HERITAGE SCOPING REPORT, FOR INCLUSION IN THE ENVIRONMENTAL SCOPING REPORT FOR THE PROPOSED KANGALA EXTENSION PROJECT, MPUMALANGA

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Declaration of Independence

- I, Wouter Fourie, 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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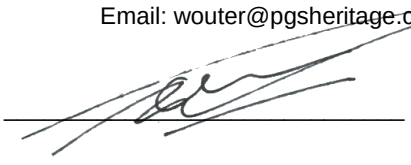
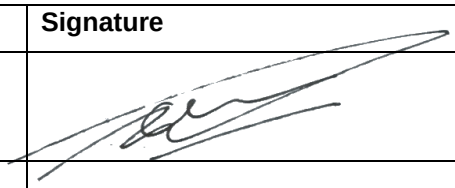
SIGNATURE: 

ACKNOWLEDGEMENT OF RECEIPT

Report Title	*Heritage Scoping Report for inclusion in the Environmental Scoping report for the Proposed Kangala Extension Project, Mpumalanga*		
Control	**Name**	**Signature**	**Designation**
Author	**W Fourie**		**Heritage Specialist/ Principal Investigator**
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CLIENT: Environmental Impact Assessment Services (EIMS)

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SIGNATURE: _____

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd was appointed by Environmental Impact Management Services (Pty) Ltd, to undertake a Heritage Scoping Report (HSR) that forms part of the Environmental Scoping Report as part of the planning to implementation process of the Kangala Extension Project for Universal Coal development 1, Victor Khanye Local Municipality, located within the Nkangala District Municipality, Mpumalanga Province.

This HSR has sown that the proposed project will have an impact on heritage resources within the expansion area.

Analysis of historical maps and aerial photography identified definite structures that include:

- Dwellings
- Clusters of dwellings (homesteads and farmsteads);
- Burial grounds;
- Structures/Buildings

The analysis further identified possible area of heritage sensitivity based. On landform as well as vegetation changes.

The South African Heritage Resources Information System's palaeontological sensitivity map rates the study as underlain by geological strata with a high palaeontological significance.

1.1 Preliminary impact analysis

The preliminary impact analysis shows that the unmitigated impact on known heritage resources is predicted to be medium negative, with a post-mitigation impact of low negative. Chance finds of unknown heritage resources is predicted that the unmitigated impact to be low negative, with a post-mitigation impact of low negative.

Based on the above the following activities will be implemented during the development of the Heritage Impact Assessment for the project.

1.2 Burial grounds and graves

Burial grounds and graves have high heritage significance and are given a Grade 3A significance rating in accordance with the system described in Section 3.1 of this document.

1.3 Structures

Structures older than 60 years are protected under Section 34 of the National Heritage resources Act and will be evaluated and graded for heritage significance during the Heritage Impact Assessment phase.

1.4 Palaeontology

Based on the South African Heritage Resources Information System database a full Palaeontological Impact assessment will be required as part of the Heritage Impact Assessment study.

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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;
- 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 2 500 000 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 20 000 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 20 000-300 000 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.

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	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
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

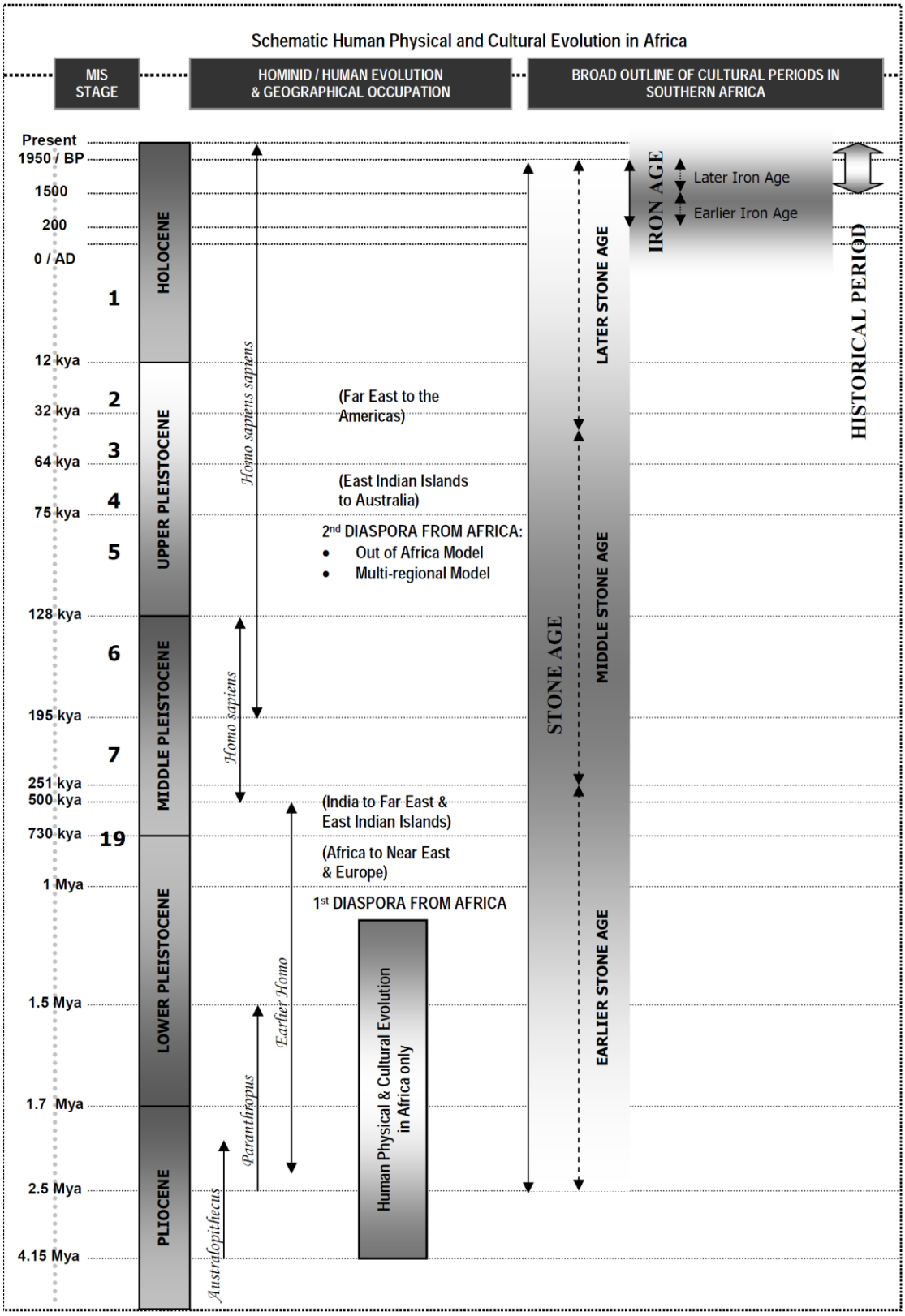


Figure 1 – Human and Cultural Time line in Africa (Morris, 2008)

1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS), to undertake a Heritage Scoping Report (HSR) that forms part of the Environmental Scoping Report (HSR) as part of the planning to implementation process of the Kangala Extension Project (KEP) for Universal Coal development 1 (UCD1), Victor Khanye Local Municipality, located within the Nkangala District Municipality, Mpumalanga Province.

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area. The HSR aims to inform the ESR in the selection of the relevant sites to be studied during the Environmental Impact Assessment (EIA) 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 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

This HSR 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.

Wouter Fourie, the Project Coordinator and author, is registered with the Association of Southern African Professional Archaeologists (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:

i. National Environmental Management Act (NEMA), Act 107 of 1998
ii. National Heritage Resources Act (NHRA), Act 25 of 1999
iii. Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002
iv. Development Facilitation Act (DFA), Act 67 of 1995

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

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

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…” 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, and those developments administered through NEMA, and MPRDA legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorizations are granted for development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impacts Processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008).

The NEMA 23(2)(b) states that an integrated environmental management plan should, "…*identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage*".

A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 of the regulations (Fourie, 2008).

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Site Location and Description

The project footprint is in Victor Khanye Local Municipality, located within the Nkangala District Municipality, Mpumalanga Province. The project area covers portions 14, 15, 16, 18, 19, 20, 22, 23 and 24 of the Farm Strydpan 243 IR and is situated approximately 7.5km south-east of the town Delmas (**Figure 2**).

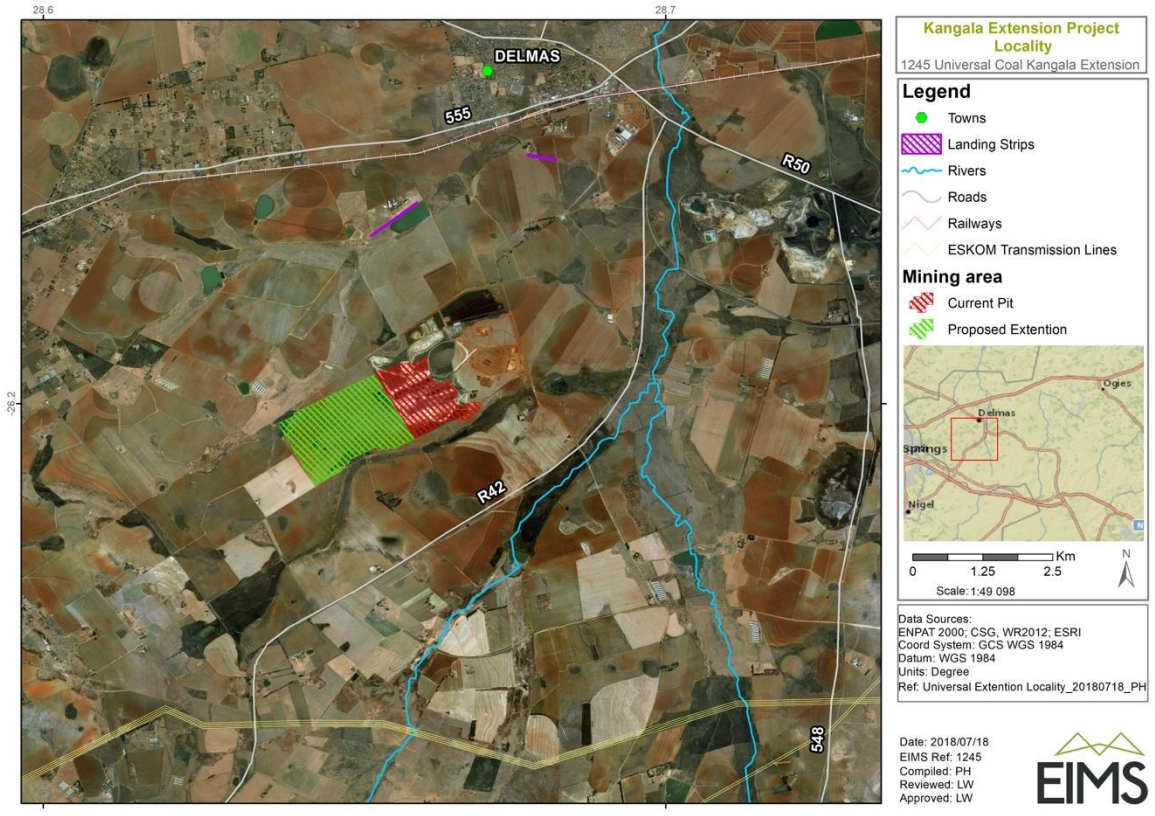


Figure 2 – Two alternatives site locations for assessment during the HSR (Image provided by EIMS, 2018)

2.2 Technical Project Description

2.2.1 Background

UCD1 wishes to develop a new opencast coal mining operation covering an extent of 251 hectares (ha), adjacent to the existing Universal Coal's Kangala Colliery on various portions of the Farm Strydpan 243 IR - herein referred to as the Kangala Extension Project. The proposed Kangala Extension Project is anticipated to use a standard truck and shovel mining method based on strip mining design and layout. The existing Coal Handling and Processing Plant (CHPP) at the Kangala Colliery will be utilised for the proposed Kangala Extension Project. It is expected that no new surface infrastructure such as offices, dams, stores facility, workshops, or change house will be required for the project.

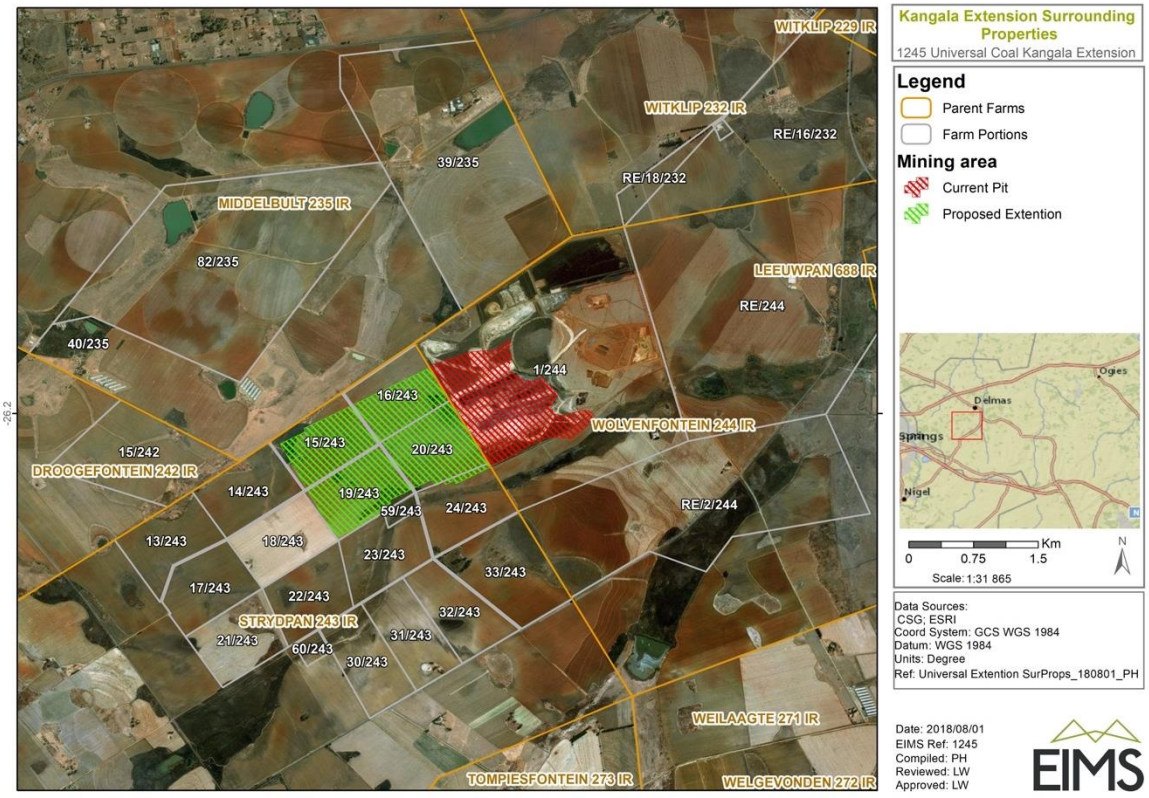


Figure 3 - Proposed Kangala extension

3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

3.1 Methodology for Assessing Heritage Site significance

This HSR report was compiled by PGS for the proposed KEP. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the NEMA (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 on foot through the proposed project area by a qualified archaeologist (January 2017), 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 heritage sites was 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 - 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:

3.1.1 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 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 Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	-	Low Significance	Destruction

3.2 Methodology for Impact Assessment

The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations (2010). 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). Please note that the impact assessment must apply to the identified Sub Station alternatives as well as the identified Transmission line routes.

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 2.

Table 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).
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.

Aspect	Score	Definition
	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 3.

Table 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 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 5.

Table 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.

3.2.1 Impact Prioritisation:

In accordance with the requirements of Regulation 31 (2)(l) of the EIA Regulations (GNR 543), 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 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 11. 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 7).

Table 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. 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 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).

Annexure A contains the plan of study for the HIA report to be compiled during the EIA phase.

4 HERITAGE BACKGROUND

The high-level archival research focused on available information sources that were used to compile a general background history of the study area and surrounds.

4.1 Archival/historical maps

Historical topographic maps were available for utilisation in the screening and scoping:

- Topographical map 2628BA – First edition 1965. The aerial photography on which the map was based dates to 1956 and its survey work was undertaken in 1966. It was drawn in 1967 by the Trigonometrical Survey Office.

4.1.1 Topographical Maps 2628BA (First Editions)

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. Many of the structures identified are farmsteads and "huts" demarcated as homesteads. As discussed in the historical background of the area further on in this report, there is a dense cultural history in Mpumalanga. Note two definite burial grounds have been circle in red in **Figure 4**.

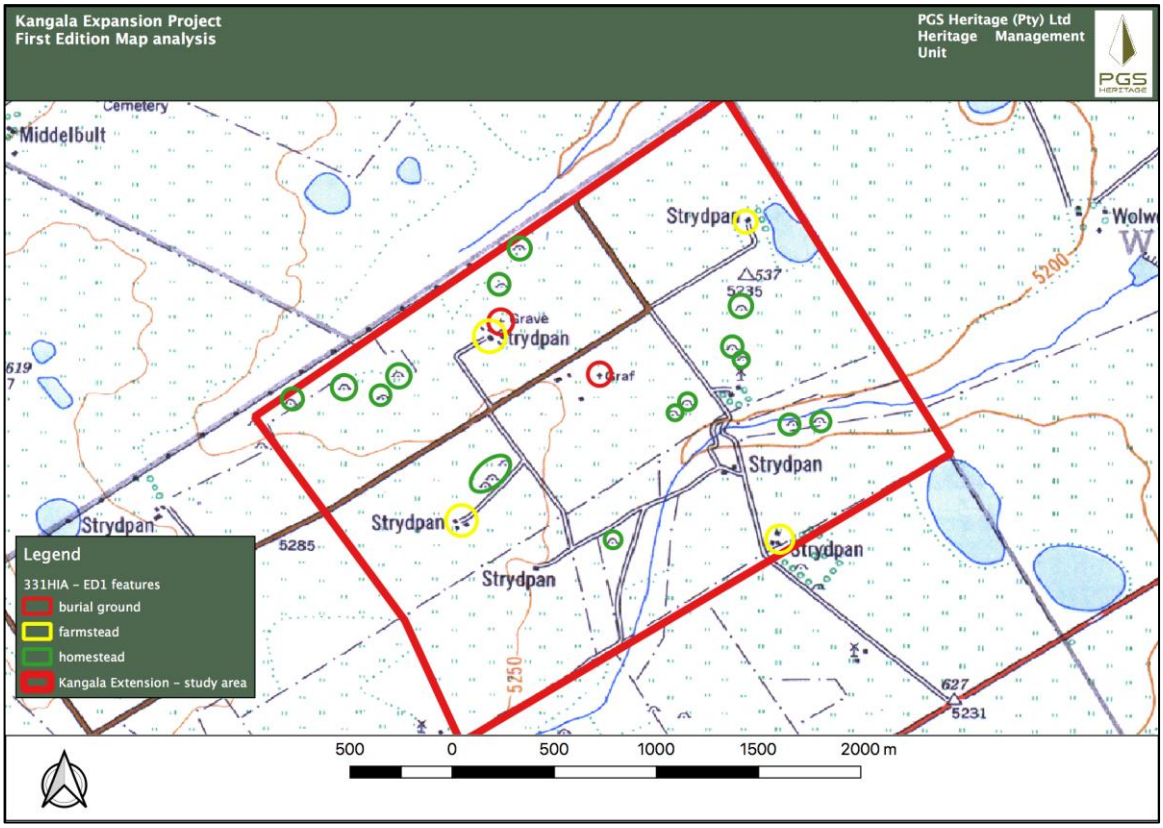


Figure 4 - Section of topographical map 2628BA showing possible heritage features circled red.

4.2 Aspects of the area's history

4.2.1 Previous Heritage Studies in area

A search on the South African Heritage Resources Information System (SAHRIS) has identified Heritage Impact Assessments conducted in and around the study area:

- ***Fourie, W. 2009. Archaeological Impact Assessment for the Kangala Coal Mine on portion 1 and RE of portion 2 of the farm Wolvenfontein 244 IR. Professional Grave Solutions (Pty) Ltd.*** *Three cemeteries and one structure were identified during this study.*
- ***Pelser AJ. 2015. Baseline Study & Heritage Assessment Report for the proposed Gold One International Holfontein Project, near Springs, Gauteng.***

  A Pelser Archaeological Consulting was appointed by Prime Resources (Pty) Ltd to conduct a Baseline Study Phase 1 HIA for the Gold One International Holfontein Project, situated near the old Holfontein Shaft and existing Modder East operations. The study area is located on the East Rand, near Springs, in Gauteng. During the assessment a number sites and features were identified, all related to earlier gold mining at Holfontein. The sites and features recorded during the assessment include the remains of various structures such as headgear foundation and bases, the old Holfontein Shaft as well as some mine buildings. Old houses and a burial ground were recorded next to the haul road from Holfontein to the Modder East operations. The old Mine Compound was also identified during the study.

- ***Pelser, A.J. 2014. Updated Report on a Phase 1 HIA for a proposed Coal Mine on Portions 26, 46 & 47 of the Farm Droogenfontein 242IR, Delmas District, Mpumalanga. For Shangoni Management Service (Pty) Ltd.***

  A Pelser Archaeological Consulting was appointed by Shangoni Management Services (Pty) Ltd, on behalf of Ngululu Resources (Pty) Ltd, to conduct a Phase 1 HIA for the proposed development of an opencast Coal Mine on portions 26, 46 & 47 of the farm Droogenfontein 242-IR, near Sundra (in the Delmas district), Mpumalanga Province. Two sites were identified on Portion 26, namely a burial ground and the remains of a farm labour settlement, possibly related to the grave site. No heritage sites, features or objects were identified on the two other portions of land.
- ***Pistorius, J.C.C. 2012. A Phase I Heritage Impact Assessment (HIA) Study for a proposed 600MW Power Plant and associated infrastructure for Kipower (Pty) Ltd near Delmas on the Eastern Highveld in the Mpumalanga Province of South Africa.***

  Dr Pistorius was contracted by Jones and Wagner Consulting to conduct a heritage impact assessment for the proposed 600MW Power Plant and associated infrastructure for Kipower (Pty) Ltd near Delmas. The results of the survey found a series of informal graveyards and historical structures, located about 10km SE of the current study area.
- ***Van Vollenhoven, A. 2011. A Report on a Cultural Heritage Baseline Study and Impact Assessment for the Proposed New Kleinfontein Goldmine (Modder East Operations), close to Springs, Gauteng Province. For Prime Resources (Pty) Ltd.***

  Archaetnos cc was requested by Prime Resources (Pty) Ltd to conduct a cultural heritage baseline study and impact assessment for the proposed Modder East Operations at the New Kleinfontein Goldmine. This is to the east of the town of Boksburg and to the north of the town of Springs in the Gauteng Province. During the survey, three sites of cultural heritage significance were identified close to the proposed development area namely an extensive burial ground as well as two small clusters of dilapidated industrial buildings. No other cultural resources were identified.
- ***Van der Walt, J. 2017. Heritage Impact Assessment on the Eloff Phase 1 Project, Delmas, Gauteng Province. HCAC for GCS.***

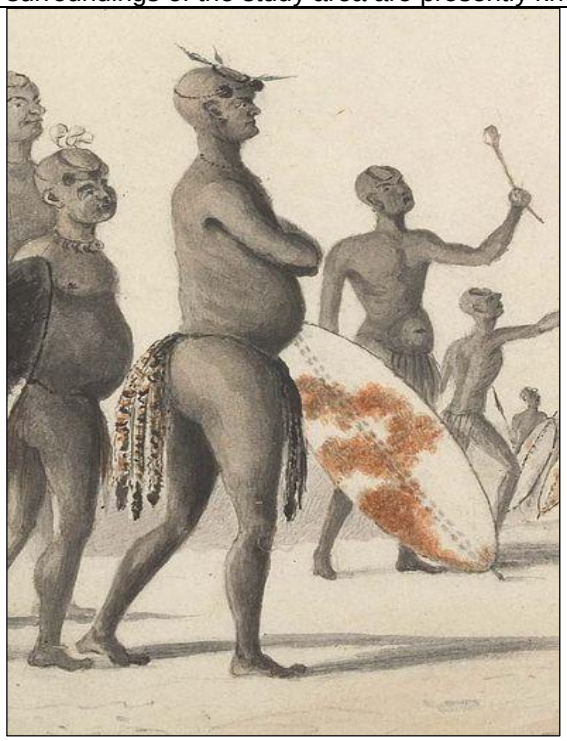
  Only six cemeteries were recorded during the survey.

4.2.2 Archaeological Background

Table 9 - Summary of archival data found on the general area

DATE	DESCRIPTION
2.5 million to 250 000 years ago	The Earlier Stone Age (ESA) is the first phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates to approximately 1.5 million years ago.

	No Early Stone Age sites are known in the vicinity of the study area. However, this is probably due more to a lack of research on the surroundings of the study area rather than a lack of sites.
250 000 to 40 000 years ago	The Middle Stone Age (MSA) is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique. A Middle Stone Age site is known from Primrose Ridge in Germiston (Harcus, 1945) (situated roughly 34 km west of the present study area), as well as two sites near Brakpan (Gaigher, 2013) (located roughly 16.6 km south-west of the present study area). However, no Middle Stone Age sites are known in the direct vicinity of the study area. However, this is probably due to a lack of research on the surroundings of the study area rather than a lack of sites.
40 000 years ago, to the historic past	The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. No Later Stone Age sites are known in the vicinity of the study area. However, this is in all likelihood rather due to a lack of research focus on the surroundings of the study area than a lack of sites.
AD 1450 – AD 1650	The Uitkomst facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the first Iron Age period to be identified for the surroundings of the study area. This facies can likely be dated to between AD 1650 and AD 1820. The decoration on the ceramics associated with this facies is characterised by stamped arcades, appliqué of parallel incisions, stamping, as well as cord impressions, and is described as a mixture of the characteristics of both Ntsuanatsatsi (Nguni) and Olifantspoort (Sotho). The Uitkomst facies (with the Makgwareng facies) is seen as the successor to the Ntsuanatsatsi facies. The Ntsuanatsatsi facies is closely related to the oral histories of the Early Fokeng and represents the earliest known movement of Nguni people out of Kwazulu-Natal into the inland areas of South Africa. In terms of this theory, the Bafokeng settled at Ntsuanatsatsi Hill in the present-day Free State Province. Subsequently, the BaKwena lineage broke away from the Bahurutshe cluster and crossed southward over the Vaal River to come in contact with the Bafokeng. As a result of this contact, a Bafokeng-Bakwena cluster was formed, which moved northward and became further 'Sotho-ised' by coming into increasing contact with other Sotho-Tswana groups. This eventually resulted in the appearance of Uitkomst facies type pottery which contained elements of both Nguni- and Sotho-Tswana speakers (Huffman, 2007). No sites associated with the Uitkomst facies are known from the surroundings of the study area.
AD 1700 – AD 1840	The Buispoort facies of the Moloko branch of the Urewe Ceramic Tradition is the next phase to be identified within the study area's surroundings. It is most likely dated to between AD 1700 and AD 1840. The key features on the decorated ceramics include rim notching, broadly incised chevrons and white bands, all with red ochre (Huffman, 2007). It is believed that the Madikwe facies developed into the Buispoort facies. The Buispoort facies is associated with sites such as Boschhoek, Buffelshoek, Kaditshwene, Molokwane and Olifantspoort (Huffman, 2007). No sites associated with the Buispoort facies are known from the surroundings of the study area.
AD 1821 – AD 1823	After leaving present-day KwaZulu-Natal, the Khumalo Ndebele (more commonly known as the Matabele) of Mzilikazi migrated through the general vicinity of the study area under discussion before reaching the central reaches of the Vaal River in the vicinity of Heidelberg in 1823 (www.mk.org.za).

	Two different settlement types have been associated with the Khumalo Ndebele. The first of these is known as Type B walling and was found at Nqabeni in the Babanango area of KwaZulu-Natal. These walls stood in the open without any military or defensive considerations and comprised an inner circle of linked cattle enclosures (Huffman, 2007). The second settlement type associated with the Khumalo Ndebele is known as Doornspruit and comprises a layout which from the air has the appearance of a 'beaded necklace'. This layout comprises long scalloped walls (which mark the back of the residential area) which closely surround a complex core, which in turn comprises a number of stone circles. The structures from the centre of the settlement can be interpreted as kitchen areas and enclosures for keeping small stock. It is important to note that the Doornspruit settlement type is associated with the later settlements of the Khumalo Ndebele, in areas such as the Magaliesberg Mountains and Marico, and represents a settlement under the influence of the Sotho with whom the Khumalo Ndebele intermarried. The Type B settlement is associated with the early Khumalo Ndebele settlements and conforms more to the typical Zulu form of settlement. As the Khumalo Ndebele passed through the general vicinity of the study areas shortly after leaving Kwazulu-Natal, one can assume that their settlements here would have conformed more to the Type B than the Doornspruit type of settlement. It must be stressed however that no published information could be found which indicates the presence of Type B sites in the general vicinity of the study area. No sites associated with this period of the archaeological history of the surroundings of the study area are presently known.
	 Figure *5 - King Mzilikazi of the Matabele. This illustration is by Captain Cornwallis Harris in c. 1838 (www.sahistory.org.za).*
1832	At this time, a Zulu impi of King Dingane moved through the general vicinity of the study area on their way to attack the Matabele of Mzilikazi, who were settled along the Magaliesberg Mountains (Bergh, 1999).
1836	The first Voortrekker parties started crossing over the Vaal River at this time. The earliest Voortrekker party to cross over the Vaal River was the one under the leadership of Louis Trichardt and Johannes Jacobus Janse van Rensburg. Although the exact route followed by the Trichardt-Janse van Rensburg party was not recorded, one suggestion is that they passed through the strip of land in-between the Bronkhorst Spruit in the west and the Wilge River to the east (Bergh, 1999). These two rivers are located to the east of Delmas.

1841 – 1850	These years saw the early establishment of farms by the Voortrekkers in the general vicinity of the study area (Bergh, 1999).
1845	Both the district and town of Lydenburg were established in this year (Bergh, 1999). The district of Lydenburg at the time encompassed a massive land mass, and it would appear that the study area fell just within this newly proclaimed district at the time.
1857	The district of Pretoria was established in 1857, with the town of that name established in 1855 (Bergh, 1999). The study area now fell within this newly proclaimed district.
1866	The town and district of Heidelberg were established in this year (Bergh, 1999). The study area fell within the Heidelberg district at this time.
1883 - 1887	In 1883, the farm, "The Springs" was surveyed by James Brooks. Coal was discovered on the farm in 1887 and the region soon became the most productive coal mining region in the country. Unfortunately, the low quality and inflammable nature of the coal resulted in most of the coal mines closing down after better quality coal was discovered in Witbank (Erasmus, 2004).
1899 – 1902	The South African War took place during this time. No events or activities during the war can be associated with the present study area. However, a number of such events and activities are known from the general vicinity. These will be briefly mentioned in the paragraphs below. Skirmishes or battles from the surrounding landscape include an action between a British force under the command Lieutenant-General J.D.P. French and a Boer commando of some 1 000 men on 23 July 1900. The main component of the battle occurred a short distance to the east and south-east of the present-day town of Delmas, at a distance of roughly 20 km east of the present study area (Changuion, 2001). Another incident occurred during the early morning of 26 December 1900, when a section of the Heidelberg Commando of some 350 men attacked the town of Benoni, as well as some of the gold mines surrounding the town, including the Kleinfontein Mine. The attack was a success, and according to some eye witnesses resulted in 22 British casualties (eight killed and 14 wounded), as well as the capture of three prisoners by the Boer commando (Blake, 2012). It is also interesting to note that the Boer Commando used the farm Rietkol as a meeting place from where the attack on Benoni proceeded (Blake, 2012).
	

	Figure 6 - Henning Petrus Nicolaas Viljoen (left) of the Heidelberg Commando, who's diary provides an eyewitness account of the attack on Benoni and its mines on 26 December 1900 (Blake, 2012). The image on the right depicts Lieutenant-General J.D.P. French, the commanding officer of the British force at the battle which occurred in close proximity to Delmas on 23 July 1900 (Changuion, 2001:77).
1902	After the end of hostilities in 1902, the new Witwatersrand District was created from farms which were previously located in the districts of Krugersdorp, Heidelberg and Pretoria. The study area now fell within the district of Witwatersrand (Bergh 1999).
1907	The town of Delmas was laid out on the farm Witklip and comprised 192 residential stands, 48 smallholdings (of 4 hectares each) with a commonage of 134 hectares. It was established by the owner of Witklip, who was a Frenchman named Frank Dumat (Erasmus, 2004). The name Delmas was derived from the French phrase 'de le mas', which means 'of the small farm' (www.sa-venues.com).

4.3 Findings of the Heritage Screening

The findings can be compiled as follows and have been combined to produce a heritage sensitivity map for the project (*Figure* 8).

4.3.1 Heritage

The sensitivity maps were produced by overlying:

- Satellite Imagery;
- Current Topographical Maps;
- First edition Topographical Maps dating from the 1960's

This enabled the identification of possible heritage sensitive areas that included:

- Dwellings
- Clusters of dwellings (homesteads and farmsteads);
- Burial grounds;
- Structures/Buildings

By superimposition and analysis it was possible to rate these structure/areas according to age and thus their level of protection under the NHRA. Note that these structures refer to possible tangible heritage sites as listed in *Table 10*.

Table 10 - Tangible heritage site in the study area

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

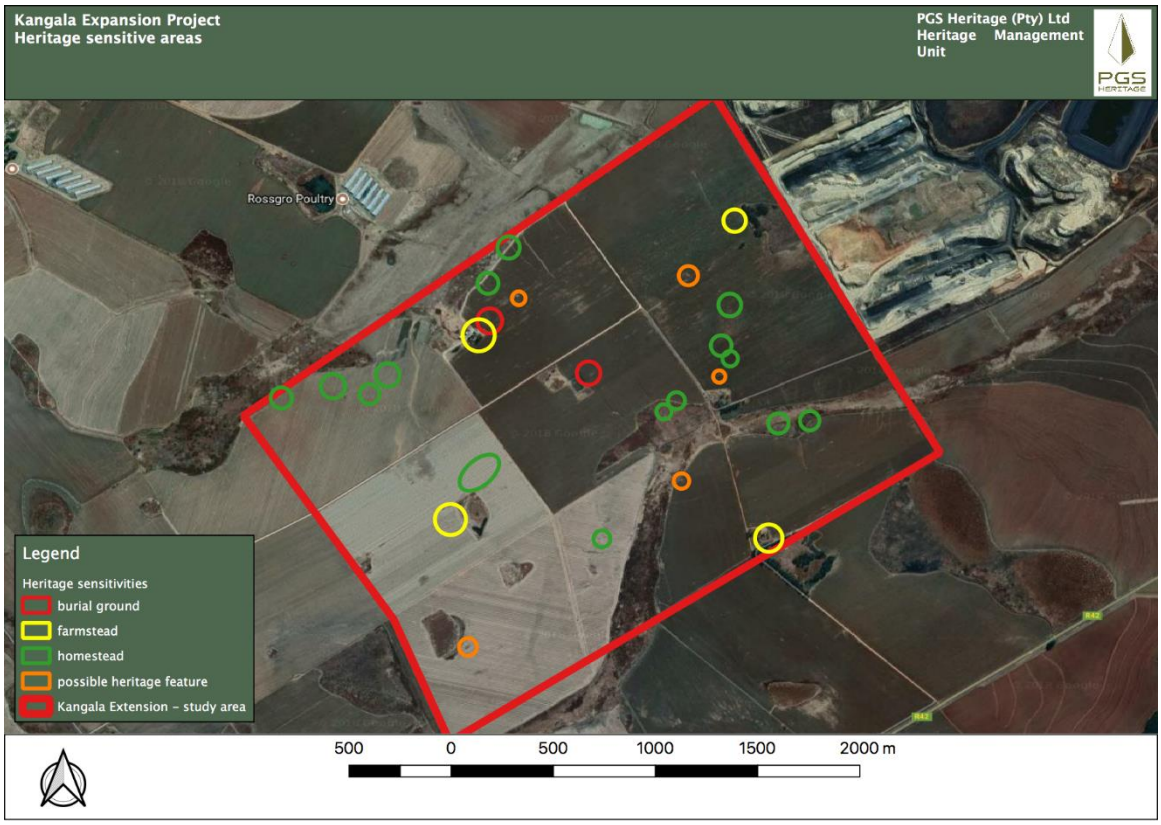


Figure 7 – Heritage sensitivity map. Identified structures with a 100m buffer are depicted.

Objects depicted include Buildings, homesteads, farmsteads, kraals and possible graves. Observation of the previous heritage reports has shown that graves are in abundance in the surrounding areas and especially near farmsteads. This factor needs to be held in consideration regarding any of the alternatives.

4.3.2 Palaeontological Heritage

The sensitivity maps were produced by overlying:

- Palaeontological sensitivity maps from the SAHRIS database (**Figure 8**).

Based on the SAHRIS database a full Palaeontological Impact assessment will be required as part of the HIA study.

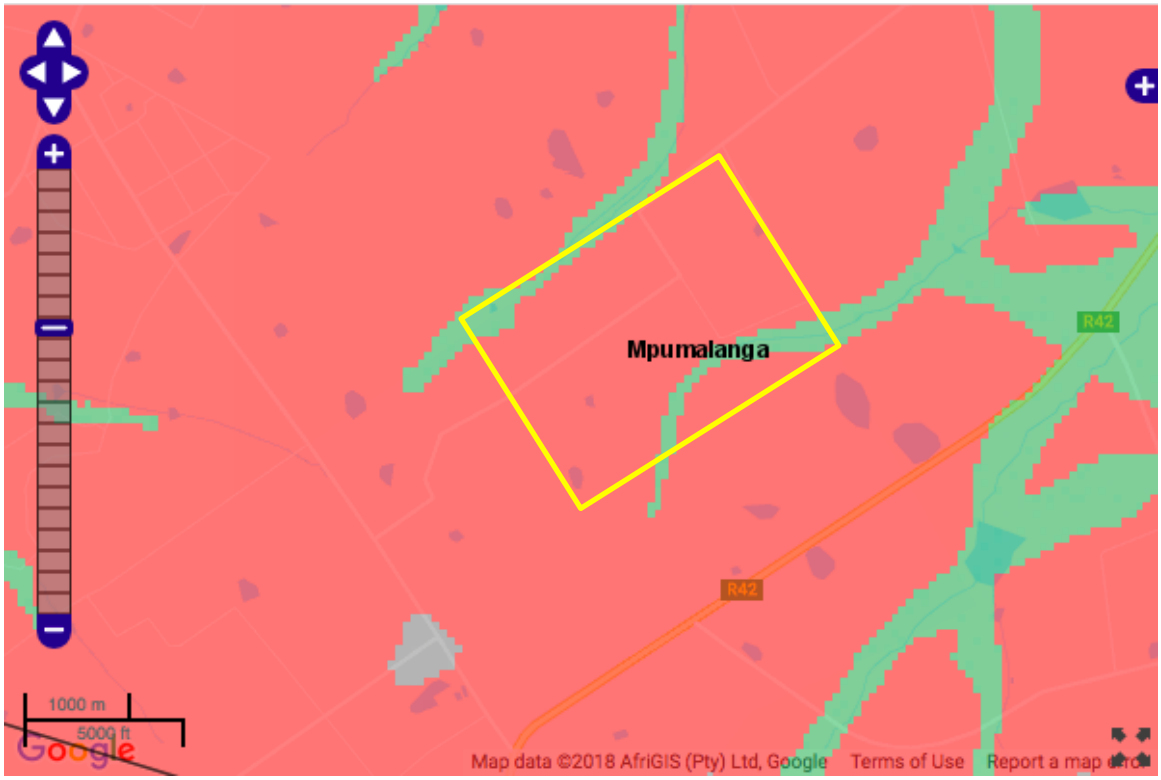


Figure 8 – Palaeontological Heritage Sensitivity map. As can be viewed, most of the area is highly sensitive. Yellow demarcates approximate study area

5 PROJECTED IMPACT ASSESSMENT

The following section provides a preliminary analysis of the predicted impacts of the KEP on heritage resources within the expansion area.

5.1 Burial grounds and graves

From the historical map analysis a minimum of two burial grounds are present on the property. Burial grounds and graves have high heritage significance and are given a Grade 3A significance rating in accordance with the system described in Section 3.1 of this document.

5.2 Structures

Various farmsteads and homesteads were identified for study during the HIA phase of the project. Structures older than 60 years are protected under Section 34 of the NHRA and will be evaluated and graded for heritage significance during the HIA phase.

5.3 Preliminary Impact assessment tables

Implementing the impact assessment methodology as supplied by EIMS the following tables provide a preliminary quantative assessment of the impacts of the project to be refined after fieldwork during the HIA Phase.

The preliminary impact analysis shows that the unmitigated impact on known heritage resources is predicted to be medium negative, with a post-mitigation impact of low negative. Chance finds of unknown heritage resources is predicted that the unmitigated impact to be low negative, with a post-mitigation impact of low negative.

Table 11 – Projected impact on burial grounds and graves

Impact Name	**Impact on burial grounds and graves**				
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	1	1	Reversibility of Impact	5	5
Duration of Impact	5	5	Probability	5	1
Environmental Risk (Pre-mitigation)					-18.75
Mitigation Measures					
Assess and grade burial grounds and graves during HIA and propose mitigation measures					
Environmental Risk (Post-mitigation)					-3.25
Degree of confidence in impact prediction:					Low
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					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.					
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					1.33
Final Significance					-4.33

Table 12 - Projected impact on structures older than 60 years

Impact Name	**Impact on structures older than 60 years**				
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	1	1	Reversibility of Impact	5	5
Duration of Impact	5	5	Probability	5	1
Environmental Risk (Pre-mitigation)					-18.75
Mitigation Measures					
Assess and grade structure during HIA and propose mitigation measures					
Environmental Risk (Post-mitigation)					-3.25
Degree of confidence in impact prediction:					Low
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					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.					
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					1.33
Final Significance					-4.33

Table 13 – Projected impact on chance finds heritage resources

Impact Name	**Impact on chance finds heritage resources**				
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	3	2
Extent of Impact	2	1	Reversibility of Impact	3	5
Duration of Impact	5	4	Probability	2	2
Environmental Risk (Pre-mitigation)					-6.50
Mitigation Measures					
Develop heritage management guidelines during the HIA Phase					
Environmental Risk (Post-mitigation)					-6.00
Degree of confidence in impact prediction:					Low
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					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.					

Degree of potential irreplaceable loss of resources	2
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.	
Prioritisation Factor	1.17
Final Significance	-7.00

6 CONCLUSIONS AND RECOMMENDATIONS

This HSR has sown that the proposed KEP will have an impact on heritage resources within the expansion area.

Analysis of historical maps and aerial photography identified definite structures that include:

- Dwellings
- Clusters of dwellings (homesteads and farmsteads);
- Burial grounds;
- Structures/Buildings

The analysis further identified possible area of heritage sensitivity based. On landform as well as vegetation changes.

The SAHRIS palaeontological sensitivity map rates the study as underlain by geological strata with a high palaeontological significance.

6.1 Preliminary impact analysis

The preliminary impact analysis shows that the unmitigated impact on known heritage resources is predicted to be medium negative, with a post-mitigation impact of low negative. Chance finds of unknown heritage resources is predicted that the unmitigated impact to be low negative, with a post-mitigation impact of low negative.

Based on the above the following activities will be implemented during the development of the HIA for the KEP.

6.2 Burial grounds and graves

Burial grounds and graves have high heritage significance and are given a Grade 3A significance rating in accordance with the system described in Section 3.1 of this document.

6.3 Structures

Structures older than 60 years are protected under Section 34 of the NHRA and will be evaluated and graded for heritage significance during the HIA phase.

6.4 Palaeontology

Based on the SAHRIS database a full Palaeontological Impact assessment will be required as part of the HIA study.

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ANNEXURE A – PLAN OF STUDY FOR EIA PHASE

The Heritage Impact Assessment (HIA) report to be compiled by PGS Heritage (PGS) for the proposed Kangal Expansion Project will assess the heritage resources found on site. This report will contain the applicable maps, tables and figures as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002). The HIA process consists of three steps:

- Step I – Literature Review: The background information to the field survey leans greatly on the Heritage Scoping Report completed by PGS for this site.

- Step II – Physical Survey: A physical survey was conducted on foot and by vehicle through the proposed project area by heritage specialists, aimed at locating and documenting sites falling within and adjacent to the proposed development footprint. – Completed during the Scoping Phase

- Step III – The final step involves the assessment of resources in terms of the heritage impact assessment criteria and report writing, as well as mapping and constructive recommendations

The significance of heritage sites was 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),
    a. Density of scatter (dispersed scatter)
    b. Low - <10/50m^2
    c. Medium - 10-50/50m^2
    d. High - >50/50m^2
- **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 pylon position
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site

Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report.

Table 14: 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 Significance	Mitigation before destruction
Generally Protected B (GP.B)		Medium Significance	Recording before destruction
Generally Protected C (GP.A)		Low Significance	Destruction