is also situated within the Magaliesberg Important Bird Area (IBA). And the northern section of the study site is situated on a Class 2 Ridge area.

The results of this study indicate that the study area is deemed sensitive, due to the current state of the site and its location. Portion 36 and Portion 37 seems to be the most sensitive, the northern sites. Several Red Data mammals and avifauna probably occur on or in the vicinity of the site. Long-term impacts can be severe.

Key Recommendations:

- Care must be taken to reduce impacts on the adjacent properties through the implementation of all the mitigation measures proposed by the specialists;
- No vegetation clearance except for the removal of alien invasive species will be allowed;
- An Alien and Invasive Species Management Plan must be implemented;
- Alien and weed species encountered on the property should be removed in order to comply with existing legislation (National Environmental Management: Biodiversity Act 2004 (act no. 10 of 2004) [as amended in 2014] alien and invasive species regulations, 2014);
- All remaining indigenous vegetation should be conserved where possible;
- A suitably qualified specialist (ecologist) to accompany the site manager to demarcate areas for prospecting, in order to avoid damaging sensitive vegetation;
- Only vegetation falling directly into demarcated access routes or project sites should be removed
- Strict management of clean and dirty water systems needs to be undertaken in line with Government Notice Regulation 704 of the National Water Act to prevent impacts on the surrounding area. This is to prevent established ecosystems, whether microbial or visible, to degenerate due to contaminated water entering surface or groundwater sources.

- Should any sensitive or Red Data animal or bird species be encountered during the construction, operation and decommissioning activities, these should be relocated to natural areas in the vicinity. Any sensitive fauna that are inadvertently killed during earthmoving operations should be preserved as museum voucher specimens.
- Reduce the levels of disturbance on areas indicated by the Environmental Control Officer (ECO) as migratory routes of animals to minimise the negative impact on biodiversity;
- Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed;
- Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance;
- No animal should be intentionally killed, caught or collected during any phase of the project;
- General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area;
- According to the Departmental Policy: Development Guidelines for Ridges (2001), a 200m buffer zone is required around class 2 ridges (Refer to Figure 22). Development proposals within the buffer zone should proceed at least to EIA stage;
- Any stormwater cut-off channels should be kept as a natural as possible with gentle slopes (angle 45° or less) on the side away from the prospecting activities. These channels should enable, small animals, reptiles and amphibians which have fallen into the channel accidentally to escape easily. If not, they could drown if the channels contain water or they may die of exposure when the channels are dry;
- For the safety of the animals it is not so much the width and depth of a drainage/storm water channel that are important, but the shape. If it has curved, smooth walls the animals that have fallen in will find it impossible to obtain purchase and will slip back time and time again and fall to the bottom of the channel. The channel must be designed in such a way as to prevent the smaller creatures from blundering in and dying. Safety features that could be incorporated into the drainage/storm water channel are the use of rough surfaces and rocks to allow trapped animals purchase, less curvature on the walls, a “step” in the slope of the wall and a “lip” along the edges of the channel which would either act as a deterrent to small animals or as an absolute physical barrier;
- Measures to prevent erosion should be implemented during all phases;
- During the Rehabilitation Phase, the following should be implemented:
 - All areas should be reshaped and levelled to resemble the pre-construction environment as far as possible.
 - All disturbed areas should be revegetated during the rehabilitation phase.
 - Re-profiling and sloping of areas at risk of erosion and incision as a result of construction activities should take place in order to maintain the ecological functionality of the area.

After conclusion of this Baseline Ecological Scan, it is the opinion of the ecologists that the northern portions (Portion 36 and 37) be excluded from the prospecting activities. The remaining portions may be utilised for prospecting purposes provided that the recommendations are adhered to.

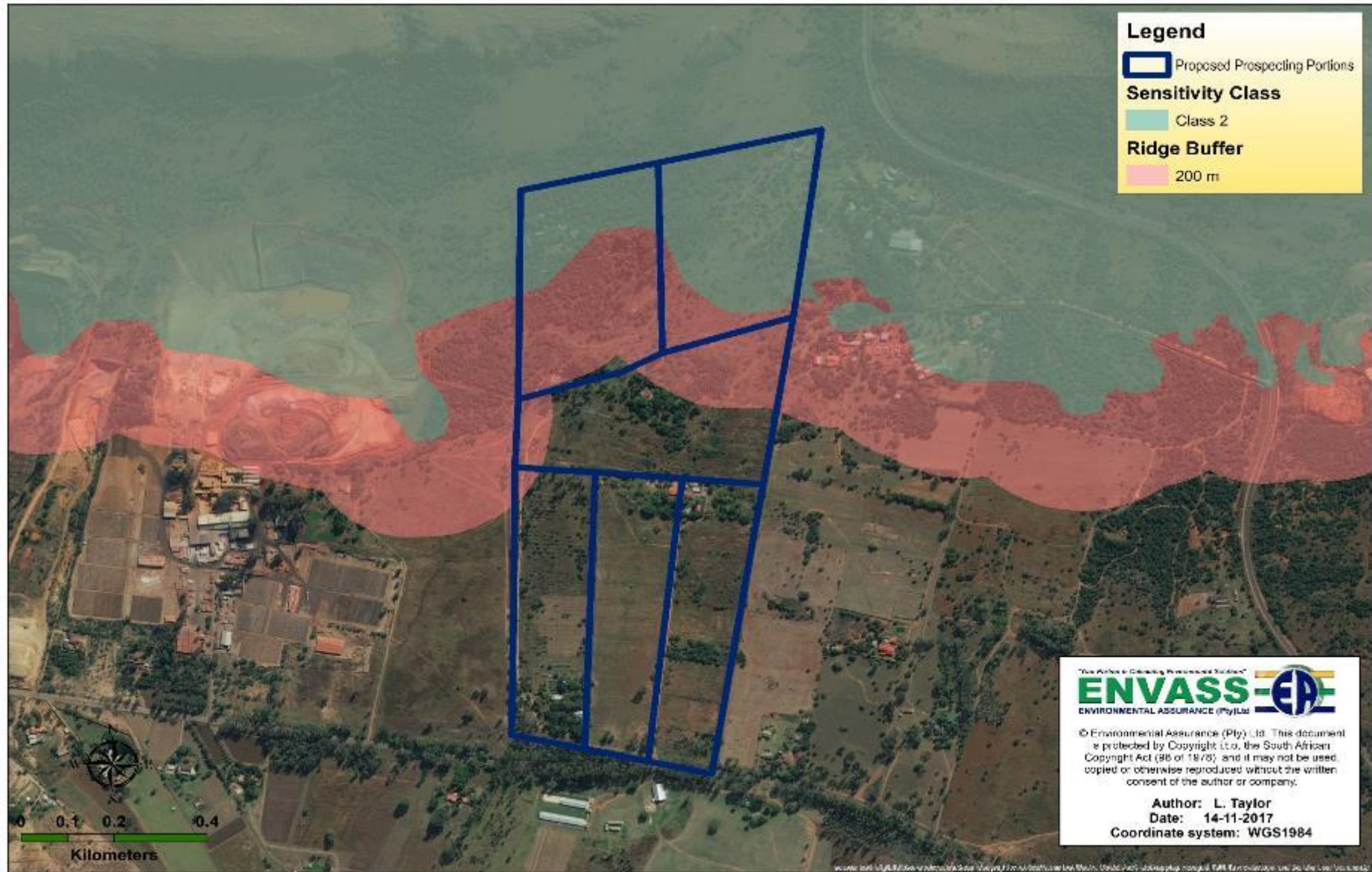


Figure 22: Proposed Ridge Buffer within the study site and surrounds.

Respectfully submitted,



L. Taylor

Electronic Copy Signed

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Annexure A

List of Bird Species Possibly to Occur on the Study Area (SABAP2, 2017)

Nr.	Scientific Name	Common Name	Conservation Status	
			Birdlife (2017)	IUCN (2017)
1	Apalis, Bar-throated	<i>Apalis thoracica</i>		
2	Avocet, Pied	<i>Recurvirostra avosetta</i>		
3	Babbler, Arrow-marked	<i>Turdoides jardineii</i>		
4	Barbet, Acacia Pied	<i>Tricholaema leucomelas</i>		
5	Barbet, Black-collared	<i>Lybius torquatus</i>		
6	Barbet, Crested	<i>Trachyphonus vaillantii</i>		
7	Batis, Chinspot	<i>Batis molitor</i>		
8	Bee-eater, Blue-cheeked	<i>Merops persicus</i>		
9	Bee-eater, European	<i>Merops apiaster</i>		
10	Bee-eater, Little	<i>Merops pusillus</i>		
11	Bee-eater, Southern Carmine	<i>Merops nubicoides</i>		
12	Bee-eater, White-fronted	<i>Merops bullockoides</i>		
13	Bishop, Southern Red	<i>Euplectes orix</i>		
14	Bishop, Yellow	<i>Euplectes capensis</i>		
15	Bishop, Yellow-crowned	<i>Euplectes afer</i>		
16	Bittern, Dwarf	<i>Ixobrychus sturmii</i>		
17	Bokmakierie, Bokmakierie	<i>Telophorus zeylonus</i>		
18	Boubou, Southern	<i>Laniarius ferrugineus</i>		
19	Brubru, Brubru	<i>Nilaus afer</i>		
20	Buffalo-weaver, Red-billed	<i>Bubalornis niger</i>		
21	Bulbul, African Red-eyed	<i>Pycnonotus nigricans</i>		
22	Bulbul, Dark-capped	<i>Pycnonotus tricolor</i>		
23	Bunting, Cape	<i>Emberiza capensis</i>		
24	Bunting, Cinnamon-breasted	<i>Emberiza tahapisi</i>		
25	Bunting, Golden-breasted	<i>Emberiza flaviventris</i>		
26	Bush-shrike, Grey-headed	<i>Malaconotus blanchoti</i>		
27	Bush-shrike, Orange-breasted	<i>Chlorophoneus sulfureopectus</i>		
28	Buttonquail, Kurrichane	<i>Turnix sylvaticus</i>		
29	Buzzard, Jackal	<i>Buteo rufofuscus</i>		
30	Buzzard, Lizard	<i>Kaupifalco monogrammicus</i>		
31	Buzzard, Steppe	<i>Buteo buteo</i>		
32	Camaroptera, Green-backed	<i>Camaroptera brachyura</i>		
33	Camaroptera, Grey-backed	<i>Camaroptera brevicaudata</i>		
34	Canary, Black-throated	<i>Crithagra atrogularis</i>		
35	Canary, Yellow-fronted	<i>Crithagra mozambica</i>		
36	Chat, Anteating	<i>Myrmecocichla formicivora</i>		

37	Chat, Familiar	<i>Cercomela familiaris</i>		
38	Cisticola, Cloud	<i>Cisticola textrix</i>		
39	Cisticola, Desert	<i>Cisticola aridulus</i>		
40	Cisticola, Lazy	<i>Cisticola aberrans</i>		
41	Cisticola, Levillant's	<i>Cisticola tinniens</i>		
42	Cisticola, Rattling	<i>Cisticola chiniana</i>		
43	Cisticola, Wailing	<i>Cisticola lais</i>		
44	Cisticola, Wing-snapping	<i>Cisticola ayresii</i>		
45	Cisticola, Zitting	<i>Cisticola juncidis</i>		
46	Cliff-chat, Mocking	<i>Thamnolaea cinnamomeiventris</i>		
47	Cliff-swallow, South African	<i>Petrochelidon spilodera</i>		
48	Coot, Red-knobbed	<i>Fulica cristata</i>		
49	Cormorant, Reed	<i>Phalacrocorax africanus</i>		
50	Cormorant, White-breasted	<i>Phalacrocorax lucidus</i>		
51	Coucal, Burchell's	<i>Centropus burchellii</i>		
52	Coucal, White-browed	<i>Centropus superciliosus</i>		
53	Cursorer, Temminck's	<i>Cursorius temminckii</i>		
54	Crake, African	<i>Crecopsis egregia</i>		
55	Crake, Black	<i>Amauornis flavirostra</i>		
56	Crane, Blue	<i>Anthropoides paradiseus</i>	NT	VU
57	Crombec, Long-billed	<i>Sylvietta rufescens</i>		
58	Crow, Cape	<i>Corvus capensis</i>		
59	Crow, Pied	<i>Corvus albus</i>		
60	Cuckoo, African	<i>Cuculus gularis</i>		
61	Cuckoo, Black	<i>Cuculus clamosus</i>		
62	Cuckoo, Diderick	<i>Chrysococcyx caprius</i>		
63	Cuckoo, Great Spotted	<i>Clamator glandarius</i>		
64	Cuckoo, Jacobin	<i>Clamator jacobinus</i>		
65	Cuckoo, Klaas's	<i>Chrysococcyx klaas</i>		
66	Cuckoo, Levillant's	<i>Clamator levillantii</i>		
67	Cuckoo, Red-chested	<i>Cuculus solitarius</i>		
68	Cuckoo-shrike, Black	<i>Campephaga flava</i>		
69	Darter, African	<i>Anhinga rufa</i>		
70	Dove, Laughing	<i>Streptopelia senegalensis</i>		
71	Dove, Namaqua	<i>Oena capensis</i>		
72	Dove, Red-eyed	<i>Streptopelia semitorquata</i>		
73	Dove, Rock	<i>Columba livia</i>		
74	Drongo, Fork-tailed	<i>Dicrurus adsimilis</i>		
75	Duck, African Black	<i>Anas sparsa</i>		
76	Duck, Comb	<i>Sarkidiornis melanotos</i>		
77	Duck, Fulvous	<i>Dendrocygna bicolor</i>		
78	Duck, Mallard	<i>Anas platyrhynchos</i>		

79	Duck, White-backed	<i>Thalassornis leuconotus</i>		
80	Duck, White-faced	<i>Dendrocygna viduata</i>		
81	Duck, Yellow-billed	<i>Anas undulata</i>		
82	Eagle, Booted	<i>Hieraaetus pennatus</i>		
83	Eagle, Tawny	<i>Aquila rapax</i>	EN	LC
84	Eagle, Verreaux's	<i>Aquila verreauxii</i>	VU	LC
85	Eagle, Wahlberg's	<i>Hieraaetus wahlbergi</i>		
86	Eagle-owl, Spotted	<i>Bubo africanus</i>		
87	Eagle-owl, Verreaux's	<i>Bubo lacteus</i>		
88	Egret, Cattle	<i>Bubulcus ibis</i>		
89	Egret, Great	<i>Egretta alba</i>		
90	Egret, Little	<i>Egretta garzetta</i>		
91	Egret, Yellow-billed	<i>Ardea intermedia</i>		
92	Eremomela, Burnt-necked	<i>Eremomela usticollis</i>		
93	Eremomela, Yellow-bellied	<i>Eremomela icteropygialis</i>		
94	Falcon, Amur	<i>Falco amurensis</i>		
95	Falcon, Lanner	<i>Falco biarmicus</i>	VU	LC
96	Falcon, Peregrine	<i>Falco peregrinus</i>		
97	Falcon, Red-footed	<i>Falco vespertinus</i>	NT	NT
98	Finch, Cuckoo	<i>Anomalospiza imberbis</i>		
99	Finch, Cut-throat	<i>Amadina fasciata</i>		
100	Finch, Red-headed	<i>Amadina erythrocephala</i>		
101	Finch, Scaly-feathered	<i>Sporopipes squamifrons</i>		
102	Firefinch, African	<i>Lagonosticta rubricata</i>		
103	Firefinch, Jameson's	<i>Lagonosticta rhodopareia</i>		
104	Firefinch, Red-billed	<i>Lagonosticta senegala</i>		
105	Fiscal, Common (Southern)	<i>Lanius collaris</i>		
106	Fish-eagle, African	<i>Haliaeetus vocifer</i>		
107	Flamingo, Greater	<i>Phoenicopterus roseus</i>	NT	LC
108	Flufftail, Red-chested	<i>Sarothrura rufa</i>		
109	Flycatcher, Fairy	<i>Stenostira scita</i>		
110	Flycatcher, Fiscal	<i>Sigelus silens</i>		
111	Flycatcher, Marico	<i>Bradornis mariquensis</i>		
112	Flycatcher, Pale	<i>Bradornis pallidus</i>		
113	Flycatcher, Southern Black	<i>Melaenornis pammelaina</i>		
114	Flycatcher, Spotted	<i>Muscicapa striata</i>		
115	Francolin, Coqui	<i>Peliperdix coqui</i>		
116	Francolin, Crested	<i>Dendroperdix sephaena</i>		
117	Francolin, Orange River	<i>Scleroptila gutturalis</i>		
118	Francolin, Shelley's	<i>Scleroptila shelleyi</i>		
119	Go-away-bird, Grey	<i>Corythaixoides concolor</i>		
120	Goose, Domestic	<i>Anser anser</i>		

121	Goose, Egyptian	<i>Alopochen aegyptiaca</i>
122	Goose, Spur-winged	<i>Plectropterus gambensis</i>
123	Goshawk, Gabar	<i>Melierax gabar</i>
124	Goshawk, Southern Pale Chanting	<i>Melierax canorus</i>
125	Grassbird, Cape	<i>Sphenoeacus afer</i>
126	Grebe, Great Crested	<i>Podiceps cristatus</i>
127	Grebe, Little	<i>Tachybaptus ruficollis</i>
128	Green-pigeon, African	<i>Treron calvus</i>
129	Greenshank, Common	<i>Tringa nebularia</i>
130	Guineafowl, Helmeted	<i>Numida meleagris</i>
131	Gull, Grey-headed	<i>Chroicocephalus cirrocephalus</i>
132	Hamerkop, Hamerkop	<i>Scopus umbretta</i>
133	Harrier-Hawk, African	<i>Polyboroides typus</i>
134	Hawk-eagle, African	<i>Aquila spilogaster</i>
135	Hawk-eagle, Ayres's	<i>Aquila ayresii</i>
136	Helmet-shrike, White-crested	<i>Prionops plumatus</i>
137	Heron, Black	<i>Egretta ardesiaca</i>
138	Heron, Black-headed	<i>Ardea melanocephala</i>
139	Heron, Goliath	<i>Ardea goliath</i>
140	Heron, Green-backed	<i>Butorides striata</i>
141	Heron, Grey	<i>Ardea cinerea</i>
142	Heron, Purple	<i>Ardea purpurea</i>
143	Heron, Squacco	<i>Ardeola ralloides</i>
144	Hobby, Eurasian	<i>Falco subbuteo</i>
145	Honey-buzzard, European	<i>Pernis apivorus</i>
146	Honeybird, Brown-backed	<i>Prodotiscus regulus</i>
147	Honeyguide, Greater	<i>Indicator indicator</i>
148	Honeyguide, Lesser	<i>Indicator minor</i>
149	Hoopoe, African	<i>Upupa africana</i>
150	Hornbill, African Grey	<i>Tockus nasutus</i>
151	Hornbill, Damara	<i>Tockus damarensis</i>
152	Hornbill, Hybrid Damara/Red-billed	<i>Tockus damarensis/erythrorhynchus</i>
153	Hornbill, Red-billed	<i>Tockus rufirostris</i>
154	Hornbill, Southern Yellow-billed	<i>Tockus leucomelas</i>
155	House-martin, Common	<i>Delichon urbicum</i>
156	Ibis, African Sacred	<i>Threskiornis aethiopicus</i>
157	Ibis, Glossy	<i>Plegadis falcinellus</i>
158	Ibis, Hadeda	<i>Bostrychia hagedash</i>
159	Indigobird, Dusky	<i>Vidua funerea</i>
160	Indigobird, Purple	<i>Vidua purpurascens</i>

161	Indigobird, Village	<i>Vidua chalybeata</i>		
162	Jacana, African	<i>Actophilornis africanus</i>		
163	Kestrel, Greater	<i>Falco rupicoloides</i>		
164	Kestrel, Lesser	<i>Falco naumanni</i>		
165	Kestrel, Rock	<i>Falco rupicolus</i>		
166	Kingfisher, Brown-hooded	<i>Halcyon albiventris</i>		
167	Kingfisher, Giant	<i>Megaceryle maxima</i>		
168	Kingfisher, Half-collared	<i>Alcedo semitorquata</i>	NT	LC
169	Kingfisher, Malachite	<i>Alcedo cristata</i>		
170	Kingfisher, Pied	<i>Ceryle rudis</i>		
171	Kingfisher, Striped	<i>Halcyon chelicuti</i>		
172	Kingfisher, Woodland	<i>Halcyon senegalensis</i>		
173	Kite, Black	<i>Milvus migrans</i>		
174	Kite, Black	<i>Milvus migrans</i>		
175	Kite, Black-shouldered	<i>Elanus caeruleus</i>		
176	Kite, Yellow-billed	<i>Milvus aegyptius</i>		
177	Korhaan, Northern Black	<i>Afrotis afraoides</i>		
178	Korhaan, Red-crested	<i>Lophotis ruficrista</i>		
179	Lapwing, African Wattled	<i>Vanellus senegallus</i>		
180	Lapwing, Blacksmith	<i>Vanellus armatus</i>		
181	Lapwing, Crowned	<i>Vanellus coronatus</i>		
182	Lark, Agulhas Long-billed	<i>Certhilauda brevirostris</i>	NT	NR
183	Lark, Benguela Long-billed	<i>Certhilauda benguelensis</i>		
184	Lark, Cape Long-billed	<i>Certhilauda curvirostris</i>		
185	Lark, Eastern Long-billed	<i>Certhilauda semitorquata</i>		
186	Lark, Fawn-coloured	<i>Calendulauda africanoides</i>		
187	Lark, Flappet	<i>Mirafra rufocinnamomea</i>		
188	Lark, Karoo Long-billed	<i>Certhilauda subcoronata</i>		
189	Lark, Red-capped	<i>Calandrella cinerea</i>		
190	Lark, Rufous-naped	<i>Mirafra africana</i>		
191	Lark, Sabota	<i>Calendulauda sabota</i>		
192	Longclaw, Cape	<i>Macronyx capensis</i>		
193	Mannikin, Bronze	<i>Lonchura cucullata</i>		
194	Marsh-harrier, African	<i>Circus ranivorus</i>	EN	LC
195	Martin, Banded	<i>Riparia cincta</i>		
196	Martin, Brown-throated	<i>Riparia paludicola</i>		
197	Martin, Rock	<i>Hirundo fuligula</i>		
198	Martin, Sand	<i>Riparia riparia</i>		
199	Masked-weaver, Lesser	<i>Ploceus intermedius</i>		
200	Masked-weaver, Southern	<i>Ploceus velatus</i>		
201	Moorhen, Common	<i>Gallinula chloropus</i>		
202	Mousebird, Red-faced	<i>Urocolius indicus</i>		

203	Mousebird, Speckled	<i>Colius striatus</i>		
204	Mousebird, White-backed	<i>Colius colius</i>		
205	Myna, Common	<i>Acridotheres tristis</i>		
206	Neddicky, Neddicky	<i>Cisticola fulvicapilla</i>		
207	Night-Heron, Black-crowned	<i>Nycticorax nycticorax</i>		
208	Nightjar, Fiery-necked	<i>Caprimulgus pectoralis</i>		
209	Nightjar, Freckled	<i>Caprimulgus tristigma</i>		
210	Olive-pigeon, African	<i>Columba arquatrix</i>		
211	Oriole, Black-headed	<i>Oriolus larvatus</i>		
212	Oriole, Eurasian Golden	<i>Oriolus oriolus</i>		
213	Ostrich, Common	<i>Struthio camelus</i>		
214	Owl, Barn	<i>Tyto alba</i>		
215	Owl, Marsh	<i>Asio capensis</i>		
216	Owlet, Pearl-spotted	<i>Glaucidium perlatum</i>		
217	Painted-snipe, Greater	<i>Rostratula benghalensis</i>	NT	LC
218	Palm-swift, African	<i>Cypsiurus parvus</i>		
219	Paradise-flycatcher, African	<i>Terpsiphone viridis</i>		
220	Paradise-whydah, Long-tailed	<i>Vidua paradisaea</i>		
221	Parakeet, Rose-ringed	<i>Psittacula krameri</i>		
222	Parrot, Meyer's	<i>Poicephalus meyeri</i>		
223	Penduline-tit, Cape	<i>Anthoscopus minutus</i>		
224	Penduline-tit, Grey	<i>Anthoscopus caroli</i>		
225	Petronia, Yellow-throated	<i>Gymnoris superciliaris</i>		
226	Pigeon, Speckled	<i>Columba guinea</i>		
227	Pipit, African	<i>Anthus cinnamomeus</i>		
228	Pipit, Buffy	<i>Anthus vaalensis</i>		
229	Pipit, Long-billed	<i>Anthus similis</i>		
230	Pipit, Plain-backed	<i>Anthus leucophrys</i>		
231	Pipit, Striped	<i>Anthus lineiventris</i>		
232	Plover, Kittlitz's	<i>Charadrius pecuarius</i>		
233	Plover, Three-banded	<i>Charadrius tricollaris</i>		
234	Pochard, Southern	<i>Netta erythrophthalma</i>		
235	Prinia, Black-chested	<i>Prinia flavicans</i>		
236	Prinia, Tawny-flanked	<i>Prinia subflava</i>		
237	Puffback, Black-backed	<i>Dryoscopus cubla</i>		
238	Pygmy-Kingfisher, African	<i>Ispidina picta</i>		
239	Pytilia, Green-winged	<i>Pytilia melba</i>		
240	Quail, Common	<i>Coturnix coturnix</i>		
241	Quail, Harlequin	<i>Coturnix delegorguei</i>		
242	Quailfinch, African	<i>Ortygospiza fuscocrissa</i>		
243	Quelea, Red-billed	<i>Quelea quelea</i>		
244	Rail, African	<i>Rallus caerulescens</i>		


245	Reed-warbler, African	<i>Acrocephalus baeticatus</i>		
246	Reed-warbler, Great	<i>Acrocephalus arundinaceus</i>		
247	Robin-chat, Cape	<i>Cossypha caffra</i>		
248	Robin-chat, White-throated	<i>Cossypha humeralis</i>		
249	Rock-thrush, Cape	<i>Monticola rupestris</i>		
250	Rock-thrush, Short-toed	<i>Monticola brevipes</i>		
251	Roller, European	<i>Coracias garrulus</i>	NT	LC
252	Roller, Lilac-breasted	<i>Coracias caudatus</i>		
253	Roller, Purple	<i>Coracias naevius</i>		
254	Ruff, Ruff	<i>Philomachus pugnax</i>		
255	Rush-warbler, Little	<i>Bradypterus baboecala</i>		
256	Sandgrouse, Double-banded	<i>Pterocles bicinctus</i>		
257	Sandpiper, Common	<i>Actitis hypoleucos</i>		
258	Sandpiper, Curlew	<i>Calidris ferruginea</i>	LC	NT
259	Sandpiper, Marsh	<i>Tringa stagnatilis</i>		
260	Sandpiper, Wood	<i>Tringa glareola</i>		
261	Scimitarbill, Common	<i>Rhinopomastus cyanomelas</i>		
262	Scops-owl, African	<i>Otus senegalensis</i>		
263	Scrub-robin, Kalahari	<i>Cercotrichas paena</i>		
264	Scrub-robin, White-browed	<i>Cercotrichas leucophrys</i>		
265	Secretarybird, Secretarybird	<i>Sagittarius serpentarius</i>	VU	VU
266	Seedeater, Streaky-headed	<i>Crithagra gularis</i>		
267	Shelduck, South African	<i>Tadorna cana</i>		
268	Shikra, Shikra	<i>Accipiter badius</i>		
269	Shoveler, Cape	<i>Anas smithii</i>		
270	Shrike, Crimson-breasted	<i>Laniarius atrococcineus</i>		
271	Shrike, Lesser Grey	<i>Lanius minor</i>		
272	Shrike, Magpie	<i>Corvinella melanoleuca</i>		
273	Shrike, Red-backed	<i>Lanius collurio</i>		
274	Snake-eagle, Black-chested	<i>Circaetus pectoralis</i>		
275	Snake-eagle, Brown	<i>Circaetus cinereus</i>		
276	Snipe, African	<i>Gallinago nigripennis</i>		
277	Sparrow, Cape	<i>Passer melanurus</i>		
278	Sparrow, Great	<i>Passer motitensis</i>		
279	Sparrow, House	<i>Passer domesticus</i>		
280	Sparrow, Northern Grey-headed	<i>Passer griseus</i>		
281	Sparrow, Southern Grey-headed	<i>Passer diffusus</i>		
282	Sparrow-weaver, White-browed	<i>Plocepasser mahali</i>		
283	Sparrowhawk, Black	<i>Accipiter melanoleucus</i>		
284	Sparrowhawk, Little	<i>Accipiter minullus</i>		
285	Sparrowhawk, Ovambo	<i>Accipiter ovampensis</i>		
286	Sparrowlark, Chestnut-backed	<i>Eremopterix leucotis</i>		

287	Sparrowlark, Grey-backed	<i>Eremopterix verticalis</i>		
288	Spoonbill, African	<i>Platalea alba</i>		
289	Spurfowl, Natal	<i>Pternistis natalensis</i>		
290	Spurfowl, Swainson's	<i>Pternistis swainsonii</i>		
291	Starling, Cape Glossy	<i>Lamprotornis nitens</i>		
292	Starling, Pied	<i>Lamprotornis bicolor</i>		
293	Starling, Red-winged	<i>Onychognathus morio</i>		
294	Starling, Violet-backed	<i>Cinnyricinclus leucogaster</i>		
295	Starling, Wattled	<i>Creatophora cinerea</i>		
296	Stilt, Black-winged	<i>Himantopus himantopus</i>		
297	Stint, Little	<i>Calidris minuta</i>		
298	Stonechat, African	<i>Saxicola torquatus</i>		
299	Stork, Abdim's	<i>Ciconia abdimii</i>	NT	LC
300	Stork, Black	<i>Ciconia nigra</i>	VU	LC
301	Stork, Marabou	<i>Leptoptilos crumeniferus</i>	NT	LC
302	Stork, White	<i>Ciconia ciconia</i>		
303	Stork, Yellow-billed	<i>Mycteria ibis</i>	EN	LC
304	Sunbird, Amethyst	<i>Chalcomitra amethystina</i>		
305	Sunbird, Greater Double-collared	<i>Cinnyris afer</i>		
306	Sunbird, Malachite	<i>Nectarinia famosa</i>		
307	Sunbird, Marico	<i>Cinnyris mariquensis</i>		
308	Sunbird, White-bellied	<i>Cinnyris talatala</i>		
309	Swallow, Barn	<i>Hirundo rustica</i>		
310	Swallow, Greater Striped	<i>Cecropis cucullata</i>		
311	Swallow, Lesser Striped	<i>Cecropis abyssinica</i>		
312	Swallow, Pearl-breasted	<i>Hirundo dimidiata</i>		
313	Swallow, Red-breasted	<i>Cecropis semirufa</i>		
314	Swallow, White-throated	<i>Hirundo albigularis</i>		
315	Swamp-warbler, Lesser	<i>Acrocephalus gracilirostris</i>		
316	Swamphen, African Purple	<i>Porphyrio madagascariensis</i>		
317	Swift, African Black	<i>Apus barbatus</i>		
318	Swift, Alpine	<i>Tachymarptis melba</i>		
319	Swift, Common	<i>Apus apus</i>		
320	Swift, Horus	<i>Apus horus</i>		
321	Swift, Little	<i>Apus affinis</i>		
322	Swift, White-rumped	<i>Apus caffer</i>		
323	Tchagra, Black-crowned	<i>Tchagra senegalus</i>		
324	Tchagra, Brown-crowned	<i>Tchagra australis</i>		
325	Teal, Cape	<i>Anas capensis</i>		
326	Teal, Hottentot	<i>Anas hottentota</i>		
327	Teal, Red-billed	<i>Anas erythrorhyncha</i>		

328	Tern, Whiskered	<i>Chlidonias hybrida</i>		
329	Tern, White-winged	<i>Chlidonias leucopterus</i>		
330	Thick-knee, Spotted	<i>Burhinus capensis</i>		
331	Thrush, Groundscraper	<i>Turdus litsitsirupa</i>		
332	Thrush, Karoo	<i>Turdus smithi</i>		
333	Thrush, Kurrichane	<i>Turdus libonyanus</i>		
334	Thrush, Olive	<i>Turdus olivaceus</i>		
335	Tinkerbird, Yellow-fronted	<i>Pogoniulus chrysoconus</i>		
336	Tit, Ashy	<i>Parus cinerascens</i>		
337	Tit, Southern Black	<i>Parus niger</i>		
338	Tit-babbler, Chestnut-vented	<i>Sylvia subcaerulea</i>		
339	Turtle-dove, Cape	<i>Streptopelia capicola</i>		
340	Vulture, Cape	<i>Gyps coprotheres</i>	EN	EN
341	Wagtail, African Pied	<i>Motacilla aguimp</i>		
342	Wagtail, Cape	<i>Motacilla capensis</i>		
343	Wagtail, Yellow	<i>Motacilla flava</i>		
344	Warbler, Garden	<i>Sylvia borin</i>		
345	Warbler, Icterine	<i>Hippolais icterina</i>		
346	Warbler, Marsh	<i>Acrocephalus palustris</i>		
347	Warbler, Sedge	<i>Acrocephalus schoenobaenus</i>		
348	Warbler, Willow	<i>Phylloscopus trochilus</i>		
349	Waxbill, Black-faced	<i>Estrilda erythronotos</i>		
350	Waxbill, Blue	<i>Uraeginthus angolensis</i>		
351	Waxbill, Common	<i>Estrilda astrild</i>		
352	Waxbill, Orange-breasted	<i>Amandava subflava</i>		
353	Waxbill, Violet-eared	<i>Uraeginthus granatinus</i>		
354	Weaver, Cape	<i>Ploceus capensis</i>		
355	Weaver, Thick-billed	<i>Amblyospiza albifrons</i>		
356	Weaver, Village	<i>Ploceus cucullatus</i>		
357	Wheatear, Capped	<i>Oenanthe pileata</i>		
358	Wheatear, Mountain	<i>Oenanthe monticola</i>		
359	White-eye, Cape	<i>Zosterops virens</i>		
360	White-eye, Orange River	<i>Zosterops pallidus</i>		
361	Whitethroat, Common	<i>Sylvia communis</i>		
362	Whydah, Pin-tailed	<i>Vidua macroura</i>		
363	Whydah, Shaft-tailed	<i>Vidua regia</i>		
364	Widowbird, Long-tailed	<i>Euplectes progne</i>		
365	Widowbird, Red-collared	<i>Euplectes ardens</i>		
366	Widowbird, White-winged	<i>Euplectes albonotatus</i>		
367	Wood-dove, Emerald-spotted	<i>Turtur chalcospilos</i>		
368	Wood-hoopoe, Green	<i>Phoeniculus purpureus</i>		
369	Woodpecker, Bearded	<i>Dendropicos namaquus</i>		

370	Woodpecker, Cardinal	<i>Dendropicos fuscescens</i>
371	Woodpecker, Golden-tailed	<i>Campethera abingoni</i>
372	Wren-warbler, Barred	<i>Calamonastes fasciolatus</i>
373	Wryneck, Red-throated	<i>Jynx ruficollis</i>

Appendix 9 : Cultural heritage desktop assessment

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ARCHAEOLOGICAL DESKTOP STUDY

**for the application of a prospecting right
on portions 36, 37, 38, 39, 40 and 41 of the
Farm Boekenhoutkloof 315 JR, Pretoria
North, Gauteng**

Author ©:

Tobias Coetzee, MA (Archaeology) (UP)

October 2017

An Archaeological Desktop Study for the application of a prospecting right
on portions 36, 37, 38, 39, 40 and 41 of the Farm Boekenhoutkloof 315 JR,
Pretoria North, Gauteng

For: Environmental Assurance (Pty) Ltd
394 Tram Street
Nieuw Muckleneuk
Pretoria
0181

Executive Summary

The author was appointed by Environmental Assurance (Pty) Ltd to undertake an Archaeological Desktop study for SABRIX (Pty) Ltd on the following Farm Portions within the City of Tshwane Metropolitan Municipality in the Gauteng Province: Portions 36, 37, 38, 39, 40 and 41 of the Boekenhoutkloof 315 JR. The study area is located 13 km northwest of the Pretoria CBD and between Akasia and Atteridgeville. The aim of this report is to contextualise the general study area in terms of heritage resources and will provide the developers with general information regarding potentially sensitive areas. This will also shed light on what is to be expected during a Phase 1 Archaeological Impact Assessment and aid in interpreting finds.

Once the prospecting sites have been determined, it is recommended that a qualified archaeologist inspect the proposed sites in order to determine whether heritage resources will be impacted on. Should any development that triggers an AIA result from the prospecting, a full Phase 1 AIA must be done.

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1. Project Background

1.1 Introduction

Environmental Assurance (Pty) Ltd appointed the author to undertake an Archaeological Desktop study for SABRIX (Pty) Ltd on the following Farm Portions near Pretoria in the Gauteng Province: Portions 36, 37, 38, 39, 40 and 41 of the Boekenhoutkloof 315 JR (**Figures 1 & 2**). The study area is located approximately 13 km northwest of the Pretoria CBD. The purpose of this study is to contextualise the demarcated study area in order to determine the scope of heritage resources that might be encountered during the prospecting phase and subsequent heritage studies, as well as to provide recommendations for the safeguarding of archaeological resources during prospecting. The aim of this report is to provide the developer with information regarding heritage resources in the vicinity of the study area based on results from previous studies and written historical information.

In the following report, I provide a broad overview of the proposed development and contextualise the study area in terms of heritage resources. The legislation section included serves as a guide towards the effective identification and protection of heritage resources and will apply to any such material unearthed during the prospecting phase.

1.2 Legislation

The South African Heritage Resources Agency (SAHRA) aims to conserve and control the management, research, alteration and destruction of cultural resources of South Africa and to prosecute if necessary. It is therefore crucially important to adhere to heritage resource legislation contained in the Government Gazette of the Republic of South Africa (Act No.25 of 1999), as many heritage sites are threatened daily by development. Conservation legislation requires an impact assessment report to be submitted for development authorisation that must include an AIA if triggered.

AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources that might occur in areas of development and (b) make recommendations for protection or mitigation of the impact of the sites.

1.2.1 The EIA and AIA processes

Phase 1 Archaeological Impact Assessments generally involve the identification of sites during a field survey with assessment of their significance, the possible impact that the development might have, and relevant recommendations.

All Archaeological Impact Assessment reports should include:

- a. Location of the sites that are found;
- b. Short descriptions of the characteristics of each site;
- c. Short assessments of how important each site is, indicating which should be conserved and which mitigated;
- d. Assessments of the potential impact of the development on the site(s);
- e. In some cases a shovel test, to establish the extent of a site, or collection of material, to identify the associations of the site, may be necessary (a pre-arranged SAHRA permit is required); and
- f. Recommendations for conservation or mitigation.

This AIA report is intended to inform the client about the legislative protection of heritage resources and their significance and make appropriate recommendations. It is essential to also provide the heritage authority with sufficient information about the sites to enable the authority to assess with confidence:

- a. Whether or not it has objections to a development;
- b. What the conditions are upon which such development might proceed;

- c. Which sites require permits for mitigation or destruction;
- d. Which sites require mitigation and what this should comprise;
- e. Whether sites must be conserved and what alternatives can be proposed to relocate the development in such a way as to conserve other sites; and
- f. What measures should or could be put in place to protect the sites which should be conserved.

When a Phase 1 AIA is part of an EIA, wider issues such as public consultation and assessment of the spatial and visual impacts of the development may be undertaken as part of the general study and may not be required from the archaeologist. If, however, the Phase 1 project forms a major component of an AIA it will be necessary to ensure that the study addresses such issues and complies with Section 38 of the National Heritage Resources Act.

1.2.2 Legislation regarding archaeology and heritage sites

National Heritage Resource Act No.25 of April 1999

Buildings are among the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Farming Community settlements. The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, meteorites and rare geological specimens;
- visual art objects;
- military objects;
- numismatic objects;
- objects of cultural and historical significance;
- objects to which oral traditions are attached and which are associated with living heritage;
- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives;

- any other prescribed category.

With regards to activities and work on archaeological and heritage sites this Act states that:

“No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.” (34. [1] 1999:58)

and

“No person may, without a permit issued by the responsible heritage resources authority:

- (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*
- (c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or*
- (d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.”(35. [4] 1999:58)*

and

“No person may, without a permit issued by SAHRA or a provincial heritage resources authority:

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;*
- (c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals.” (36. [3] 1999:60)*

On the development of any area the gazette states that:

“...any person who intends to undertake a development categorised as:

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*

- (b) *the construction of a bridge or similar structure exceeding 50m in length;*
- (c) *any development or other activity which will change the character of a site-*
 - i. *exceeding 5000m² in extent; or*
 - ii. *involving three or more existing erven or subdivisions thereof; or*
 - iii. *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - iv. *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*
- (d) *the re-zoning of a site exceeding 10000m² in extent; or*
- (e) *any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.” (38. [1] 1999:62-64)*

and

“The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

- (a) *The identification and mapping of all heritage resources in the area affected;*
- (b) *an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;*
- (c) *an assessment of the impact of the development on such heritage resources;*
- (d) *an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;*
- (e) *the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;*
- (f) *if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and*

- (g) *plans for mitigation of any adverse effects during and after the completion of the proposed development.*"
(38. [3] 1999:64)

Human Tissue Act and Ordinance 7 of 1925

The Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) protects graves younger than 60 years. These fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities. Graves 60 years or older fall under the jurisdiction of the National Heritage Resources Act as well as the Human Tissues Act, 1983.

2. Study Area and Project Description

2.1 Location & Physical environment

The closest city to the study area is Pretoria, located about 13 km to the southeast. Akasia is located about 4 km northeast of the area demarcated for prospecting and Atteridgeville 6 km to the south. The study area falls within the City of Tshwane Metro Municipality in the Gauteng Province. In terms of vegetation, the study area falls within the Grassland Biome, Central Bushveld Bioregion and Moot Plains Bushveld vegetation unit. A small section along the northern boundary of the study area falls on Gold Reef Mountain Bushveld. The Grassland Biome covers approximately 28% of South Africa. According to Mucina & Rutherford (2006), the conservation status for Moot Plains Bushveld is considered vulnerable. The conservation target for this vegetation unit is 19% and about 13% is conserved in the Magaliesberg Nature Reserve. Moot Plains Bushveld is found in the North-West and Gauteng Provinces, with the main belt occurring immediately south of the Magaliesberg from Selons River Valley in the west to Pretoria in the east. A narrow belt is also found immediately north of the Magaliesberg and Daspoort mountain ranges from Rustenburg in the west to the Crocodile River in the east. Cultivation, urban and built-up areas have transformed about 28% of this vegetation unit. Erosion in these areas is generally very low. Gold reef Mountain Bushveld, on the other hand, is found in the North-West, Gauteng, Free State and Mpumalanga Provinces and occurs along the quartzite ridges of the Magaliesberg from Boshhoek and Koster in the west to Bronkhorstspuit in the east. Other areas include the west-east ridges of the Witwatersrand, the inner ridges of the Vredefort Dome and part of the Suikerbosrand and hills around Heidelberg. In terms of conservation, Gold Reef Mountain Bushveld is considered least threatened with a conservation target of 24%. About 22% is conserved mainly in the Magaliesberg Nature Reserve and a small portion in other nature reserves. Cultivation, urban and built-up areas transformed about 15% and erosion is generally very low (Mucina & Rutherford 2006).

The average elevation for Moot Plains Bushveld varies between 1050 and 1450 MASL, while the elevation for Gold Reef Mountain Bushveld varies between 1200 and 1750 MASL. The average elevation of the project area is 1320 MASL and it is noted that the northern boundary is more elevated as it borders the Magaliesberg.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 573 mm per year. The average maximum temperature for the study area ranges from 18.3 °C in June to 27.5 °C in January. The lowest temperatures occur during July when an average of 1.7 °C is reached during the night (SA Explorer accessed 24/10/2017).

The study area falls within the A21H Quaternary Catchment that forms part of the Crocodile (West) and Marico Management Area. The closest major river to the study area is the Swartspruit, a perennial river flowing roughly 1.5 km to the south of the area demarcated for prospecting.

2.2 Project description

The area demarcated for the prospecting of Shale/Brick Clay, Clay, Silica Sand, Sand and Aggregate covers an area of approximately 60.428 ha (**Table 1 & Figure 3**). Prospecting will initially consist of a high-level desktop study and potential desktop resource evaluation. Activities will include studying previous drilling, trenching, sampling and exploration data. Historical data and existing maps will be studied as well. Should the results of the desktop study be favourable, further exploration drilling, trenching and resource estimations will be performed on selected sites.

Table 1: Property name & coordinates

Property	Portion	Map Reference (1:50 000)	Coordinates
Boekenhoutkloof 315 JR	36	2528CA	S: -25.688399 E: 28.063330
Boekenhoutkloof 315 JR	37	2528CA	S: -25.687947 E: 28.066328
Boekenhoutkloof 315 JR	38	2528CA	S: -25.691207 E: 28.064781
Boekenhoutkloof 315 JR	39	2528CA	S: -25.694705 E: 28.062592
Boekenhoutkloof 315 JR	40	2528CA	S: -25.694705 E: 28.064234
Boekenhoutkloof 315 JR	41	2528CA	S: -25.694800 E: 28.065400

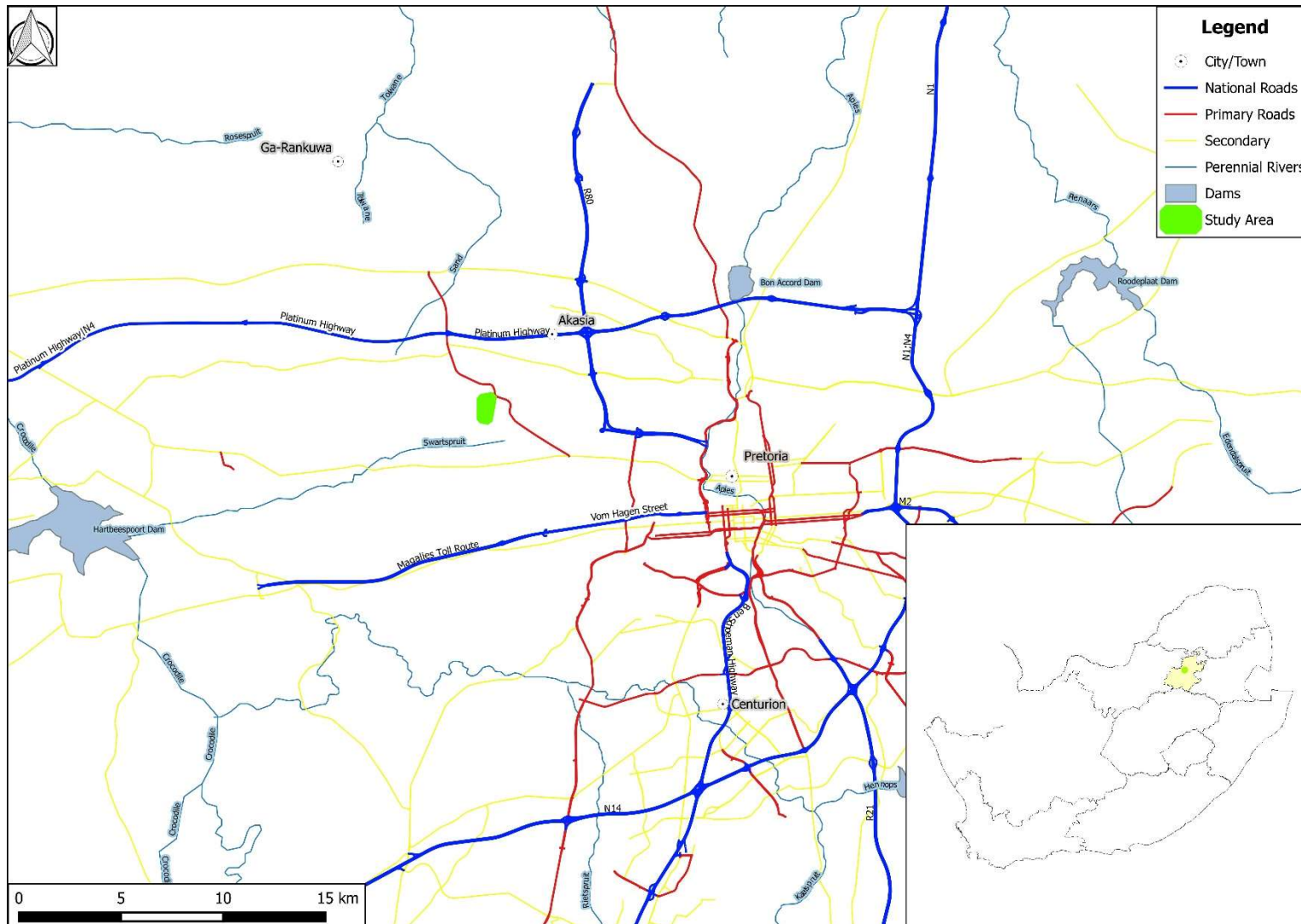


Figure 1: Regional and Provincial location of the study area.

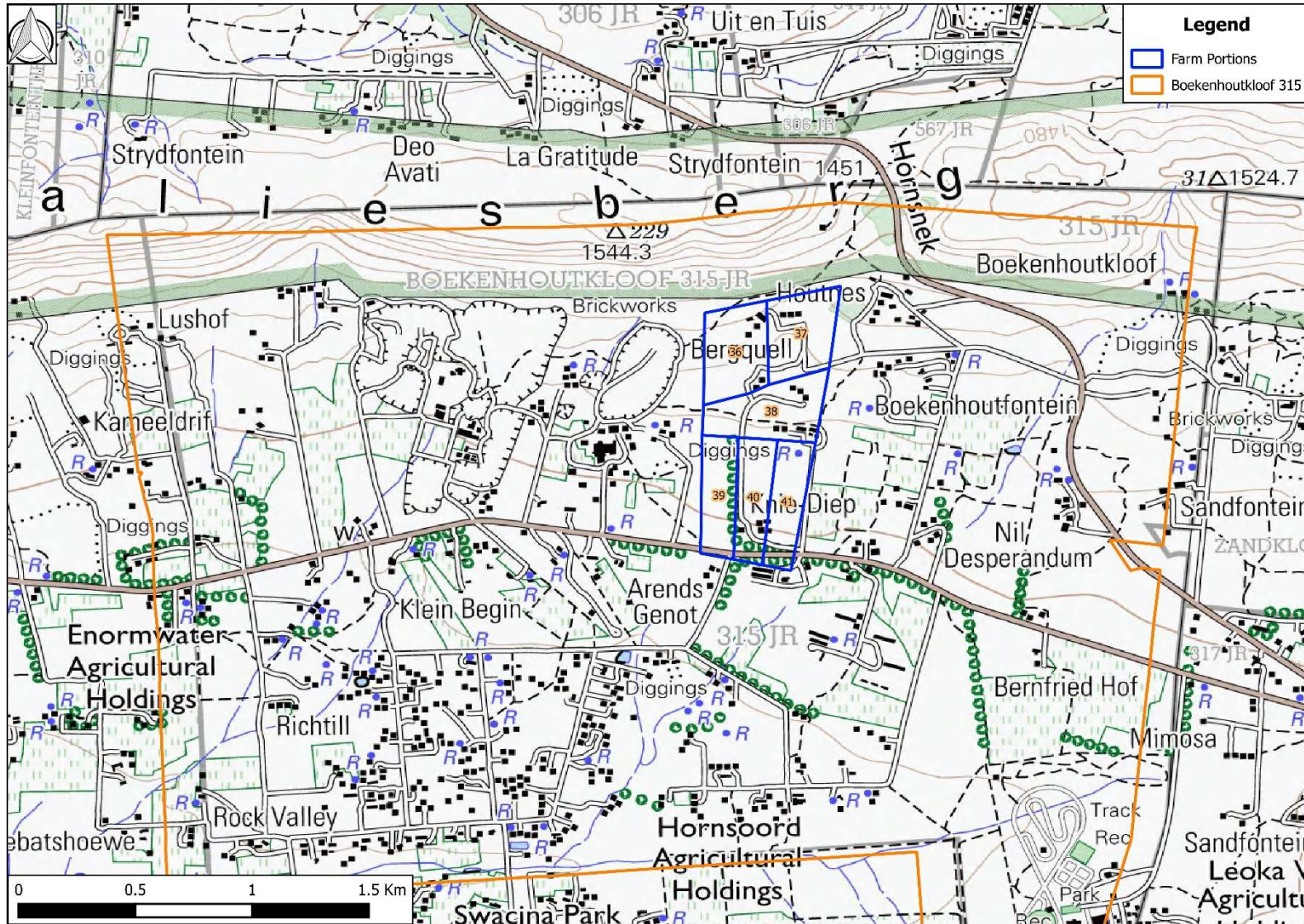


Figure 2: Segment of SA 1: 50 000 2528 CA indicating the study area.

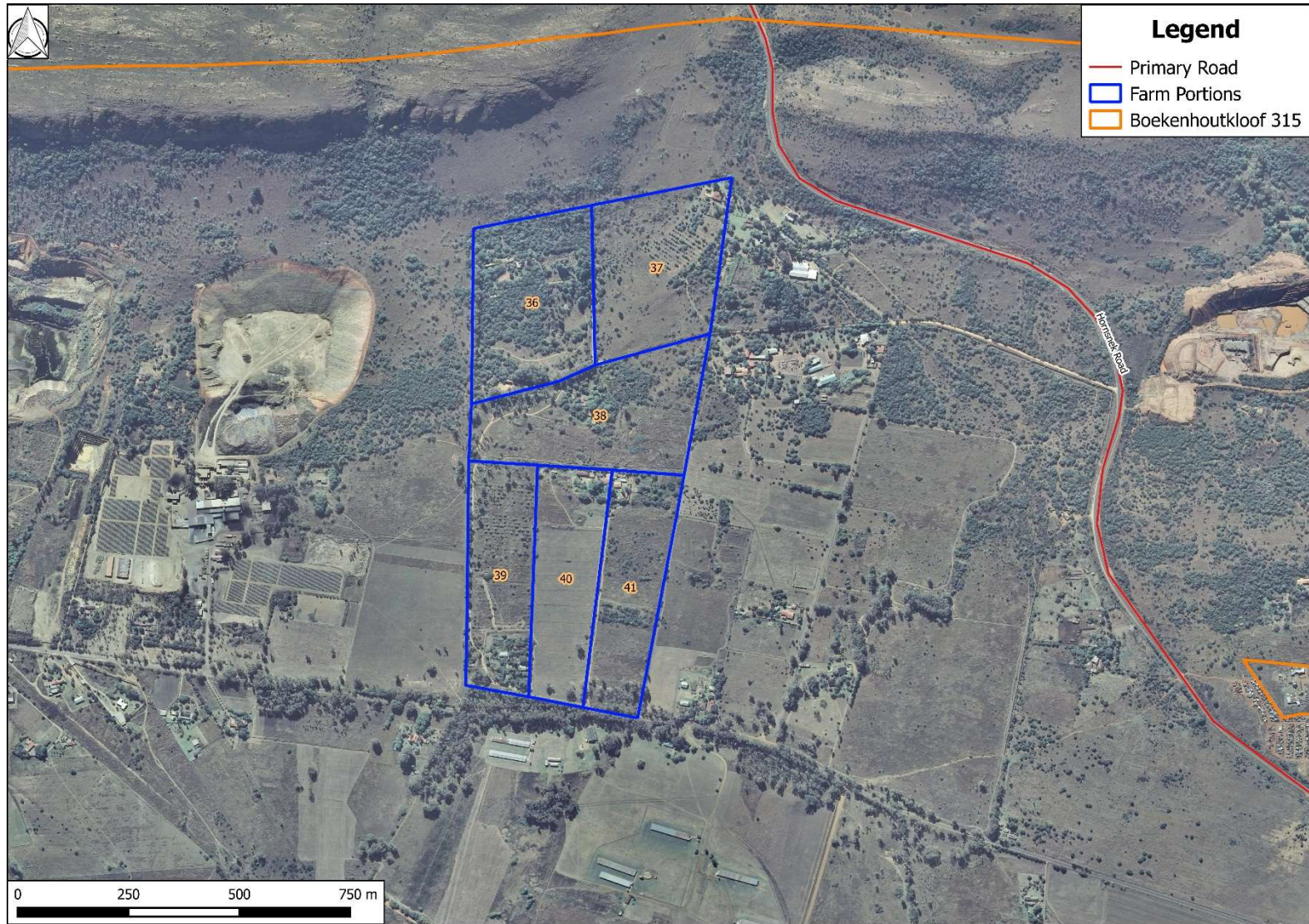


Figure 3: Proposed prospecting site on aerial backdrop.

3. Archaeological Background

Southern African archaeology is broadly divided into the Early, Middle and Later Stone Ages; Early, Middle and Later Iron Ages; and Historical or Colonial Periods. This section of the report provides a general background to archaeology in South Africa.

3.1 The Stone Age

The earliest stone tool industry, the Oldowan, was developed by early human ancestors which were the earliest members of the genus *Homo*, such as *Homo habilis*, around 2.6 million years ago. It comprises tools such as cobble cores and pebble choppers (Toth & Schick 2007). Archaeologists suggest these stone tools are the earliest direct evidence for culture in southern Africa (Clarke & Kuman 2000). The advent of culture indicates the advent of more cognitively modern hominins (Mitchell 2002: 56, 57)

The Acheulean industry completely replaced the Oldowan industry. The Acheulean industry was first developed by *Homo ergaster* between 1.8 to 1.65 million years ago and lasted until around 300 000 years ago. Archaeological evidence from this period is also found at Swartkrans, Kromdraai and Sterkfontein. The most typical tools of the ESA are handaxes, cleavers, choppers and spheroids. Although hominins seemingly used handaxes often, scholars disagree about their use. There are no indications of hafting, and some artefacts are far too large for it. Hominins likely used choppers and scrapers for skinning and butchering scavenged animals and often obtained sharp ended sticks for digging up edible roots. Presumably, early humans used wooden spears as early as 5 million years ago to hunt small animals.

Middle Stone Age artefacts started appearing about 250 000 years ago and replaced the larger Early Stone Age bifaces, handaxes and cleavers with smaller flake industries consisting of scrapers, points and blades. These artefacts roughly fall in the 40-100 mm size range and were, in some cases, attached to handles, indicating a significant technical advance. The first *Homo sapiens* species also emerged during this period. Associated sites are Klasies River Mouth, Blombos Cave and Border Cave (Deacon & Deacon 1999).

Although the transition from the Middle Stone Age to the Later Stone Age did not occur simultaneously across the whole of southern Africa, the Later Stone Age ranges from about 20 000 to 2000 years ago. Stone tools from this period are generally smaller, but were used to do the same job as those from previous periods; only in a different, more efficient way. The Later Stone Age is associated with: rock art, smaller stone tools (microliths), bows and arrows, bored stones, grooved stones, polished bone tools, earthenware pottery and beads. Examples of Later Stone Age sites are Nelson Bay Cave, Rose Cottage Cave and Boomplaas Cave (Deacon & Deacon 1999).

3.2 The Iron Age & Historical Period

The Early Iron Age marks the movement of farming communities into South Africa in the first millennium AD, or around 2500 years ago (Mitchell 2002:259, 260). These groups were agro-pastoralist communities that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Archaeological evidence from Early Iron Age sites is mostly artefacts in the form of ceramic assemblages. The origins and archaeological identities of this period are largely based upon ceramic typologies. Some scholars classify Early Iron Age ceramic traditions into different “streams” or “trends” in pot types and decoration, which emerged over time in southern Africa. These “streams” are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). Early Iron Age ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. This period continued until the end of the first millennium AD (Mitchell 2002; Huffman 2007). Some well-known Early Iron Age sites include the Lydenburg Heads in Mpumalanga, Happy Rest in the Limpopo Province and Mzonjani in Kwa-Zulu Natal.

The Middle Iron Age roughly stretches from AD 900 to 1300 and marks the origins of the Zimbabwe culture. During this period cattle herding appeared to play an increasingly important role in society. However, it was proved that cattle remained an important source of wealth throughout the Iron Age. An important shift in the Iron Age of southern Africa took place in the Shashe-Limpopo basin during this period, namely the development of class distinction and sacred leadership. The Zimbabwe culture can be divided into three periods based on certain capitals. Mapungubwe, the first period, dates from AD 1220 to 1300, Great Zimbabwe from AD 1300 to 1450, and Khami from AD 1450 to 1820 (Huffman 2007: 361, 362).

The Late Iron Age roughly dates from AD 1300 to 1840. It is generally accepted that Great Zimbabwe replaced Mapungubwe. Some characteristics include a greater focus on economic growth and the increased importance of trade. Specialisation in terms of natural resources also started to play a role, as can be seen from the distribution of iron slag which tend to occur only in certain localities compared to a wide distribution during earlier times. It was also during the Late Iron Age that different areas of South Africa were populated, such as the interior of KwaZulu Natal, the Free State, the Gauteng Highveld and the Transkei. Another characteristic is the increased use of stone as building material. Some artefacts associated with this period are knife-blades, hoes, adzes, awls, other metal objects as well as bone tools and grinding stones.

The Historical period mainly deals with Europe’s discovery, settlement and impact on southern Africa. Some topics covered by the Historical period include Dutch settlement in the Western Cape, early mission stations, Voortrekker routes and the Anglo Boer War. This time period also saw the compilation of early maps by missionaries, explorers, military personnel, etc.

3.3 Previous research

Fort West Phase 1 Development

An archaeological survey was done for the development of a mixed-use township on Portion 1 of the Farm Fort 646 JR within the Tshwane Metropolitan Municipality. The site is located south of the Daspoortrand, north of the suburb of Lotus Gardens and approximately 4.5 km south of the proposed prospecting concerned in this report. J. van Schalkwyk (2012) surveyed the study area and located seven stone-walled Late Iron Age sites consisting of settlement structures, cattle enclosures and several other smaller enclosures. According to Van Schalkwyk (2012), these sites can probably be linked to Tswana- or Ndebele speakers who settled in the area within the past 300 years. Other sites of heritage importance located in close vicinity are Fort Daspoort, built by the ZAR out of fear for British domination (Van Vollenhoven 1999), and Westfort Hospital, which was erected in 1898.

HIA on the Farm Hartbeeshoek 301 JR

The National Cultural History Museum (2002) conducted a Heritage Impact Assessment to identify graves on the Farm Hartbeeshoek 301 JR within the Akasia municipal area, Pretoria. The aim of the study was to identify graves within the road reserve of the Platinum Toll Highway. The study identified approximately 20 graves marked with stone cairns and a recommendation was made to relocate the graves. The identified graveyard was located about 5 km northeast of the area demarcated for the SABRIX prospecting concerned in this study.

Extension of SABRIX Quarry

Dr R. C. de Jong (2002) conducted a Heritage Scoping Study, done as part of the EMP, for the expansion of the SABRIX quarry on Portion 19 of the Farm Boekenhoutkloof 315 JR, Pretoria. According to De Jong (2002) the Farm Boekenhoutkloof originally belonged to the Zuid-Afrikaansche Republiek and was subsequently leased to Willem Hendrik Boshoff Jr. from 26 July 1859. During the 1860s, the farm was transferred to G. P. J. Horn. The original farmhouse was built by Horn to the northwest of the SABRIX quarry and a farm school was later erected approximately in the middle of the property. In June 1892, Arthur H. Walker surveyed the entire farm for G. P. J. Horn and in March 1912, the farm was subdivided. During the survey, two heritage sites were identified: one ruin consisting of stone-walls and clay mortar dating to between 1930 and 1960, and one graveyard consisting of several graves (De Jong 2002).

4. Evaluation

The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences.

A fundamental aspect in the conservation of a heritage resource relates to whether the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. There are many aspects that must be taken into consideration when determining significance, such as rarity, national significance, scientific importance, cultural and religious significance, and not least, community preferences. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and if appropriate mitigated in order to gain data / information which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed.

5. Statement of Significance & Recommendations

5.1 Statement of significance

The study area: Portions 36, 37, 38, 39, 40 and 41 of the Farm Boekenhoutkloof 315 JR

As can be seen from previous research done in the area the general region is significant from a heritage perspective. Heritage sites are likely to include graveyards, Iron Age/Farmer and Historical remains. Since heritage sites, such as graves, are not always clearly identifiable as it might consist of stone cairns, it is advised that a qualified archaeologist inspect the proposed prospecting sites prior to drilling to establish whether the sites might be sensitive from a heritage perspective.

5.2 Recommendations

The following recommendations are made in order to avoid the destruction of heritage remains in the areas demarcated for prospecting:

- Prior to any development, construction or prospecting a qualified archaeologist should conduct a site inspection on the areas demarcated for geotechnical drilling/prospecting. Proposed access roads to the drill sites should also be surveyed in order to avoid the destruction of heritage material.
- Should the prospecting outcome result in further development or construction, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered.
- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the prospecting phase, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).

6. Addendum: Terminology

Archaeology:

The study of the human past through its material remains.

Artefact:

Any portable object used, modified, or made by humans; e.g. pottery and metal objects.

Assemblage:

A group of artefacts occurring together at a particular time and place, and representing the sum of human activities.

Context:

An artefact's context usually consist of its immediate *matrix* (the material surrounding it e.g. gravel, clay or sand), its *provenience* (horizontal and vertical position within the matrix), and its *association* with other artefacts (occurrence together with other archaeological remains, usually in the same matrix).

Cultural Resource Management (CRM):

The safeguarding of the archaeological heritage through the protection of sites and through salvage archaeology (rescue archaeology), generally within the framework of legislation designed to safeguard the past.

Excavation:

The principal method of data acquisition in archaeology, involving the systematic uncovering of archaeological remains through the removal of the deposits of soil and other material covering and accompanying it.

Feature:

An irremovable artefact; e.g. hearths or architectural elements.

Ground Reconnaissance:

A collective name for a wide variety of methods for identifying individual archaeological sites, including consultation of documentary sources, place-name evidence, local folklore, and legend, but primarily actual fieldwork.

Matrix:

The physical material within which artefacts is embedded or supported, i.e. the material surrounding it e.g. gravel, clay or sand.

Phase 1 Assessments:

Scoping surveys to establish the presence of and to evaluate heritage resources in a given area.

Phase 2 Assessments:

In-depth culture resources management studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required.

Sensitive:

Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains.

Site:

A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity.

Surface survey:

There are two kinds: (1) unsystematic and (2) systematic. The former involves field walking, i.e. scanning the ground along one's path and recording the location of artefacts and surface features. Systematic survey by comparison is less subjective and involves a grid system, such that the survey area is divided into sectors and these are walked ally, thus making the recording of finds more accurate.

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