



PGS HERITAGE

PALAEONTOLOGICAL DESKTOP ASSESSMENT FOR THE PROPOSED MOGALAKWENA SOLAR PV PROJECT IN LIMPOPO, SOUTH AFRICA

Amended Palaeontological Desktop Report

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PGS Project No: 544HIA



+ 27 (0) 12 332 5305



+27 (0) 86 675 8077



contact@pgsheritage.co.za



PO Box 32542, Totiusdal, 0134

Offices in South Africa, Kingdom of Lesotho and Mozambique

Head Office:
906 Bergarend Streets
Waverley, Pretoria,
South Africa

Directors: HS Steyn, PD Birkholtz, W Fourie

Declaration of Independence

I, Elize Butler, declare that –

General declaration:

- I act as the independent palaeontological specialist in this application.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant.
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have expertise in conducting palaeontological 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 favorable 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 a palaeontological specialist in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realize that a false declaration is an offense 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;

PALAEONTOLOGICAL CONSULTANT: **CONTACT PERSON:**

Banzai Environmental (Pty) Ltd
Elize Butler
Tel: +27 844478759
Email: elizebutler002@gmail.com

SIGNATURE:



ACKNOWLEDGEMENT OF RECEIPT

Report Title	Amended Palaeontological Desktop Assessment for the proposed Mogalakwena Solar PV Project in Limpopo, South Africa		
Control	Name	Signature	Designation
Author	Elize Butler		Palaeontologist
Reviewed			

This PDA report has been compiled considering the National Environmental Management Act 1998 (NEMA) and Environmental Impact Regulations 2014 as amended, requirements for specialist reports, Appendix 6, as indicated in the table below.

Table 1 - NEMA Table

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
1.(1) (a) (i) Details of the specialist who prepared the report	Page ii and Section 2 of Report – Contact details and company and Appendix A	-
(ii) The expertise of that person to compile a specialist report including a curriculum vitae	Section 2 – refer to Appendix A	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 4 – Objective	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 5 – Geological and Palaeontological history	-
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 9	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 1 and 10	Desktop Study
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 7 Approach and Methodology	-
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 1 and 10	
(g) An identification of any areas to be avoided, including buffers	Section 5	No buffers or areas of sensitivity identified
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site	Section 5 – Geological and Palaeontological history	

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
including areas to be avoided, including buffers;		
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7.1 – Assumptions and Limitation	-
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 1 and 10	
(k) Any mitigation measures for inclusion in the EMPr	None	
(l) Any conditions for inclusion in the environmental authorisation	None	
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	None	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 1 and 10	
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 1 and 10	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study	N/A	Not applicable. A public consultation process will be conducted as part of the EIA and EMPr process.
(p) A summary and copies if any comments that were received during any consultation process	N/A	
(q) Any other information requested by the competent authority.	N/A	Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Section 3 compliance with SAHRA guidelines	

EXECUTIVE SUMMARY

Banzai Environmental was appointed by PGS Heritage (Pty) Ltd to conduct the Palaeontological Desktop Assessment (PDA) to assess the Mogalakwena Solar PV Project in Limpopo. To comply with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), this PDA is necessary to confirm if fossil material could potentially be present in the planned mining area and to evaluate the impact of the proposed development on the Palaeontological Heritage.

The proposed PV development is surrounded by rocks of the Rustenburg Layered Suite and Lebowa Granite Suite of the Bushveld Complex, while the proposed PV facility is underlain by the Hout River Gneiss Suite (Archaean Granitoid Intrusions). According to the PalaeoMap on the South African Heritage Resources Information System database, the Palaeontological Sensitivity of the Houtriver Gneiss Suite (Archaean Granitoid Intrusions) is zero as they are igneous in origin and thus unfossiliferous (Almond and Pether 2008, SAHRIS website).

It is therefore considered that the construction and operation of the proposed Mogalakwena Solar PV Project, Limpopo Province is deemed appropriate and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources.

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TERMINOLOGY AND ABBREVIATIONS

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 influences 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

Fossil

Mineralized 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;

Palaeontology

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

Table 2 - Abbreviations

Abbreviations	Description
AAP	Anglo American Platinum Limited
ASAP	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEFF	Department of Environmental Department of Environment, Forestry and Fisheries
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
IPP	Independent Power Producer
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NECSA	Nuclear Energy Corporation of South Africa
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
NGPM	Nkwe Garatau Platinum Mine
PDA	Palaeontological Desktop Assessment
PIA	Palaeontological Impact Assessment
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
PV	Solar photovoltaic
RfP	Request for Proposal
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

1 INTRODUCTION

Anglo American Platinum Limited (AAP) seeks to appoint an Independent Power Producer (IPP) for the development, financing, ownership, construction, operation and maintenance of a Solar photovoltaic (PV) Facility (The Project). The PV Facility will supply energy on an exclusive basis to the AAP's Mogalakwena Mine in Limpopo, South Africa in terms of a Power Purchase Agreement with an operating Term of 25 years, as may be extended or amended in accordance with the terms of the PPA. The Project will not be transferred to AAP or its selected nominee on the expiry or early termination of the Term.

This IPP shall be chosen through a Request for Proposal (RfP) process, which is currently underway and nearing completion. The optimal Solar PV generation capacity shall be determined by the IPP based on their own calculations¹.

1.1. Objectives

The key objectives of the Project (in no particular order) are to:

- develop the market for platinum group metals through the commercial-scale use of environmentally-friendly hydrogen fuel cells;
- build Company experience and repeatable processes in preparation for the anticipated further installation of solar PV generation equipment near the Mine and, potentially, at other operations owned by the Company;
- empower a broader group of people and facilitate Local Community upliftment by ensuring appropriate Local Community participation through:
 - active participation and skills transfer;
 - shareholding;
 - job creation for Local Community members;
 - Local procurement; and
 - corporate social investment expenditure into projects for the Local Community.
- procure a cost-effective Project, that provides increased energy cost certainty over time; diversify the energy mix of the Mogalakwena Mine; and reduce the environmental impact of the Mogalakwena Mine¹.

¹Information provided by Zutari

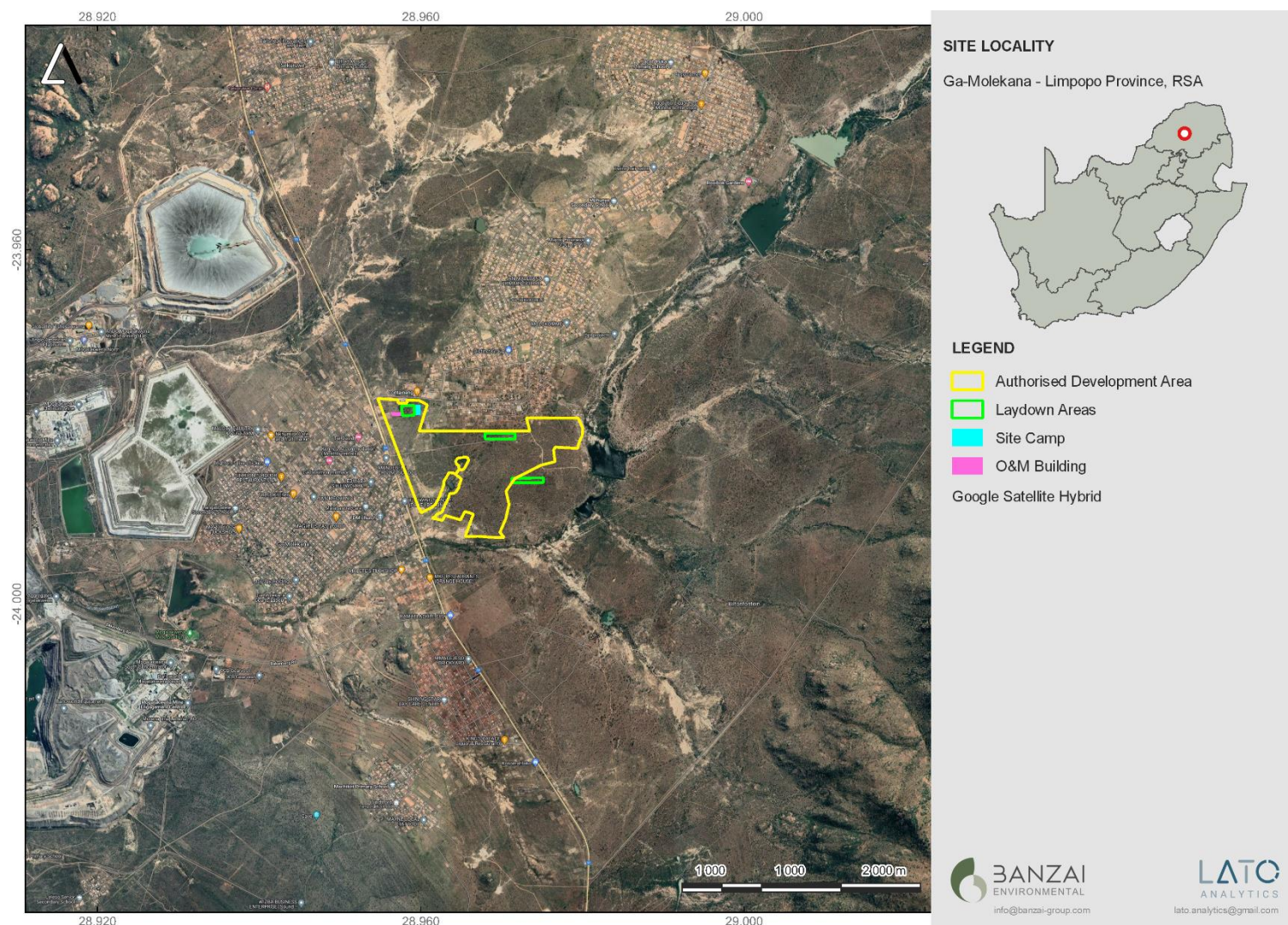


Figure 1 - Google Earth (2020) Image of the proposed Mogalakwena Solar PV Project in Limpopo, South Africa.

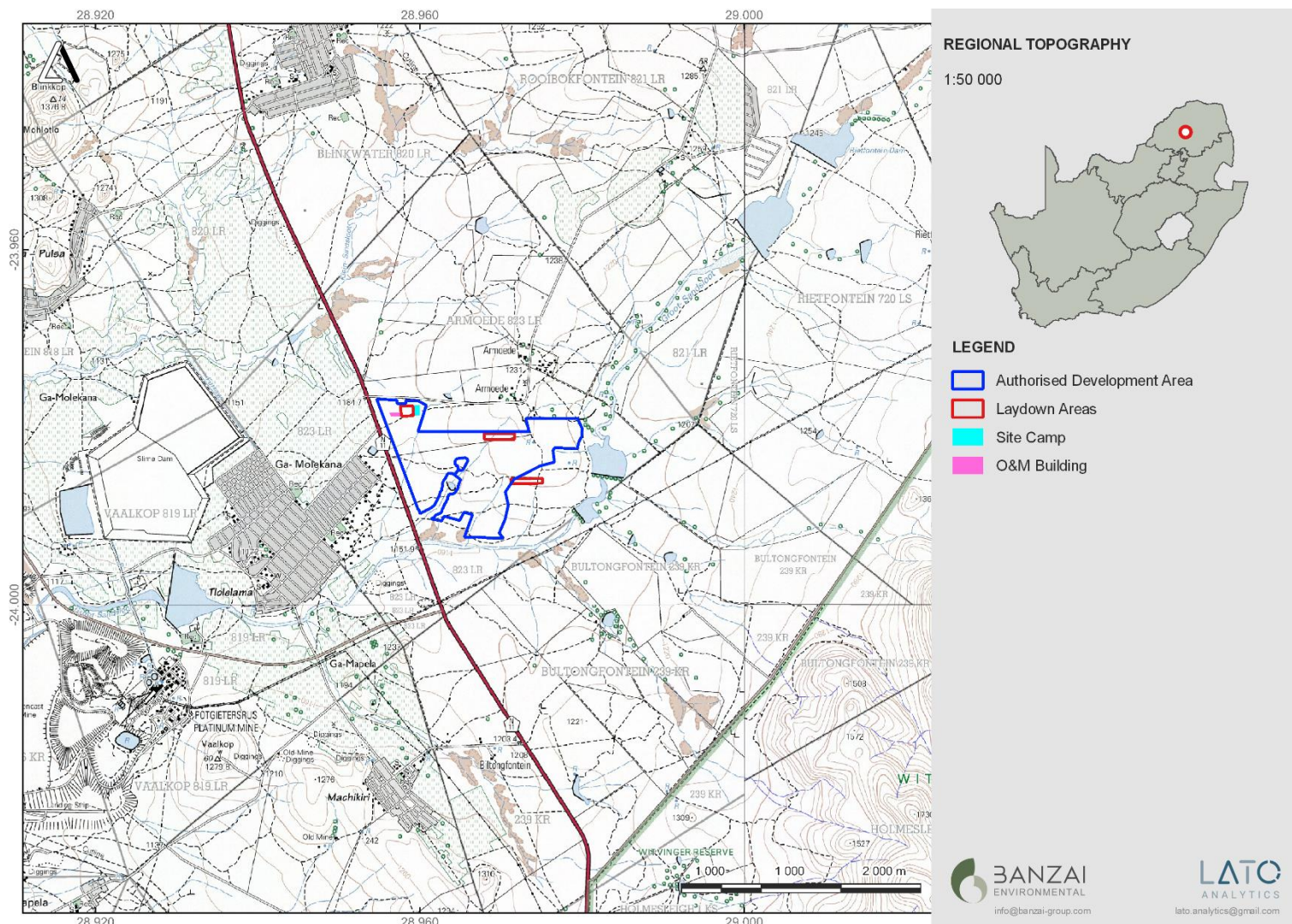


Figure 2 - Location of the proposed Mogalakwena Solar PV Project in Limpopo, South Africa.

2 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

This present study has been conducted by Mrs Elize Butler. She has conducted approximately 300 PIAs for developments in the Free State, KwaZulu-Natal, Eastern, Central, and Northern Cape, Northwest, Gauteng, Limpopo, and Mpumalanga Provinces. She has an MSc (*cum laude*) in Zoology (specializing in Palaeontology) from the University of the Free State, South Africa and has been working in Palaeontology for more than twenty-five years. She has experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the Karoo Basin. She has been a member of the Palaeontological Society of South Africa (PSSA) since 2006 and has been conducting PIAs since 2014.

3 LEGISLATION

3.1 National Heritage Resources Act (25 of 1999)

Cultural Heritage in South Africa, includes all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include **“all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens”**.

Palaeontological heritage is exceptional and non-renewable and is protected by the NHRA. Palaeontological resources and may not be unearthed, broken moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

This Palaeontological Impact assessment forms part of the Heritage Impact Assessment (HIA) and adhere to the conditions of the Act. According to **Section 38 (1)**, an HIA is required to assess any potential impacts to palaeontological heritage within the development footprint where:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- the construction of a bridge or similar structure exceeding 50 m in length;
- any development or other activity which will change the character of a site—
- (exceeding 5 000 m² in extent; or
- involving three or more existing erven or subdivisions thereof; or
- involving three or more erven or divisions thereof which have been consolidated within the past five years; or

- the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
- the re-zoning of a site exceeding 10 000 m² in extent;
- or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

4 OBJECTIVE

The aim of a PIA is to decrease the effect of the development on potential fossils at the development site.

According to the “SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports” the purpose of the PIA are: 1) to **identify** the palaeontological importance of the rock formations in the footprint; 2) to evaluate the palaeontological magnitude of the formations; 3) to determine the **impact** on fossil heritage; and 4) to **recommend** how the property developer should guard against and lessen damage to fossil heritage.

The terms of reference of a PIA are as follows:

General Requirements:

- Adherence to the content requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations 2014, as amended.
- Adherence to all applicable best practice recommendations, appropriate legislation and authority requirements.
- Submit a comprehensive overview of all appropriate legislation, guidelines.
- Description of the proposed project and provide information regarding the developer and consultant who commissioned the study.
- Description and location of the proposed development and provide geological and topographical maps.
- Provide Palaeontological and geological history of the affected area.
- Identification sensitive areas to be avoided (providing shapefiles/kml's) in the proposed development.
- Evaluation of the significance of the planned development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:
 - a. **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity.

- b. **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity.
- c. **Cumulative impacts** result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities.
 - Fair assessment of alternatives (infrastructure alternatives have been provided):
 - Recommend mitigation measures to minimise the impact of the proposed development; and

Implications of specialist findings for the proposed development (such as permits, licenses etc).

5 GEOLOGICAL AND PALAEONTOLOGICAL HISTORY

The proposed PV development is depicted on the 1: 250 000 2328 Pietersburg Geological Map (1985) while the transmission lines and corridors are shown on the 2428 Nylstroom (1978) Geological Map (Council for Geosciences, Pretoria). The proposed PV development is surrounded by rocks of the Rustenburg Layered Suite and Lebowa Granite Suite of the Bushveld Complex, while the proposed PV facility is underlain by the Hout River Gneiss Suite (Archaean Granitoid Intrusions) (**Figure 33**). According to the PalaeoMap on the South African Heritage Resources Information System database, the Palaeontological Sensitivity of the Houtriver Gneiss Suite (Archaean Granitoid Intrusions) is zero as they are igneous in origin and thus unfossiliferous (**Figure 4**; Almond and Pether 2008, SAHRIS website).

The Hout River Gneiss Suite is present in the north-eastern Kaapvaal craton and contain granitoid gneisses with various compositions. This Gneiss consists of coarse-grained metamorphic rock that is typically banded and is formed by regional high-grade metamorphism of granite. Alkali feldspar, amphiboles mica, quartz, and rarely pyroxenes forms large crystals in this gneiss (Robb et al, 2006).

South Africa produces more than half of the world's annual production of chromium, platinum, valadium and refractory minerals. These minerals are a result from an extraordinary body of igneous rocks, namely the Bushveld Complex. The Bushveld Complex consists of three different types of igneous rocks. The oldest is a series of volcanic rocks, followed by basaltic magma that did not reach the surface but instead formed an enormous underground chamber of approximately 400 x 300 km across the Limpopo, North West and Mpumulanga provinces reaching a maximum thickness of approximately 8 km. Lastly magma intruded above the basaltic body and crystallized as granite. The three components are known as the Rooiberg Group, Rustenburg Layered Suite and Lebowa Granite Suite, which together make up the Bushveld Complex.

The Rustenburg Layered Suite is Vaalian in age (2,100 – 1,920 Million years old) and consists of an igneous intrusion with anorthosite, hybrid gabbro, gabbro, diabase, epidiorite, pyroxenite, and norite rocks.

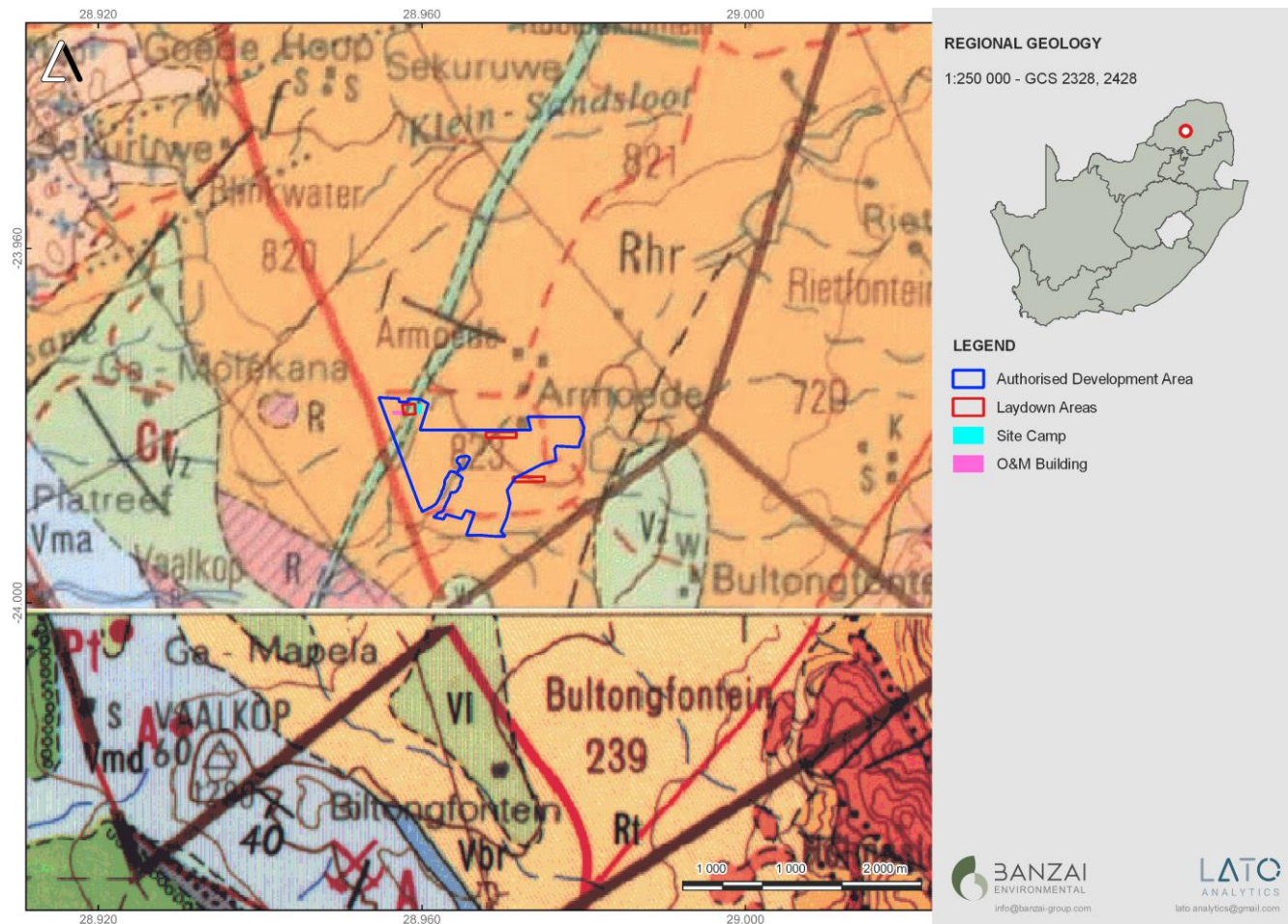


Figure 3 - Extract of the 1: 250 000 2428 Nylstroom (1978) Geological Map and 2328 Pietersburg Geological Map (1985) (Council for Geosciences, Pretoria). The proposed PV development is underlain by Archaean granitoid Intrusions.

Legend

FORMATION FORMASIE	(INCLUDING VOLCANIC ROCKS/INSLUITENDE VULKANIESE GESTEENTES)	LITHOLOGY/LITOLOGIE
QUATERNARY KWATERNÊR	Alluvium Alluvium	

LITHOLOGY/LITOLOGIE		
Mn	Coarse-grained grey to pink granite, in places red near top (---); Grofkorrelrige grys tot pienk graniet, plek-plek rooi naby top (---);	Nebo Granite Nebo-Graniet
Mr	Granophyre; quartz-feldspar porphyry, granophyre (---); Granofier; kwarts-veldspaatporfier, granofier (---);	LEBOWA GRANITE SUITE SUITE LEBOWAGRANIE
Vu	Ferrogabbro; troctolite, anorthosite (---); magnetitite layer (---); magnetitite pipe (---); Ferrogabbro; troktoliet, anortosit (---); magnetitietlaag (---); magnetitietyp (---);	RASHOOP GRANOPHYRE SUITE SUITE RASHOOPGRANOFIER
Vg	Gabbro, norite, anorthosite Gabbro, noriet, anortosit	Upper zone Bo-zone
Vc	Pyroxenite, porphyritic pyroxenite, anorthosite, leuconorite, melanorite; chromitite layer (---); Merensky Reef (---); platinum reef (---); Piroksieniet, porfiritiese piroksieniet, anortosit, leukonoriet, melanoriet; chromitietlaag (---); Merenskyrif (---); platinumrif (---);	Main zone Hoofzone
VI	Melanorite, pyroxenite, serpentized harzburgite, chromitite layer (---); Melanoriet, piroksieniet, geserpentiniseerde harzburgiet, chromitietlaag (---);	Critical zone Kritieke sone
Vgl	Quartz porphyry, altered lava Kwartsporfier, veranderde lawa	Lower zone Onderste sone
Vs	Porphyritic, spherulitic rhyolite and subordinate andesite, tuff, volcanic breccia and in places ignimbrite at top Porfiritiese, sferulitiese rioliet en ondergeskikte andesiet, tuf, vulkaniese braksie en plek-plek ignimbriet naby top	
Vk	Porphyritic, spherulitic and amygdaloidal rhyolite Porfiritiese, sferulitiese en amandelhoudende rioliet	

Vmt	Matlalagraniet Matlala Granite	Vs	Smitskraal- graniet Smitskraal Granite	Vpa	Palmetfontein- graniet Palmetfontein Granite
Vlg					
Vsy					
Vt	Turfloopgraniet Turfloop Granite	Vut		Vui	Uitloopgraniet Uitloop Granite
Rmo	Moletsigraniet Moletsi Granite	Rm		Vlu	Lunsklipgraniet Lunsklip Granite
Rhr	Houtriviergneis + Hout River Gneiss	Rh		R	
Za		Zms			

GROEP ROOIBERG ROOIBERG GROUP	Vr
GROEP PRETORIA PRETORIA GROUP	Vp
GROEP CHUNIESPOORT CHUNIESPOORT GROUP	Vma
Formasie Swartrif Black Reef Formation	Vb
GROEP WOLKBERG WOLKBERG GROUP	Vw

Q (yellow); Quaternary Superficial deposits; alluvium

Mn (red-orange)-Nebo Granite, Lebowa Granite Suite, Bushveld Complex; coarse grained grey to pink granite, in places red near the top

Vg (bright green)- Rustenburg Layered Suite, Bushveld complex; Gabbo, norite anorthosite

VI, (dull green) -Melanorite, pyroxenite serpentized harzburgite, chromitite layer

Rhr-(orange)- Hout River Gneiss

Vma, Malmani Subgroup, Chuniespoort Group, Transvaal Supergroup-dolomite, chert, limestone, chert breccia with interbedded shale, sandstone and quartzite

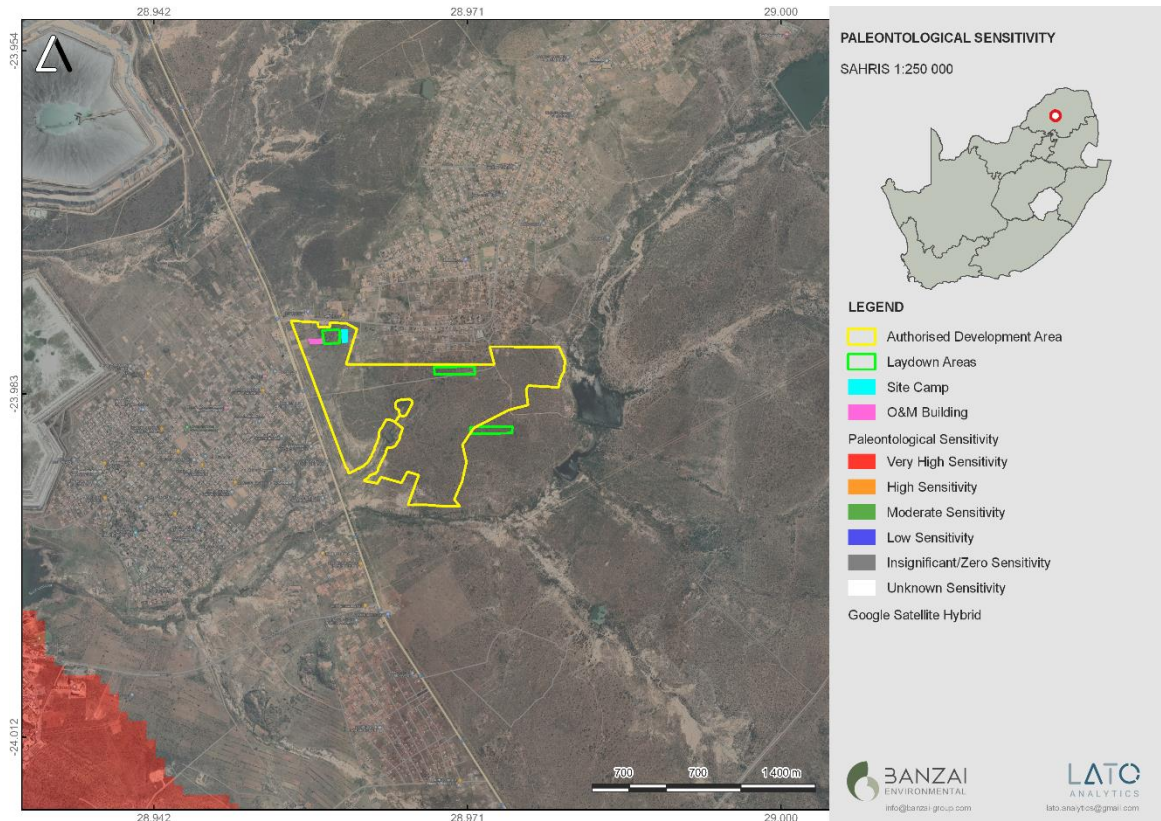


Figure 4 - Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the proposed development in brown.

Table 3 - SAHRIS Palaeosensitivity ratings table. The relevant sensitivities are highlighted

Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study; a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required

WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.
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According to the SAHRIS Palaeo Sensitivity map (Figure 4) there is a zero chance of finding fossils in the in the grey area, while there is a high chance of finding fossils in the red area. However, the igneous rocks of the Bushveld Complex would have baked fossils in this development footprint.

6 GEOGRAPHICAL LOCATION OF THE SITE

The Mogalakwena mine is situated on the N11 near Mokapane, while the PV Project Site is in close proximity to the substations at the Mine.

7 METHODS

The aim of a desktop study is to evaluate the risk to palaeontological heritage in the proposed development. This includes all trace fossils and fossils. All available information is consulted to compile a desktop study and includes: PIA reports in the same area; aerial photos and Google Earth images, topographical as well as geological maps.

7.1 Assumptions and Limitations

When conducting a PIA several factors can affect the accuracy of the assessment. The focal point of geological maps is the geology of the area and the sheet explanations were not meant to focus on palaeontological heritage. Many inaccessible regions of South Africa have not been reviewed by palaeontologists and data is generally based on aerial photographs. Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented.

Comparable Assemblage Zones in other areas is used to provide information on the existence of fossils in an area that was not yet been documented. When similar Assemblage Zones and geological formations for Desktop studies is used it is generally **assumed** that exposed fossil heritage is present within the footprint.

8 ADDITIONAL INFORMATION CONSULTED

In compiling this report the following sources were consulted:

- Geological map 1:100 000, Geology of the Republic of South Africa (Visser 1984)
- 1: 250 000 2328 Pietersburg Geological Map (1985)
- 1: 250 000 2428 Nylstroom (1978) Geological Map (Council for Geosciences, Pretoria)

- A Google Earth map with polygons of the proposed development was obtained from PGS Consultants.

9 IMPACT ASSESSMENT METHODOLOGY

Impacts on Palaeontological Heritage are only likely to happen within **the construction phase**. No impacts are expected to occur during the operation phase or decommissioning phase.

Impact	Loss of Fossil Heritage			
Description of impact	Construction will possibly damage and destroy fossil heritage			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	Removal of fossil Heritage			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Negligible	Natural and/ or social functions and/ or processes are negligibly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Highly unlikely / none	Expected never to happen	Highly unlikely / none	Expected never to happen
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Negligible - negative		Negligible - positive	
Comment on significance	The Palaeontological significance is negligible and thus the project may be authorised to its whole extent			
Cumulative impacts	Low as the surrounding environment is not known for its fossil heritage			

10 FINDINGS AND RECOMMENDATIONS

The proposed PV development is surrounded by rocks of the Rustenburg Layered Suite and Lebowa Granite Suite of the Bushveld Complex, while the proposed PV facility is underlain by the Hout River Gneiss Suite (Archaean Granitoid Intrusions). According to the PalaeoMap on the South African Heritage Resources Information System database, the Palaeontological Sensitivity of the Hout River Gneiss Suite (Archaean Granitoid Intrusions) is zero as they are igneous in origin and thus unfossiliferous (Almond and Pether 2008, SAHRIS website)..

It is therefore considered that the construction and operation of the proposed Mogalakwena Solar PV Project, Limpopo Province is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources.

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ELIZE BUTLER

PROFESSION: Palaeontologist

YEARS' EXPERIENCE: 30 years in Palaeontology

EDUCATION: B.Sc Botany and Zoology, 1988
University of the Orange Free State

B.Sc (Hons) Zoology, 1991
University of the Orange Free State

Management Course, 1991
University of the Orange Free State

M. Sc. *Cum laude* (Zoology), 2009
University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

MEMBERSHIP

Palaeontological Society of South Africa (PSSA) 2006-currently

EMPLOYMENT HISTORY

Part time Laboratory assistant Department of Zoology & Entomology
University of the Free State Zoology
1989-1992

Part time laboratory assistant Department of Virology
University of the Free State Zoology
1992

Research Assistant National Museum, Bloemfontein 1993 –
1997

Principal Research Assistant National Museum, Bloemfontein
and Collection Manager 1998–2022

TECHNICAL REPORTS

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- E. Butler. 2019.** Palaeontological Impact Assessment of the proposed new Township Development, Lethabo Park, on Remainder of Farm Roodepan No 70, Erf 17725 And Erf 15089, Roodepan Kimberley, Sol Plaatjies Local Municipality, Frances Baard District Municipality, Northern Cape
- E. Butler. 2019.** Palaeontological Protocol for Finds for the proposed 16m WH Battery Storage System in Steinkopf, Northern Cape Province
- E. Butler. 2019.** Palaeontological Exemption Letter of the proposed 4.5WH Battery Storage System near Midway-Pofadder, Northern Cape Province
- E. Butler. 2019.** Palaeontological Exemption Letter of the proposed 2.5ml Process Water Reservoir at Gloria Mine, Black Rock, Hotazel, Northern Cape
- E. Butler. 2019.** Palaeontological Desktop Assessment for the Establishment of a Super Fines Storage Facility at Gloria Mine, Black Rock Mine Operations, Hotazel, Northern Cape:
- E. Butler. 2019.** Palaeontological Desktop Assessment for the Proposed New Railway Bridge, and Rail Line Between Hotazel And The Gloria Mine, Northern Cape Province

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- E. Butler.** 2019. Palaeontological Desktop Assessment for the Proposed Environmental Authorisation and Amendment Processes for Elandsfontein Colliery.
- E. Butler.** 2019. Palaeontological Impact Assessment and Protocol for Finds of a Proposed New Quarry on Portion 9 (of 6) of the farm Mimosa Glen 885, Bloemfontein, Free State Province
- E. Butler.** 2019. Palaeontological Impact Assessment and Protocol for Finds of a proposed development on Portion 9 and 10 of the Farm Mimosa Glen 885, Bloemfontein, Free State Province
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