



PALAEONTOLOGICAL IMPACT ASSESSMENT

ZIBULO COLLIERY 132 KV POWERLINE
AND SUBSTATION PROJECT

August 2023

COMPILED FOR: PGS Heritage



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:

Banzai Environmental (Pty) Ltd

CONTACT PERSON:

Elize Butler

Tel: +27 844478759

Email: info@banzai-group.com

SIGNATURE:



This Palaeontological Impact Assessment 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
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 -Methods and TOR
(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, 8 and 10
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 4 -Methods and TOR
(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 alternative;	Section 1 and 10
(g) An identification of any areas to be avoided, including buffers	Section 5



Table 1: NEMA Table	
Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report
	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 including areas to be avoided, including buffers;	Section 5 – Geological and Palaeontological history
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 4.1 – 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	Section 11
(l) Any conditions for inclusion in the environmental authorisation	Section 1 and 10
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 1 and 10
(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
(p) A summary and copies if any comments that were received during any consultation process	N/A



Table 1: NEMA Table	
Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report
(q) Any other information requested by the competent authority.	N/A
(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

PGS Heritage commissioned Banzai Environmental to conduct the Palaeontological Impact Assessment (PIA) for the proposed Zibulo Colliery 132KV Powerline and Substation project located in the City of eMalahleni Metropolitan Municipality, Nkangala District Municipality, Mpumalanga Province. This PIA is required to confirm if fossil material could potentially be present in the approved development area and to evaluate the potential impact of the proposed changes to the development on the Palaeontological Heritage under the National Environmental Management Act 107 of 1998 (NEMA) and to comply with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA).

The Vryheid Formation (Ecca Group, Karoo Supergroup) and Jurassic dolerite underpin the proposed Powerline Project. According to the South African Heritage Resources Information System (SAHRIS), the Palaeontological Sensitivity of the Vryheid Formation (Ecca Group) is Very High, whereas that of Karoo Dolerite is Zero because it is igneous in origin and thus unfossiliferous (Almond et al, 2013; SAHRIS website).

On 18 August, 2023, a site-specific field survey of the development footprint was done both on foot and by car. There were no fossiliferous outcrops found in the area where construction is planned. According to the site investigation and desktop research, fossil heritage of scientific and conservation relevance is rather uncommon in the total development footprint. In contrast, the SAHRIS Palaeosensitivity Map and DFFE Screening Tool assigned a Very High Sensitivity to the development region. **A Medium Palaeontological value has been assigned to the PV development construction phase prior to mitigation and a Low value after mitigation. The construction phase will be the only development phase that will have an influence on Palaeontological Heritage, with no significant impacts projected during the operational or decommissioning stages.**

Because the No-Go Alternative evaluates the alternative of 'doing nothing' and maintaining the *status quo*, it will have a Neutral influence on the development's Palaeontological Heritage. **The cumulative impact of the development are medium pre-mitigation and low post-mitigation, which are within the project's allowable limits.** As a result, it is anticipated that the projected development will not have a negative influence on the area's palaeontological resources.

As the development footprint is not considered sensitive in terms of palaeontological resources, construction of the development may thus be approved in its entirety. It is thus suggested that no additional palaeontological heritage research, ground truthing, or specialised mitigation be undertaken until new found fossils are identified.



If fossil remains are discovered during any phase of construction, whether on the surface or revealed through excavations, the Environmental Control Officer (ECO) in charge of these activities is required to follow the Chance Find Procedure as contained in the Generic EMPR as it is adequate to mitigate the impact.

Therefore, it is advised that no additional palaeontological heritage studies, fieldwork, or expert mitigation are needed until fossils are found.



TABLE OF CONTENT

1	INTRODUCTION.....	1
1.1	Project Description	1
2	QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR	5
3	LEGISLATION	5
4	METHODS AND TERMS OF REFERENCE	7
4.1	Assumptions and Limitations	8
5	GEOLOGICAL AND PALAEOLOGICAL HISTORY	9
6	GEOGRAPHICAL LOCATION OF THE SITE.....	18
7	ADDITIONAL INFORMATION CONSULTED	18
8	SITE VISIT	18
9	IMPACT ASSESSMENT METHODOLOGY	22
9.1	Method of Environmental Assessment	22
10	FINDINGS AND RECOMMENDATIONS.....	24
11	BIBLIOGRAPHY	25



LIST OF FIGURES

Figure 1: Regional locality of the proposed 132 kV Thungela Zibulo PL in Mpumalanga Province. **Error! Bookmark not defined.**

Figure 2: Locality of the proposed 132 KV Thungela Zibulo PL in Mpumalanga Province. 4

Figure 3: Extract of the 1:250 000 East-Rand 2628 (1986) Geological Map (Council for Geosciences, Pretoria) indicates that the study area is underlain by the Vryheid Formation (Ecca Group) (Pv, khaki) with small areas of Jurassic dolerite (Jd, red). 11

Figure 4: Extract of the SAHRIS PalaeoMap map (Council of Geosciences) indicates that the study area is underlain by sediments with a Very High (red) and Zero (grey) Palaeontological Sensitivity. 13

Figure 5: Palaeontological Sensitivity generated by the National Environmental Web-Based Screening indicating the Very High Palaeontological Sensitivity of the proposed development, while areas with a Medium Sensitivity also underlies the study area. 15

Figure 6: Updated Geology (Council of Geosciences, Pretoria) indicates that the study area is largely underlain by the Vryheid Formation (Pv, Ecca Group, Karoo Supergroup) with small patches of the Karoo Dolerite Suite (Jd). **Error! Bookmark not defined.**

Figure 7: Examples of Glossopteris leaves (Prevec et al 2009). 17

Figure 8: Mesosaurus sp. National Museum specimen NMQR3536 17

Figure 9: General view over the northern margin of the proposed PL development. 19

Figure 10: General view over the middle portion of the proposed PL development. 20

Figure 11: General view over the southern portion of the proposed PL development. 21

LIST OF TABLES

Table 1: NEMA Tableiv

Table 2: Legend to the East-Rand 2626 (1986) Geological Map (Council for Geosciences, Pretoria). 12

Table 3: Palaeontological Sensitivity indicated by the SAHRIS PalaeoMap (Almond et al, 2013; SAHRIS website 13

Table 4: The rating system **Error! Bookmark not defined.**

Table 5: Summary of Impact Tables 23

Appendix A: CV

GLOSSARY OF TERMS

Fossil



Mineralized bones of vertebrate and invertebrate animals, as well as plants. A trace fossil is the traces of animals/plants preserved in stone.

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.

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 comprises of fossilised remains or traces of past life.



LIST OF ABBREVIATIONS

BA	Basic Assessment
DEA	Department of Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
CA	National Competent Authority
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EMPr	Environmental Management Programme
ESO	Environmental Site Officer
HIA	Heritage Impact Assessment
Ma	Millions of years ago
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PIA	Palaeontological Impact Assessment
PL	Powerline
PSSA	Palaeontological Society of South Africa
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
S&EIA	Scoping & Environmental Impact Assessment
ToR	Terms of Reference



1 INTRODUCTION

Anglo American Inyosi Coal PTY LTD (the Applicant) has appointed Environmental Impact Management Services (EIMS) as the Environmental Assessment Practitioner (EAP) to assist with undertaking the necessary authorisation processes, including compiling the necessary reports and undertaking the statutory consultation processes, in support of the proposed project.

The proposed project and activity are proposed to be undertaken at the following location:

- Property Description: The proposed 125m powerline corridor is located on the following farms and portions: Leeuwfontein 219 (Portions: 0 RE, 12, 13, 21, 24, 35); Olga 35 (Portion 0 RE); Rietvlei 64 (Portion: 0 RE, 1, 4, 7); Smithfield 44 (Portions: 1, 2, 3, 4, 5); Zondagsfontein 253 (Portions: 0 RE, 3, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15).
- Central Co-ordinates:
 - Cologne Substation - 26° 7'24.26"S, 28°59'46.03"E.
 - Modiri Substation - 26°12'11.37"S, 29° 1'17.01"E.
 - Zibulo North Shaft Substation - 26° 8'56.88"S, 28°57'22.38"E.
- Physical Address: Zibulo North Shaft.
- Regional Description:
 - District Municipality: Nkangala.
 - Local Municipality: Victor Khanye and Emalahleni.
 - Province: Mpumalanga Province.
- Closest town or point of interest: Zibulo North Shaft entrance is located at 26° 8' 55.0" S, 28° 57' 10.32" E, approximately 6.6 km south of Kendal Power Station and approximately 14.5 km Southwest of Ogies.
- The entirety of the proposed powerline project falls within the Electrical Generation Infrastructure (EGI) International Corridor as defined in the Department of Forestry, Fisheries and Environment, 2022 Standard for the Development and Expansion of Power Lines and Substations within identified Geographical Areas (Revision 2).

1.1 Project Description

Zibulo North Shaft requires a 20MVA electricity supply for the mining operations by 2025. The following assets will be established for the supply:



- A new Zibulo North Shaft 132/11kV 2x20MVA Substation for the Zibulo North Shaft Point of Supply (POS). 2x20MVA TRFR's will be installed in phase 1 with an open TRFR bay for the installation of the third TRFR in 2032 should it be required.
- Establish 132kV Feeder Bay at the existing Cologne Substation.
- Build 7km (option 1 & 2) Kingbird 132kV line from Cologne Substation to Zibulo North Shaft Substation.
- Establish 132kV Feeder Bay at the existing Modiri Substation.
- Build 10.5km (option 1) or 15km (option 2) Kingbird 132kV line from Modiri Substation to the Zibulo North Shaft Substation. The route options will be assessed during the course of this environmental application process.

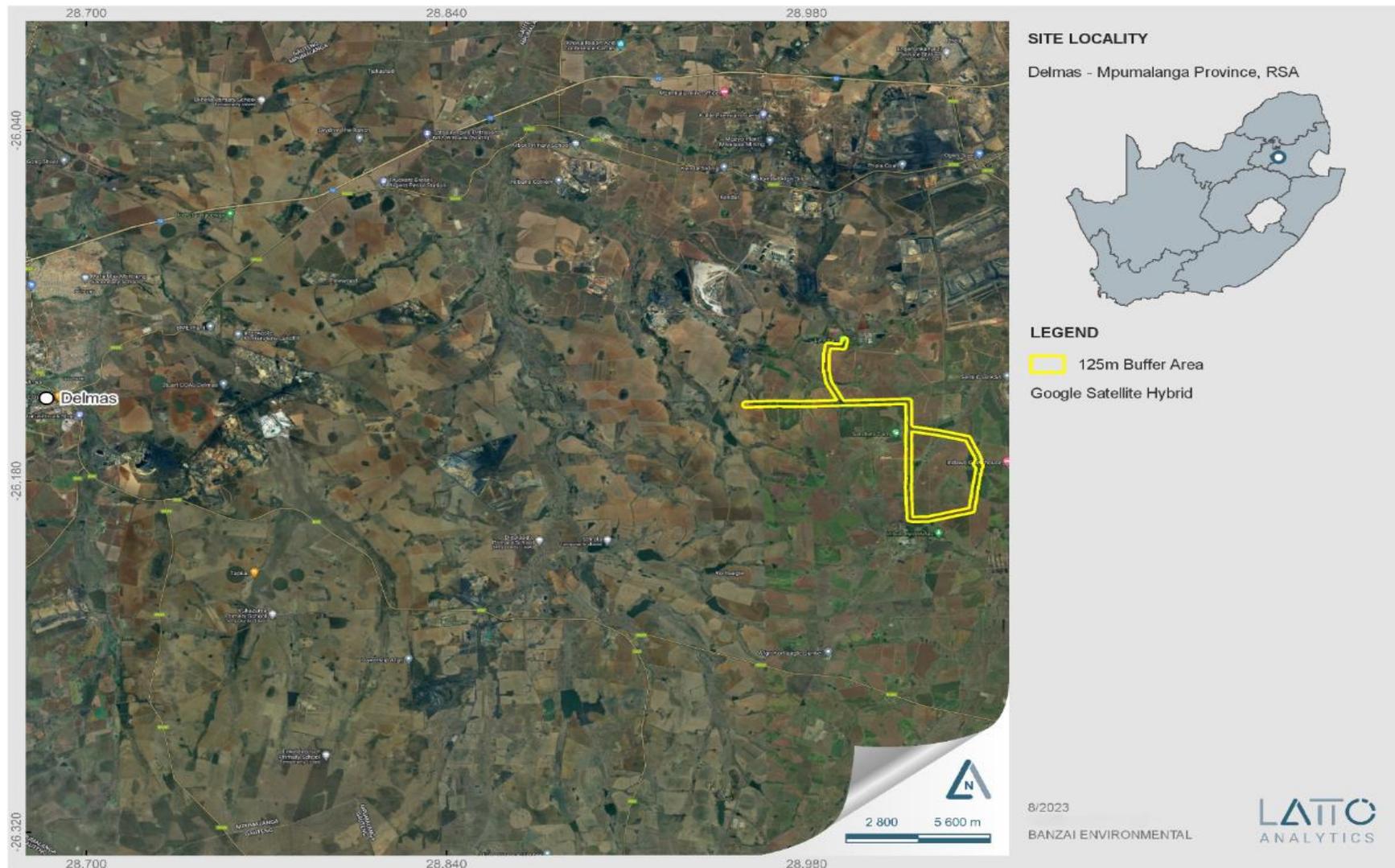


Figure 1: Regional locality of the proposed 132 kV Zibulo PL in Mpumalanga Province.

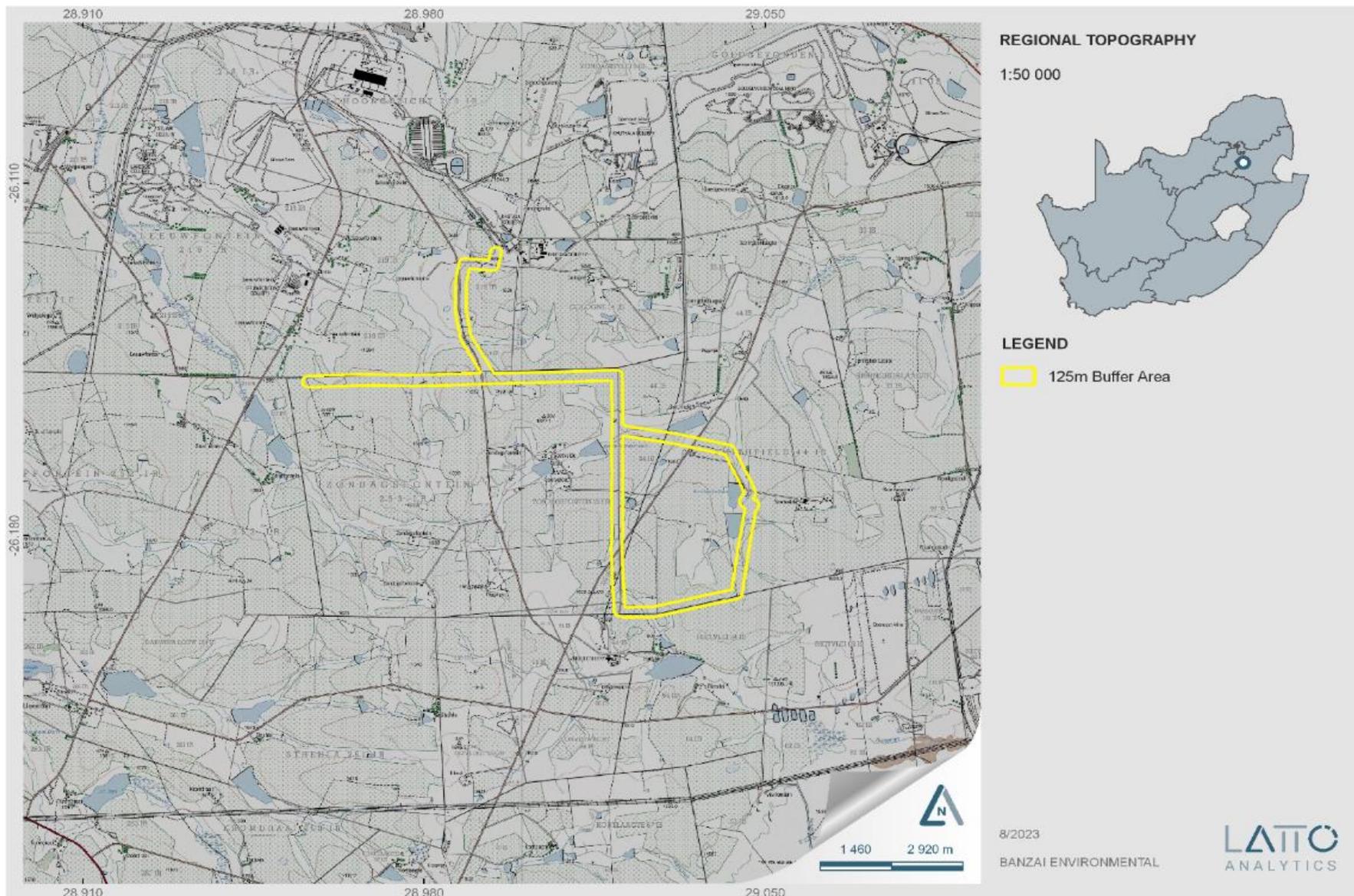


Figure 2: Locality of the proposed 132 KV Zibulo PL in Mpumalanga Province.



2 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Mrs. Elize Butler conducted the current study. For developments in the Free State, KwaZulu-Natal, Eastern, Central, and Northern Cape, Northwest, Gauteng, Limpopo, and Mpumalanga, she has completed almost 300 palaeontological impact assessments. She has an MSc (*cum laude*) in Zoology with a focus in Palaeontology from the University of the Free State in South Africa, and she has more than 30 years of experience in the field. She has knowledge of finding, collecting, and curating fossils. She began conducting PIAs in 2014 and has been a member of the Palaeontological Society of South Africa (PSSA) since 2006.

3 LEGISLATION

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”**.

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

- National Environmental Management Act (NEMA) Act 107 of 1998
- National Heritage Resources Act (NHRA) Act 25 of 1999
- Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified.

The next section in each Act is directly applicable to the identification, assessment, and evaluation of cultural heritage resources.

GNR 982 (Government Gazette 38282, 14 December 2014) promulgated under the National Environmental Management Act (NEMA) Act 107 of 1998

- Basic Assessment Report (BAR) – Regulations 19 and 23
- Environmental Impacts Assessment (EIA) – Regulation 23
- Environmental Scoping Report (ESR) – Regulation 21
- Environmental Management Programme (EMPr) – Regulations 19 and 23

National Heritage Resources Act (NHRA) Act 25 of 1999

- Protection of Heritage Resources – Sections 34 to 36
- Heritage Resources Management – Section 38



MPRDA Regulations of 2014

Environmental reports to be compiled for application of mining right – Regulation 48

- Contents of scoping report – Regulation 49
- Contents of environmental impact assessment report – Regulation 50
- Environmental management programme – Regulation 51
- Environmental management plan – Regulation 52

The NEMA (No 107 of 1998) states that an integrated EMP should (23:2 (b)) “...*identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage*”.

In agreement with legislative requirements, EIA rating standards as well as SAHRA policies the following comprehensive and legally compatible PIA report have been compiled.

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 METHODS AND TERMS OF REFERENCE

This PIA assesses the development's potential impact on the fossil heritage. This Palaeontological Assessment is part of the HIA Report. The PIA's goals are to: 1) identify the palaeontological significance of the rock formations in the footprint; 2) evaluate the palaeontological magnitude of the formations; 3) clarify the impact on fossil heritage; and 4) make recommendations for how the developer might protect and minimize potential harm to fossil heritage, according to the "SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports".

Calculations of the palaeontological state of each rock segment and the potential impact of development on fossil history take into account the palaeontological status of the rocks, the type of development, and the amount of bedrock removed.

The Provisional DFFE Screening Tool, the SAHRIS Palaeosensitivity map, all Palaeontological Impact Assessment reports for the same area, Google Earth images, topographical and geological maps, as well as academic articles about specimens from the development area and Assemblage Zones, are all used to create scoping reports.

When the development footprint has a moderate to high palaeontological sensitivity, a field-based assessment is necessary. A desktop or field assessment of the exposed rock is used to evaluate the significance of the proposed development's impact, and recommendations for more research or mitigation are made. Excavations for the project often only take place during the building phase, changing the terrain and destroying or permanently encasing fossils at or below the ground surface. Then, access to Fossil Heritage will no longer be available for academic study.

When doing a site investigation, a palaeontologist examines the local development as well as the quantity and variety of fossils found there. This can be demonstrated by looking at representative fossiliferous rock exposures (most igneous and metamorphic rocks are not fossiliferous, whereas sedimentary rocks contain fossil heritage). Examined rock exposures frequently contain a sizeable portion of the stratigraphic unit, which is primarily made up of recently exposed (unweathered) rock. These exposures may be man-made (such as quarries, open building excavations, even railway and road cuttings) or natural (such as cliffs, and dongas as well as rocky outcrops along stream or river banks). It is usual practice for palaeontologists to record well-preserved fossils (GPS, and stratigraphic data) during field assessment examinations.

Although mitigation is often done prior to construction, it may take place if potentially fossiliferous bedrock is revealed. Fossil collection and documentation are examples of mitigation. A permit from SAHRA must be obtained before beginning any fossil excavation, and the material must be stored at an



authorized facility. When mitigation is properly used, it is possible to have a positive impact by raising awareness of the palaeontological past of the area.

By physically evaluating bedrock outcrops to determine their lithology and fossil richness and crisscrossing the development footprint, one can assess an area's fossil potential. Because the presence of fossils at the surface is so unexpected, an average sample size of the region is investigated. To be clear, however, the lack of fossils in a development footprint does not automatically suggest that there is no palaeontologically important material present on the site (on or below the ground surface).

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;
- Describe of the proposed project and provide information regarding the developer and consultant who commissioned the study;
- Describe location of the proposed development and provide geological and topographical maps
- Provide palaeontological and geological history of the affected area;
- Identify sensitive areas to be avoided (providing shapefiles/kmls) in the proposed development;
- Evaluate 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** are impacts that 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
- Detail the implications of specialist findings for the proposed development (such as permits, licenses etc).

4.1 Assumptions and Limitations



The geology of the area is the focal point of geological maps, and the sheet explanations of the Geological Maps were not intended to focus on palaeontological heritage. Many inaccessible areas of South Africa have never been examined by palaeontologists, and data is typically dependent solely on aerial pictures. Locality and geological information in museums and university databases is out of date, and data acquired in the past is not always adequately documented.

Comparable Assemblage Zones in other places are also used to provide information on the existence of fossils in areas that have not before been recorded. When similar Assemblage Zones and geological formations are used for Desktop studies, it is commonly assumed that exposed fossil exists within the footprint. As a result, a field assessment will improve the accuracy of the desktop evaluation.

5 GEOLOGICAL AND PALAEOONTOLOGICAL HISTORY

The geology of the proposed Zibulo PL in Mpumalanga is depicted on the 1: 250 000 **East-Rand 2628** (1986) Geological Map (Council for Geosciences, Pretoria) (**Figure 3; Table 2**). The study area is underlain by the Vryheid Formation (Ecca Group) (Pv, khaki) with small areas of Jurassic dolerite (Jd, red). The PalaeoMap of the South African Heritage Resources Information System (SAHRIS) indicates that the the Palaeontological Sensitivity of the Vryheid Formation (Ecca Group, Karoo Supergroup) is Very High, while that of Jurassic dolerite is Zero (**Figure 4, Table 3**) (Almond *et al*, 2013; SAHRIS website). The suggested location is classified as having a Very High Palaeontology Theme Sensitivity in the DEA Screening Report, as seen in **Figure 5**. Updated geology (Council for Geosciences, Pretoria) corresponds with that in the 1986 Geological Map (**Figure 6**).

The Karoo igneous province is a classic continental basalt (CFB) province of the world. This province is made up of intrusive and extrusive rocks that are spread across a broad area (Duncan *et al*, 2006). Flood basalts, in general, do not contribute to notable volcanic structures, but rather are generated by successive eruptions from a set of fissures that form sub-horizontal lava flows (sills and dykes) of different thickness. This lava has capped the landscape where they erupted. Because the Karoo is an old flood basalt province, it has been preserved as erosional shards of a larger lava cap that formerly covered most of southern Africa. The Karoo lava outcrop is believed to encompass at least 140 000 km², but it was greater in the past [2 000 000 km² (Cox 1970, 1972)].

The Karoo Igneous Province is rich in flood basalts as well as silicic volcanic rocks. These units, which are made up of rhyodacite and rhyolitic magma, appear along the Lebombo monocline. Individual units can span up to 60 km and exhibit large pyroclastic structures, classifying them as rheoignimbrites. The base lavas are conformable to the Clarens Formation, however sandstone erosion occurred prior to the volcanic eruptions in some locations. Lock *et al.* (1974) discovered evidence in the Eastern Cape that magma interacted with ground water to form volcanoclastic deposits as well as phreatic and phreatomagmatic diatremes during the early stages of volcanism. Eales *et al.* (1984) discovered pillow lavas and related hyaloclastite breccias, as well as thin lenses of fluviatile sandstones interbedded with the lowermost magmas, as evidence of aquatic environments during early volcanism.



The Vryheid Formation is known to have a diverse assemblage of Glossopteris flora (spathulate, reticulate-veined leaves), which is the Vryheid Formation's source vegetation. After continental deglaciation, Gymnospermous glossopterids (**Figure 7**) dominated the peat and non-peat substrates of Permian wetlands (Falcon, 1986c, Greb et al., 2006).

Adendorff (2005), Bordy and Prevec (2008), Prevec et al. (2008, 2009, 2010), and Prevec (2011) are examples of recent palaeobotanical studies. Bamford (2011) has described numerous plant fossils from this formation (e.g., Azaniodendron fertile, Cyclodendron leslii, Sphenophyllum hammanskraalensis, Annularia sp., Raniganjia sp., Asterotheca spp., Liknopetalon enigmata, Hirsutum sp., Scutum sp., Ottokaria sp., Estcourtia sp., Arberia sp., Lidgetonnia sp., Noeggerathiopsis sp., Podocarpidites sp as well as more than 20 Glossopteris species. Palynological investigations on the coal-bearing successions of the Vryheid Formation have previously included publications by Aitken (1993, 1994, 1998) and Millstead (1994, 1999), with more recent studies undertaken by Götz and Ruckwied, (2014).

According to Bamford (2011), just a little amount of data on these possibly fossiliferous deposits has been published, and that good material is most likely present around coal mines whereas exposures are poor and of little interest in other regions. Plant fossils are frequently numerous when they do appear. Bamford believes that while it is not possible to preserve all fossiliferous sites, they should be adequately documented and explored in the interests of science. Fossils must be stored in an accredited institution (e.g., Iziko Museum, Ditsong Museum, Wits Evolutionary Studies Institute (ESI), Grahamstown Museum, National Museum Bloemfontein).

No fossil vertebrates have been found in the Vryheid formation to date. Fossil insects are uncommon, although palynomorphs are diverse. This deposit has also yielded non-marine bivalves and fish scales. Trace fossils are abundant, but their diversity is limited. Mesosaurus (**Figure 8**) is a mesosaurid lizard that has been found in the southern regions of the basin but may potentially be found in other places of the Vryheid formation. Although fossils are uncommon in this biozone, a single fossil may be scientifically significant because numerous fossil taxa are known from a single specimen.

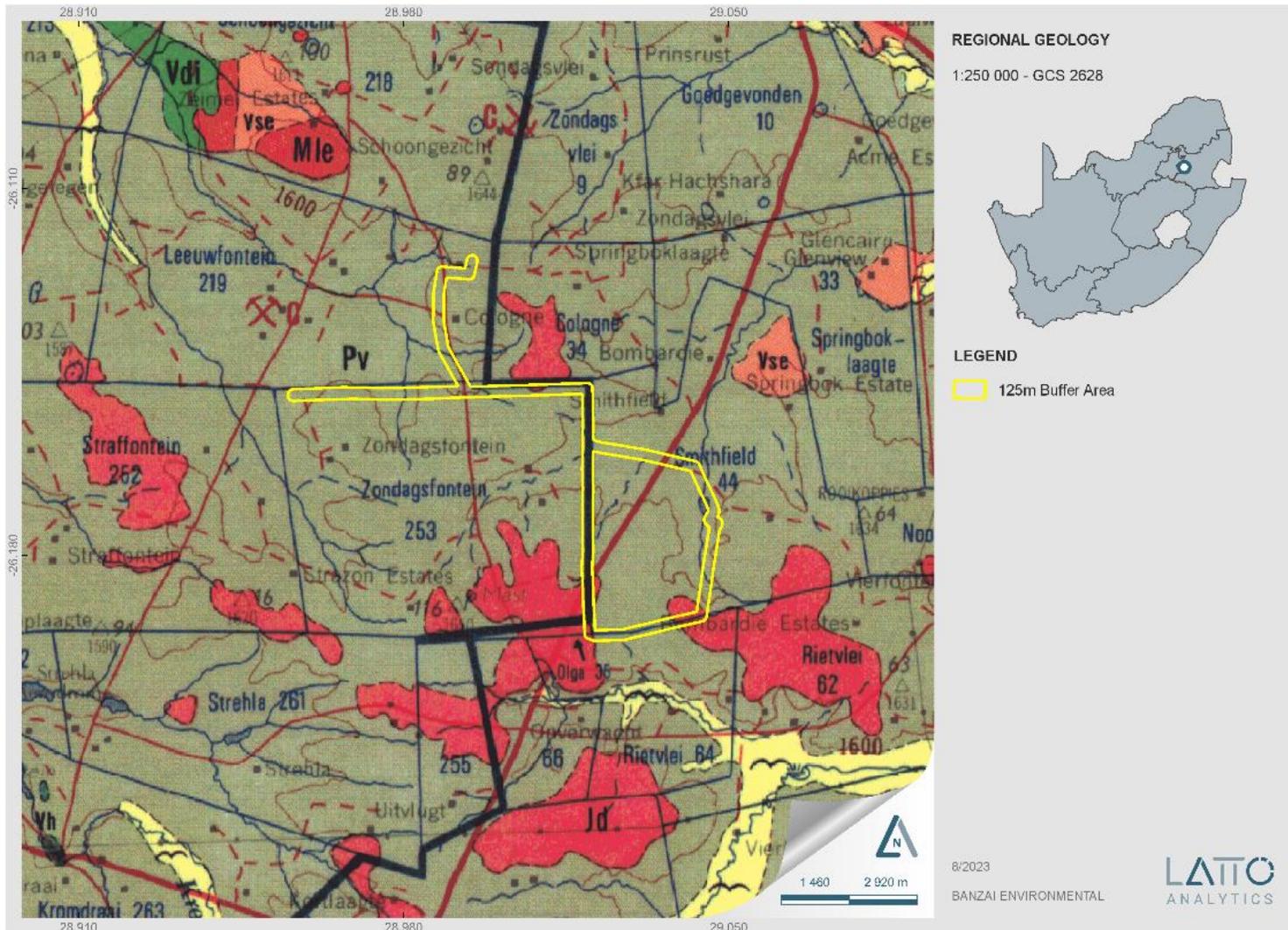
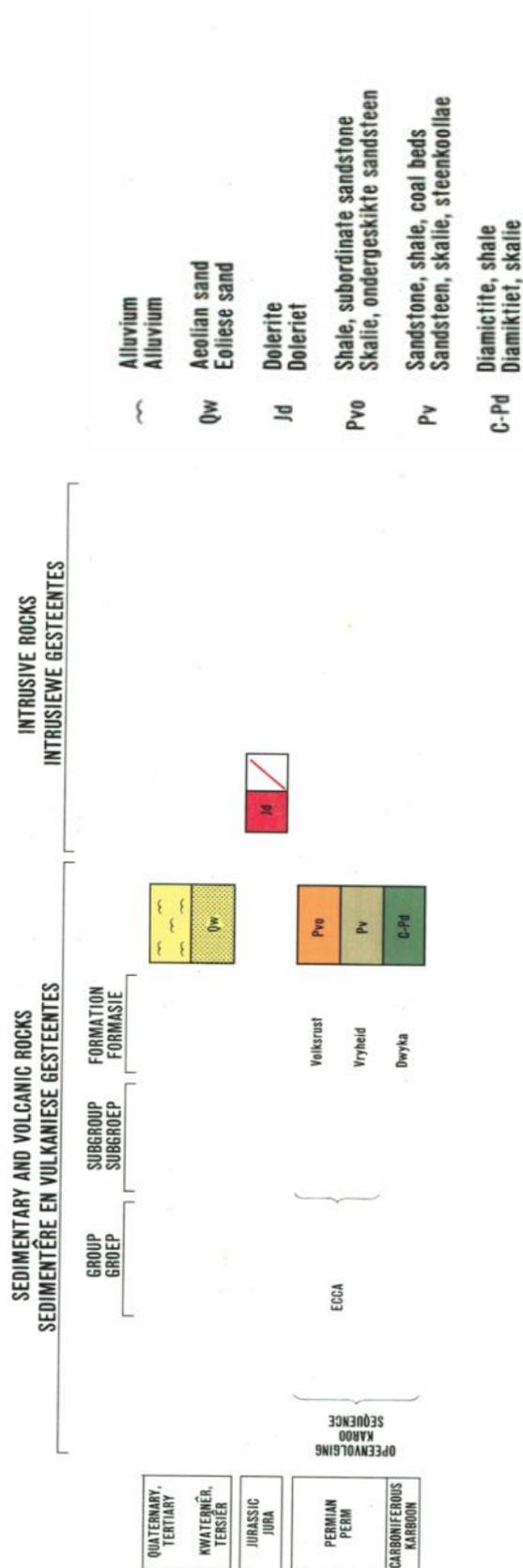


Figure 3: Extract of the 1:250 000 East-Rand 2628 (1986) Geological Map (Council for Geosciences, Pretoria) indicates that the study area is underlain by the Vryheid Formation (Ecca Group) (Pv, khaki) with small areas of Jurassic dolerite (Jd, red).



Table 2: Legend to the East-Rand 2626 (1986) Geological Map (Council for Geosciences, Pretoria).



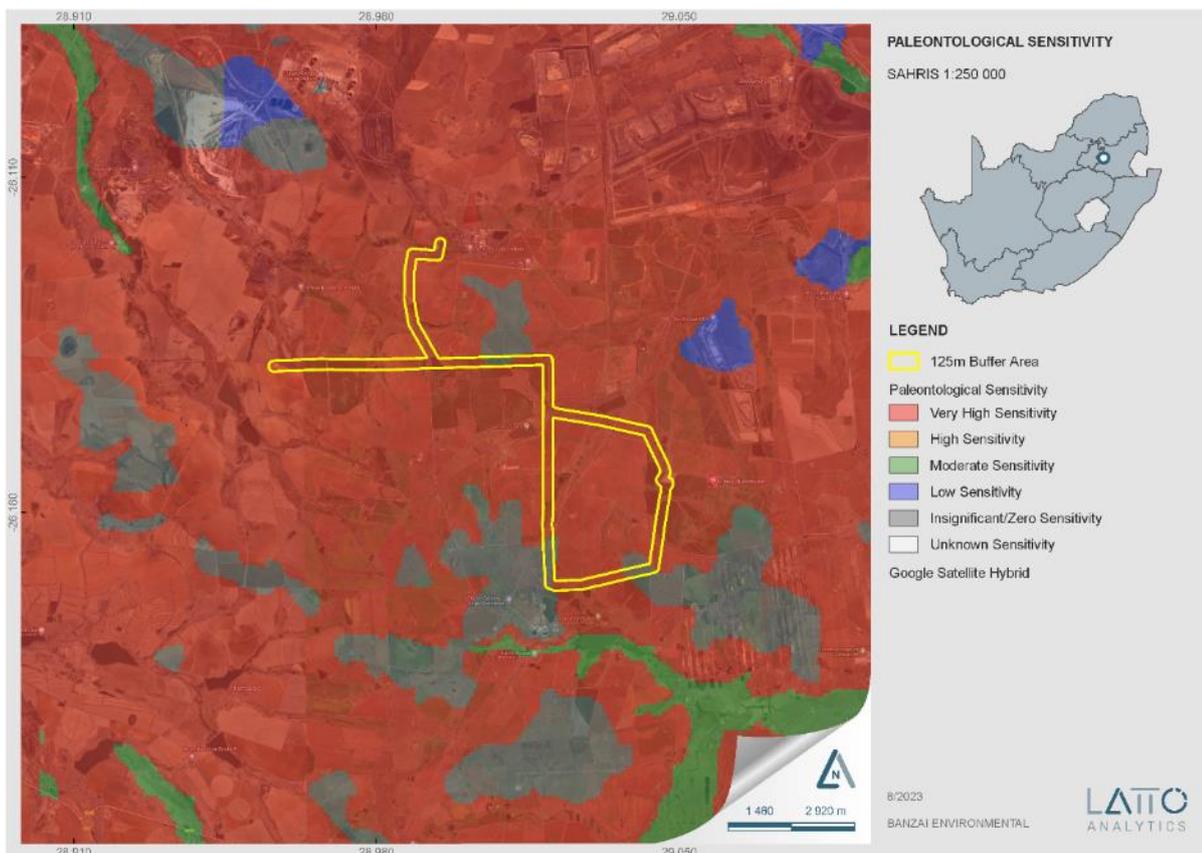


Figure 4: Extract of the SAHRIS PalaeoMap map (Council of Geosciences) indicates that the study area is underlain by sediments with a Very High (red) and Zero (grey) Palaeontological Sensitivity.

Table 3: Palaeontological Sensitivity indicated by the SAHRIS PalaeoMap (Almond et al, 2013; SAHRIS website)

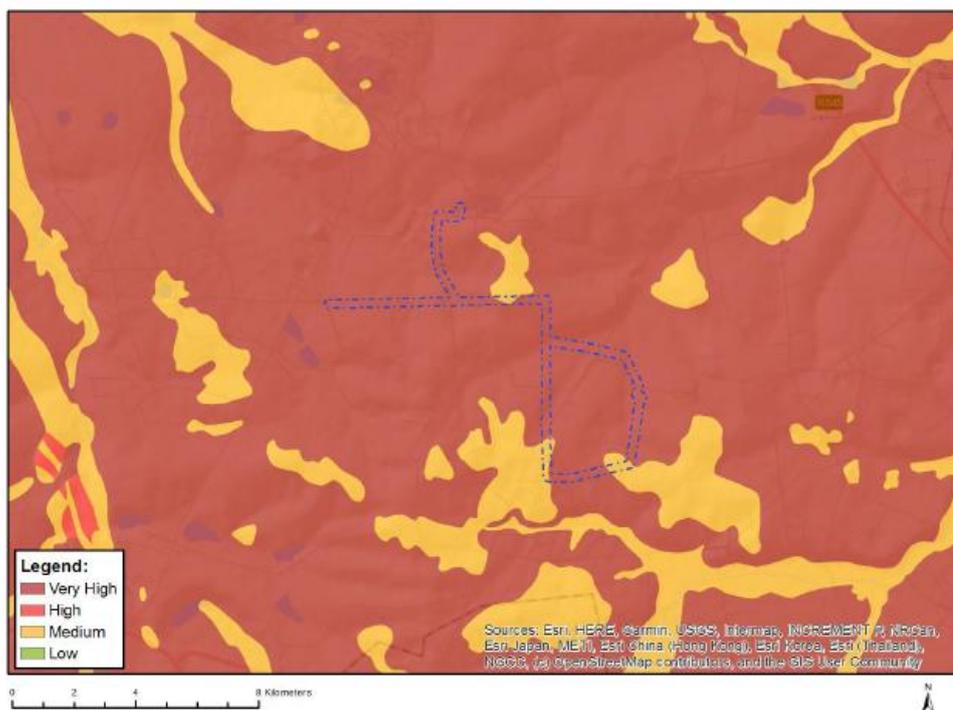
Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are 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.



MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Features with a Medium paleontological sensitivity
Very High	Features with a Very High paleontological sensitivity

Figure 5: Palaeontological Sensitivity generated by the National Environmental Web-Based Screening indicating the Very High Palaeontological Sensitivity of the proposed development, while areas with a Medium Sensitivity also underlies the study area.



6

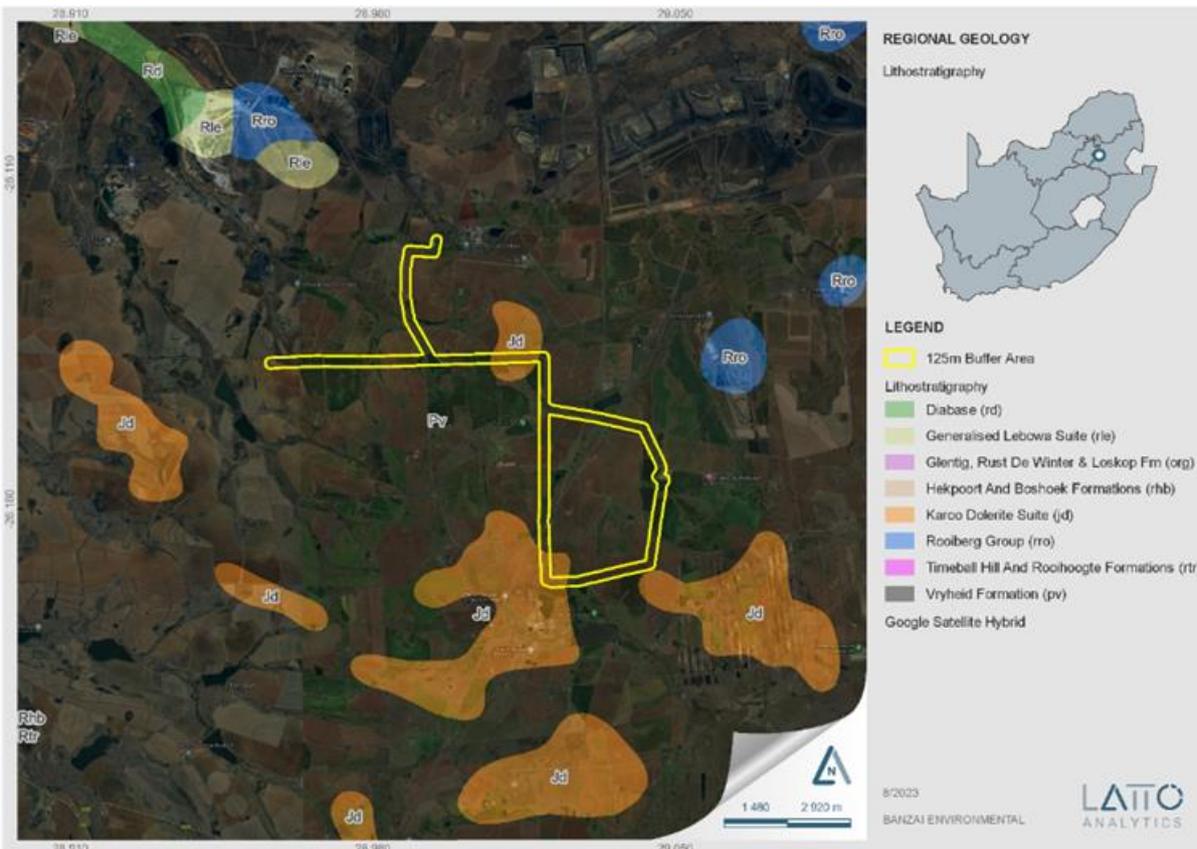


Figure 6 Updated Geology (Council of Geosciences, Pretoria) indicates that the study area is largely underlain by the Vryheid Formation (Pv, Eccca Group, Karoo Supergroup) with small patches of the Karoo Dolerite Suite (Jd).



Figure 6: Examples of Glossopteris leaves (Prevec et al 2009).



Figure 7: Mesosaurus sp. National Museum specimen NMQR3536.



6 GEOGRAPHICAL LOCATION OF THE SITE

The proposed PL development is approximately 6.6 km south of Kendal Power Station and approximately 14.5 km Southwest of Ogies (**Figure 1-2**).

7 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)
- A Google Earth map with polygons of the proposed development was obtained from PGS Heritage.
- 1:250 000 East-Rand 2628 (1986) Geological Map (Council for Geosciences, Pretoria).
- Updated Geology produced by the Council of Geosciences (Pretoria).
- Palaeosensitivity map on SAHRIS website.
- The National Environmental Web-based Screening Tool.
PIAs in the area include that of Fourie 2022 (see references).

8 SITE VISIT

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 18 August 2023. The area is utilized as agriculture pastures and highly disturbed. No fossiliferous outcrops were identified during the site visit.



Figure: 8 General view over the northern margin of the proposed PL development.



Figure 9: General view over the middle portion of the proposed PL development.



Figure 10: General view over the southern portion of the proposed PL development.



9 IMPACT ASSESSMENT METHODOLOGY

9.1 Method of Environmental Assessment

An assessment of the impact significance of the proposed Zibulo PL Project in Mpumalanga indicates that development is underlain by the Vryheid Formation (Ecca Group, Karoo Supergroup, as well as Jurassic Dolerite of the Karoo Dolerite Suite.

Nature of the Impact

The proposed development will comprise of vegetation clearance and the construction of Powerlines, substations and related infrastructure.

Geographical extent of the impact

Impacts on fossil heritage will only occur during the construction phase of the development when new excavations into fresh potentially fossiliferous bedrock takes place. The extent of the area of potential impact is thus limited to the project site

Sensitive areas

The proposed PL and associated infrastructure is underlain by the Vryheid Formation that is Palaeontologically Highly Sensitive.

Duration of the Impact

The expected duration of the impact is potentially permanent too long term. In the absence of mitigation procedures (and if fossils are present in the development area) the harm or destruction of palaeontological heritage will be permanent.

Potential Significance of the Impact

The destruction/damage of fossil heritage in the development, will be permanent and irreversible. Any fossil heritage in the development area is considered to be of scientific and culturally significant and thus any negative impact on the fossil heritage will be highly significant.

Severity/ Beneficial scale

The development of the proposed Power line and substation Project is beneficial, not only on a local level, but regional as well. A secondary advantage of the construction of the project would be that the excavations may uncover fossils hidden beneath the surface and would have remained unknown to science.

Intensity of impact occurring

Probable significant impacts on palaeontological heritage during the construction phase are low.

Probability



According to the Geology of the proposed development, fossil heritage can be found in the proposed development.

Mitigation

If fossil heritage is present in the development footprint any negative or detrimental impact on these fossils can be mitigated by describing and collecting of the well-preserved fossils (by a professional palaeontologist). If fossil Heritage is discovered in the area the Chance Find Protocol must be implemented and a qualified palaeontologic must be appointed to conduct the mitigation. A SAHRA permit will be required for fossil collection and the fossil heritage must be housed in an accredited institution (university or museum).

Degree of irreversible Loss

Impacts on fossil heritage are generally irreversible. Scientifically all well-documented records and palaeontological studies of any fossils exposed during construction would represent a positive impact. The possibility of a negative impact on the palaeontological heritage of the area can be reduced by the implementation of adequate mitigation procedures. If mitigation is undertaken the benefit scale for the project will be beneficial.

Irreplaceable loss

Fossil heritage may be present in the fossiliferous sediments underlying the development. Significant loss of fossil heritage may be limited by taking a precautionary approach.

Table 4: Summary of Impact Tables

Environmental parameter	Issues	Rating prior to mitigation	Average	Rating post mitigation	Average
Planning Phase the Zibulo Powerline and substation Project	No Impact		No Impact		
Construction Stage the Zibulo Powerline and substation Project	Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study	-13	Negative Medium impact	6	Low positive



Operational Phase the Zibulo Powerline and substation Project	No Impact		No Impact		No Impact
Decommissioning the Zibulo Powerline and substation Project	No Impact		No Impact		No Impact

10 FINDINGS AND RECOMMENDATIONS

The Vryheid Formation (Ecca Group, Karoo Supergroup) and Jurassic dolerite underpin the proposed Powerline Project. According to the South African Heritage Resources Information System (SAHRIS), the Palaeontological Sensitivity of the Vryheid Formation (Ecca Group) is Very High, whereas that of Karoo Dolerite is Zero because it is igneous in origin and thus unfossiliferous (Almond et al, 2013; SAHRIS website).

On 18 August, 2023, a site-specific field survey of the development footprint was done both on foot and by car. There were no fossiliferous outcrops found in the area where construction is planned. According to the site investigation and desktop research, fossil heritage of scientific and conservation relevance is rather uncommon in the total development footprint. In contrast, the SAHRIS Palaeosensitivity Map and DFFE Screening Tool assigned a Very High Sensitivity to the development region. **A Medium Palaeontological value has been assigned to the PV development construction phase prior to mitigation and a Low value after mitigation. The construction phase will be the only development phase that will have an influence on Palaeontological Heritage, with no significant impacts projected during the operational or decommissioning stages.**

Because the No-Go Alternative evaluates the alternative of 'doing nothing' and maintaining the *status quo*, it will have a Neutral influence on the development's Palaeontological Heritage. **The cumulative impact of the development are medium pre-mitigation and low post-mitigation, which are within the project's allowable limits.** As a result, it is anticipated that the projected development will not have a negative influence on the area's palaeontological resources.

As the development footprint is not considered sensitive in terms of palaeontological resources, construction of the development may thus be approved in its entirety. It is thus suggested that no additional palaeontological heritage research, ground truthing, or specialised mitigation be undertaken until new found fossils are identified.

If fossil remains are discovered during any phase of construction, whether on the surface or revealed through excavations, the Environmental Control Officer (ECO) in charge of these activities is required to



follow the Chance Find Procedure as contained in the Generic EMPR as it is adequate to mitigate the impact.

Therefore, it is advised that no additional palaeontological heritage studies, fieldwork, or expert mitigation are needed until fossils are found.

11 BIBLIOGRAPHY

- ALMOND, J., PETHER, J, and GROENEWALD, G. 2013. South African National Fossil Sensitivity Map. SAHRA and Council for Geosciences. Schweitzer *et al.* (1995) pp p288.
- ADENDORFF, R. 2005. A revision of the ovuliferous fructifications of glossopterids from the Permian of South Africa. Unpublished PhD thesis, University of the Witwatersrand, Johannesburg, 421 pp.
- AITKEN, G.A., 1993. Palynology of the Number Five Seam in the Witbank/Highveld coalfields. Unpublished M.Sc. thesis, University of the Witwatersrand, Johannesburg, 231 pp.
- AITKEN, G.A., 1994. Permian palynomorphs from the Number Five Seam, Ecca Group, Witbank/Highveld coalfields, South Africa. *Palaeontologia Africana* 31, 97-109.
- ALMOND, J., PETHER, J, and GROENEWALD, G. 2013. South African National Fossil Sensitivity Map. SAHRA and Council for Geosciences.
- ANDERSON, J.M., ANDERSON, H.M., 1985. Palaeoflora of Southern Africa: Prodrum of South African megafloras, Devonian to Lower Cretaceous. A.A. Balkema, Rotterdam. 423 pp.
- BAMFORD, M. 2011. Desktop study Palaeontology Ermelo to Empangeni- Eskom powerline. Internal report Bernard Price Institute for Palaeontological Research, University of the Witwatersrand, 4 pp.
- BORDY, E. M., and PREVEC, R., 2008. Sedimentology, palaeontology and palaeo-environments of the Middle (?) to Upper Permian Emakwezini Formation (Karoo Supergroup, South Africa). *South African Journal of Geology* 111, 429-456.
- BORDY, E., PREVEC, R., 2015. Lithostratigraphy of the Emakwezini Formation (Karoo Supergroup), South Africa. *South African Journal of Geology* 118.3, 307-310. doi:10.2113/gssajg.118.3.307.
- BORDY, E.M., HANCOX, P.J., RUBIDGE, B.S., 2005. TURNER, B.R. AND THOMSON, K., Discussion on 'Basin development during deposition of the Elliot Formation (Late Triassic – Early Jurassic), Karoo Supergroup, South Africa' (*South African Journal of Geology* 107, 397–412) – A Reply. *South African Journal of Geology* 108, 454–461.
- BORDY, E.M., PREVEC, R. 2008. Sedimentology, palaeontology and palaeo-environments of the Middle (?) to Upper Permian Emakwezini Formation (Karoo Supergroup, South Africa). *South African Journal of Geology* 111, 429-458.
- CAIRNCROSS, B., 1986. Depositional environments of the Permian Vryheid Formation in the East Witbank Coalfield, South Africa: A framework for coal seam stratigraphy, occurrence and distribution. Unpublished PhD Thesis, University of the Witwatersrand, Johannesburg, 232 pp.
- CAIRNCROSS, B., 1990. Tectono-sedimentary settings and controls of the Karoo Basin Permian coals, South Africa. *International Journal of Coal Geology* 16, 175–178.
- CAIRNCROSS, B., 2001. An overview of the Permian (Karoo) coal deposits of southern Africa. *Journal of African Earth Sciences* 33, 529–562.
- CAIRNCROSS, B., CADLE, A.B., 1987. A genetic stratigraphy for the Permian coal-bearing Vryheid Formation in the east Witbank Coalfield, South Africa. *South African Journal of Geology* 90, 219– 230.
- DUNCAN, A.R., and MARSH, J.S. 2006. The Karoo Igneous Province. In: JOHNSON, M.R, ANHAEUSSER and Thomas, R.J (Eds). *The Geology of South Africa*. Geological Society of South Africa, Johannesburg/Council for Geosciences, Pretoria. pp 501-520.
- DU TOIT, A. 1954. *The geology of South Africa*. xii + 611pp, 41 pls. Oliver & Boyd, Edinburg.
- EIMS. 2023. Background Information Document: Zibulo Colliery 132KV Powerline and Substation project.
- ERIKSSON, P.G., MCCOURT, S., SNYMAN, C.P., 1994. A note on the petrography of upper Karoo sandstones in the Natal Drakensberg: implications for the Clarens Formation palaeoenvironment. *Transactions of the Geological Society of South Africa* 97, 101–105.
- FALCON, R.M.S., 1986. A brief review of the origin, formation, and distribution of coal in southern Africa, in: Anhaesser, C.R., Maske, S. (Eds.), *Mineral Deposits of Southern Africa*, Vol. II, Geological Society of South Africa, Johannesburg, pp. 1879–1898.



- FOURIE, H.C. 2022. Palaeontological Impact Assessment: Phase 1 Field Study: Zibulo Colliery: Zibulo North Shaft Project.
- GROENEWALD, G.H. and GROENEWALD D. 2014. Palaeotechnical Report for the Mpumalanga Province, South African Heritage Resources Agency, Pp 23.
- HANCOX, P.J., 2000. The Continental Triassic of South Africa. *Zentralblatt für Geologie und Paläontologie. Teil I, Heft 11-12 (Vol 3)*, 1998, 1285–1324.
- HANCOX, P.J., 2011. Independent geological report on the Eloff Project coal development, exploration and resources. Prepared For: Homeland Energy Group Limited by CCIC Coal (Pty) Limited, 106 pp.
- HANCOX, P.J., Götz, A, E., 2014. South Africa's coalfields-a 2014 perspective.
- HANCOX, P.J., RUBIDGE, B.S., 1997. The role of fossils in interpreting the development of the Karoo Basin. *Palaeontologia africana* 33, 41–54.
- HANCOX, P.J., RUBIDGE, B.S., 2001. Breakthroughs in the biodiversity, biogeography, biostratigraphy and basin analysis of the Beaufort Group. *Journal of African Earth Sciences* 33 (3/4), 563–577.
- JEFFREY, L.S., 2005. Characterization of the coal resources of South Africa. *Journal of the South African Institute of Mining and Metallurgy*, 95–102.
- JOHNSON, M.R., VAN VUUREN, C.J., VISSER, J.N.J., COLE, D.I., WICKENS, H.DEV., CHRISTIE, A.D.M., ROBERTS, D.L., BRANDL, G., 2006. Sedimentary rocks of the Karoo Supergroup. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). *The Geology of South Africa*. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 461 – 499.
- JOURBERT, M.R., 1994. Emakwezini Formation. In: Johnson, M.R. (Ed.), *Lexicon of South African Stratigraphy: Part 1: Phanerozoic Units*, South African Committee for Stratigraphy, Council for Geoscience, South Africa, 56 pp.
- KENT, L. E., 1980. Part 1: Lithostratigraphy of the Republic of South Africa, South West Africa/Namibia and the Republics of Bophuthatswana, Transkei, and Venda. SACS, Council for Geosciences, Pp 535-574.
- LOCK, B. E., 1978. The Cape Fold Belt of South Africa; tectonic control of sedimentation. *Geol. Ass. (London). Proc.* 89, 263±281.
- LOCK, B.E., 1980. Flat-plate subduction and the Cape Fold Belt of South Africa. *Geology* 8, 35±39.
- MACRAE, C. 1999. Life etched in stone. *Fossils of South Africa*. 305 pp. The Geological Society of South Africa, Johannesburg.
- MILLSTEED, B.D., 1994. Palynological evidence for the age of the Permian Karoo coal deposits near Vereeniging, northern Orange Free State, South Africa. *South African Journal of Geology* 97(1), 15– 20.
- MILLSTEED, B.D., 1999. Palynology of the Early Permian coal-bearing deposits near Vereeniging, Free State, South Africa. *Bulletin of the Council for Geoscience South Africa* 124, 1–77.
- PLUMSTEAD, E.P., 1969. Three thousand million years of plant life in Africa. Geological Society of southern Africa, Annexure to Volume LXXII. 72pp + 25 plates.
- PLUMSTEAD, E.P. 1970. Recent progress and the future of palaeobotanical correlation in Gondwanaland. In: S.H. Haughton (Ed). *Proceedings 2nd IUGS Symposium on Gondwana Stratigraphy and Palaeontology*. Council for Scientific and Industrial Research, South Africa, 139-144.
- PREVEC, R., 2011. A structural re-interpretation and revision of the type material of the glossopterid ovuliferous fructification *Scutum* from South Africa. *Palaeontologia Africana* 46, 1–19.
- PREVEC, R., GASTALDO, R.A., NEVELING, J., REID, S.B., LOOY, C.V., 2010. An autochthonous glossopterid flora with latest Permian palynomorphs and its depositional setting in the *Dicynodon* Assemblage Zone of the southern Karoo Basin, South Africa. *Palaeogeography, Palaeoclimatology, Palaeoecology* 292(3-4), 391–408.
- PREVEC, R., LABANDEIRA, C.C., NEVELING, J., GASTALDO, R.A., BAMFORD, M.K., LOOY, C.V., 2009. Portrait of a Gondwanan ecosystem: a new Late Permian locality from Kwazulu-Natal, South Africa. *Review of Palaeobotany and Palynology* 156, 454–493.
- PREVEC, R., LABANDEIRA, C.C., NEVELING, J., GASTALDO, R.A., BAMFORD, M.K., LOOY, C.V., 2009. Portrait of a Gondwanan ecosystem: a new Late Permian locality from Kwazulu-Natal, South Africa. *Review of Palaeobotany and Palynology* 156, 454–493.
- PREVEC, R., MCLOUGHLIN, S., BAMFORD, M.K., 2008. Novel double wing morphology revealed in a South African ovuliferous glossopterid fructification. *Review of Palaeobotany and Palynology* 150, 22–36.
- RUCKWIED, K., GOTZ, A.E., JONES, P. 2014. Palynological records of the Permian *Ecca* Group (South Africa): utilizing climatic icehouse-greenhouse signals for cross basin correlation. *Palaeogeography, Palaeoclimatology, Palaeoecology*. <http://dx.doi.org/10.1016/j.palaeo.2014.05.003>.
- SEWARD, A.C. 1907. On a collection of Permo-Carboniferous plants from the St. Lucia (Somkele) Coal-field, Zululand, and from the Newcastle District, Natal. *Transactions of the Geological Society of South Africa*, 10, 81-89.



SG 2.2 SAHRA APMHOB Guidelines, 2012. Minimum standards for palaeontological components of Heritage Impact Assessment Reports, Pp 1-15.

VISSER, D.J.L. (ed) 1984. Geological Map of South Africa 1:100 000. South African Committee for Stratigraphy, Council for Geoscience, Pretoria.

VISSER, D.J.L. (ed) 1989. *Toeligting: Geologiese kaart (1:100 000). Die Geologie van die Republieke van Suid Afrika, Transkei, Bophuthatswana, Venda, Ciskei en die Koningkryke van Lesotho en Swaziland*. South African Committee for Stratigraphy. Council for Geoscience, Pretoria, Pp 494.



APPENDIX A

CURRICULUM VITAE

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 and Collection Manager	National Museum, Bloemfontein 1998–2022

TECHNICAL REPORTS

Butler, E. 2014. Palaeontological Impact Assessment of the proposed development of private dwellings on portion 5 of farm 304 Matjesfontein Keurboomstrand, Knysna District, Western Cape Province. Bloemfontein.

Butler, E. 2014. Palaeontological Impact Assessment for the proposed upgrade of existing water supply infrastructure at Noupoot, Northern Cape Province. 2014. Bloemfontein.

Butler, E. 2015. Palaeontological impact assessment of the proposed consolidation, re-division, and development of 250 serviced erven in Nieu-Bethesda, Camdeboo local municipality, Eastern Cape. Bloemfontein.

Butler, E. 2015. Palaeontological impact assessment of the proposed mixed land developments at Rooikraal 454, Vrede, Free State. Bloemfontein.

Butler, E. 2015. Palaeontological exemption report of the proposed truck stop development at Palmiet 585, Vrede, Free State. Bloemfontein.

Butler, E. 2015. Palaeontological impact assessment of the proposed Orange Grove 3500 residential development, Buffalo City Metropolitan Municipality East London, Eastern Cape. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Gonubie residential development, Buffalo City Metropolitan Municipality East London, Eastern Cape Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Ficksburg raw water pipeline. Bloemfontein.

Butler, E. 2015. Palaeontological Heritage Impact Assessment report on the establishment of the 65 mw Majuba Solar Photovoltaic facility and associated infrastructure on portion 1, 2 and 6 of the farm Witkoppies 81 HS, Mpumalanga Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed township establishment on the remainder of portion 6 and 7 of the farm Sunnyside 2620, Bloemfontein, Mangaung metropolitan municipality, Free State, Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Woodhouse 1 photovoltaic solar energy facilities and associated infrastructure on the farm Woodhouse729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Woodhouse 2 photovoltaic solar energy facilities and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Orkney solar energy farm and associated infrastructure on the remaining extent of Portions 7 and 21 of the farm Wolvehuis 114, near Orkney, North West Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Spectra foods broiler houses and abattoir on the farm Maiden Manor 170 and Ashby Manor 171, Lukhanji Municipality, Queenstown, Eastern Cape Province. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed construction of the 150 MW Noupoot concentrated solar power facility and associated infrastructure on portion 1 and 4 of the farm Carolus Poort 167 and the remainder of Farm 207, near Noupoot, Northern Cape. Prepared for Savannah Environmental. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed Woodhouse 1 Photovoltaic Solar Energy facility and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed Woodhouse 2 Photovoltaic Solar Energy facility and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. Bloemfontein.



- Butler, E. 2016. Proposed 132kV overhead power line and switchyard station for the authorised Solis Power 1 CSP project near Upington, Northern Cape. Bloemfontein.
- Butler, E. 2016. Palaeontological Impact Assessment of the proposed Senqu Pedestrian Bridges in Ward 5 of Senqu Local Municipality, Eastern Cape Province. Bloemfontein.
- Butler, E. 2016. Recommendation from further Palaeontological Studies: Proposed Construction of the Modderfontein Filling Station on Erf 28 Portion 30, Founders Hill, City of Johannesburg, Gauteng Province. Bloemfontein.
- Butler, E. 2016. Recommendation from further Palaeontological Studies: Proposed Construction of the Modikwa Filling Station on a Portion of Portion 2 of Mooihoek 255 Kt, Greater Tubatse Local Municipality, Limpopo Province. Bloemfontein.
- Butler, E. 2016. Recommendation from further Palaeontological Studies: Proposed Construction of the Heidedal filling station on Erf 16603, Heidedal Extension 24, Mangaung Local Municipality, Bloemfontein, Free State Province. Bloemfontein.
- Butler, E. 2016. Recommended Exemption from further Palaeontological studies: Proposed Construction of the Gunstfontein Switching Station, 132kv Overhead Power Line (Single or Double Circuit) and ancillary infrastructure for the Gunstfontein Wind Farm Near Sutherland, Northern Cape Province. Savannah South Africa. Bloemfontein.
- Butler, E. 2016. Palaeontological Impact Assessment of the proposed Galla Hills Quarry on the remainder of the farm Roode Krantz 203, in the Lukhanji Municipality, division of Queenstown, Eastern Cape Province. Bloemfontein.
- Butler, E. 2016. Chris Hani District Municipality Cluster 9 water backlog project phases 3a and 3b: Palaeontology inspection at Tsomo WTW. Bloemfontein.
- Butler, E. 2016. Palaeontological Impact Assessment of the proposed construction of the 150 MW Noupoot concentrated solar power facility and associated infrastructure on portion 1 and 4 of the farm Carolus Poort 167 and the remainder of Farm 207, near Noupoot, Northern Cape. Savannah South Africa. Bloemfontein.
- Butler, E. 2016. Palaeontological Impact Assessment of the proposed upgrading of the main road MR450 (R335) from Motherwell to Addo within the Nelson Mandela Bay Municipality and Sunday's River valley Local Municipality, Eastern Cape Province. Bloemfontein.
- Butler, E. 2016. Palaeontological Impact Assessment construction of the proposed Metals Industrial Cluster and associated infrastructure near Kuruman, Northern Cape Province. Savannah South Africa. Bloemfontein.
- Butler, E. 2016. Palaeontological Impact Assessment for the proposed construction of up to a 132kv power line and associated infrastructure for the proposed Kalkaar Solar Thermal Power Plant near Kimberley, Free State and Northern Cape Provinces. PGS Heritage. Bloemfontein.
- Butler, E. 2016. Palaeontological Impact Assessment of the proposed development of two burrow pits (DR02625 and DR02614) in the Enoch Mgijima Municipality, Chris Hani District, Eastern Cape.
- Butler, E. 2016. Ezibeleni waste Buy-Back Centre (near Queenstown), Enoch Mgijima Local Municipality, Eastern Cape. Bloemfontein.
- Butler, E. 2016. Palaeontological Impact Assessment for the proposed construction of two 5 Mw Solar Photovoltaic Power Plants on Farm Wildebeestkuil 59 and Farm Leeuwbosch 44, Leeudoringstad, North West Province. Bloemfontein.
- Butler, E. 2016. Palaeontological Impact Assessment for the proposed development of four Leeuwberg Wind farms and basic assessments for the associated grid connection near Loeriesfontein, Northern Cape Province. Bloemfontein.
- Butler, E. 2016. Palaeontological impact assessment for the proposed Aggeneys south prospecting right project, Northern Cape Province. Bloemfontein.
- Butler, E. 2016. Palaeontological impact assessment of the proposed Motuoane Ladysmith Exploration right application, KwaZulu Natal. Bloemfontein.
- Butler, E. 2016. Palaeontological impact assessment for the proposed construction of two 5 MW solar photovoltaic power plants on farm Wildebeestkuil 59 and farm Leeuwbosch 44, Leeudoringstad, North West Province. Bloemfontein.
- Butler, E. 2016: Palaeontological desktop assessment of the establishment of the proposed residential and mixed-use development on the remainder of portion 7 and portion 898 of the farm Knopjeslaagte 385 Ir, located near Centurion within the Tshwane Metropolitan Municipality of Gauteng Province. Bloemfontein.



- Butler, E. 2017. Palaeontological impact assessment for the proposed development of a new cemetery, near Kathu, Gamagara local municipality and John Taolo Gaetsewe district municipality, Northern Cape. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of The Proposed Development of The New Open Cast Mining Operations on The Remaining Portions Of 6, 7, 8 And 10 Of the Farm Kwaggafontein 8 In the Carolina Magisterial District, Mpumalanga Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment for the Proposed Development of a Wastewater Treatment Works at Lanseria, Gauteng Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Scoping Report for the Proposed Construction of a Warehouse and Associated Infrastructure at Perseverance in Port Elizabeth, Eastern Cape Province.
- Butler, E. 2017. Palaeontological Desktop Assessment for the Proposed Establishment of a Diesel Farm and a Haul Road for the Tshipi Borwa mine Near Hotazel, In the John Taolo Gaetsewe District Municipality in the Northern Cape Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment for the Proposed Changes to Operations at the UMK Mine near Hotazel, In the John Taolo Gaetsewe District Municipality in the Northern Cape Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment for the Development of the Proposed Ventersburg Project-An Underground Mining Operation near Ventersburg and Henneman, Free State Province. Bloemfontein.
- Butler, E. 2017. Palaeontological desktop assessment of the proposed development of a 3000 MW combined cycle gas turbine (CCGT) in Richards Bay, Kwazulu-Natal. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment for the Development of the Proposed Revalidation of the lapsed General Plans for Elliotdale, Mhashe Local Municipality. Bloemfontein.
- Butler, E. 2017. Palaeontological assessment of the proposed development of a 3000 MW Combined Cycle Gas Turbine (CCGT) in Richards Bay, Kwazulu-Natal. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed development of the new open cast mining operations on the remaining portions of 6, 7, 8 and 10 of the farm Kwaggafontein 8 10 in the Albert Luthuli Local Municipality, Gert Sibande District Municipality, Mpumalanga Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed mining of the farm Zandvoort 10 in the Albert Luthuli Local Municipality, Gert Sibande District Municipality, Mpumalanga Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment for the proposed Lanseria outfall sewer pipeline in Johannesburg, Gauteng Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed development of open pit mining at Pit 36W (New Pit) and 62E (Dishaba) Amandelbult Mine Complex, Thabazimbi, Limpopo Province. Bloemfontein.
- Butler, E. 2017. Palaeontological impact assessment of the proposed development of the sport precinct and associated infrastructure at Merrifield Preparatory school and college, Amathole Municipality, East London. PGS Heritage. Bloemfontein.
- Butler, E. 2017. Palaeontological impact assessment of the proposed construction of the Lehae training and fire station, Lenasia, Gauteng Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed development of the new open cast mining operations of the Impunzi mine in the Mpumalanga Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the construction of the proposed Viljoenskroon Munic 132 KV line, Vierfontein substation and related projects. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed rehabilitation of 5 ownerless asbestos mines. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed development of the Lephale coal and power project, Lephale, Limpopo Province, Republic of South Africa. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed construction of a 132KV powerline from the Tweespruit distribution substation (in the Mantsopa local municipality) to the Driedorp rural substation (within the Naledi local municipality), Free State province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed development of the new coal-fired power plant and associated infrastructure near Makhado, Limpopo Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed construction of a Photovoltaic Solar Power station near Collett substation, Middelburg, Eastern Cape. Bloemfontein.



- Butler, E. 2017. Palaeontological Impact Assessment for the proposed township establishment of 2000 residential sites with supporting amenities on a portion of farm 826 in Botshabelo West, Mangaung Metro, Free State Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment for the proposed prospecting right project without bulk sampling, in the Koa Valley, Northern Cape Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment for the proposed Aroams prospecting right project, without bulk sampling, near Aggeneys, Northern Cape Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed Belvior aggregate quarry II on portion 7 of the farm Maidenhead 169, Enoch Mgijima Municipality, division of Queenstown, Eastern Cape. Bloemfontein.
- Butler, E. 2017. PIA site visit and report of the proposed Galla Hills Quarry on the remainder of the farm Roode Krantz 203, in the Lukhanji Municipality, division of Queenstown, Eastern Cape Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed construction of Tina Falls Hydropower and associated power lines near Cumbu, Mthlontlo Local Municipality, Eastern Cape. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed construction of the Mangaung Gariep Water Augmentation Project. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed Belvoir aggregate quarry II on portion 7 of the farm Maidenhead 169, Enoch Mgijima Municipality, division of Queenstown, Eastern Cape. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed construction of the Melkspruit-Rouxville 132KV Power line. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed development of a railway siding on a Portion of portion 41 of the farm Rustfontein 109 is, Govan Mbeki local municipality, Gert Sibande district municipality, Mpumalanga Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed consolidation of the proposed Ilima Colliery in the Albert Luthuli local municipality, Gert Sibande District Municipality, Mpumalanga Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed extension of the Kareerand Tailings Storage Facility, associated borrow pits as well as a storm water drainage channel in the Vaal River near Stilfontein, North West Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed construction of a filling station and associated facilities on the Erf 6279, district municipality of John Taolo Gaetsewe District, Ga-Segonyana Local Municipality Northern Cape. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed of the Lephallale Coal and Power Project, Lephallale, Limpopo Province, Republic of South Africa. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed Overvaal Trust PV Facility, Buffelspoort, North West Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed development of the H₂ Energy Power Station and associated infrastructure on Portions 21; 22 And 23 of the farm Hartebeestspruit in the Thembisile Hani Local Municipality, Nkangala District near Kwamhlanga, Mpumalanga Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed upgrade of the Sandriver Canal and Klippan Pump station in Welkom, Free State Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed upgrade of the 132kv and 11kv power line into a dual circuit above ground power line feeding into the Urania substation in Welkom, Free State Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment of the proposed Swaziland-Mozambique border patrol road and Mozambique barrier structure. Bloemfontein.
- Butler, E. 2017. Palaeontological Impact Assessment of the proposed diamonds alluvial & diamonds general prospecting right application near Christiana on the remaining extent of portion 1 of the farm Kaffraria 314, registration division HO, North West Province. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment for the proposed development of Wastewater Treatment Works on Hartebeesfontein, near Panbult, Mpumalanga. Bloemfontein.
- Butler, E. 2017. Palaeontological Desktop Assessment for the proposed development of Wastewater Treatment Works on Rustplaas near Piet Retief, Mpumalanga. Bloemfontein.



- Butler, E. 2018. Palaeontological Impact Assessment for the Proposed Landfill Site in Luckhoff, Letsemeng Local Municipality, Xhariep District, Free State. Bloemfontein.
- Butler, E. 2018. Palaeontological Impact Assessment of the proposed development of the new Mutsho coal-fired power plant and associated infrastructure near Makhado, Limpopo Province. Bloemfontein.
- Butler, E. 2018. Palaeontological Impact Assessment of the authorisation and amendment processes for Manangu mine near Delmas, Victor Khanye local municipality, Mpumalanga. Bloemfontein.
- Butler, E. 2018. Palaeontological Desktop Assessment for the proposed Mashishing township establishment in Mashishing (Lydenburg), Mpumalanga Province. Bloemfontein.
- Butler, E. 2018. Palaeontological Desktop Assessment for the Proposed Mlonzi Estate Development near Lusikisiki, Ngquza Hill Local Municipality, Eastern Cape. Bloemfontein.
- Butler, E. 2018. Palaeontological Phase 1 Assessment of the proposed Swaziland-Mozambique border patrol road and Mozambique barrier structure. Bloemfontein.
- Butler, E. 2018. Palaeontological Desktop Assessment for the proposed electricity expansion project and Sekgame Switching Station at the Sishen Mine, Northern Cape Province. Bloemfontein.
- Butler, E. 2018. Palaeontological field assessment of the proposed construction of the Zonnebloem Switching Station (132/22kV) and two loop-in loop-out power lines (132kV) in the Mpumalanga Province. Bloemfontein.
- Butler, E. 2018. Palaeontological Field Assessment for the proposed re-alignment and de-commissioning of the Firham-Platrand 88kv Powerline, near Standerton, Lekwa Local Municipality, Mpumalanga province. Bloemfontein.
- Butler, E. 2018. Palaeontological Desktop Assessment of the proposed Villa Rosa development In the Buffalo City Metropolitan Municipality, East London. Bloemfontein.
- Butler, E. 2018. Palaeontological field Assessment of the proposed Villa Rosa development In the Buffalo City Metropolitan Municipality, East London. Bloemfontein.
- Butler, E. 2018. Palaeontological desktop assessment of the proposed Mookodi – Mahikeng 400kV line, North West Province. Bloemfontein.
- Butler, E. 2018. Palaeontological Desktop Assessment for the proposed Thornhill Housing Project, Ndlambe Municipality, Port Alfred, Eastern Cape Province. Bloemfontein.
- Butler, E. 2018. Palaeontological desktop assessment of the proposed housing development on portion 237 of farm Hartebeestpoort 328. Bloemfontein.
- Butler, E. 2018. Palaeontological desktop assessment of the proposed New Age Chicken layer facility located on holding 75 Endicott near Springs in Gauteng. Bloemfontein.
- Butler, E. 2018 Palaeontological Desktop Assessment for the development of the proposed Leslie 1 Mining Project near Leandra, Mpumalanga Province. Bloemfontein.
- Butler, E. 2018. Palaeontological field assessment of the proposed development of the Wildealskloof mixed use development near Bloemfontein, Free State Province. Bloemfontein.
- Butler, E. 2018. Palaeontological Field Assessment of the proposed Megamor Extension, East London. Bloemfontein
- Butler, E. 2018. Palaeontological Impact Assessment of the proposed diamonds Alluvial & Diamonds General Prospecting Right Application near Christiana on the Remaining Extent of Portion 1 of the Farm Kaffraria 314, Registration Division HO, North West Province. Bloemfontein.
- Butler, E. 2018. Palaeontological Impact Assessment of the proposed construction of a new 11kV (1.3km) Power Line to supply electricity to a cell tower on farm 215 near Delpportshoop in the Northern Cape. Bloemfontein.
- Butler, E. 2018. Palaeontological Field Assessment of the proposed construction of a new 22 kV single wood pole structure power line to the proposed MTN tower, near Britstown, Northern Cape Province. Bloemfontein.
- Butler, E. 2018. Palaeontological Exemption Letter for the proposed reclamation and reprocessing of the City Deep Dumps in Johannesburg, Gauteng Province. Bloemfontein.
- Butler, E. 2018. Palaeontological Exemption letter for the proposed reclamation and reprocessing of the City Deep Dumps and Rooikraal Tailings Facility in Johannesburg, Gauteng Province. Bloemfontein.
- Butler, E. 2018. Proposed Kalabasfontein Mine Extension project, near Bethal, Govan Mbeki District Municipality, Mpumalanga. Bloemfontein.
- Butler, E. 2018. Palaeontological Desktop Assessment for the development of the proposed Leslie 1 Mining Project near Leandra, Mpumalanga Province. Bloemfontein.



- Butler, E. 2018. Palaeontological Desktop Assessment of the proposed Mookodi – Mahikeng 400kV Line, North West Province. Bloemfontein.
- Butler, E. 2018. Environmental Impact Assessment (EIA) for the Proposed 325mw Rondekop Wind Energy Facility between Matjiesfontein and Sutherland in the Northern Cape Province.
- Butler, E. 2018. Palaeontological Impact Assessment of the proposed construction of the Tooverberg Wind Energy Facility, and associated grid connection near Touws River in the Western Cape Province. Bloemfontein.
- Butler, E. 2018. Palaeontological impact assessment of the proposed Kalabasfontein Mining Right Application, near Bethal, Mpumalanga.
- Butler, E., 2019. Palaeontological Desktop Assessment of the proposed Westrand Strengthening Project Phase II.
- Butler, E., 2019. Palaeontological Field Assessment for the proposed Sirius 3 Photovoltaic Solar Energy Facility near Upington, Northern Cape Province
- Butler, E., 2019. Palaeontological Field Assessment for the proposed Sirius 4 Photovoltaic Solar Energy Facility near Upington, Northern Cape Province
- Butler, E., 2019. Palaeontological Field Assessment for Heuningspruit PV 1 Solar Energy Facility near Koppies, Ngwathe Local Municipality, Free State Province.
- Butler, E., 2019. Palaeontological Field Assessment for the Moeding Solar Grid Connection, North West Province.
- Butler, E., 2019. Recommended Exemption from further Palaeontological studies for the Proposed Agricultural Development on Farms 1763, 2372 And 2363, Kakamas South Settlement, Kai! Garib Municipality, Mgcawu District Municipality, Northern Cape Province.
- Butler, E., 2019. Recommended Exemption from further Palaeontological studies: of Proposed Agricultural Development, Plot 1178, Kakamas South Settlement, Kai! Garib Municipality
- Butler, E., 2019. Palaeontological Desktop Assessment for the Proposed Waste Rock Dump Project at Tshipi Borwa Mine, near Hotazel, Northern Cape Province:
- Butler, E., 2019. Palaeontological Exemption Letter for the proposed DMS Upgrade Project at the Sishen Mine, Gamagara Local Municipality, Northern Cape Province
- Butler, E., 2019. Palaeontological Desktop Assessment of the proposed Integrated Environmental Authorisation process for the proposed Der Brochen Amendment project, near Groblershoop, Limpopo
- Butler, E., 2019. Palaeontological Desktop Assessment of the proposed updated Environmental Management Programme (EMPr) for the Assmang (Pty) Ltd Black Rock Mining Operations, Hotazel, Northern Cape
- Butler, E., 2019. Palaeontological Desktop Assessment of the proposed Kriel Power Station Lime Plant Upgrade, Mpumalanga Province
- Butler, E., 2019. Palaeontological Impact Assessment for the proposed Kangala Extension Project Near Delmas, Mpumalanga Province.
- Butler, E., 2019. Palaeontological Desktop Assessment for the proposed construction of an iron/steel smelter at the Botshabelo Industrial area within the Mangaung Metropolitan Municipality, Free State Province.
- Butler, E., 2019. Recommended Exemption from further Palaeontological studies for the proposed agricultural development on farms 1763, 2372 and 2363, Kakamas South settlement, Kai! Garib Municipality, Mgcawu District Municipality, Northern Cape Province.
- Butler, E., 2019. Recommended Exemption from further Palaeontological Studies for Proposed formalisation of Gamakor and Noodkamp low-cost Housing Development, Keimoes, Gordonias Rd, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.
- Butler, E., 2019. Recommended Exemption from further Palaeontological Studies for proposed formalisation of Blaauwskop Low-Cost Housing Development, Kenhardt Road, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.
- Butler, E., 2019. Palaeontological Desktop Assessment of the proposed mining permit application for the removal of diamonds alluvial and diamonds kimberlite near Windsorton on a certain portion of Farm Zoelen's Laagte 158, Registration Division: Barkly Wes, Northern Cape Province.
- Butler, E., 2019. Palaeontological Desktop Assessment of the proposed Vedanta Housing Development, Pella Mission 39, Khâi-Ma Local Municipality, Namakwa District Municipality, Northern Cape.
- Butler, E., 2019. Palaeontological Desktop Assessment for The Proposed 920 KWP Groenheuwel Solar Plant Near Augrabies, Northern Cape Province



- Butler, E., 2019. Palaeontological Desktop Assessment for the establishment of a Super Fines Storage Facility at Amandelbult Mine, Near Thabazimbi, Limpopo Province
- Butler, E., 2019. Palaeontological Impact Assessment for the proposed Sace Lifex Project, Near Emalahleni, Mpumalanga Province
- Butler, E., 2019. Palaeontological Desktop Assessment for the proposed Rehau Fort Jackson Warehouse Extension, East London
- Butler, E., 2019. Palaeontological Desktop Assessment for the proposed Environmental Authorisation Amendment for moving 3 Km of the Merensky-Kameni 132KV Powerline
- Butler, E., 2019. Palaeontological Impact Assessment for the proposed Umsobomvu Solar PV Energy Facilities, Northern and Eastern Cape
- Butler, E., 2019. Palaeontological Desktop Assessment for six proposed Black Mountain Mining Prospecting Right Applications, without Bulk Sampling, in the Northern Cape.
- Butler, E., 2019. Palaeontological field Assessment of the Filling Station (Rietvlei Extension 6) on the Remaining Portion of Portion 1 of the Farm Witkoppies 393JR east of the Rietvleidam Nature Reserve, City of Tshwane, Gauteng
- Butler, E., 2019. Palaeontological Desktop Assessment of The Proposed Upgrade of The Vaal Gamagara Regional Water Supply Scheme: Phase 2 And Groundwater Abstraction
- Butler, E., 2019. Palaeontological Desktop Assessment of The Expansion of The Jan Kempdorp Cemetery on Portion 43 Of Farm Guldenskat 36-Hn, Northern Cape Province
- Butler, E., 2019. Palaeontological Desktop Assessment of the Proposed Residential Development on Portion 42 Of Farm Geldunskat No 36 In Jan Kempdorp, Phokwane Local Municipality, Northern Cape Province
- Butler, E., 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
- Butler, E., 2019. Palaeontological Protocol for Finds for the proposed 16m WH Battery Storage System in Steinkopf, Northern Cape Province
- Butler, E., 2019. Palaeontological Exemption Letter of the proposed 4.5WH Battery Storage System near Midway-Pofadder, Northern Cape Province
- Butler, E., 2019. Palaeontological Exemption Letter of the proposed 2.5ml Process Water Reservoir at Gloria Mine, Black Rock, Hotazel, Northern Cape
- Butler, E., 2019. Palaeontological Desktop Assessment for the Establishment of a Super Fines Storage Facility at Gloria Mine, Black Rock Mine Operations, Hotazel, Northern Cape:
- Butler, E., 2019. Palaeontological Desktop Assessment for the Proposed New Railway Bridge, and Rail Line Between Hotazel and the Gloria Mine, Northern Cape Province
- Butler, E., 2019. Palaeontological Exemption Letter of The Proposed Mixed Use Commercial Development on Portion 17 of Farm Boegoeberg Settlement Number 48, !Kheis Local Municipality in The Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Assessment of the Proposed Diamond Mining Permit Application Near Kimberley, Sol Plaatjies Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Assessment of the Proposed Diamonds (Alluvial, General & In Kimberlite) Prospecting Right Application near Postmasburg, Registration Division; Hay, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Assessment of the proposed diamonds (alluvial, general & in kimberlite) prospecting right application near Kimberley, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Phase 1 Impact Assessment of the proposed upgrade of the Vaal Gamagara regional water supply scheme: Phase 2 and groundwater abstraction. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Assessment of the proposed seepage interception drains at Duvha Power Station, Emalahleni Municipality, Mpumalanga Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Assessment letter for the Proposed PV Solar Facility at the Heineken Sedibeng Brewery, near Vereeniging, Gauteng. Banzai Environmental (Pty) Ltd, Bloemfontein.



- Butler, E., 2019. Palaeontological Phase 1 Assessment for the Proposed PV Solar Facility at the Heineken Sedibeng Brewery, near Vereeniging, Gauteng. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological field Assessment for the Proposed Upgrade of the Kolomela Mining Operations, Tsantsabane Local Municipality, Siyanda District Municipality, Northern Cape Province, Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Assessment of the proposed feldspar prospecting rights and mining application on portion 4 and 5 of the farm Rozynen 104, Kakamas South, Kai! Garib Municipality, Zf Mgcawu District Municipality, Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Phase 1 Field Assessment of the proposed Summerpride Residential Development and Associated Infrastructure on Erf 107, Buffalo City Municipality, East London. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Impact Assessment for the proposed re-commission of the Old Balgay Colliery near Dundee, KwaZulu Natal.
- Butler, E., 2019. Palaeontological Phase 1 Impact Assessment for the Proposed Re-Commission of the Old Balgay Colliery near Dundee, KwaZulu Natal. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Assessment for the Proposed Environmental Authorisation and Amendment Processes for Elandsfontein Colliery. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 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. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 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. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Exemption Letter for the proposed residential development on the Remainder of Portion 1 of the Farm Strathearn 2154 in the Magisterial District of Bloemfontein, Free State. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Field Assessment for the Proposed Nigel Gas Transmission Pipeline Project in the Nigel Area of the Ekurhuleni Metropolitan Municipality, Gauteng Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Assessment for five Proposed Black Mountain Mining Prospecting Right Applications, Without Bulk Sampling, in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E. 2019. Palaeontological Desktop Assessment for the Proposed Environmental Authorisation and an Integrated Water Use Licence Application for the Reclamation of the Marievale Tailings Storage Facilities, Ekurhuleni Metropolitan Municipality - Gauteng Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Impact Assessment for the Proposed Sace Lifex Project, near Emalahleni, Mpumalanga Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Assessment for the proposed Golfview Colliery near Ermelo, Msukaligwa Local Municipality, Mpumalanga Province
- Butler, E., 2019. Palaeontological Desktop Assessment for the Proposed Kangra Maquasa Block C Mining development near Piet Retief, in the Mkhondo Local Municipality within the Gert Sibande District Municipality. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Desktop Assessment for the Proposed Amendment of the Kusipongo Underground and Opencast Coal Mine in Support of an Environmental Authorization and Waste Management License Application. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2019. Palaeontological Exemption Letter of the Proposed Mamatwan Mine Section 24g Rectification Application, near Hotazel, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Field Assessment for the Proposed Environmental Authorisation and Amendment Processes for Elandsfontein Colliery. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Desktop Assessment for the Proposed Extension of the South African Nuclear Energy Corporation (Necsa) Pipe Storage Facility, Madibeng Local Municipality, North West Province. Banzai Environmental (Pty) Ltd, Bloemfontein.



- Butler, E., 2020. Palaeontological Field Assessment for the Proposed Piggery on Portion 46 of the Farm Brakkefontien 416, Within the Nelson Mandela Bay Municipality, Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological field Assessment for the proposed Rietfontein Housing Project as part of the Rapid Land Release Programme, Gauteng Province Department of Human Settlements, City of Johannesburg Metropolitan Municipality. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Desktop Assessment for the Proposed Choje Wind Farm between Grahamstown and Somerset East, Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Desktop Assessment of the Proposed Prospecting Right Application for the Prospecting of Diamonds (Alluvial, General & In Kimberlite), Combined with A Waste License Application, Registration Division: Gordonia and Kenhardt, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Impact Assessment for the Proposed Clayville Truck Yard, Ablution Blocks and Wash Bay to be Situated on Portion 55 And 56 Of Erf 1015, Clayville X11, Ekurhuleni Metropolitan Municipality, Gauteng Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Desktop Assessment for the Proposed Hartebeesthoek Residential Development. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Desktop Assessment for the Proposed Mooiplaats Educational Facility, Gauteng Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Impact Assessment for the Proposed Monument Park Student Housing Establishment. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Field Assessment for the Proposed Standerton X10 Residential and Mixed-Use Developments, Lekwa Local Municipality Standerton, Mpumalanga Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Field Assessment for the Rezoning and Subdivision of Portion 6 Of Farm 743, East London. Banzai Environmental (Pty) Ltd, Bloemfontein. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Field Assessment for the Proposed Matla Power Station Reverse Osmosis Plant, Mpumalanga Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Desktop Assessment of the Proposed Prospecting Right Application Without Bulk Sampling for the Prospecting of Diamonds Alluvial near Bloemhof on Portion 3 (Portion 1) of the Farm Boschpan 339, the Remaining Extent of Portion 8 (Portion 1), Portion 9 (Portion 1) and Portion 10 (Portion 1) and Portion 17 (Portion 1) of the Farm Panfontein 270, Registration Division: Ho, North West Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Desktop Assessment of the Proposed Prospecting Right Application Combined with a Waste Licence Application for the Prospecting of Diamonds Alluvial, Diamonds General and Diamonds near Wolmaransstad on the Remaining Extent, Portion 7 and Portion 8 Of Farm Rooibult 152, Registration Division: HO, North West Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Desktop Assessment of the Proposed Prospecting Right Application With Bulk Sampling combined with a Waste Licence Application for the Prospecting of Diamonds Alluvial (Da), Diamonds General (D), Diamonds (Dia) and Diamonds In Kimberlite (Dk) near Prieska On Portion 7, a certain Portion of the Remaining Extent of Portion 9 (Wouter), Portion 11 (De Hoek), Portion 14 (Stofdraai) (Portion of Portion 4), the Remaining Extent of Portion 16 (Portion Of Portion 9) (Wouter) and the Remaining Extent of Portion 18 (Portion of Portion 10) of the Farm Lanyon Vale 376, Registration Division: Hay, Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Desktop Assessment of the Proposed Prospecting Right Area and Mining Permit Area near Ritchie on the Remaining Extent of Portion 3 (Anna's Hoop) of the Farm Zandheuvell 144, Registration Division: Kimberley, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Desktop Assessment of the Proposed Okapi Diamonds (Pty) Ltd Mining Right of Diamonds Alluvial (Da) & Diamonds General (D) Combined with a Waste Licence Application on the Remaining Extent of Portion 9 (Wouter) of the Farm Lanyon Vale 376; Registration Division: Hay; Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2020. Palaeontological Field Assessment of the Proposed Prospecting Right Application for the Prospecting of Diamonds (Alluvial & General) between Douglas and Prieska on Portion 12, Remaining Extent of Portion 29 (Portion of Portion 13) and Portion 31 (Portion of Portion 29) on the



Farm Reads Drift 74, Registration Division; Herbert, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment for the Proposed Mining Permit Application Combined with a Waste License Application for the Mining of Diamonds (Alluvial) Near Schweitzer-Reneke on a certain Portion of Portion 12 (Ptn of Ptn 7) of the Farm Doornhoek 165, Registration Division: HO, North West Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment for Black Mountain Koa South Prospecting Right Application, Without Bulk Sampling, in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Impact Assessment of the Proposed AA Bakery Expansion, Sedibeng District Municipality, Gauteng. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment for the Proposed Boegoeberg Township Expansion, Kheis Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment for the Proposed Gariep Township Expansion, Kheis Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment for the Proposed Groblershoop Township Expansion, Kheis Local Municipality, Zf Mgcawu District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment for the Proposed Grootdrink Township Expansion, Kheis Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Exemption Letter for the Proposed Opwag Township Expansion, Kheis Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Exemption Letter for the Proposed Topline Township Expansion, Kheis Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment for the Proposed Wegdraai Township Expansion, Kheis Local Municipality, Zf Mgcawu District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological field Assessment for the Proposed Establishment of an Emulsion Plant on Erf 1559, Hardustria, Harrismith, Free State. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, 2020. Part 2 Environmental Authorisation (EA) Amendment Process for the Kudusberg Wind Energy Facility (WEF) near Sutherland, Western and Northern Cape Provinces- Palaeontological Impact Assessment. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment Proposed for the Construction and Operation of the Battery Energy Storage System (BESS) and Associated Infrastructure and inclusion of Additional Listed Activities for the Authorised Droogfontein 3 Solar Photovoltaic (PV) Energy Facility Located near Kimberley in the Sol Plaatje Local Municipality, Francis Baard District Municipality, in the Northern Cape Province of South Africa. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Impact Assessment for the Proposed Development of a Cluster of Renewable Energy Facilities between Somerset East and Grahamstown in the Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the Proposed Amaoti Secondary School, Pinetown, eThekweni Metropolitan Municipality KwaZulu Natal. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the Proposed an Inland Diesel Depot, Transportation Pipeline and Associated Infrastructure on Portion 5 of the Farm Franshoek No. 1861, Swinburne, Free State Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the proposed erosion control gabion installation at Alpine Heath Resort on the farm Akkerman No 5679 in the Bergville district Kwazulu-Natal. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the proposed Doornkloof Residential development on portion 712 of the farm Doornkloof 391 Jr, City of Tshwane Metropolitan Municipality in Gauteng, South Africa. Banzai Environmental (Pty) Ltd, Bloemfontein.



Butler, E., 2021. Palaeontological Desktop Assessment for the Proposed Expansion of the Square Kilometre Array (SKA) Meerkat Project, on the Farms Mey's Dam RE/68, Brak Puts RE /66, Swartfontein RE /496 & Swartfontein 2/496, in the Kareeberg Local Municipality, Pixley Ka Seme District Municipality, and the Farms Los Berg 1/73 & Groot Paardekloof RE /74, in the Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for De Beers Consolidated Mines: Proposed Drilling on Portion 6 of Scholtzfontein 165 and Farm Arnotsdale 175, Herbert District in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for De Beers Consolidated Mines: Proposed Drilling on the Remaining Extent of Biessie Laagte 96, and Portion 2 and 6 of Aasvogel Pan 141, Near Hopetown in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for De Beers Consolidated Mines: Proposed Drilling in the North West Province: on Portions 7 (RE) (of Portion 3), 11, 12 (of Portion 3), 34 (of Portion 30), 35 (of Portion 7) of the Farm Holfontein 147 IO and Portions 1, 2 and the RE) of the Farm Kareeboschbult 76 Ip and Portions 1, 2, 4, 5, 6, (of Portion 3), 7 (of Portion 3), 13, 14, and the Re of the farm Oppaslaagte 100IP and portions 25 (of Portion 24) and 30 of the farm Slypsteen 102 IP. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the Proposed Expansion of the Cavalier Abattoir on farm Oog Van Boekenhoutskloof of Tweefontein 288 JR, near Cullinan, City of Tshwane Metropolitan Municipality, Gauteng. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the Proposed Doornkloof Residential Development on Portion 712 of the Farm Doornkloof 391 JR, City of Tshwane Metropolitan Municipality in Gauteng, South Africa. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed High Density Social Housing Development on part of the Remainder of Portion 171 and part of Portion 306 of the farm Derdepoort 326 JR, City of Tshwane. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Red Rock Mountain Farm activities on Portions 2, 3 and 11 of the Farm Buffelskloof 22, near Calitzdorp in the Western Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Mixed-use Development on a Part of Remainder of Portion 171 and Portion 306 of the farm Derdepoort 326 JR, City of Tshwane. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the Proposed Realignment of the D 2809 Provincial Road as well as the Mining Right Application for the Glisa and Paardeplaats Sections of the NBC Colliery (NBC) near Belfast (eMakhazeni), eMakhazeni Local Municipality, Nkangala District Municipality, Mpumalanga Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed construction of Whittlesea Cemetery within Enoch Mjijima Local Municipality area, Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the establishment of a mixed-use development on Portion 0 the of Erf 700, Despatch, Nelson Mandela Bay Municipality, Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed East Orchards Poultry Farm, Delmas/Botleng Transitional Local Council, Mpumalanga. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the proposed East Orchards Poultry Farm, Delmas/Botleng Transitional Local Council, Mpumalanga. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment to assess the proposed Gariep Road upgrade near Groblershoop, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the Ngwedi Solar Plant which forms part of the authorised Paleso Solar Powerplant near Viljoenskroon in the Free State. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the Noko Solar Power Plant and power line which forms part of the authorised Paleso Solar Powerplant near Orkney in the North West. Banzai Environmental (Pty) Ltd, Bloemfontein.



Butler, E., 2021. Palaeontological Impact Assessment for the Proposed Power Line as part of the Paleso Solar Power Plant near Viljoenskroon in the Free State. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the Thakadu Solar Plant which forms part of the authorised Paleso Solar Powerplant near Viljoenskroon in the Free State. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment for the proposed Farming Expansions on Portions 50 of the Farm Rooipoort 555 JR, Portion 34 of the Farm Rooipoort 555 JR, Portions 20 and 49 of the Farm Rooipoort 555 JR and Portion 0(RE) of the Farm Oudou Boerdery 626 JR, Tshwane Metropolitan Municipality, Gauteng Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment for the proposed Saselamani CBD on the Remainder of Tshikundu's Location 262 MT, and the Remainder of Portion 1 of Tshikundu's Location 262 MT, Collins Chabane Local Municipality, Limpopo Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the proposed expansions of the existing Molare Piggery infrastructure and related activities on Portion 0(Re) of the farm Arendsfontein 464 JS, Portion 0(Re) of the farm Wanhoop 443 JS, Portion 0(Re) of the farm Eikeboom 476 JS and Portions 2 & 7 of the farm Klipbank 467 JS within the jurisdiction of the Steve Tshwete Local Municipality, Mpumalanga Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Nchwaning Rail Balloon Turn Outs at Black Rock Mine Operations (BRMO) near Hotazel in the John Taolo Gaetsewe District Municipality in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Black Rock Mining Operations (BRMO) new rail loop and stacker reclaiming Project at Gloria Mine near Hotazel in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2020. Palaeontological Desktop Assessment for the proposed Nchwaning Rail Balloon Turn Outs at Black Rock Mine Operations (BRMO) near Hotazel in the John Taolo Gaetsewe District Municipality in the Northern Cape.

Butler, E., 2021. Palaeontological Impact Assessment for the proposed utilization of one Borrow Pit for the planned Clarkebury DR08034 Road Upgrade, Engcobo Local Municipality, Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Kappies Kareeboom Prospecting Project on Portion 1 and the Remainder of the farm Kappies Kareeboom 540, the Remainder of Farm 544, Portion 5 of farm 534 and Portion 1 of the farm Putsfontein 616, ZF Mgcawu District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Kameel Fontein Prospecting Project on the Remainder of the farm Kameel Fontein 490, a portion of the farm Strydfontein 614 and the farm Soetfontein 606, ZF Mgcawu District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Lewis Prospecting Project on Portions of the Farms Lewis 535, Spence 537, Wright 538, Symthe 566, Bredenkamp 567, Brooks 568, Beaumont 569 and Murray 570, John Taolo Gaetsewe District Municipality in the Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the Construction of the Ganspan Pering 132kV Powerline, Phokwane Local Municipality, Frances Baard District Municipality in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the Longlands Prospecting Project on a Portion of the farm Longlands 350, Frances Baard District Municipality, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Impact Assessment for the proposed development of 177 new units in the northern section of Mpongo Park in the Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Qhumanco Irrigation Project, Chris Hani District Municipality Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.

Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Raphuti Settlement Project on Portions of the Farm Weikrans 539KQ in the Waterberg District Municipality of the Limpopo Province. Banzai Environmental (Pty) Ltd, Bloemfontein.



- Butler, E., 2021. Palaeontological Impact Assessment for the Senqu Rural Project, Joe Gqabi District Municipality, Senqu Local Municipality, in the Eastern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Impact Assessment for the proposed new Township development on portion of the farm Klipfontein 716 and farm Ceres 626 in Bloemfontein, Mangaung Metropolitan Municipality, Free State. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Desktop Assessment for the ECDOT Borrow Pits and WULA near Sterkspruit, Joe Gqabi District Municipality in the Eastern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Desktop Assessment for the proposed SANRAL Stone Crescent Embankment Stabilisation Works along the N2 on the farm Zyfer Fonteyn 253 (Portion 0, 11 and 12RE) and Palmiet Rivier 305 (Portion 34, 36) near Grahamstown in the Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Impact Assessment for the Klein Rooipoort Trust Citrus Development, in the Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Impact Assessment for the proposed Victoria West water augmentation project in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Campbell Sewer, Internal Reticulation, Outfall Sewer Line and Oxidation Ponds, located on ERF 1, Siyancuma Local Municipality in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Desktop Assessment for the proposed Development and Upgrades within the Great Fish River Nature Reserve, Eastern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Desktop Assessment for proposed Parsons Power Park a portion of Erf 1. within the Nelson Mandela Bay Municipality in the Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Desktop Assessment for the proposed expansion of the farming operations on part of portions 7 and 8 of farm Boerboonkraal 353 in the Greater Tubatse Local Municipality of Sekhukhune District, Limpopo Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Desktop Assessment to assess the proposed low-level pedestrian bridge, in Heilbron, Free State. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Desktop Assessment to assess the proposed township developments in Hertzogville, Malebogo, in Heilbron, Free State. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Impact Assessment for the proposed construction of Malangazana Bridge on Farm No.64 Nkwenkwana, Engcobo Local Municipality, Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Impact Assessment to assess the proposed Construction of Middelburg Integrated Transport Control Centre on Portion 14 of Farm 81 Division of Middelburg, Chris Hani District Municipality in the Eastern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Desktop Assessment for the Witteberge Sand Mine on the remainder of farm Elandskrag Plaas 269 located in the Magisterial District of Laingsburg and Central Karoo District Municipality in the Western Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Impact Assessment (PIA) to assess the proposed Agrizone 2, Dube Trade Port in KwaZulu Natal Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2021. Palaeontological Desktop Assessment assessing the proposed Prospecting Right application without bulk sampling for the prospecting of Chrome ore and platinum group metals on the Remaining Extent of the farm Doornspruit 106, Registration Division: HO; North West Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Desktop Assessment for the proposed Ennerdale Extension 2 Township Establishment on the Undeveloped Part of Portion 134 of the Farm Roodepoort 302IQ, City of Johannesburg Metropolitan Municipality, Gauteng Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Desktop Assessment for the Construction of the ESKOM Mesong 400kV Loop-In Loop-Out Project, Ekurhuleni Municipality, Gauteng Province. Banzai Environmental (Pty) Ltd, Bloemfontein.



- Butler, E., 2022. Palaeontological Desktop Assessment for the Proposed Vinci Prospecting Right Application on the Remainder of the Farm Vinci 580, ZF Mgcawu District Municipality, in the Northern Cape Province, Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Desktop Assessment for the proposed Farm 431 Mining Right Application (MRA), near Postmasburg, ZF Mgcawu District Municipality, in the Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Impact Assessment for the Leeuw Braakfontein Colliery Expansion Project (LBC) in the Amajuba District Municipality, KwaZulu-Natal. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Desktop Assessment for the proposed reclamation of the 5L23 TSF in Ekurhuleni, Gauteng Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Desktop Assessment for the Proposed Mogalakwena Mine Infrastructure Expansion (near Mokopane in the Mogalakwena Local Municipality, Limpopo Province). Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Desktop Assessment for the proposed 10km Cuprum to Kronos Double Circuit 132kV Line and Associated Infrastructure in Copperton in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Impact Assessment for the proposed Hoekplaas WEF near Victoria West in the Northern Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Desktop Assessment (PDA) assessing the proposed Prospecting Right Application without bulk sampling for the Prospecting of Diamonds Alluvial (DA), Diamonds General (D), Diamonds in Kimberlite (DK) & Diamonds (DIA) on the Remaining Extent of the Farm Goede Hoop 547, Remaining Extent of the Farm 548, Remaining Extent of Portion 2 and Portion 3 of the Farm Skeyfontein 536, Registration Division: Hay, Northern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Impact Assessment for the proposed extension of Duine Weg Road between Pellsrus and Marina Martinique as well as a Water Use Authorisation (WUA) for the project. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Proposed Mimosa Residential Development and Associated Infrastructure on Fairview Erven, in Gqeberha (Port Elizabeth), Nelson Mandela Bay Metropolitan Municipality, Eastern Cape Province. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Impact Assessment for the Witteberge Sand Mine on the remainder of farm Elandskrag Plaas 269 located in the Magisterial District of Laingsburg and Central Karoo District Municipality in the Western Cape. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E., 2022. Palaeontological Desktop Assessment to assess the Palaeontology for the Somkhele Anthracite Mine's Prospecting Right Application, on the Remainder of the Farm Reserve no 3 No 15822 within the uMkhanyakude District Municipality and the Mtubatuba Local Municipality, KwaZulu Natal. Banzai Environmental (Pty) Ltd, Bloemfontein.
- Butler, E. 2022. Palaeontological Desktop Assessment to assess the proposed Altina 120 MW Solar Photovoltaic (PV) Project near Orkney in the Free State,
- Butler, E. 2022. Palaeontological Desktop Assessment to assess the proposed SERE Solar Photovoltaic Plant Phase 1A and associated infrastructure in the Western Cape Province.
- Butler, E. 2022. Palaeontological Impact Assessment for the proposed development of a 10 MW Solar Photovoltaic (PV) Plant and associated grid connection infrastructure on Portion 9 of the Farm Little Chelsea 10, Eastern Cape Province.
- Butler, E. 2022. Palaeontological Desktop Assessment to assess the proposed Dominion 1 Solar Park, located on the Remaining Extent of Portion 18 of Farm 425, near Klerksdorp within the North-West Province.
- Butler, E., 2022. Palaeontological Desktop Assessment to assess the proposed Dominion 2 Solar Park, located on the Remaining Extent of Portion 8 of Farm 425, near Klerksdorp within the North-West Province.
- Butler, E., 2022. Palaeontological Desktop Assessment to assess the proposed Dominion 3 Solar Park, located on the Remaining Extent of Portion 11 of Farm 425, and Remaining Extent of Portion 31 of Farm 425 near Klerksdorp within the North-West Province
- Butler, E., 2022. Palaeontological Impact Assessment to assess the Delta Solar Power Plant on the remaining extent of the farm Kareefontein No. 340, Dr Ruth Segomotsi Mompati District Municipality, Lekwa-Teemane Local Municipality near Bloemhof in the North West Province



- Butler. E., 2022. Palaeontological Impact Assessment to assess the Sonneblom Solar Power Plant (SPP) on Portion 1 of the farm Blydschap No. 504 within the Mangaung Metropolitan Municipality, southeast of Bloemfontein in the Free State.
- Butler. E., 2022. Palaeontological Impact Assessment for the proposed Naos Solar PV One Project near Viljoenskroon in the Free State.
- Butler. E., 2022. Palaeontological Impact Assessment for the proposed Naos Solar PV Two Project near Viljoenskroon in the Free State.
- Butler. E., 2022. Palaeontological Impact Assessment for the proposed Naos Solar PV Two Project near Viljoenskroon in the Free State.
- Butler. E., 2022. Palaeontological Impact Assessment for the Ngwedi Solar Power near Viljoenskroon in the Free State.
- Butler. E., 2022. Palaeontological Impact Assessment for the Noko Solar Power Plant and power line near Orkney in the North West.
- Butler. E., 2022. Palaeontological Impact Assessment for the Proposed Power Line as part of the Paleso Solar Power Plant near Viljoenskroon in the Free State
- Butler. E., 2022. Palaeontological Impact Assessment for the Thakadu Solar Plant which near Viljoenskroon in the Free State
- Butler. E., 2022. Palaeontological Impact Assessment of the Kentani, Braklaagte, Klipfontein, Klipfontein 2, Leliehoek and Sonoblomo PV Facilities located near Dealsville in the Free State Province
- Butler. E., 2022. Palaeontological Impact Assessment for the proposed Harvard 1 Solar Photovoltaic (PV) facility on Portion 5 of Farm Spes Bona no 2355, Mangaung Metropolitan Municipality in the Free State.
- Butler. E., 2022. Palaeontological Impact Assessment for proposed Harvard 2 Solar Photovoltaic (PV) facility on Portion 8 of Farm Spes Bona No 2355, Mangaung Metropolitan Municipality in the Free State.
- Butler. E., 2022. Palaeontological Impact Assessment for the proposed Doornrivier Solar 1, southwest of Matjhabeng (formerly Virginia) in the Free State
- Butler. E., 2022. Palaeontological Desktop Assessment for the proposed Leeuwbosch PV solar photovoltaic (PV) plant and associated infrastructure on Portion 37 of the Farm Leeuwbosch No. 44 near Leeudoringstad within the Maquassi Hills Local Municipality in the Dr Kenneth Kaunda District Municipality in the North West Province.
- Butler. E., 2023. Palaeontological Impact Assessment to assess the Carmel Solar 1 Photovoltaic Solar Energy Facility, near Carletonville, Gauteng Province.
- Butler. E., 2023. Palaeontological Impact Assessment to assess the Carmel Solar 2 Photovoltaic Solar Energy Facility, near Carletonville, Gauteng Province
- Butler. E., 2023. Palaeontological Impact Assessment to assess the Carmel Solar 3 Photovoltaic Solar Energy Facility, near Carletonville, Gauteng Province.
- Butler. E., 2023. Palaeontological Desktop Assessment for the proposed Droogfontein 6 Solar Energy Facility and Battery Energy Storage System, near Kimberley, Northern Cape Province
- Butler. E., 2023. Palaeontological Desktop Assessment to assess the Icarus Solar Power Plant near Klerksdorp, North West Province.
- Butler. E., 2023. Palaeontological Desktop Assessment to assess the proposed Virgo Solar Power Plant near Kathu in the Northern Cape Province
- Butler. E., 2023. Palaeontological Desktop Assessment to assess the proposed Libra Solar Power Plant near Kathu in the Northern Cape Province
- Butler. E., 2023. Palaeontological Impact Assessment to assess the proposed Khwezi Solar Grid Infrastructure near Excelsior, in the Free State Province
- Butler. E., 2023. Palaeontological Impact Assessment to assess the proposed Khwezi Solar Power Plant near Excelsior, in the Free State Province
- Butler. E., 2023. Palaeontological Impact Assessment to assess the proposed Lengana Solar Grid Infrastructure near Excelsior, in the Free State Province
- Butler. E., 2023. Palaeontological Impact Assessment to assess the proposed Lengana Solar Power Plant near Excelsior, in the Free State Province
- Butler. E., 2023. Palaeontological Desktop Assessment for Luckhoff Solar 1 Photovoltaic Solar Energy Facility (SEF) and associated infrastructure near Luckhoff in the Free State