



HERITAGE SCOPING REPORT, FOR INCLUSION IN THE ENVIRONMENTAL SCOPING REPORT FOR THE PROPOSED KALGOLD EXPANSION PROJECT, NORTH WEST PROVINCE

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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 report 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	Heritage Scoping Report for inclusion in the Environmental Scoping report		
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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 for the implementation process of the Kalgold Expansion Project (KEP) for Harmony Gold, Ratlou Local Municipality within the Ngaka Modiri Molema District Municipality in the North West Province.

This HSR has shown that the proposed KEP could impact on heritage resources within the expansion area despite of the extensive disturbance of the landscape through mining as well as agricultural activities.

The South African Heritage Resources Information System (SAHRIS) palaeontological sensitivity map rates the study as underlain by geological strata with a moderate palaeontological significance.

Preliminary impact analysis

The preliminary impact analysis shows that the unmitigated impact on known heritage resources is predicted to be medium to low 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, it is recommended that a field survey of the footprint areas related to the expansions is done to confirm the possible presence of heritage resources and based on the findings develop appropriate mitigation measures.

EXECUTIVE SUMMARY

1	INTRO	DUCTION	1	
1.1	Scope	e of the Study	1	
1.2	Speci	alist Qualifications	1	
1.3	Assur	nptions and Limitations	1	
1.4	Legis	lative Context	1	
	1.4.1	Notice 648 of the Government Gazette 45421	2	
	1.4.2	NEMA – Appendix 6 requirements	2	
	1.4.3	The National Heritage Resources Act	2	
2	TECH	NICAL DETAILS OF THE PROJECT	3	
2.1	Site L	ocation and Description	3	
2.2	Techr	nical Project Description	3	
3	METHODOLOGY 4			
3.1	Site S	Significance	6	
4	IMPAG	CT ASSESSMENT PROTOCOL	7	
4.1	Deter	mination of Environmental Risk	8	
4.2	Impac	ct Prioritisation	10	
5	HERIT	AGE SENSITIVITY	11	
	5.1.1	Previous Heritage Impact Assessment Reports from the Study Area and Surroun	dings 11	
	5.1.2	Palaeontological Heritage	12	
	5.1.3	Heritage Screening	13	
	5.1.4	Heritage Sensitivity	13	
6	PROJ	ECTED IMPACT ASSESSMENT	17	
6.1	Prelin	ninary Impact assessment tables	17	
7	CONC	LUSIONS AND RECOMMENDATIONS	19	
7.1	Preliminary impact analysis 19			
8	REFE	RENCES	19	

List of Figures

Figure 1 – Human and Cultural Time line in Africa (Morris, 2008)	.х
Figure 2 - Proposed Kalgold extension (Image provided by EIMS, 2020)	5
Figure 3 – Palaeontological Heritage Sensitivity map. As can be viewed, most of the area	is
moderate sensitive. Yellow demarcates approximate study area 1	13
Figure 4 – A combined heritage sensitivity map for the Kalgold area 1	14
Figure 5 – Palaeontological Screening map. Source: Department of Environmental Affairs 1	15

Figure 6 – Archaeology and Heritage Sc	reening map. Source:	Department of Environmental
Affairs		

List of Appendices

A CV of specialist

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 No. 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
KEP	Kalgold Expansion Project
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
SAHRIS	South African Heritage Resources Information System



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

1 INTRODUCTION

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 (ESR) as part of the planning for the implementation process of the Kalgold Expansion Project (KEP) for Harmony Gold, Ratlou Local Municipality within the Ngaka Modiri Molema District Municipality in the North West 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 No. 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 Heritage Impact Assessment (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

This report excludes fieldwork that is to be completed as part of the HIA Report.

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:

 Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified

- National Environmental Management Act (NEMA), Act 107 of 1998 Appendix 6
- National Heritage Resources Act (NHRA), Act 25 of 1999

1.4.1 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA, GN.648 requires sensitivity verification for a site selected on the national web based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this Government Notice (GN) are listed in **Table 1** and the applicable section in this report noted.

	Relevant section in	Where not applicable
GN 648	report	in this report
2.2 (a) a desktop analysis, using satellite imagery;	section 5	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	To be done during he HIA	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	To be done during he HIA	-
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	To be done during he HIA	-

Table 1 - Reporting requirements for GN648

1.4.2 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below. The HIA report will be incompliance of Appendix 6 and include a table guide for ease of reference.

1.4.3 The National Heritage Resources Act

- National Heritage Resources Act (NHRA) Act 25 of 1999
 - Protection of Heritage Resources Sections 34 to 36; and
 - Heritage Resources Management Section 38

The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically

impacted on by development as stipulated in Section 38 of NHRA. This study falls under s38(8) and requires comment from the relevant heritage resources authority.

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Site Location and Description

The existing opencast gold mining operation of Kalgold is situated in the Kraaipan Greenstone Belt some 50 kilometers southwest of Mahikeng in the jurisdiction of Ratlou Local Municipality within the Ngaka Modiri Molema District Municipality in the North West Province (**Figure 2**).

2.2 Technical Project Description

The existing Harmony Kalgold operation wishes to expand its current production from the current production rate of 130 000 tons per month to 300 000 tons per month. A pre-feasibility study has been undertaken. The findings of the pre-feasibility study have concluded that the following new activities and expansions must be provided for:

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

Kalgold mine is an open pit mining operation located some 60km South West of Mahikeng in the North West Province. The mine is owned and operated by Harmony Gold, who acquired the mine in 1999. The mine is located in the Kraaipan Greenstone Belt, which is part of the large Amalia-Kraaipan Greenstone terrain. The largest ore body is found in the D-Zone, which was mined out by a single pit operation along a strike length of 1 300m and to a depth of approximately 290m below

surface. Mining at Kalgold Mine continued at the A-Zone, Windmill and Watertank Open Pits, which are all relatively new opencast operations.

3 METHODOLOGY

The methodology to be utilised for the whole HIA study will be as follows

The applicable maps, tables and figures, will. be included as stipulated in the NHRA (no 25 of 1999), the NEMA (no 107 of 1998). The HIA process consists of three steps:

Step I – Literature Review and sensitivity analysis¹: The background information to the field survey relies greatly on previous studies completed for the project to determine known sensitivities, as well as the heritage background research completed for this report.

Step II – Physical Survey: A physical survey will be conducted of proposed project area by a qualified heritage specialist. The survey is 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.

¹ According to Notice 648 of the Government Gazette 45421



Figure 2 - Proposed Kalgold extension (Image provided by EIMS, 2020)

3.1 Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this report

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 2** and Table 3).

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
1	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
11	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by HWC. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
111	Heritage resources that contribute to the environm and fulfils one of the criteria set out in section 3(Grade II status. Grade III sites may be formally pr	ental quality or cultural significand 3) of the Act but that does not fu otected by placement on the Heri	ce of a larger area Ilfil the criteria for itage Register.
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table 2 - Rating system for archaeological resources

Table 3 - Rating system for built environment resource
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Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
1	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
11	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by HWC.	Exceptionally High Significance
II	Such a resource contributes to the fulfils one of the criteria set out in II status. Grade III sites may be fo	e environmental quality or cultural significan section 3(3) of the Act but that does not fu ormally protected by placement on the Herit	nce of a larger area and Ifil the criteria for Grade age Register.
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or other cultural significance

4 IMPACT ASSESSMENT PROTOCOL

The following impact rating protocol will be utilised for completion of the final HIA for this project.

The impact significance rating methodology, as provided by EIMS, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). 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 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). The impact assessment will be applied to all identified alternatives. Where possible, mitigation measures will be recommended for the impacts identified.

4.1 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. The 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:

$$C = (E + D + M + R) \times N$$

4

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in **Table 4** below.

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 th 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),	

 Table 4 - Criteria for Determining Impact Consequence

Aspect	Score	Definition
	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 Error! Reference source not found.**9**.

Table 5 - 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

	5	5	10	15	20	25				
eouenpe	4	4	8	12	16	20				
	3	3	6	9	12	15				
	2	2	4	6	8	10				
ISE	1	1	2	3	4	5				
l o	0	1	2	3	4	5				
Probability										

Table 6 - Determination of Environmental Risk

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 7**.

Table 7 - 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.

4.2 Impact Prioritisation

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

- 1. Cumulative impacts; and
- 2. The degree to which the impact may cause irreplaceable loss of resources.

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.

	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.							
Cumulative Impact (CI)	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.							
	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.							
Irreplaceable Loss of Resources (LR)	Medium (2) Where the impact may result in the irreplaceable loss be replaced or substituted) of resources but th (services and/or functions) of these resources is lim								
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).							

Table 8 - Criteria for Determining Prioritisation

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 5. The impact priority is therefore determined as follows:

Priority = 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 9**).

Priority	Ranking	Prioritisation Factor
2	Low	1
3	Medium	1.125
4	Medium	1.25
5	Medium	1.375
6	High	1.5

Table 9 - Determination of Prioritisation Factor

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 an attempt 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 and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 10 - Final Environmental Significance Rating

Environmental Significance Rating								
Value	Description							
≤ -20	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).							
> -20 ≤ - 10	Medium negative (i.e. where the impact could influence the decision to develop in the area).							
> -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).							
0	No impact							
<10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).							
≥ 10 < 20	Medium positive (i.e. where the impact could influence the decision to develop in the area).							
≥ 20	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).							

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

5 HERITAGE SENSITIVITY

5.1.1 Previous Heritage Impact Assessment Reports from the Study Area and Surroundings

An assessment of the South African Heritage Resources Information System (SAHRIS) of SAHRA was undertaken to establish whether any previous archaeological and heritage impact assessments had revealed archaeological and heritage sites within the present study area components. Previous reports were also made available by the client.

This assessment has revealed that three previous studies had been undertaken in an in the surroundings of the study area.

All previous studies that were located on the SAHRIS system and/or received from the client, will be briefly discussed in chronological order below. In each case, the results of each study are shown in bold.

- Van Schalkwyk, J. 2004. Heritage Impact Assessment of a section of the Kraaipan Secondary Road, Vryburg and Ditsobotla Districts, North West Province. The report identified various memorials and cemeteries associated with the South African War (1899-1902). Most of these were in the vicinity of Kraaipan some 16km to the east of the study area.
- Sellane, M. 2013. Heritage Impact Assessment (HIA) for the proposed Mareetsane Batho-Batho Solar photo voltaic (PV) Facility and associated powerline. The report identified 10 burial grounds in an are some 30km to the east of the study area.
- Küsel, U.S. 2013. Cultural Heritage Resources Impact Assessment for a proposed extension of operations on portions of the farm Spanover 552 IO at the existing mine "KALGOLD" in the North-West province for "Harmony Kalgold Mining Operations", As well as updating of the heritage remains on the existing mine. African Heritage Consultants. Various heritage features were identified including four cemeteries, various ruins and farmstead most dating from the 1960s.

5.1.2 Palaeontological Heritage

The sensitivity maps were produced by overlying:

• Palaeontological sensitivity maps from the SAHRIS database (**Figure 3**).

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



Figure 3 – Palaeontological Heritage Sensitivity map. As can be viewed, most of the area is moderate sensitive. Yellow demarcates approximate study area

5.1.3 Heritage Screening

A Heritage Screening Report was compiled by the Department of Environmental Affairs National Webbased Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended (**Figure 5** and Figure 6). According to the Heritage screening report, the directly affected area has a Medium heritage and palaeontological sensitivity.

5.1.4 Heritage Sensitivity

The sensitivity maps were produced by overlying:

- Satellite Imagery;
- Current Topographical Maps; and
- First edition Topographical Maps dating to 1972 (Figure 4).

The map analysis and previous studies shows that number of known possible heritage features were identified in the study area.



Figure 4 – A combined heritage sensitivity map for the Kalgold area



Figure 5 – Palaeontological Screening map. Source: Department of Environmental Affairs



Figure 6 – Archaeology and Heritage Screening map. Source: Department of Environmental Affairs

6 PROJECTED IMPACT ASSESSMENT

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

6.1 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 to low 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.

IMPACT DESCRIPTION			Pre-Mitigation							Post Mitigation								Priority Factor Criteria			
Identifier	Impact	Phase	Na tur e	Ex te nt	Dur atio n	Mag nitu de	Reve rsibil ity	Pro babi lity	Pre- mitigati on ER	Na tur e	Ex te nt	Dur atio n	Mag nitu de	Reve rsibil ity	Pro babi lity	Post- mitigati on ER	Conf iden ce	Cumula tive Impact	Irreplac eable loss	Priorit y Facto r	Fina I scor e
Heritage resources	Damage/destruction of unidentified heritage finds	Plannin g	-1	1	5	1	5	2	-6	-1	1	4	1	4	1	-2,5	High	1	3	1,25	-3,13
	Damage/destruction of unidentified heritage finds	Constru ction	-1	1	5	1	5	1	-3	-1	1	4	2	4	2	-5,5	High	2	3	1,38	-7,56
	Damage/destruction of unidentified heritage finds	Operati on	-1	1	5	1	5	1	-3	-1	1	4	2	4	2	-5,5	High	2	3	1,38	-7,56
	Damage/destruction of unidentified heritage finds	Decom missioni ng	-1	1	5	1	5	1	-3	-1	1	4	2	4	2	-5,5	High	2	3	1,38	-7,56
	Damage/destruction of unidentified heritage finds	Rehab and closure	-1	1	5	1	5	1	-3	-1	1	3	2	5	2	-5,5	High	2	3	1,38	-7,56
Burial grounds and graves	Damage/destruction of possible finds	Plannin g	-1	1	5	4	5	3	-11,25	-1	1	5	2	5	2	-6,5	High	2	2	1,25	-8,13
	Damage/destruction of possible finds	Constru ction	-1	1	5	4	5	3	-11,25	-1	1	5	2	5	2	-6,5	High	2	2	1,25	-8,13
	Damage/destruction of possible finds	Operati on	-1	1	5	4	5	3	-11,25	-1	1	5	2	5	2	-6,5	High	2	2	1,25	-8,13
	Damage/destruction of possible finds	Decom missioni ng	-1	1	1	1	1	1	-1	-1	1	1	1	1	1	-1	High	2	2	1,25	-1,25
	Damage/destruction of possible finds	Rehab and closure	-1	1	1	1	1	1	-1	-1	1	1	1	1	1	-1	High	2	2	1,25	-1,25
Palaeontol ogy	Damage/destruction of possible finds	Plannin q	-1	1	1	1	1	1	-1	-1	1	1	1	1	1	-1	High	2	2	1,25	-1,25
	Damage/destruction of possible finds	Constru ction	-1	1	5	1	1	1	-2	-1	1	1	1	1	1	-1	High	2	2	1,25	-1,25
	Damage/destruction of possible finds	Operati on	-1	1	5	1	1	1	-2	-1	1	5	5	5	1	-4	High	2	2	1,25	-5,00
	Damage/destruction of possible finds	Decom missioni ng	-1	1	1	1	1	1	-1	-1	1	1	1	1	1	-1	High	2	2	1,25	-1,25
	Damage/destruction of possible finds	Rehab and closure	-1	1	1	1	1	1	-1	-1	1	1	1	1	1	-1	High	2	2	1,25	-1,25

Table 11 – Projected impact heritage resources

7 CONCLUSIONS AND RECOMMENDATIONS

This HSR has shown that the proposed KEP will have a projected minimal impact on heritage resources within the expansion area despite of the extensive disturbance of the landscape through mining as well as agricultural activities.

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

7.1 Preliminary impact analysis

The preliminary impact analysis shows that the unmitigated impact on known heritage resources is predicted to be medium to low 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, it is recommended that a field survey of the footprint areas related to the expansions is done to confirm the possible presence of heritage resources and based on the findings develop appropriate mitigation measures.

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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, Mozambique, Malawi, Mauritius, Zimbabwe and the Democratic Republic of the Congo