



**PALAEONTOLOGICAL FIELD ASSESSMENT FOR THE PROPOSED DESPATCH PARK  
MIXED-USE DEVELOPMENT ON PORTION 0 OF ERF 700, DESPATCH, NELSON  
MANDELA BAY MUNICIPALITY, EASTERN CAPE REF: ECM1/C/LN2/M/43-2021**

**Compiled for:**

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## **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.

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**SIGNATURE:**

A handwritten signature in black ink, appearing to read 'Elize Butler'.

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*

<b>Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017</b>	<b>Relevant section in report</b>	<b>Comment where not applicable.</b>
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 vita	Section 2 – refer to <b>Appendix A</b>	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 4 – Objective	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 5 – Geological and Palaeontological history	-
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 10	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 1 and 11	
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 7 Approach and Methodology	-
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 1 and 11	
(g) An identification of any areas to be avoided, including buffers	Section 5	No buffers or areas of sensitivity identified

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
(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 7.1 – Assumptions and Limitation	-
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 1 and 11	
(k) Any mitigation measures for inclusion in the EMPr	Section 12	
(l) Any conditions for inclusion in the environmental authorisation	Section 12	
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 12	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 1 and 11	
(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 11	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study	N/A	Not applicable. A public consultation process will be conducted as part of the EIA and EMPr process.
(p) A summary and copies if any comments that were received during any consultation process	N/A	

<b>Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017</b>	<b>Relevant section in report</b>	<b>Comment where not applicable.</b>
(q) Any other information requested by the competent authority.	N/A	Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Section 3 compliance with SAHRA guidelines	

## EXECUTIVE SUMMARY

Banzai Environmental was appointed by Environmental Consultants International (Pty) Ltd (ECI) to conduct the 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. To comply with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), this PDA is necessary to confirm if fossil material could potentially be present in the planned development area and to evaluate the potential impact of the proposed development on the Palaeontological Heritage.

The proposed development is mostly underlain by the Kirkwood Formation (Uitenhage Group) in the south while Quaternary sediments is present in the northern portion of the development. The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Kirkwood Formation is Very High. However, this map indicates that the northern portion of the development is underlain by unknown sediment (Almond and Pether, 2009; Almond *et al.*, 2013).

Two alternatives for the proposed development have been proposed. These alternatives only differ in the number of units allocated for the development. A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 23 October 2021. The site is covered by dense vegetation and no visible evidence of fossiliferous outcrops was identified. As the geology of the two layout alternatives is the same there is not a preference for a specific alternative from a Palaeontological point of view. Fossils are abundantly found in the Kirkwood Formation (Uitenhage Group).

It is thus recommended that:

- The Environmental Control Officer (ECO), responsible for the development should be aware of the possibility of finding fossils in the Kirkwood Formation.
- Training of accountable supervisory personnel by a qualified palaeontologist in the recognition of fossil heritage is necessary.
- If Palaeontological Heritage is uncovered during surface clearing and excavations the **Chance find Protocol** attached should be implemented immediately. These discoveries ought to be protected (if possible, *in situ*) and the ECO must report to SAHRA (Contact details: Eastern Cape Provincial Heritage Resources Authority (ECPHRA), 16 Commissioner Street, East London, 5201, South Africa. Tel: 043 745 0888. Fax: 043 745 0889., email: [info@ecphra.org.za](mailto:info@ecphra.org.za); Web: <https://www.ecphra.org.za/>) so that correct mitigation (recording and collection) can be carry out by a paleontologist.

Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012). It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

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## 1 INTRODUCTION

The establishment of a Mixed-Use Development, on Portion 0 of Erf 700, Despatch, Nelson Mandela Bay Municipality (NMBMM) in the Eastern Cape is proposed (**Figure1-3**). Corner House Developments commissioned Environmental Consultants International (Pty) Ltd (ECI) as independent Environmental Assessment Practitioner (EAP) to apply for the Environmental Authorization (EA), including a Scoping and Environmental Impact Assessment Report (S&EIR) and Environmental Management Plan (EMPr) to the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT). The development is approximately 47 hectares (ha) in extent.

The proposed development will comprise of the following:

- residential
- institutional
- business, and
- open space land uses.

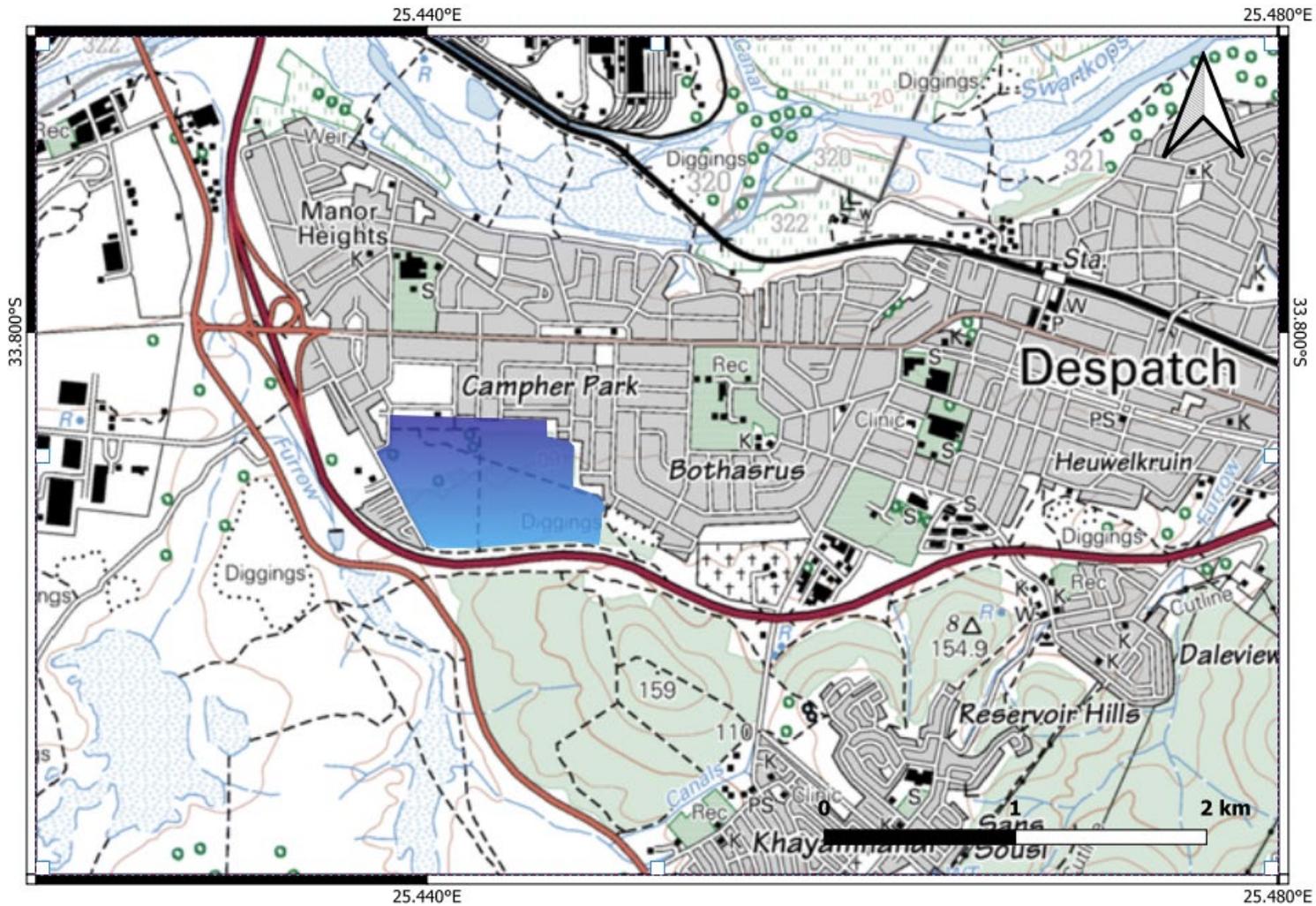
The residential section will include a retirement village, single residential units; town houses; and flats. The commercial part will consist of a filling station, shopping centre, office space, as well as a private hospital and school.

Two alternatives will be assessed in the EIA phase namely

- Alternative 1: Proposed Activity
- Alternative 2: Layout Alternative



**Figure 1:** Google Earth Image (2021) indicating the locality of the proposed Mixed-Use Development, on Portion 0 of Erf 700, Despatch, Nelson Mandela Bay Municipality (NMBMM) in the Eastern Cape Province



**Figure 2:** Location of the Mixed-Use Development, on Portion 0 of Erf 700, Despatch, Nelson Mandela Bay Municipality (NMBMM) in the Eastern Cape Province.

[1:50,000 Topographical Map Ref – 3325CD].

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The following information is provided by ECI

The **Proposed Activity** is the preferred alternative and consists of ten phases of development including low, medium and high-density residential development, retail facilities, a health facility, a filling station and a school. The total footprint will be 47 hectares and the development will include a **maximum of 2347 residential units**. All ten phases will be developed in chronological order, starting at Phase 1 to Phase 10 and the entire development will be completed within a period of 13 years. The ten phases will be developed as follows:

- Phase 1 will consist of 480 residential units (medium to high density)
- Phase 2 will consist of a 1000m<sup>2</sup> retail component
- Phase 3 will consist of 355 residential units (medium to high density)
- Phase 4 will consist of 355 residential units (medium to high density)
- Phase 5 will consist of a 1000m<sup>2</sup> retail component
- Phase 6 will consist of 357 residential units (medium to high density)
- Phase 7 will consist of 400 residential units (medium to high density)
- Phase 8 will consist of a 1000m<sup>2</sup> private hospital and a 5000m<sup>2</sup> filling station
- Phase 9 will consist of an 8000m<sup>2</sup> private school
- Phase 10 will consist of 400 residential units.

Areas bordering existing residential areas will be zoned as Residential 1 (low density) erven, whereas units next to R75 road will be high density units. The proposed filling station (Phase 8) and retail components of Phase 2 and Phase 5 will be accessible to residents of the development from the east (by car or by foot), via Gen Smuts Ave, and to non-residents of the development, from the west, via Jansen Street.

**Alternative 2** is very similar to the Proposed Activity apart from the density of the residential phases. Alternative 2 also consists of ten phases of development including low, medium and high-density residential development, retail facilities, a health facility, a filling station and a school. The total footprint will be 47 hectares and the development will include a **maximum of 5000 residential units**. All ten phases will be developed in chronological order, starting at Phase 1 to Phase 10 and the entire development will be completed within a period of 13 years.

The ten phases will be developed as follows:

- Phase 1 will consist of 480 residential units (high density)
- Phase 2 will consist of a 1000m<sup>2</sup> retail component
- Phase 3 will consist of 355 residential units (high density)
- Phase 4 will consist of 355 residential units (high density)

- Phase 5 will consist of a 1000m<sup>2</sup> retail component • Phase 6 will consist of 357 residential units (high density)
- Phase 7 will consist of 400 residential units (high density)
- Phase 8 will consist of a 1000m<sup>2</sup> private hospital and a 5000m<sup>2</sup> filling station
- Phase 9 will consist of an 8000m<sup>2</sup> private school
- Phase 10 will consist of 400 residential units.

Areas bordering existing residential areas will be zoned as Residential 1 (low density) erven, whereas units next to R75 road will be high density units. The proposed filling station (Phase 8) and retail components of Phase 2 and Phase 5 will be accessible to residents of the development from the east (by car or by foot), via Gen Smuts Ave, and to non-residents of the development, from the west, via Jansen Street.



Figure 3: Alternative 1. Proposed activity



Figure 4: Alternative 2- Layout alternative

## 2 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

## 3 LEGISLATION

### 3.1 National Heritage Resources Act (25 of 1999)

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

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**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

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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 m<sup>2</sup> 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 m<sup>2</sup> in extent.
- or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

#### **4 OBJECTIVE**

The objective of a Palaeontological Impact Assessment (PIA) is to determine the impact of the development on potential palaeontological material at the site.

According to the “SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports” the aims of the PIA are to: 1) identify rock formations (exposed and subsurface) that are deemed to be paleontologically significant 2) calculate the palaeontological significance of these formations(referring to the literature and Palaeontological Impact Assessments for previous documentation of heritage in the same area), and by conducting a field investigation to identify exposed and potential heritage 3) comment on the potential impact of the development (exposed and/or potential fossil resources) and 4) to recommend how the developer should protect or mitigate damage to fossil resources.

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.

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- Adherence to all applicable best practice recommendations, appropriate legislation and authority requirements.
- Submit a comprehensive overview of all appropriate legislation, guidelines.
- Description of the proposed project and provide information regarding the developer and consultant who commissioned the study.
- Description and location of the proposed development and provide geological and topographical maps.
- Provide Palaeontological and geological history of the affected area.
- Identification sensitive areas to be avoided (providing shapefiles/kmls) in the proposed development.
- Evaluation of the significance of the planned development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:
  - a. **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity.
  - b. **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity.
  - c. **Cumulative impacts** 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
- Implications of specialist findings for the proposed development (such as permits, licenses etc).

## 5 GEOLOGICAL AND PALAEOLOGICAL HISTORY

The proposed Despatch Mixed-Use Development on Portion 0 of Erf 700, Despatch, NMBMM in the Eastern Cape Province is depicted on the 1: 250 000 3324 Geological map of Port Elizabeth (1979) (Council of Geoscience. According to this map the proposed development is mostly underlain by the Kirkwood Formation (J-Kk) (Uitenhage Group) in the south while Quaternary sediments (T-Qg) is present in the northern portion of the development (**Figure 4**). The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Kirkwood Formation is Very High. However, this map indicates that the northern portion of the development is underlain by unknown sediment (white, Figure 5) (Almond and Pether, 2009; Almond *et al.*, 2013). This development falls in the Algoa Basin.

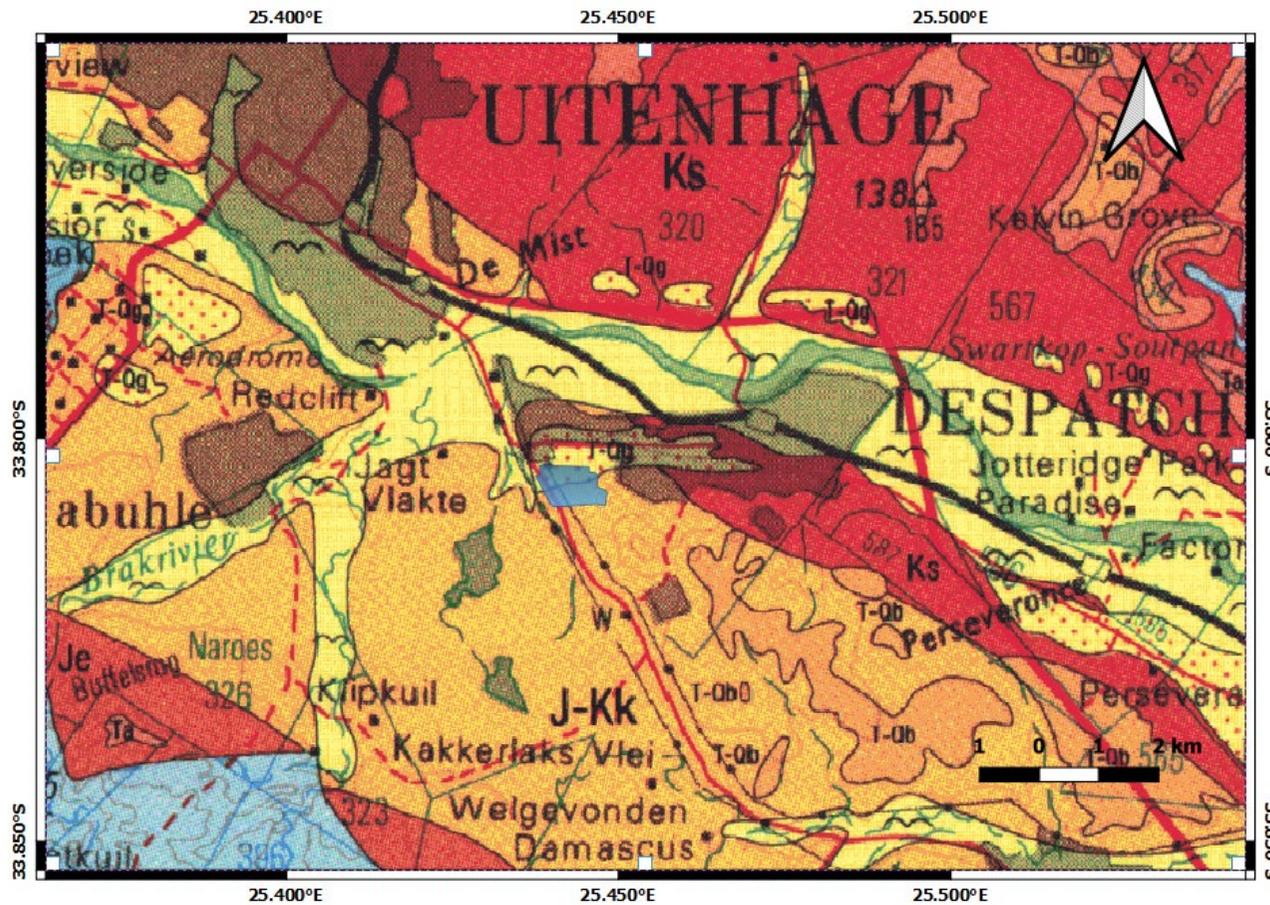
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The Uitenhage Group consists of three formations namely the Enon (oldest), Kirkwood, and Sundays River Formation (youngest) (Torien and Hill, 1989). It appears that these formations represent diverse depositional environments within a generally contemporaneous fluvial system, but the boundaries of the formations are not always clear. The oldest Enon formation (Je) occasionally consist of remarkable boulder conglomerates that is characteristic of a high energy depositional environment (in both alluvial fans and braided rivers). The Kirkwood formation (J-Kk) overlies the Enon formation, but the contact is not always clear due to intermediate features. The Kirkwood formation characterises the palaeosols and flood-plain deposits generally correlated with meandering river systems, as well as lacustrine, and probably coastal, settings. This formation is easily weathered and generally consists of sandstone and silty mudstones. Multi-coloured reddish brown, pinkish or greenish grey palaeosols are typical of this formation. The sandstones may be pale grey, yellowish or whitish in colour. The Kirkwood grades into the Sundays River Formation (Ks), which is the youngest formation of the Uitenhage Group and is represented by estuarine or shallow marine deposits. Characteristics of the Sundays River formation is siltstone and sandstone, that weather greenish grey and may contain gypsum and limestone as well as grey to blueish mudrock. Major drainage systems along the coastal areas of this region comprise of Quaternary intermediate and low-level fluvial terrace deposits (T-Qg), These deposits represent high-energy deposits in ancient river terraces that is presently at much higher elevations than the maximum flood levels for modern river systems. Toerien and Hill (1989) found that these gravel and soil layers may be cemented by iron oxides, lime, and silica and may have a calcrete cover.

No fossils are known from Quaternary gravel terraces (T-Qg; Fig. 4) and are considered to be of very low palaeontological significance (Almond, 2012). As previously mentioned, the Enon Formation had a high depositional energy and is extremely coarse-grained in nature and only rare bone fragments have been uncovered to date as well as some charred wood (McLachlan and McMillan, 1976). Numerous fossils have been recovered by the two youngest Formations (Kirkwood and Sundays River Formation) of the Uitenhage Group. The first fossils recovered from the Kirkwood Formation dates to 1845 with the discovery of fragmentary bones (partial skull with teeth) now identified as the stegosaur *Paranthodon africanus* (Atherstone, 1857; Galton and Coombs, 1981). Almost all vertebrate fossils recovered from the Kirkwood Formation are very fragmentary, and commonly only consists of isolated teeth and bones. The Kirkwood Formation is well-known for its Late Jurassic/ Early Cretaceous dinosaurs as well as diplodocid, stegosaurid, dicraeosaurid, and brachiosaurid forms, as well as coelosaur theropods and little iguanodontids. Other animal fossils include crocodiles, frogs, sphenodontid and other lizards, small mammals, and fish as well as turtles (McLachlan and McMillan 1976; Ross et al, 1999; de Klerk et al, 1998; de Klerk et al., 2000; McPhee et al., 2016). A wealth of invertebrate fossils is also known from this formation and in the Kirkwood area estuarine and freshwater molluscs are found as well as crustaceans (conchostracans and ostracods) and oysters (McLachlan and McMillan 1976; MacRae  
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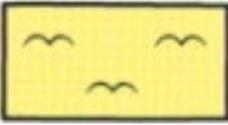
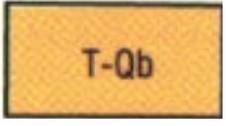
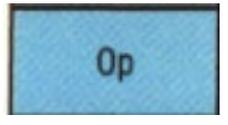
1999). Fossil plants near Kikrwood (especially along the Bezuidenhouts River) are the most well-represented in South Africa for this period (Anderson & Anderson, 1985; Bamford, 1986; MacRae, 1999; Muir et al., 2015). Studies conducted by Muir *et al* (2015) found an abundance of logs, as well as fossil charcoal on the Bezuidenhout River locality. Lignite and plant impression as well as amber, has been recovered. Plant impressions are seldom visible at the surface and are only found through the breaking of siltstones or mudrocks along bedding planes. Within the finer-grained siltstones and mudrocks plants such as benettitaleans, conifers, cycads, ferns and liverworts, are exposed by breaking the surrounding matrix. The Bezuidenhouts Riverbanks are especially well-known for its well preserved plant impressions in blue-grey siltstones.

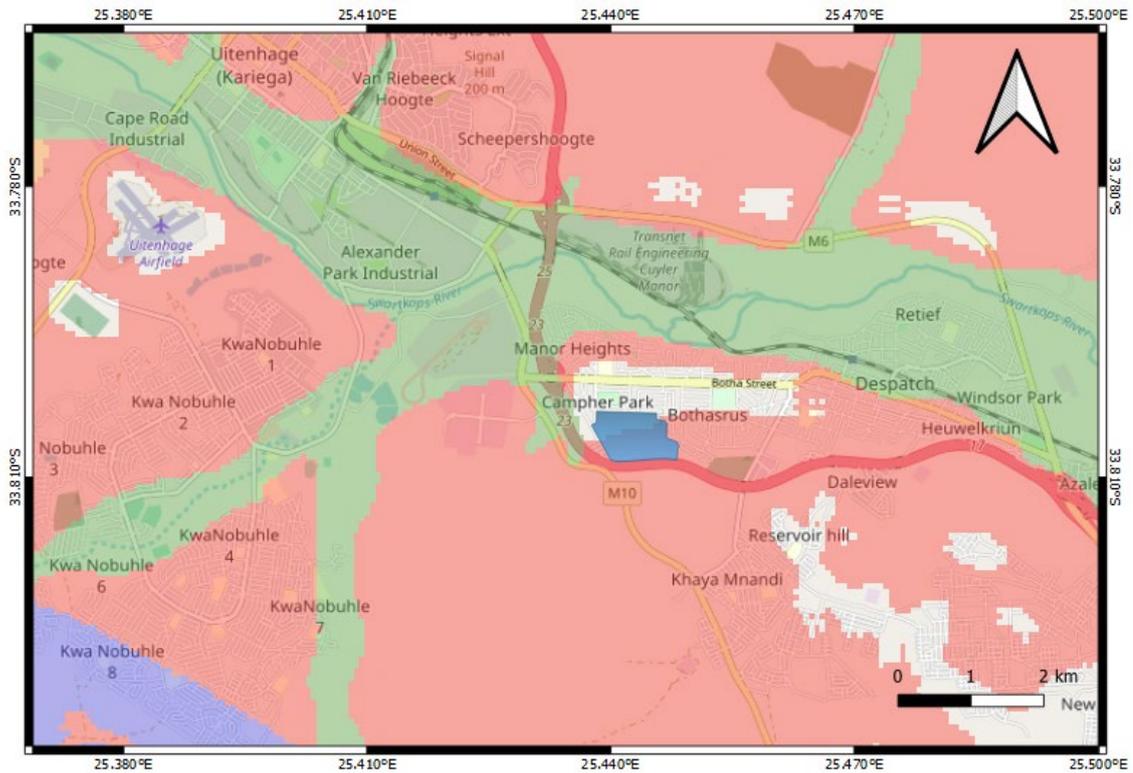
The Sundays River Formation is known for its shallow–marine deposits which may also have included estuarine, lagoonal and even shallow shelf settings. Invertebrate shells, plant remains, vertebrate fragments and microfossils are common. Most fossils remains are fragmentary but almost complete skeletons of the marine plesiosaur were recovered from this formation. Ammonites, commonly found in the Sundays River Formation have been extensively studied (Klinger and Kennedy, 1979).



(1979) (Council of Geoscience) indicating the geology of the proposed mixed-use development in blue. The proposed development is mostly underlain by the Kirkwood Formation (J-Kk) (Uitenhage Group) in the south while Quaternary sediments (T-Qg) is present in the northern portion of the development.

Table 2: Legend to map and short explanation [Modified from the 1:250 000 2234 Port Elizabeth (1979) Geological Map, Pretoria]

Symbol	Age	Group/Formation	Lithology
	Quaternary		Alluvium
			Intermediate and low-level fluvial terrace gravel
		Bluewater Bay*	Alluvial sheet gravel and sand
	Cretaceous	Sondagsrivier Formation, Uitenhage Group	Greenish-grey mudstone, sandstone
	Cretaceous/ Jurassic	Kirkwood Formation, Uitenhage Group	Reddish and green mudstone, sandstone
	Jurassic	Enon Formation, Uitenhage Group	Conglomerate, subordinate sandstone and mudstone
	Ordovician	Skiereiland Formation, Table Mountain Group	Quartzitic sandstone



**Figure 6:** Extract of the 1 in 250 000 SAHRIS PalaeoMap (Council of Geosciences) indicating the location of the proposed development.

*Proposed mixed-use development is indicated in blue. According to the SAHRIS Palaeosensitivity map (Figure 6) the proposed development is underlain by sediments with a Very High (red,) and unknown (white) Palaeontological Significance.*

Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

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The colors on the PalaeoMap indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero

## 6 GEOGRAPHICAL LOCATION OF THE SITE

The property forms a part of the Campher Park suburb, in the south-western part of Despatch. The development is about 25 km from Port Elizabeth along the R75 provincial road. The proposed development is presently zoned as 'Undetermined' and therefore needs to be rezoned with NMBMM preceding commencement of construction. Middle and low-density residential development is present to the north, west and east of the proposed development while the R75 forms the southern boundary of the property

## 7 METHODS

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

### 7.1 Assumptions and Limitations

The focal point of geological maps is the geology of the area, and the sheet explanations were not meant to focus on palaeontological heritage. Many inaccessible regions of South Africa have never been reviewed by palaeontologists and data is generally based on aerial photographs alone. Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented.

Comparable Assemblage Zones in other areas is sourced to provide information on the existence of fossils in an area which was not documented in the past. When using similar Assemblage Zones and geological formations for Desktop studies it is generally **assumed** that exposed fossil heritage is present within the footprint. **A field-assessment will thus improve the accuracy of the desktop assessment.**

## 8 ADDITIONAL INFORMATION CONSULTED

In compiling this report the following sources were consulted:

- Geological map 1:100 000, Geology of the Republic of South Africa (Visser 1984);
- 1: 250 000 Geological map 3324Port Elizabeth (1979) (Council of Geoscience)
- A Google Earth map with polygons of the proposed development was obtained from ECI.

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## 9 SITE VISIT

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 23 October 2021. The proposed development is extensively covered by high and extremely dense vegetation while rubbish and building material was dumped on the boundaries especially in the north west. During the site visit no visible evidence of fossiliferous outcrops was identified.



**Figure 7:** Northwestern boundary of the proposed Mixed-use development  
GPS coordinates -33,803611; 25,438611



**Figure 8:** Natural vegetation as well as dumped garden rubbish on the northern boundary of the site.

GPS coordinates -33.803333; 25.442222



**Figure 9:**North-eastern border of the proposed development indicating the dense vegetation of the area

GPS coordinates -33,804167; 25,445833



**Figure 10:** South-eastern border overlooking the proposed development



**Figure 11:** Southern border next to the R75.  
GPS coordinates -33,808333; 25,443611



**Figure 12:** North-western border of the development underlain by Quaternary sediments  
GPS coordinates - -33.804444; 25.438333

## 10 IMPACT ASSESSMENT METHODOLOGY

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the following project phases:

- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact, the following criteria is used:

Table 3: The rating system

<b>NATURE</b>		
The Nature of the Impact is the possible destruction of fossil heritage		
<b>GEOGRAPHICAL EXTENT</b>		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
<b>PROBABILITY</b>		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
<b>DURATION</b>		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be

		mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
<b>INTENSITY/ MAGNITUDE</b>		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
<b>REVERSIBILITY</b>		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
<b>IRREPLACEABLE LOSS OF RESOURCES</b>		

This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	<b>Complete loss of resources</b>	<b>The impact is result in a complete loss of all resources.</b>
<b>CUMULATIVE EFFECT</b>		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	<b>Low cumulative impact</b>	<b>The impact would result in insignificant cumulative effects.</b>
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
<b>SIGNIFICANCE</b>		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: <b>[(Extent (1) + probability (3) + reversibility (4) + irreplaceability (4) + duration (4) + cumulative effect (1)] x magnitude/intensity (2).</b> The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
<b>29 to 50</b>	<b>Negative medium impact</b>	<b>The anticipated impact will have moderate negative effects and will require moderate mitigation measures.</b>
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.

74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive

### 10.1 Summary of Impact Tables

Loss of fossil heritage will be a negative impact. Only the site will be affected by the proposed development. The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures, the damage or destruction of any palaeontological materials will be permanent. Impacts on palaeontological heritage during the construction phase could potentially occur. A negative medium Significance has been allocated to the proposed development.

## 11 FINDINGS AND RECOMMENDATIONS

The proposed development is mostly underlain by the Kirkwood Formation (Uitenhage Group) in the south while Quaternary sediments are present in the northern portion of the development. The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Kirkwood Formation is Very High. However, this map indicates that the northern portion of the development is underlain by unknown sediment (Almond and Pether, 2009; Almond *et al.*, 2013).

Two alternatives for the proposed development have been proposed. These alternatives only differ in the number of units allocated for the development. A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 23 October 2021. The site is covered by dense vegetation and no visible evidence of fossiliferous outcrops was identified. As the geology of the two layout alternatives is the same there is not a preference for a specific alternative from a Palaeontological point of view. Fossils are abundantly found in the Kirkwood Formation (Uitenhage Group).

It is thus recommended that:

- The Environmental Control Officer (ECO), responsible for the development should be aware of the possibility of finding fossils in the Kirkwood Formation.
- Training of accountable supervisory personnel by a qualified palaeontologist in the recognition of fossil heritage is necessary.
- If Palaeontological Heritage is uncovered during surface clearing and excavations the **Chance find Protocol** attached should be implemented immediately. These discoveries ought to be protected (if possible, *in situ*) and the ECO must report to SAHRA (Contact

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details: Eastern Cape Provincial Heritage Resources Authority (ECPHRA), 16 Commissioner Street, East London, 5201, South Africa. Tel: 043 745 0888. Fax: 043 745 0889., email: [info@ecphra.org.za](mailto:info@ecphra.org.za); Web: <https://www.ecphra.org.za/>) so that correct mitigation (recording and collection) can be carry out by a paleontologist.

Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012). It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

## 12 CHANCE FINDS PROTOCOL

A following procedure will only be followed if fossils are uncovered during excavation.

### 12.1 Legislation

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

Palaeontological heritage is unique and non-renewable and is protected by the NHRA and are the property of the State. It is thus the responsibility of the State to manage and conserve fossils on behalf of the citizens of South Africa. Palaeontological resources may not be excavated, 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.

### 12.2 Background

A fossil is the naturally preserved remains (or traces) of plants or animals embedded in rock. These plants and animals lived in the geologic past millions of years ago. Fossils are extremely rare and irreplaceable. By studying fossils, it is possible to determine the environmental conditions that existed in a specific geographical area millions of years ago.

### 12.3 Introduction

This informational document is intended for workmen and foremen on the construction site. It describes the actions to be taken when mining or construction activities accidentally uncovers fossil material.

It is the responsibility of the Environmental Site Officer (ESO) or site manager of the project to train the workmen and foremen in the procedure to follow when a fossil is accidentally uncovered. In the absence of the ESO, a member of the staff must be appointed to be responsible for the proper implementation of the chance find protocol as not to compromise the conservation of fossil material.

### 12.4 Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately **stop working** and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: [www.sahra.org.za](http://www.sahra.org.za)). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an

appropriate box while due care must be taken to remove all fossil material from the rescue site.

- Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

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## Appendix A – Elize Butler CV

### CURRICULUM VITAE

#### ELIZE BUTLER

**PROFESSION:** Palaeontologist  
**YEARS' EXPERIENCE:** 26 years in Palaeontology

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

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

Management Course, 1991  
University of the Orange Free State

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

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

#### MEMBERSHIP

Palaeontological Society of South Africa (PSSA) 2006-currently

#### EMPLOYMENT HISTORY

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

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

Research Assistant National Museum, Bloemfontein 1993 –  
1997

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

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**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.

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**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.

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**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.

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**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.

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**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.

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**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.

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**Butler, E. 2017.** Palaeontological Desktop Assessment of the construction of the proposed Viljoenskroon Munic 132 KV line, Vierfontein substation and related projects. Bloemfontein.

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**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.

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**Butler, E. 2017.** Palaeontological Desktop Assessment for the proposed prospecting right project without bulk sampling, in the Koa Valley, Northern Cape Province. Bloemfontein.

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**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.

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**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.

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**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed of the Lephalale Coal and Power Project, Lephalale, Limpopo Province, Republic of South Africa. Bloemfontein.

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**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.

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**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.

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**Butler, E. 2018.** Palaeontological Impact Assessment for the Proposed Landfill Site in Luckhoff, Letsemeng Local Municipality, Xhariep District, Free State. Bloemfontein.

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**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.

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**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.

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**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

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**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 Delportshoop 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.

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**Butler, E. 2018.** Proposed Kalabasfontein Mine Extension project, near Bethal, Govan Mbeki District Municipality, Mpumalanga. Bloemfontein.

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**Butler, E., 2019.** Palaeontological Field Assessment for the proposed Sirius 4 Photovoltaic Solar Energy Facility near Upington, Northern Cape Province

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**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

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**Butler, E., 2019.** Palaeontological Impact Assessment for the proposed Kangala Extension Project Near Delmas, Mpumalanga Province.

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- Butler, E., 2019.** Palaeontological Impact Assessment for the proposed Sace Lifex Project, Near Emalahleni, Mpumalanga Province
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- 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
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- 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
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- Palaeontological Field Assessment for the proposed establishment of a mixed-use development on Portion 0 the of Erf 700, Despatch, Nelson Mandela Bay Municipality, Eastern Cape*

**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

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**Butler, E., 2019.** Palaeontological Desktop Assessment of the proposed seepage interception drains at Duvha Power Station, Emalahleni Municipality, Mpumalanga Province

**Butler, E., 2019.** Palaeontological Desktop Assessment letter for the Proposed PV Solar Facility at the Heineken Sedibeng Brewery, near Vereeniging, Gauteng.

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**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, Kailash Municipality, Zf Mgcawu District Municipality, Northern Cape

**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.

**Butler, E., 2019.** Palaeontological Desktop Impact Assessment for the proposed re-commission of the Old Balgray Colliery near Dundee, Kwazulu Natal.

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**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

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**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

**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

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**Butler, E., 2020.** Palaeontological Field Assessment for the Rezoning and Subdivision of Portion 6 Of Farm 743, East London

**Butler, E., 2020.** Palaeontological Field Assessment for the Proposed Matla Power Station Reverse Osmosis Plant, Mpumalanga Province

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