PROPOSED KALABASFONTEIN MINE EXTENSION PROJECT, NEAR BETHAL, GOVAN MBEKI DISTRICT MUNICIPALITY, MPUMALANGA.

Phase 1 – Heritage Impact Assessment

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Declaration of Independence

- I, Ilan Smeyatsky, declare that –
- General declaration:
- I act as the independent heritage practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting heritage impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

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ACKNOWLEDGEMENT OF RECEIPT

Report Title	***PROPOSED KALABASFONTEIN MINE EXTENSION PROJECT, NEAR BETHAL, GOVAN MBEKI DISTRICT MUNICIPALITY, MPUMALANGA.***		
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The Heritage Impact Assessment Report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA): Appendix 6 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended) requirements for specialist reports as indicated in the table below.

NEMA Regs (2014, as amended) - Appendix 6	Relevant section in report
Details of the specialist who prepared the report	Page 2 of Report – Contact details and company
The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to **Appendix D**
A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report
An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1 and 2.2
The date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.6
A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 5 and **Appendix B**
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 3.6 and 5
An identification of any areas to be avoided, including buffers	Section 6
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 3.6 refer
A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 6
Any mitigation measures for inclusion in the EMPr	Section 6
Any conditions for inclusion in the environmental authorisation	Section 6
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 6
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and	Section 6
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	
A description of any consultation process that was undertaken during the course of carrying out the study	Not applicable. A public consultation process was handled as part of the EIA and EMP process.
A summary and copies if any comments that were received during any consultation process	Not applicable. To date not comments regarding heritage resources that require input from a specialist have been raised.
Any other information requested by the competent authority.	Not applicable.

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) for the extension of the current mining areas over portions 7, 8, Remaining Extent (RE), 11 and 13 of the farm Kalabasfontein 232 IS, inclusive of two proposed sites for a new ventilation shaft, namely Portion 7 of the farm Uitgedacht 229 IS and Portion 22 of the farm Uitgedacht 229 IS and connecting powerline, near Bethal, Msukaligwa Local Municipality, Mpumalanga.

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant. Management measures as listed and required in other HIA's conducted in the area must still be implemented for other heritage features identified in the larger Bethal area.

Archaeology

The data analysis has enabled the identification of possible heritage sensitive areas that included:

- Dwellings;
- Clusters of dwellings (homesteads and farmsteads);
- Archaeological Sensitive areas (based on historical descriptions); and
- Structures.

Note that these structures refer to possible heritage sites as listed in **Table 1**.

Table 1: Tangible Heritage site in the study area

Name	Description	Legislative protection
Architectural Structures	Possibly older than 60 years	NHRA Sect 3 and 34
Cemeteries	Graves	NHRA Sect 3 and 36 and MP Graves Act

Previous studies conducted in the area around Bethal have shown that the archaeological record is temporally confined to the Iron Age. During the field assessment, a total of 10 heritage sites were located. These include four burial grounds (**KAL002, KAL003, KAL008, KAL010**) and six historical sites (**KAL001, KAL004, KAL005, KAL006, KAL007 and KAL009**). Refer to **Figure 43** for the locality of heritage resources in relation to the proposed development area.

It must be considered that the heritage significance of the identified sites plays a role in the evaluation of the impact and must influence the magnitude rating of the impact tables. Thus, a heritage resource with a high heritage significance rating will have a higher impact magnitude rating than a resource with a low or no heritage significance rating. Consequently, mitigation measures will be more extensive for a heritage resource with a high heritage significance than for those with a low heritage significance.

The management and mitigation measures as described in Section 6 of this report have been developed to minimise the project impact on heritage resources. Impacts on burial grounds and graves are rated as being LOW NEGATIVE before mitigation and LOW NEGATIVE after mitigation measures are implemented. Impacts on Historical sites are rated as being LOW NEGATIVE before mitigation and LOW NEGATIVE after mitigation measures are implemented.

Palaeontology

The proposed development footprint of the proposed Kalabasfontein development is entirely underlain by sedimentary rocks of the Permian aged Vryheid Formation, (Ecca Group, Karoo Supergroup). The Vryheid Formation of the Ecca Group has a **Very High Palaeontological** Sensitivity. Although no fossils have been found in the current mining area, it is possible that important fossils namely the Glossopteris flora will be documented during excavations. This flora is associated with the shales between the coal seams but not in the coal itself. The recording of fossils will improve our knowledge of the Palaeontological Heritage of the development area.

Two alternative sites have been suggested for a **new ventilation shaft**, namely Portion 7 of the farm Uitgedacht 229 IS and Portion 22 of the farm Uitgedacht 229 IS. The planned **extension of the current mining area** will involve minimal new surface infrastructure as the mining method is underground mining and existing surface infrastructure from the Forzando South mine will be utilized. As the geology of the mine extension and ventilation shaft alternatives is similar, there are none preferred alternative for either of the ventilation shafts.

As no fossils have been recovered from the existing mining area the proposed development is deemed feasible and will not lead to detrimental impacts on the palaeontological resources of the area. A chance find protocol for finding fossils from the proposed development site is thus recommended.

Impacts on Palaeontological resources are rated as MODERATE NEGATIVE before and LOW NEGATIVE after mitigation measures are implemented.

General

In the event that heritage resources are discovered during site clearance, construction activities must stop, and a qualified archaeologist appointed to evaluate and make recommendations on mitigation measures.

The overall impact of the development on heritage resources is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels.

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TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; and
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Early Stone Age

The archaeology of the Stone Age between 700 000 and 3 300 000 years ago.

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

Holocene

The most recent geological time period which commenced 10 000 years ago.

Late Stone Age

The archaeology of the last 30 000 years associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Table 2: List of abbreviations used in this report

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Earlier Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LCTs	Large Cutting Tools
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

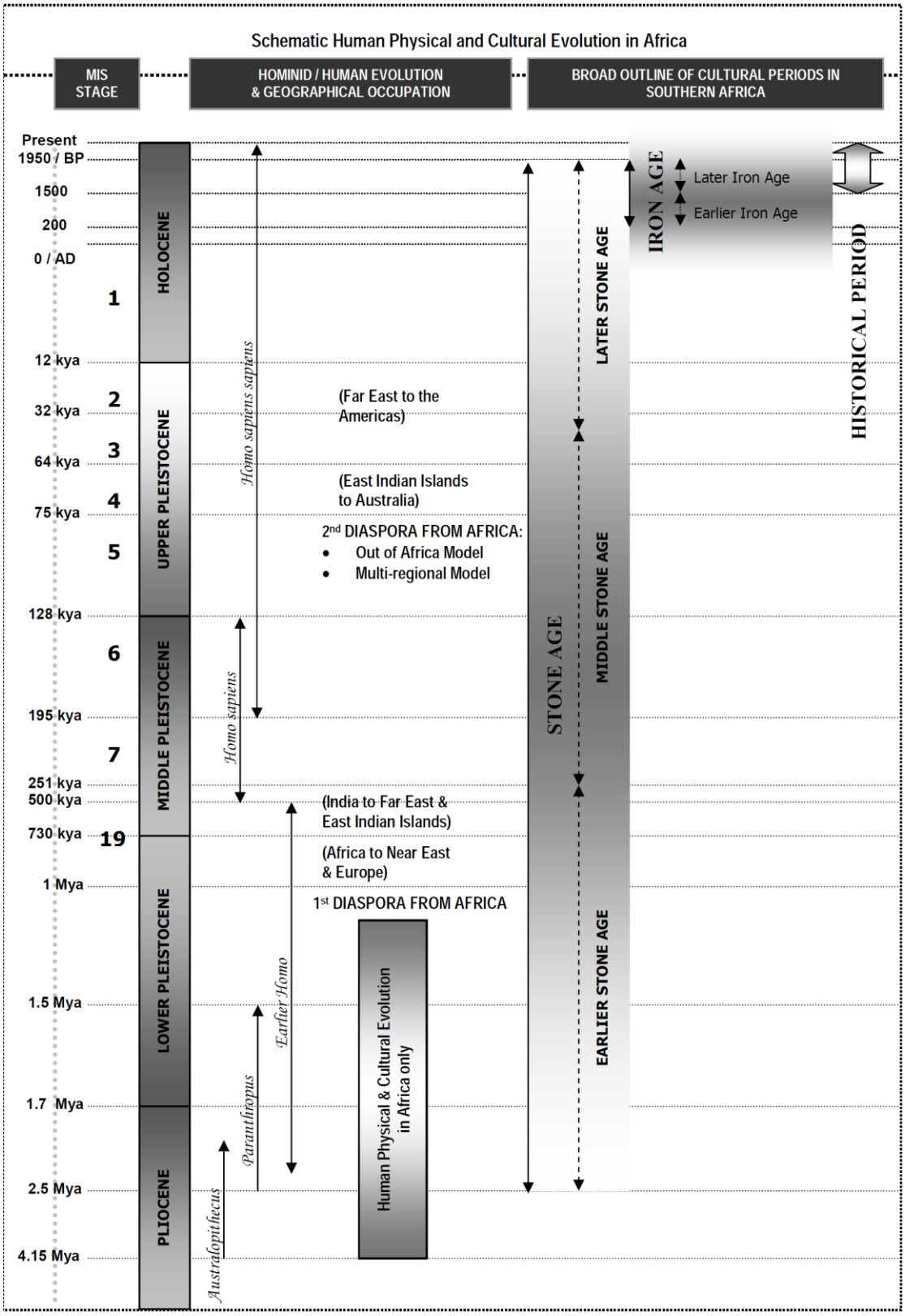

Figure 1 – Human and Cultural Timeline in Africa (Morris, 2008)

1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) for the extension of the current underground mining areas over portions 7, 8, Remaining Extent (RE), 11 and 13 of the farm Kalabasfontein 232 IS, inclusive of two proposed sites for a new ventilation shaft and power line, namely Portion 7 of the farm Uitgedacht 229 IS and Portion 22 of the farm Uitgedacht 229 IS and connecting powerline near Bethal, Msukaligwa Local Municipality, Mpumalanga.

1.1 Scope of the Study

The aim of the study was to identify possible heritage sites and finds that may occur in the proposed study area. The HIA aims to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

This HIA Report was compiled by PGS.

The staff at PGS has a combined experience of nearly 70 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Mr. Ilan Smeyatsky, graduated with his Master's degree (MSc) in Archaeology; is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA) and is accredited as a Field Supervisor.

Mr. Wouter Fourie, the Project Coordinator, is registered with the ASAPA as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the current dense vegetation cover. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

1.4 Legislative Context

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

- National Environmental Management Act (NEMA), Act 107 of 1998
- NHRA, Act 25 of 1999
- Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

- NEMA (Act 107 of 1998)
    - Basic Environmental Assessment (BEA) – Section (23)(2)(d)
    - Environmental Scoping Report (ESR) – Section (29)(1)(d)
    - Environmental Impact Assessment (EIA) – Section (32)(2)(d)
    - Environmental Management Plan (EMP) – Section (34)(b)
- NHRA (Act 25 of 1999)
    - Protection of Heritage Resources – Sections 34 to 36; and
    - Heritage Resources Management – Section 38
- MPRDA (Act 28 of 2002)
    - Section 39(3)

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of CRM those resources specifically impacted on by development as stipulated in Section 38 of NHRA. This study falls under Section 38(8) and requires comment from the relevant heritage resources authority.

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

The study area is located in Mpumalanga, 20 kilometres north of Bethal and 20 kilometres east of Ga-Nala (Kriel). It is located to the east and south of the existing Forzando South 380MR and

Forzando North 381MR respectively which fall within the Msukaligwa Local Municipality (**Figure 2**). The project proposes the extension of the current mining areas over portions 7, 8, Remaining Extent (RE), 11 and 13 of the farm Kalabasfontein 232 IS, inclusive of two proposed sites for a new ventilation shaft, namely Portion 7 of the farm Uitgedacht 229 IS and Portion 22 of the farm Uitgedacht 229 IS and connecting powerline.

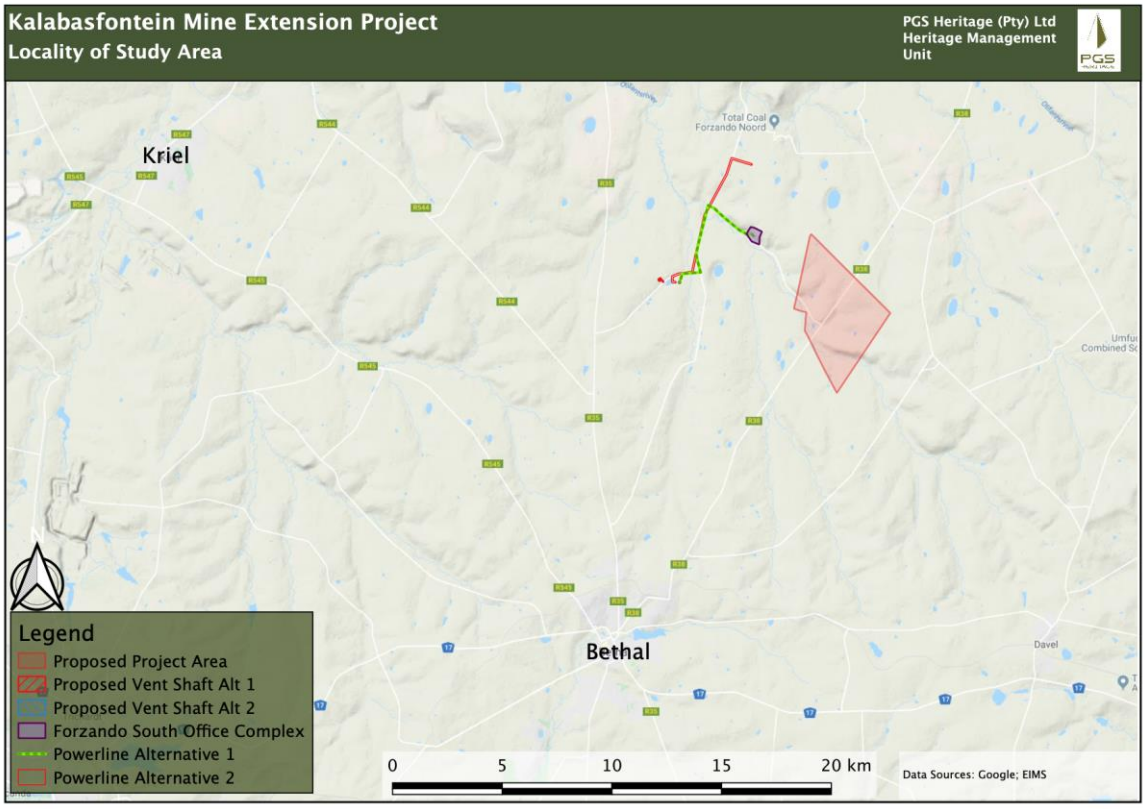

Figure 2 – Locality of study area

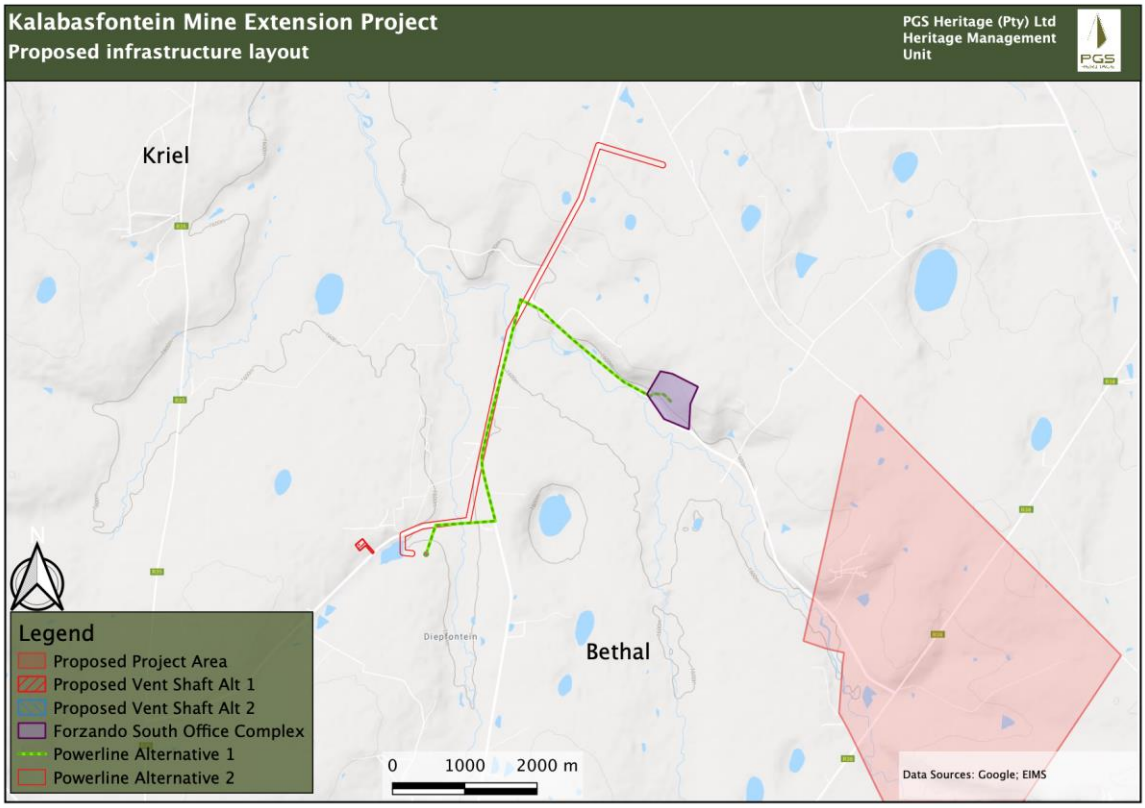

Figure 3 - Locality map of Kalabasfontein project area and new ventilation shaft on Portion 7 of the farm Uitgedacht 229 IS (EIMS 2018)

2.2 Technical Project Description

The following brief project description for the project has been supplied by EIMS (EIMS 2018):

The Kalabasfontein project has an estimated LOM of 17 years with the project schedule and timeframe being based on the Forzando South equipment availabilities, efficiencies and both skilled and unskilled labour force. Mining in the Kalabasfontein project area is based on two Continuous Miner (CM) sections.

The access corridor to Kalabasfontein Reserves was identified during exploration drilling. Reserves will be mined through access from one of Forzando South Reserves block. This will eliminate intense preparation work of developing a new incline, as there will be infrastructure available at the face.

Currently, Forzando South mine is scheduled until 2037. However, the Kalabasfontein portion will be mined as soon as permission is granted, in order to ensure sustained production volumes and quantities from the 5 CM sections that are currently being mined. The mine will maintain its production rate of 2.2 Million tonnes (Mt) per annum. Commissioning of Kalabasfontein will not add to the production of Forzando South but will provide relocation areas for existing Forzando South sections. Since the Kalabasfontein project will be mined concurrently with Forzando South,

production decline will be due to depletion of Reserves. In the second quarter of year 17 (2037), the first section will pull out and leave the one section to deplete the remaining Reserves.

2.2.1 Infrastructure Requirements

As the Kalabasfontein project will use the existing Forzando South and Forzando North infrastructure, it is envisaged that additional infrastructure requirements will be minimal. These requirements are based on staff required over the production period for permanent employees and contractors. Water and electricity requirements for the construction of mine access (ventilation shaft) and surface infrastructure are temporary, lasting for approximately 12 months. **Table 3** below presents the electrical equipment that will be utilized during the underground mining operations.

Table 3: Underground mining equipment - electrical powered machines

Equipment	Activity	kW/hr power use
Feeder breaker	Sizing and feeding coal	150
Conveyor drives and take up sections	Conveying coal long distance	45
Transformers and switch gear		20
Auxiliary ventilation fans	Diluting dust and methane	15
De-watering pumps	Dewatering u/g workings	10
Material stores and crew station		5
Continuous Miner	Cutting coal	650
Shuttle cars	Conveying coal short distance	219
Twin boom roof bolter with side wall bolting capability	Roof bolting	74
Main Fan	Diluting duct and methane	180
Self-propelled diesel/ electric face drill rig	Horizontal drilling	75
Self-propelled diesel/ electric roof bolter	Back bye and roof support	60
Total		1 503

As the Kalabasfontein project will use the existing Forzando South and Forzando North infrastructure, it is envisaged that additional infrastructure requirements will be minimal. A ventilation shaft will be required, this will be located outside the Kalabasfontein project area, either on portion 7 or portion 22 of the farm Uitgedacht 229 IS approximately 6km away **Figure 3**. Existing access roads will be used as far as possible..

Since this project will be an extension of the Forzando South operations, it anticipated that the existing infrastructure will be utilized during all phases of the project. The existing surface infrastructure related to Forzando North can be summarised as follows:

- Coal beneficiation plant;
- Coal discard dumps;
- Rail line of about 1,6 km to the Richards Bay Coal Terminal railway line;
- Rail loop of about 400 m diameter;
- Coal product load-out stockpile located to the west of the discard dump;

- ROM coal stockpile;
- Water pollution control dams;
- Metallurgical coal stockpiles; and
- Administration, workshops, change house and related buildings.

At present the existing surface infrastructure related to Forzando South can be summarised as follows:

- Power lines;
- Ventilation shafts (one upcast & one downcast);
- ROM coal stockpile;
- Overland conveyor from boxcut to Forzando North plant;
- Water pollution control dams; and
- Administration, workshops, change house and related buildings.

3 CURRENT STATUS QUO

3.1 Site Description

The Kalabasfontein Project is situated approximately 20 kilometres north of Bethal and 20 kilometres east of Ga-Nala (Kriel). It is situated in a semi-rural area under the Msukaligwa Local Municipality.

The study area consists of farmlands currently being utilised for maize production as well as animal agriculture (mainly cattle) (**Figure 4 & Figure 5**). As a result, the vast majority of the Kalabasfontein Project footprint overlays ploughed and grazing fields with some portions of the study area consisting of natural ridges and rivers (**Figure 7 & Figure 8**). The majority of the study area is disturbed predominantly due to the aforementioned agricultural activities (**Figure 6**). Where not transformed into farmlands, the area consists of Grassland biome vegetation, which is dominated by various species of grasses growing on undulating hills (**Figure 9)**. The site localities of the two proposed ventilation shafts fall upon heavily ploughed maize fields (**Figure 10 & Figure 11**). Overall, the site was accessible by foot and site detection visibility was good.

Figure 4 – View of harvested maize fields

Figure 5 – Cattle grazing

Figure 6 – View of intensely ploughed field

Figure 7 – View of typical cattle grazing area, notice the lack of features on the terrain

Figure 8 – View of river in foreground and ridgeline in background within one of the only undisturbed parts of the study area

Figure 9 – View of same of river taken from the ridge line

Figure 10 - Site location for Ventilation Shaft Alt 1

Figure 11 - Site location for Ventilation Shaft Alt 2

3.2 Archival findings

The archival research focused on available information sources that were used to compile a background history of the study area and surrounds. This data then informed the possible heritage resources to be expected during field surveying.

3.2.1 South African Heritage Resources Information System (SAHRIS)

A scan of SAHRIS has revealed the following studies conducted in and around the study area of this report:

- VAN SCHALKWYK, J. 2003. Archaeological Survey of a Section of the Secunda-Mozambique Gas Pipeline, Ermelo and Bethal. – **This assessment identified a series of informal burial grounds.**
- VAN SCHALKWYK, J. 2003. Archaeological Survey of a Section of the Secunda-Mozambique Gas Pipeline Bethal and Highveld Ridge. - **This assessment identified Iron Age heritage remains as well as an informal burial ground.**
- KENT, S. 2006. A Unique Middle Stone Age Open-Air Habitation Site Along the Little Caledon River: Bethal 1. - **This assessment identified a Middle Stone Age open air habitation site.**
- VAN VOLLENHOVEN, A. 2009. A Report on a Cultural Heritage Impact Assessment for the EMP Amendment of the Forzando North Coal Mine near Bethal, Mpumalanga Province. - **This assessment identified Historical heritage remains as well as several informal burial grounds.**
- VAN VOLLENHOVEN, A. 2012. A Report on a Heritage Impact Assessment for the Schurvekop Coal Mine Project near Bethal in the Mpumalanga Province. - **This assessment identified several informal burial grounds**.

- PISTORIUS, J.C.C. 2017. A Phase I Heritage Impact assessment study for the proposed Davel Project near Bethal in the Mpumalanga Province. - **This assessment identified Historical heritage remains as well as several informal burial grounds.**
- VAN VOLLENHOVEN, A. 2012. A Report on a Cultural Heritage Impact Assessment for a proposed mining right amendment application at the Halfgewonnen Colliery, between Bethal and Hendrina, Mpumalanga Province. - **This assessment identified no heritage remains.**
- VAN VOLLENHOVEN, A. 2017. Report on a Cultural Heritage Impact Assessment for a Proposed Underground Mine on Different Portions of the Farm Schurvekop 227 IS, close to Bethal, Mpumalanga Province. - **This assessment identified several informal burial grounds.**
- COETZEE, T. 2018. Phase 1 AIA for The Expansion of the Kleinfontein Colliery Between Hendrina and Bethal, Mpumalanga. - **This assessment identified Historical heritage remains as well as several informal burial grounds.**
- ORTON, J. 2017. Heritage Impact Assessment: Proposed Service Station and Access on Erven 1685 & 1729, Kriel, Bethal Magisterial District, Mpumalanga. - **This assessment identified no heritage remains.**
- VAN VOLLENHOVEN, A. 2013. A Report on a Cultural Heritage Impact Assessment for a proposed mining right application at the Overlooked Colliery, between Bethal and Hendrina, Mpumalanga Province. - **This assessment identified Historical heritage remains as well as several informal burial grounds.**
- PELSER, A. 2015. Phase 1 Heritage Impact Report for the Vosbreet Boerdery Proposed New Pig Farm on Portions 6 & 10 of the farm Rensburgshoop 74 IS near Bethal, Mpumalanga. - **This assessment identified Iron Age heritage remains.**

3.3 Archaeological background

The province of Mpumalanga is known to be rich in archaeological sites that tell the story of humans and their predecessors in the region going back some 1,7 million years (Delius & Hay, 2009). The pre-colonial period is divided broadly into the Stone Age and the Iron Age.

The Stone Age refers to the earliest people of South Africa who relied mainly on stone for their tools and were hunter-gatherers. This period is divided into the Earlier, Middle and Later Stone Age:

- *Earlier Stone Age:* The period from ± 2.5 million yrs. - ± 250 000 yrs. ago. Acheulean stone tools are dominant.
- *Middle Stone Age*: Various stone tool industries in SA dating from ± 250 000 yrs. – 40 000 yrs. before present.
- *Later Stone Age:* The period from ± 40 000 yrs. before present to the period of contact with either Iron Age farmers or European colonists. (Delius & Hay, 2009; Morris, 2008)

The Iron Age as a whole represents the spread of Bantu-speaking people whose way of life was pastoral-agricultural and includes both the Pre-Historic and Historic periods. As indicated by the name, this period is distinguished by the knowledge of extraction and use of various metals, mainly iron. Similarly to the Stone Age, it can also be divided into three periods:

- *The Early Iron Age:* Most of the first millennium AD.
- *The Middle Iron Age*: 10th to 13th centuries AD
- *The Late Iron Age:* 14th century to colonial period. (Delius & Hay, 2009; Morris, 2008)

The archaeological literature does not contain much information on the Stone Age archaeology of this area, since this period has not been researched extensively in Mpumalanga (Esterhuysen & Smith, 2007). However, it is clear from the general archaeological record that the larger Mpumalanga region has been inhabited by humans since Earlier Stone Age (ESA) times. Although no Stone Age sites are known from the immediate vicinity of the study area, there are some sites recorded in the greater region (Esterhuysen & Smith, 2007). Examples of such sites are noted below.

3.3.1 Stone Age Sites

An Earlier Stone Age (ESA) site is located at Maleoskop near Groblersdal. Concentrations of ESA stone tools were found in erosion gullies along the Rietspruit (Esterhuysen & Smith, 2007). Evidence for the Middle Stone Age (MSA) period has been excavated from Bushman Rock Shelter, situated on the farm Klipfonteinhoek in the Ohrigstad District. The MSA layers indicated that the cave was visited repeatedly over a long period, between approximately 40 000 years ago and 27 000 years Before Present (Esterhuysen & Smith, 2007). Two Later Stone Age (LSA) sites were found at the farm Honingklip near Badplaas in the Carolina District, (Esterhuysen & Smith, 2007).

3.3.2 Iron Age Sites

Early Iron Age

Early farming communities moved into the Mpumalanga area around AD 500. These early farmers used metal tools and pottery and lived in fairly permanent agricultural villages. The most well-known EIA site in the area is the Lydenburg Heads site in the Sterkstroom Valley. A brief account of the discovery is provided by Esterhuysen and Smith (2007):

"In 1957 a young boy, Ludwig von Bezing, found some strangely shaped pieces of pottery on his father's farm near Lydenburg, which seemed like pieces of human masks. Over the next few years he collected more fragments as well as other artefacts, including pot shards, iron and copper beads, ostrich eggshell beads, and millstones. Whilst studying at the University of Cape Town, he brought the fragments to the attention of Ray Inskeep, Professor of Archaeology. Inskeep then excavated the site and supervised the masks' reconstruction. Known as the Lydenburg Heads, they immediately became famous, partly because of their rarity and intriguing appearance, and partly

because they reveal aspects of past cultural and ritual practices. They are on permanent display at the South African Museum in Cape Town. The heads have been carbon-dated to about AD 500. Similar pottery heads dating to the same period have been found near the KwaZulu-Natal coast."

Figure 12 – Lydenburg Heads (Iziko Museum; from Delius, 2009)

Late Iron Age

Late Farmer societies developed extensive stone settlements around Lydenburg, Badfontein, Sekhukhuneland, Roossenekal and Steelpoort (Delius & Hay, 2009). The greater Belfast area specifically, is known for its large complexes of LIA stonewalling. Although there was some early research on the stone ruins in the general region of the then-named eastern Transvaal, systematic investigation of the ruins only began in the last decade (Collett, 1982). Evers (1975) and Mason (1968) both undertook surveys of aerial photographs from the general area and identified a vast number of such settlements between Lydenburg and Machadodorp. Evers noted that settlements are not evenly distributed over the area, largely for topographical reasons (1975). These settlements typically consisted of three interrelated elements: homesteads, with cattle kraals surrounded by enclosures for human habitation; stone-edged paths or roadways, probably for movement of cattle; and stone terraces, for agricultural cultivation. Most of the homesteads were built in symmetrical patterns, some of which were reproduced in rock engravings found close to these settlements (Delius and Hay; 2009).

With regard to dating, the beginning of the Late Iron Age in this region is obscure. At the time of Evers' article there were no sites known that were intermediate in age between the Early Iron Age sites and the later stone-walled sites. However, since elsewhere in the then-named Transvaal and Orange Free State, stone-walled building appeared to start around A.D. 1450-1500, this was thought to be true in this region as well (Evers, 1975).

Rock Engravings

An article by Maggs (1995), explains that these agriculturist engravings are mainly dominated by depictions of ground plans representing the shape of settlements people built and lived in. Virtually all known engraved sites are in the vicinity of Late Iron Age settlements and it is now known that such engravings are much more common than was previously thought. Fieldwork in several such regions has produced many formerly unrecorded sites within the limited areas searched. Therefore, Maggs recommended that future fieldwork on the stone-built settlements should incorporate an examination of neighbouring rock outcrops for possible engravings (*ibid*). Maggs' article highlights that such images may represent abstract or symbolic spatial arrangements reflecting the cosmology of the society that made them. He uses an example taken from the Pedi, a northern Sotho group linked geographically and culturally with the Mpumalanga engravings. Within this system, social and religious structure was, and among many rural communities still is, clearly inseparable. Each member literally knows their place within the homestead according to their age, sex and status (*ibid*).

3.3.3 Historical Background

The Second South African (Anglo-Boer) War

Delius & Hay (2009) note that the area between Belfast and Machadodorp was very active during the Anglo Boer War (1899-1902) with numerous skirmishes, railway sabotage and battle sites occurring in the Mpumalanga Highveld area. The Anglo-Boer War or Second South African War was waged between Great Britain and the two Boer Republics, the Zuid Afrikaansche Republiek (ZAR) and the Oranje Vrystaat, from 1899 to 1902 (*ibid*). Pretoria was captured by the British on 5 June 1900, but this did not result in the end of the war, as had been anticipated. British forces then embarked upon the defeat of the Boer forces still occupying the then Eastern ZAR. Various British forces advanced towards the ridge of the eastern Highveld, (Jooste, 2001). In August 1900, it was decided by the Boer forces that the line must be defended at all costs, as Machadodorp, the temporary seat of the ZAR government (5 June 1900 – 27 August 1900), was to be protected to safeguard a retreat toward Lydenburg and Barberton (Fourie, 2008a). After the battle of Bergendal, where the Boer forces were defeated on 28 August 1900, and the town of Machadodorp was occupied by the British troops; on 1 September 1900, Lord Roberts, Commander-in-chief of the British troops in Southern Africa, proclaimed the Transvaal as part of the British Empire (Jooste, 2008).

3.4 Archival/historical maps

Historical topographic maps were available for utilisation in the study:

- Topographical map 2629BC & 2629AD – First edition 1963/4 map. Air photography undertaken in 1955, surveyed in 1963/4 and drawn in 1963/4 by the Trigonometrical Survey office (**Figure 13** & **Figure 14**).

The maps were utilised to identify structures that could possibly be older than 60 years and thus protected under Section 34 and 35 of the NHRA. One can see several structures on the Kalabasfontein property within the study area footprint as well as several “huts”. The structures are most likely the original farm buildings of the Kalabasfontein farm and the “huts” probably represented farm labourer accommodation. These “huts” are of particular importance as it is known for stillborn or infant remains to be buried under the floor of the living area in African tradition.

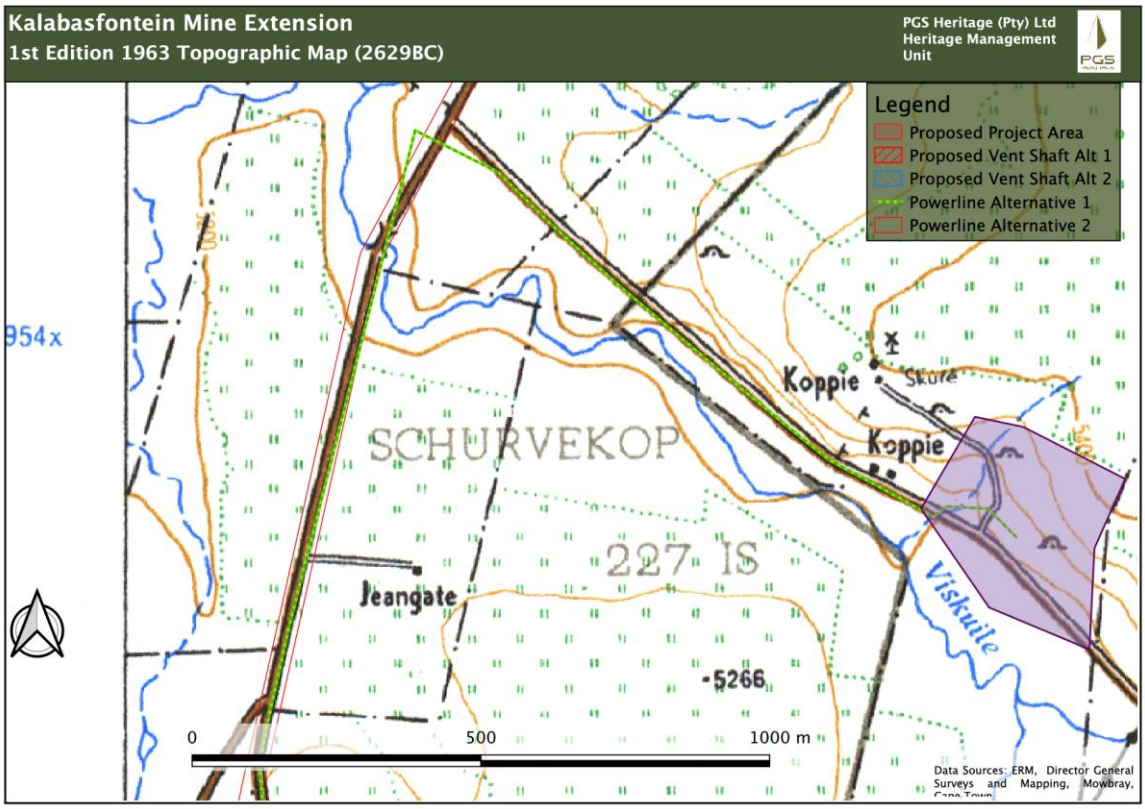

Figure 13 – 1st Edition 1963 Historical Topographic Map (2629BC)

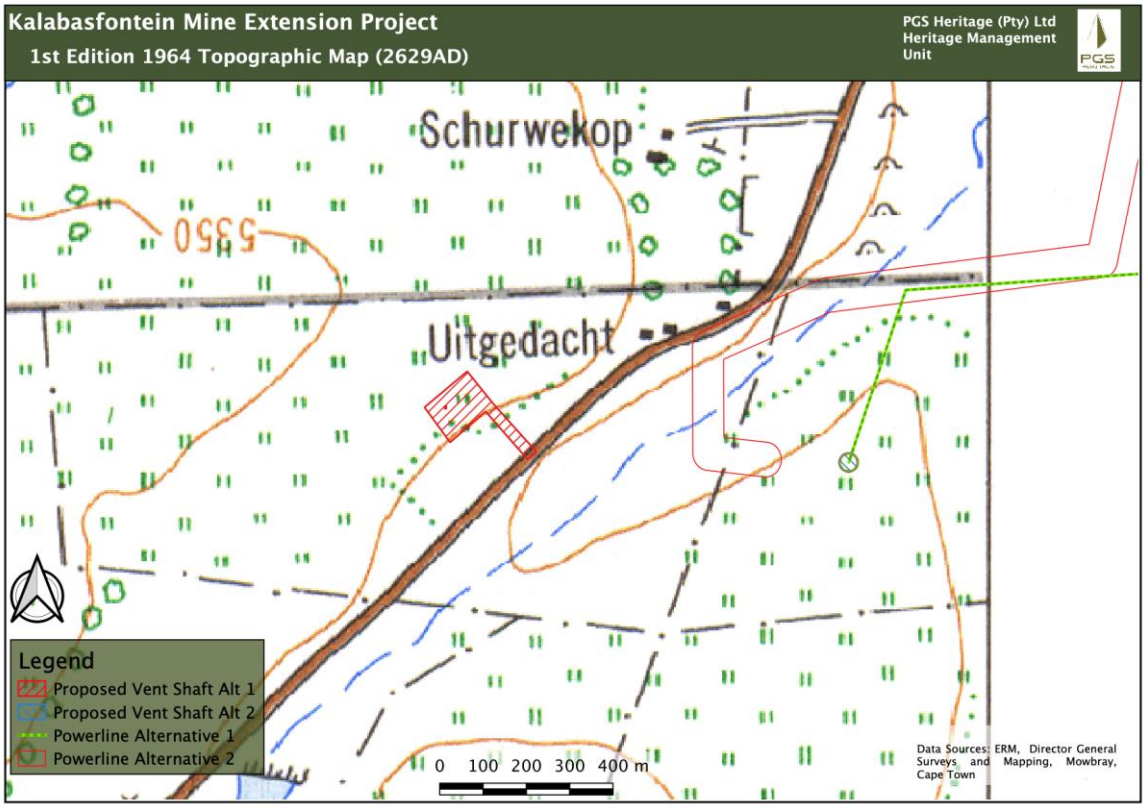

Figure 14 - 1st Edition 1964 Historical Topographic Map (2629AD)

3.5 Fieldwork and Findings

A controlled surface survey was conducted on foot and vehicle over a period of one day by one archaeologist from PGS. The fieldwork was conducted on the 4th October 2018 and 17th of July 2019. The track logs (in orange) for the survey are indicated in **Figure 15**.

Heritage resources identified during the fieldwork component of this HIA is described in **Table 4** and their positions shown in **Figure 43.**

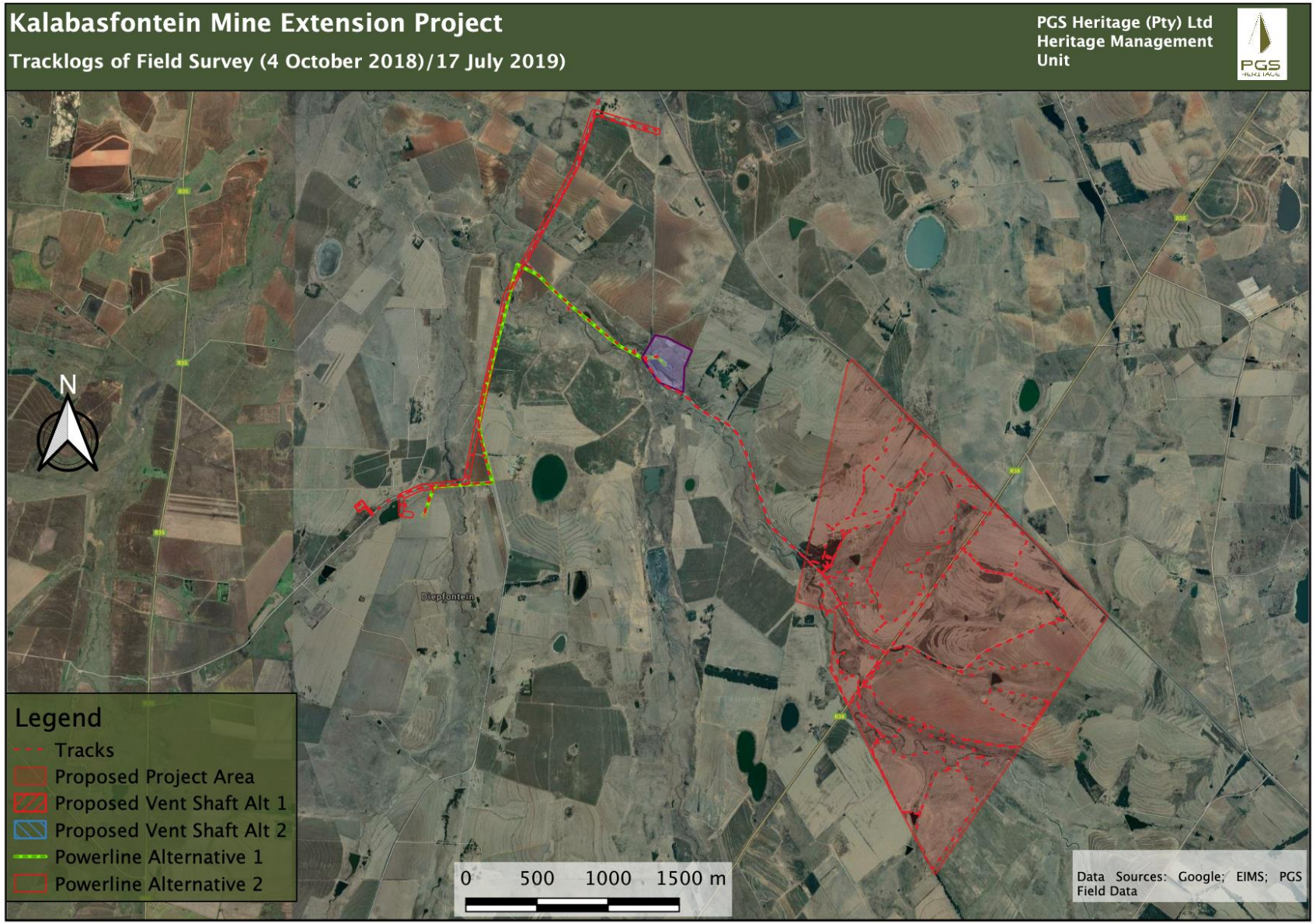

Figure 15 – Track log recordings from site visits

Table 4: Sites identified during heritage survey

Site[1] number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KAL001	S 26.30857°	E 29.55583 °	The site comprises an old farmhouse, presumably forming one of the original Kalabasfontein farmsteads as shown on the historical topographic maps. In addition, this structure appears to date from the historic to recent past due to its design and the construction materials employed. **The structure measures 25m x 20m.**	Low	GP.B

Figure 16 – Remains of smaller rectangular structure

Figure 17 – Remains of larger rectangular structure

[1] *Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.*

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KAL002	S 26.31162 °	E 29.55454 °	The site comprises an informal burial ground that most likely served as the main cemetery for the farm labourers of the Kalabasfontein farm over the years. The grave headstones and dressings range from marble, granite and concrete to simply being stone packed with metal or stone grave markers. Additionally, there are many graves without any form of dressings or markers, taking the form of basic soil mounds. The burial ground is poorly maintained with most of its surrounding fencing in a state of disrepair however, grass is cut in some places indicating that at least some of the graves are still being visited. It is also clear that child graves are buried among adults. The youngest grave identified was buried in 2010 while the oldest one was dated to 1945. In addition, there is clearly a distinction between an older part of the burial ground and the new part. In total, the burial ground consists of approximately 90-100 graves. The graves are facing west to east. **The site measures 55m x 35m.**	High	GP.A

Figure 18 – View of part of the burial ground, note the unmarked burial mounds in the foreground

Figure 19 – Some brick lined and stone packed graves

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 *Figure 20 – Grave dating to 2010*			 *Figure 21 – Grave dating to 1945*		
 *Figure 22 – Close-up of part of the burial ground*			 *Figure 23 – "Old" section of the burial ground*		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KAL003	S 26.31782°	E 29.55864°	The site comprises an informal burial ground. Three of the graves possess concrete headstones and dressings while the remainder are simply stone packed. The three graves with headstones most likely belonged to family relating to the Kalabasfontein farm owners. The burial ground is poorly maintained with no fencing. The oldest grave identified was dated to 1941. In total, the burial ground consists of approximately 10 graves. The graves are facing west to east. **The site measures 55m x 35m.**	High	GP.A

Figure 24 – View of the burial ground

Figure 25 – The three graves that have concrete dressings and headstones

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 26 – One of the stone packed graves

Figure 27 – Grave dating to 1941

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KAL004	S 26.30823°	E 29.55666°	The site comprises an old stone-built storage shed, employing sandstone blocks and a brick foundation, presumably forming part of one of the original Kalabasfontein farmsteads as shown on the historical topographic maps (KAL001). It is a good example of a highveld “waenhuis”/barn. The use of stone masonry and vernacular shape indicates a date of older than 60 years. The utilisation of red clay fired bricks and inclusion of a steel window frame indicated a later transition of the addition to residential use. It is not well maintained. **The site measures 15m x 10m.**	Low	GP.C

Figure 28 – View of the structure at KAL004

Figure 29 – View of the interior of KAL004

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KAL005	S 26.31961°	E 29.58595°	The site comprises an old stone built farm utility building, employing sandstone blocks and a stone foundation, presumably forming part of one of the original Kalabasfontein farmsteads as shown on the historical topographic maps. The stone masonry and multiple additions show a long history of utilisation of the structure for storage, sheds and accommodation through the live of the farmstead. **The site measures 35m x 15m.**	Low	GP.C

Figure 30 – View of the structure at KAL005

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KAL006	S 26.31913°	E 29.58567°	The site comprises an old stone-built storage shed, employing sandstone blocks and a stone foundation, presumably forming part of one of the original Kalabasfontein farmsteads as shown on the historical topographic maps. It is a good example of a highveld “waenhuis”/barn. The use of stone masonry and vernacular shape indicates a date of older than 60 years. **The site measures 10m x 10m.**	Low	GP.C

Figure 31 – View of the structure at KAL005

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KAL007	S 26.31914°	E 29.58607°	The site comprises an old farmhouse, presumably forming one of the original Kalabasfontein farmsteads as shown on the historical topographic maps. In addition, this structure appears to date from the historic to recent past due to its design and the construction materials employed. **The structure measures 20m x 15m.**	Low	GP.B
					
			Figure 32 – View of the structure at KAL007		
KAL008	S 26.33286°	E 29.56716°	The site comprises an informal burial ground. The vast majority of the graves are simply stone packed without any form of markers or headstones. The degraded state of many of the graves would lead me to believe that they are quite old and should be assumed to be at least 60 years old, if not older. The burial ground is poorly maintained with no	High	GP.A

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			fencing however, the grass is being cut on some of the graves indicating that they are still being visited. The oldest identified grave with a headstone was dated to 1945. In total, the burial ground consists of approximately 75-80 graves. The graves are facing east to west. **The site measures 50m x 30m.**		

Figure 33 – View of the burial ground

Figure 34 – Secondary view of burial ground

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 *Figure 35 – View of grave buried in 1945, "Jumayima Mmabate"*			 *Figure 36 – View of one of the few graves with a dressing*		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KAL009	S 26.28548°	E 29.52640°	The site comprises an old stone sandstone-built homestead with a stone foundation and the remnants of associate stone built outbuildings. These structures are shown on the historical topographic maps. In addition, these structure appears to date from the historic to recent past due to its design and the construction materials employed. **The structure measures 20m x 15m while the overall site extent measures 130m x 60m.**	Low	GP.B

Figure 37 – Remains of structure at KAL009

Figure 38 – Remains of stone-built outbuildings

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KAL010	S 26.33286°	E 29.56716°	The site comprises an informal burial ground. The majority of the graves have concrete dressings and headstones, with a few having granite ones. The burial ground is poorly maintained with no fencing. The oldest identified grave with a headstone was dated to 1956 and the youngest 1991. In total, the burial ground consists of 10 graves. The graves are facing east to west. **The site measures 50m x 30m.**	High	GP.A

Figure 39 – View of the burial ground

Figure 40 – Secondary view of burial ground

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 41 – View of grave buried in 1991

Figure 42 – View of grave buried in 1956

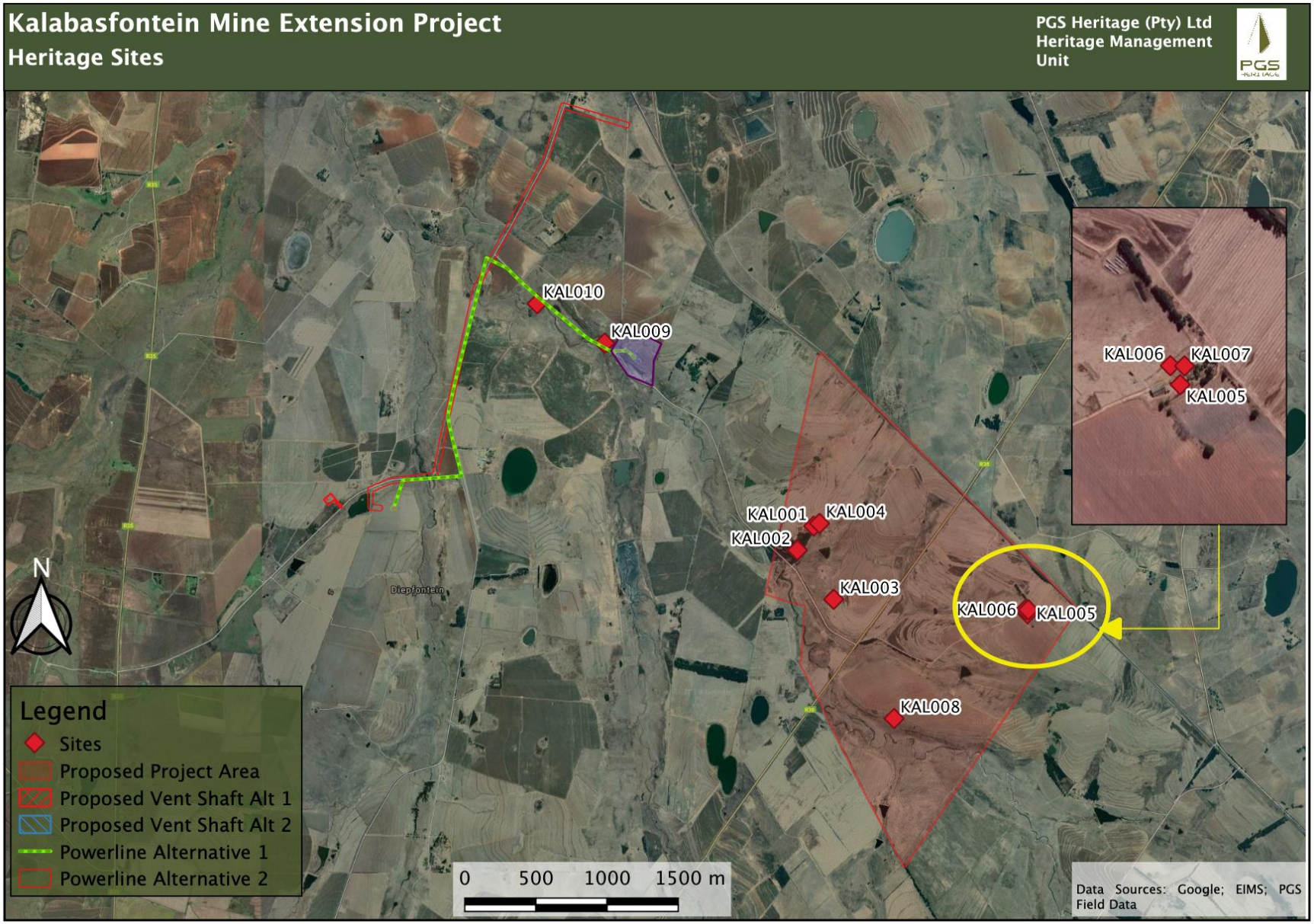

Figure 43 - Heritage sites identified during field survey

4 PALAEONTOLOGY

Banzai Environmental was appointed to do a Palaeontological Desktop Assessment and found that:

The proposed development footprint of the proposed Kalabasfontein development is entirely underlain by sedimentary rocks of the Permian aged Vryheid Formation, (Ecca Group, Karoo Supergroup). The Vryheid Formation of the Ecca Group has a Very High Palaeontological Sensitivity. No significant fossils are expected to be found before deep excavation (>1.5m) are completed. It is very possible that important fossils will be documented during excavations. The recording of fossils will improve our knowledge of the Palaeontological Heritage of the development area.

Figure 44 - Surface geology of the proposed Kalabasfontein Project, near Bethal, Mpumalanga. The proposed development is entirely underlain by the Vryheid Formation (Ecca Group, Karoo Supergroup).)

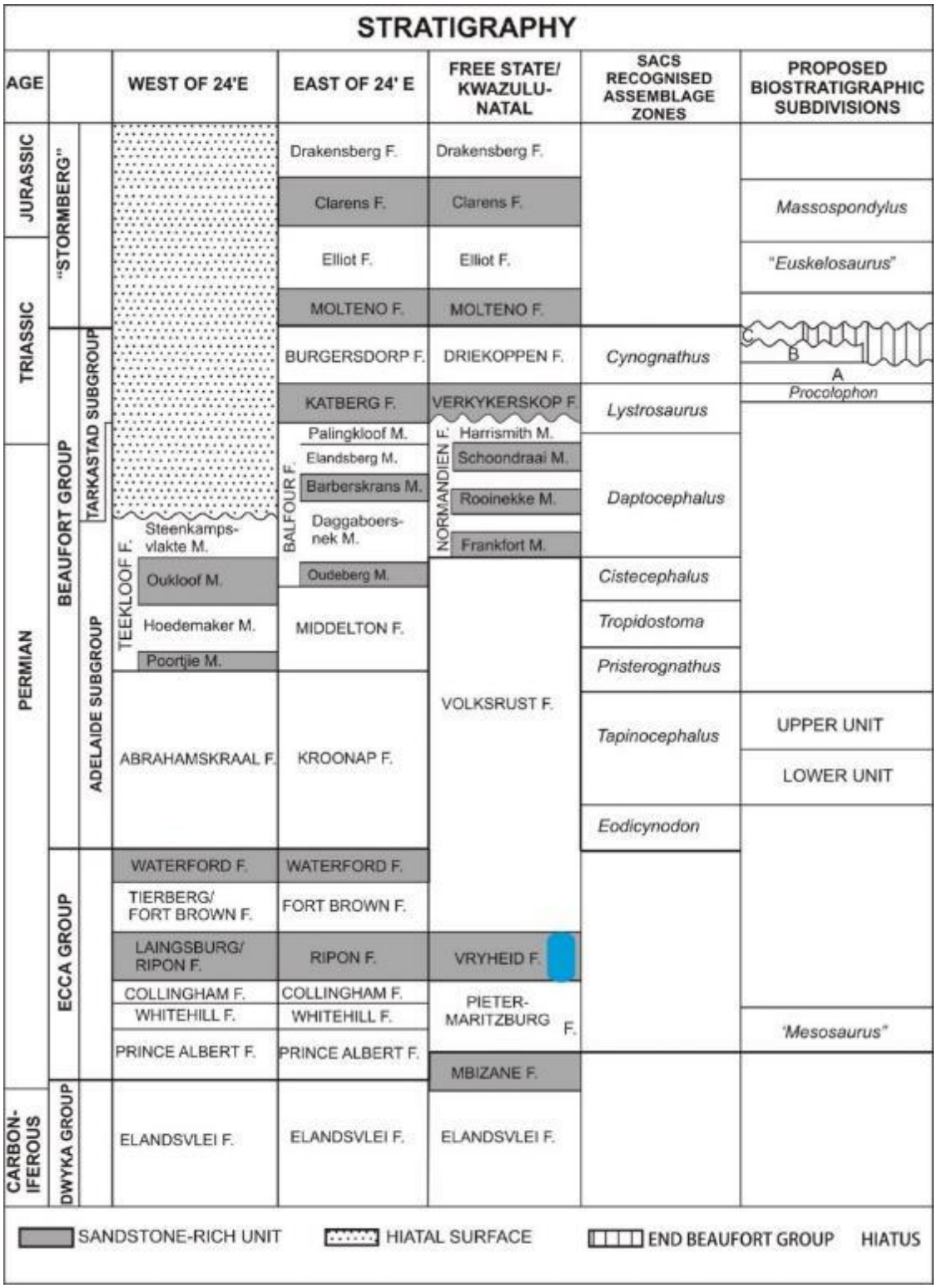

Figure 45 - Lithostratigraphic (rock-based) and biostratigraphic (fossil-based) subdivisions of the Ecca and Beaufort Group of the Karoo Supergroup with rock units and fossil assemblage zones relevant to the present study marked in red (Modified from Rubidge 1995 (Banzai 2018)

Two alternative sites have been suggested for a **new ventilation shaft**, namely Portion 7 of the farm Uitgedacht 229 IS and Portion 22 of the farm Uitgedacht 229 IS. The planned **extension of the current mining area** will involve minimal new surface infrastructure as the mining method is underground mining and existing surface infrastructure from the Forzando South mine will be utilized. As the geology of the mine extension and ventilation shaft alternatives is similar, there are none preferred alternative for either of the ventilation shafts.

As no fossils have been recovered from the existing mining area the proposed development is deemed feasible and will not lead to detrimental impacts on the palaeontological resources of the area. A chance find protocol for finding fossils from the proposed development site is thus recommended.

5 IMPACT ASSESSMENT

The aim of the impact evaluation is to determine the extent of the impact of the proposed project on the identified heritage resources and predict possible impacts on unidentified heritage resources.

During the field assessment, a total of 10 heritage sites were located. These include four burial grounds (**KAL002, KAL003, KAL008, KAL010**) and six historical sites (**KAL001, KAL004, KAL005, KAL006, KAL007 and KAL009**). Refer to **Figure 43** for the locality of heritage resources in relation to the proposed development area.

It must be considered that the heritage significance of the identified sites plays a role in the evaluation of the impact and must influence the magnitude rating of the impact tables. Thus, a heritage resource with a high heritage significance rating will have a higher impact magnitude rating than a resource with a low or no heritage significance rating. Consequently, mitigation measures will be more extensive for a heritage resource with a high heritage significance than for those with a low heritage significance.

All the impacts are envisaged to happen during construction activities.

5.1 Status Quo and "No Go" option

5.1.1 Status Quo

No fatal flaws were identified from a cultural, historical, archaeological and paleontological perspective

5.1.2 "No go" Option

No such option is contemplated.

5.2 Project Impact

5.2.1 Heritage resources and sensitivity

The identified heritage resources are allocated a sensitivity buffer based on the recognised management buffers accepted by SAHRA in the past few years. No regulations in the NHRA provide guidelines on buffer zones. In the case of heritage sensitivity, a buffer of 20 – 50 meters is proposed based on the type of heritage resource. In the case of burial grounds and graves (BGG) a buffer of 50 meters is generally proposed and 20 meters for a heritage structure such as ruins and other built structure.

5.2.2 Impact on burial grounds

Four burial grounds were identified during the field work. Due to the social and cultural significance of burial grounds and graves, a high heritage significance is given to such sites. **KAL002, KAL003, KAL008** have not been demarcated formally.

The impact of the proposed project on the burial ground is rated as having a LOW negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance.

Table 5: Assessment of impact of Development on burial grounds

Impact Name	**Impact of burial grounds**				
Alternative	**Powerline Alternative 1**				
Phase	**Construction**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	5	2
Extent of Impact	2	1	Reversibility of Impact	5	5
Duration of Impact	4	4	Probability	1	1
Environmental Risk (Pre-mitigation)					-4.00
Mitigation Measures					
Demarcate the site with a 50-meter buffer and avoid it. If the site cannot be avoided a grave relocation process will need to take place.					
Environmental Risk (Post-mitigation)					-3.00
Degree of confidence in impact prediction:					High
Impact Prioritisation					

Public Response	1
Low: Issue not raised in public responses	
Cumulative Impacts	2
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.	
Degree of potential irreplaceable loss of resources	3
The impact may result in the irreplaceable loss of resources of high value (services and/or functions).	
Prioritisation Factor	1.50
Final Significance	-4.50

In the event of any heritage resources being uncovered, SAHRA should be contacted and a qualified archaeologist appointed to evaluate the finds and make appropriate recommendation on mitigation.

5.2.3 Impact on Historical Structures

The impact of the proposed project on the historic heritage resources at **KAL001, KAL004, KAL005, KAL006, KAL007, KAL009** is rated as LOW negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

Table 6: Impact assessment table - Destruction of heritage structures

Impact Name	**Destruction of Heritage structures**				
Alternative	**Powerline Alternative 1**				
Phase	**Construction**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	2	2
Extent of Impact	2	1	Reversibility of Impact	5	5
Duration of Impact	4	4	Probability	2	2
Environmental Risk (Pre-mitigation)					-6.50
Mitigation Measures					
*The sites should be avoided with at least a 20 m buffer if activities should occur near them. If the sites will be affected directly, they will need to be documented before a destruction permit can be applied for at the provincial heritage resources authority (Mpumalanga). Only site **KAL009** may be affected as it is located near the road where the power line will be erected. In the event that any other heritage resources are uncovered SAHRA should be contacted and a qualified archaeologist appointed to evaluate the finds and make appropriate recommendation on mitigation*					
Environmental Risk (Post-mitigation)					-3,00

Degree of confidence in impact prediction:	High
Impact Prioritisation	
Public Response	1
Low: Issue not raised in public responses	
Cumulative Impacts	3
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.	
Degree of potential irreplaceable loss of resources	3
The impact may result in the irreplaceable loss of resources of high value (services and/or functions).	
Prioritisation Factor	1,67
Final Significance	-4.50

5.2.4 Impact on Palaeontological Resources

The impact of the development will only occur on the site but most probably the fossil heritage will be negatively impacted on. When fossil heritage is destroyed the impact will be irreversible. The impact will be long term to permanent and the magnitude and probability of the impact will be high.

The impact of the proposed project on the Palaeontology is rated as having a MODERATE negative significance before mitigation with LOW negative significance after mitigation.

Table 7: Impact assessment for the Ventilation shaft alternative 1

A. Loss of fossil heritage - Ventilation shaft Alternative 1: Portion 7 of the farm Uitgedacht 229 IS					
Impact Name	**Loss of fossil heritage**				
Alternative	**Alternative 1**				
Phase	**Construction**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	4	2
Extent of Impact	2	2	Reversibility of Impact	5	5
Duration of Impact	4	4	Probability	2	1
Environmental Risk (Pre-mitigation)					-7.50
Mitigation Measures					
As no fossils have been recovered from the existing mining area the proposed development is deemed feasible and will not lead to detrimental impacts on the palaeontological resources of the area. A chance find protocol for finding fossils from the proposed development site is thus included in this report					
Environmental Risk (Post-mitigation)					-3.25
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1

Low: Issue not raised in public responses	
Cumulative Impacts	2
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.	
Degree of potential irreplaceable loss of resources	3
The impact may result in the irreplaceable loss of resources of high value (services and/or functions).	
Prioritisation Factor	1.50
Final Significance	-4.88

Table 8: Impact assessment for the Ventilation shaft alternative 2

A. Loss of fossil heritage - Ventilation shaft Alternative 2: Portion 22 of the farm Uitgedacht 229 IS					
Impact Name	**Loss of fossil heritage**				
Alternative	**Alternative Impact assessment for the Ventilation shaft alternative 2**				
Phase	**Construction**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	4	2
Extent of Impact	2	2	Reversibility of Impact	5	5
Duration of Impact	4	4	Probability	2	1
Environmental Risk (Pre-mitigation)					-7.50
Mitigation Measures					
As no fossils have been recovered from the existing mining area the proposed development is deemed feasible and will not lead to detrimental impacts on the palaeontological resources of the area. A chance find protocol for finding fossils from the proposed development site is thus included in this report					
Environmental Risk (Post-mitigation)					-3.25
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					2
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					3
The impact may result in the irreplaceable loss of resources of high value (services and/or functions).					
Prioritisation Factor					1.50
Final Significance					-4.88

Table 9: Impact assessment for the Kalabasfontein Underground mining project

A. Loss of fossil heritage - Kalabasfontein Underground mining project					
Impact Name	**Loss of fossil heritage**				
Alternative	**Sole Alternative**				
Phase	**Mining/Operational phase**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	4	2
Extent of Impact	2	2	Reversibility of Impact	5	5
Duration of Impact	4	4	Probability	2	1
Environmental Risk (Pre-mitigation)					-7.50
Mitigation Measures					
As no fossils have been recovered from the existing mining area the proposed development is deemed feasible and will not lead to detrimental impacts on the palaeontological resources of the area. A chance find protocol for finding fossils from the proposed development site is thus included in this report					
Environmental Risk (Post-mitigation)					-3.25
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					2
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					3
The impact may result in the irreplaceable loss of resources of high value (services and/or functions).					
Prioritisation Factor					1.50
Final Significance					-4.88

6 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

6.1 Construction phase

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camps area and small-scale infrastructure. However, these activities will be limited to the development of the ventilation shafts and their associated infrastructure as the existing Kalabasfontein infrastructure will be utilized for all underground mining activities.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised.

Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project and these must be catered for. Temporary infrastructure, such as construction camps and laydown areas, is often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure is implemented.

6.2 Chance find procedure

- A heritage practitioner should be appointed to develop a heritage induction program and conduct training for the ECO, as well as team leaders, in the identification of heritage resources and artefacts.
- An appropriately qualified archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities be halted.
- The qualified archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the material and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the archaeologist.

6.3 Possible finds during construction

The study area occurs within a greater archaeological site as identified during the fieldwork and scoping phase. Excavations of foundations and soil clearance can uncover the following:

- stone foundations;
- ash middens associated with the farmsteads and homesteads that can contain bone, glass and clay ceramics, ash, metal objects such as spoons, forks, and knives.
- possible infant burials

6.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 10** gives guidelines for lead times on permitting.

Table 10: Lead times for permitting and mobilisation

ACTION	RESPONSIBILITY	TIMEFRAME
Preparation for field monitoring and finalisation of contracts	The contractor and service provide	1 months
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	1 month
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial ground or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

6.5 Heritage Management Plan for EMPr implementation

NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)	COST
Possible finds								
A	Implement chance find procedures in case where possible heritage finds area made	Construction	During construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Monthly Checklist/Report	**R10 000**
Known sites								
Burial Grounds	• Demarcate sites with a 50-meter buffer and avoid them. • Stakeholder engagement will need to be implemented • If this is not possible a detailed grave relocation process must be implemented as required under the NHRA and National Health Act regulations.	Construction	During construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report	**Relocation of graves – R 10-15 mil**
Historical structures	• The sites should be avoided with at least a 20 m buffer if activities should occur near them. If the sites will be affected directly, they will need to be documented before a destruction permit can be	Construction	Construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34 and 38 of NHRA	ECO Monthly Checklist/Report	**R100 000**

NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)	COST
	applied for at the provincial heritage resource authority (Mpumalanga). • **KAL009** may be affected as it occurs near the road where the proposed powerline will be erected, however it should be noted and demarcated. If it would be impacted negatively by the proposed development, consultation with the local community is recommended. • If any other heritage resources are uncovered SAHRA should be contacted and a qualified archaeologist appointed to evaluate the finds and make appropriate recommendation on							
Palaeontology	• Implement chance finds protocol as developed in the PIA conducted for this project.	Construction	Construction	Applicant ECO Palaeontologist	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	ECO Monthly Checklist/Report	**R80 000**

7 CONCLUSIONS AND RECOMMENDATIONS

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

7.1 Archaeology

The data analysis has enabled the identification of possible heritage sensitive areas that included:

- Dwellings;
- Clusters of dwellings (homesteads and farmsteads);
- Archaeological Sensitive areas (based on historical descriptions); and
- Structures.

Note that these structures refer to possible heritage sites as listed in **Table 11**.

Table 11 - Tangible Heritage site in the study area

Name	Description	Legislative protection
Architectural Structures	Possibly older than 60 years	NHRA Sect 3 and 34
Cemeteries	Graves	NHRA Sect 3 and 36 and MP Graves Act

Previous studies conducted in the area around Bethal have shown that the archaeological record is temporally confined to the Iron Age. During the field assessment, a total of 10 heritage sites were located. These include four burial grounds (**KAL002, KAL003, KAL008, KAL010**) and six historical sites (**KAL001, KAL004, KAL005, KAL006, KAL007 and KAL009**). Refer to **Figure 43** for the locality of heritage resources in relation to the proposed development area.

It must be considered that the heritage significance of the identified sites plays a role in the evaluation of the impact and must influence the magnitude rating of the impact tables. Thus, a heritage resource with a high heritage significance rating will have a higher impact magnitude rating than a resource with a low or no heritage significance rating. Consequently, mitigation measures will be more extensive for a heritage resource with a high heritage significance than for those with a low heritage significance.

The management and mitigation measures as described in Section 6 of this report have been developed to minimise the project impact on heritage resources. Impacts on burial grounds and graves are rated as being LOW NEGATIVE before mitigation and LOW NEGATIVE after mitigation measures are implemented. Impacts on Historical sites are rated as being LOW NEGATIVE before mitigation and LOW NEGATIVE after mitigation measures are implemented.

7.2 Palaeontology

The proposed development footprint of the proposed Kalabasfontein development is entirely underlain by sedimentary rocks of the Permian aged Vryheid Formation, (Ecca Group, Karoo Supergroup). The Vryheid Formation of the Ecca Group has a **Very High Palaeontological** Sensitivity. Although no fossils have been found in the current mining area, it is possible that important fossils namely the Glossopteris flora will be documented during excavations. This flora is associated with the shales between the coal seams but not in the coal itself. The recording of fossils will improve our knowledge of the Palaeontological Heritage of the development area.

Two alternative sites have been suggested for a **new ventilation shaft**, namely Portion 7 of the farm Uitgedacht 229 IS and Portion 22 of the farm Uitgedacht 229 IS. The planned **extension of the current mining area** will involve minimal new surface infrastructure as the mining method is underground mining and existing surface infrastructure from the Forzando South mine will be utilized. As the geology of the mine extension and ventilation shaft alternatives is similar, there are none preferred alternative for either of the ventilation shafts.

As no fossils have been recovered from the existing mining area the proposed development is deemed feasible and will not lead to detrimental impacts on the palaeontological resources of the area. A chance find protocol for finding fossils from the proposed development site is thus recommended.

Impacts on Palaeontological resources are rated as MODERATE NEGATIVE before and LOW NEGATIVE after mitigation measures are implemented.

7.3 General

In the event that heritage resources are discovered during site clearance, construction activities must stop, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.

The overall impact of the development, on the heritage resources identified during this report, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.

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Appendix A

Heritage Assessment Methodology

The applicable maps, tables and figures are included, as stipulated in the NHRA (Act No 25 of 1999) and NEMA (Act No 107 of 1998). The HIA process consisted of three steps;

Step I – Literature Review - The background information to the field survey relies greatly on the Heritage Background Research.

Step II – Physical Survey - A physical survey was conducted predominantly by foot within the proposed areas by two qualified archaeologists, which aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant archaeological resources, the assessment of resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

The significance of identified heritage sites are based on four main criteria -

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
    - Low - <10/50m2
    - Medium/High - 10-50/50m2
    - High - >50/50m2
- Uniqueness; and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows -

A - No further action necessary;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate development activity position;
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site.

Impacts on these sites by the development will be evaluated as follows -

Site Significance

Site significance classification standards prescribed by the SAHRA (2006) and approved by the ASAPA for the Southern African Development Community (SADC) region, were used for the purpose of this report (**Table A 1**).

Table A 1: Site significance classification standards as prescribed by SAHRA.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1		Conservation; National Site nomination
Provincial Significance (PS)	Grade 2		Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)		High / Medium/High Significance	Mitigation before destruction
Generally Protected B (GP.A)		Medium/High Significance	Recording before destruction
Generally Protected C (GP.A)		Low Significance	Destruction

Appendix B

The Significance Rating Scales for the Proposed Prospecting Activities on Heritage Resources

The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations (2014). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/likelihood (P) of the impact occurring. This determines the environmental risk. In addition other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).

1. Determination of Environmental Risk:

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER).

The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R)}{4} \times N$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in **Table A 2**.

Table A 2: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).

Aspect	Score	Definition
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per

.

Table A 3: Probability Scoring

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

ER= C x P

Table A 4: Determination of Environmental Risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10

	1	1	2	3	4	5
		1	2	3	4	5
	Probability					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in **Table A** 5.

Table A 5: Significance Classes

Environmental Risk Score	
Value	**Description**
< 9	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥9; <17	Medium (i.e. where the impact could have a significant environmental risk),
≥ 17	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

2. Impact Prioritisation:

In accordance with the requirements of Appendix 3(3)(j) the 2014 EIA Regulations (GNR 982), and further to the assessment criteria presented in the Section above it is necessary to assess each potentially significant impact in terms of:

Cumulative impacts; and

The degree to which the impact may cause irreplaceable loss of resources.

In addition it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented. **Table A 6**

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Table A 6: Criteria for Determining Prioritisation

Public response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public response.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.

	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in **Table A 7.** The impact priority is therefore determined as follows:

Priority = PR + CI + LR

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Refer to **Table A 7**).

Table A 7: Determination of Prioritisation Factor

Priority	Ranking	Prioritisation Factor
3	Low	1
4	Medium	1.17
5	Medium	1.33
6	Medium	1.5
7	Medium	1.67
8	Medium	1.83
9	High	2

In order to determine the final impact significance the PF is multiplied by the ER of the post-mitigation scoring (Table A 8). The ultimate aim of the PF is to be able to increase the post-mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table A 8: Final Environmental Significance Rating

Environmental Significance Rating	
Value	**Description**
< 10	Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),

≥10 <20	Medium (i.e. where the impact could influence the decision to develop in the area),
≥ 20	High (i.e. where the impact must have an influence on the decision process to develop in the area).

Appendix D

Project team CV's

ILAN SMEYATSKY

Professional Archaeologist

Personal Details

- **Name:** Ilan
- **Surname:** Smeyatsky
- **Identity Number:** 9109275072080
- **Date of Birth:** 27-09-1991
- **Citizenship:** South African
- **Gender:** Male
- **Marital Status:** Single
- **Languages Spoken**: English

Education History

2010-2013: **BSc Bachelors Degree**

University of the Witwatersrand, Johannesburg, South Africa

- Archaeology
- Psychology
- Statistics
- Research Design and Analysis
- 67% Pass (**2:1 Qualification**)

2014: **BSc (Hons) in Archaeology**

AWARDS:

- Received the 2014 Center of Excellence in Palaeoscience award - **Bursary to the value of ZAR 30000 ≈ $2500**
- Received the Post-Graduate Merit Award in 2015 for academic merit for my Honours academic results - **Bursary to the value of ZAR 25000 ≈ $1800**

University of the Witwatersrand, Johannesburg, South Africa

- Archaeology
- Excavation techniques
- Theory
- 69% Pass (**2:1 Qualification**)
- **Distinction** received for thesis entitled: "Stylistic variation in Later Stone Age tanged arrowheads: a pilot study using geometric morphometrics"

2015-2017: **MSc by Research (Archaeology)**

University of the Witwatersrand, Johannesburg, South Africa

- Archaeology
- Statistical analysis
- GIS (Geographic Information Systems)
- Thesis entitled: "Discerning and explaining shape variations in Later Stone Age tanged arrowheads, South Africa"

Aug 2016 –
Jan 2017: **Semester of Archaeology Masters**

AWARD: Received the 2016 AESOP+ full Masters scholarship to study at Uppsala University, Uppsala, Sweden – **Scholarship to the value of ZAR 160,000 ≈ $11,000**
Uppsala University, Uppsala, Sweden

- Archaeological theory
- GIS (Geographic Information Systems)
- Invitational research

Employment History
Part time employment as a student:

- **2009-2013**: Part-Time Electrician Apprentice: Assisting in home electrical repair jobs.
- **2014-2015:** Lab Research Assistant: Analysing and classifying lithic artefacts, Data capturing, Mentoring trainee research assistants.

Experience in the field of archaeology:

- **2013-2015: Fieldwork/Excavator - Responsibilities:** Feature detection, excavation, sieving, sorting, analysis, soil sampling, field documentation, 'dumpy' operation , Total Station operation, DGPS operation, rock art tracing and photography, engraving tracing and photography.
    - South African excavations:
        - Early Stone Age excavation at Maropeng World Heritage Site in Gauteng (1 Week – August 2015)
        - Pig cadaver exhumation as part of forensic experiment near Pretoria, Gauteng (1 Week – December 2014) - Praised for having the determination of returning for each subsequent excavation day as it was performed on a purely volunteer basis and the work conditions were particularly strenuous - Dr. Coen Nienaber

        - Iron Age excavation at Komati Gorge, Mpumalanga (1 Week – August 2014) - Praised for being exceptionally “methodical and proficient” with my excavation techniques – Dr. Alex Schoeman
        - Rock art fieldwork at Komati Gorge, Mpumalanga (1 Week – August 2014)
        - Underwater archaeology site mapping Komati Gorge, Mpumalanga (1 Week – August 2014)
        - Early Stone Age excavation at Maropeng World Heritage Site in Gauteng (2 Weeks - September 2013) - Personally uncovered some of the only stone tools (~1.8 million years old) found during that digging season.
- **2016: Excavation Supervisor - Responsibilities:** Supervision of two junior excavators, site detection, decision of excavation grid placement, excavation, sieving, sorting, soil sampling, field documentation.
        - Historical (farm site) excavation at Graaff-Reinet, Eastern Cape, South Africa (2 Weeks)
        - Completed dig 1 week ahead of schedule aided by my efficient direction, drive and support to the excavators under my supervision.
- **April 2017 – April 2018:** Intern Archaeologist – PGS Heritage: Heritage Impact assessments, background research, report writing, permit applications, collections management, stakeholder engagement and grave relocation.
- **April 2018 – PRESENT:** Archaeologist – PGS Heritage: Heritage Impact assessments, background research, report writing, permit applications, collections management, stakeholder engagement and grave relocation.

Professional Body Membership:

- Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member
- CRM Accreditation (ASAPA) -
    - Field Supervisor – Stone Age, Iron Age & Grave Relocations

WOUTER FOURIE

Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

Summary of Experience

Specialised expertise in Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems, including *inter alia* -

Involvement in various grave relocation projects (some of which relocated up to 1000 graves) and grave "rescue" excavations in the various provinces of South Africa

Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
    - Iron Age Mitigation Work for various projects, including archaeological excavations and monitoring
    - Involvement with various Heritage Impact Assessments, outside South Africa, including -
- Archaeological Studies in Democratic Republic of Congo
- Heritage Impact Assessments in Mozambique, Botswana and DRC
- Grave Relocation project in DRC

Key Qualifications

BA [Hons] (Cum laude) - Archaeology and Geography - 1997

BA - Archaeology, Geography and Anthropology - 1996

Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member

Accredited Professional Heritage Specialist – Association of Professional Heritage Practitioners (APHP)

CRM Accreditation (ASAPA) -

- Principal Investigator - Grave Relocations
- Field Director – Iron Age
- Field Supervisor – Colonial Period and Stone Age
- Accredited with Amafa KZN

Key Work Experience

2003- current - Director – Professional Grave Solutions (Pty) Ltd

2007 – 2008 - Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand

2005-2007 - Director – Matakoma Heritage Consultants (Pty) Ltd

2000-2004 - CEO– Matakoma Consultants

1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng
1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

Worked on various heritage projects in the SADC region including, Botswana, Mauritius, Malawi, Mozambique and the Democratic Republic of the Congo