PALAEONTOLOGICAL SPECIALIST STUDY

In terms of Section 38(8) of the NHRA

Proposed Mount Ruth Interchange upgrade, Mdantsane, East London

Prepared by

Dewald Wilken

and

CTS HERITAGE

In Association with

Terreco

March 2020

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THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I, **Dewald Wilken**, as the appointed independent specialist hereby declare that I:

• act/ed as the independent specialist in this application;

• regard the information contained in this report as it relates to my specialist input/study to be true and correct, and

• do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• have and will not have no vested interest in the proposed activity proceeding;

• have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;

• have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

• have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

• have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;

• have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favorable to the applicant or not; and

• am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543

Signed

Name
Dewald Wilken

Date: 11 March 2020

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EXECUTIVE SUMMARY

A desktop palaeontological Impact assessment was requested by the Buffalo City Metropolitan Municipality for the proposed construction of a new interchange on National Route 2. This report is completed in conjunction with a Heritage Impact Assessment to comply with the requirements of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

The proposed site lies on Jurassic Karoo dolerites that has intruded into the Middleton Formation of the late Permian Adelaide Subgroup in the Beaufort Group of the Karoo Supergroup. The Jurassic Dolerites are completely sterile and could have destroyed fossils in proximity due to contact metamorphism. However, construction could penetrate through these dolerites into the Middleton Formation which is a highly sensitive area in terms of national fossil heritage. Although the Middleton Formation is rich in fossils, very few vertebrate fossils have been found in close relation to the proposed construction site. Therefore, the site has a small chance of containing typical vertebrates of the Pristerognathus, Tropidostoma, Cistecephalus and Dicynodon Assemblage Zones. There is also a small chance of encountering typical but infrequent late Glossopteris flora.

For this reason, a Chance Fossil Find Procedure is added to the end of this report. As far as the palaeontology is concerned the project may proceed.

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1. INTRODUCTION

1.1 Background Information on Project

Buffalo City Metropolitan Municipality has developed proposals to construct a new interchange on National Route 2, Section 15 at approximately km 41.8. The development proposals include a 'diamond interchange' at St Luke's Road with a link road joining St Luke's Road to Billie Road. Existing bridges impacted by the proposed project are Billie Road rail overpass (B 5569) and St Luke's Bridge.

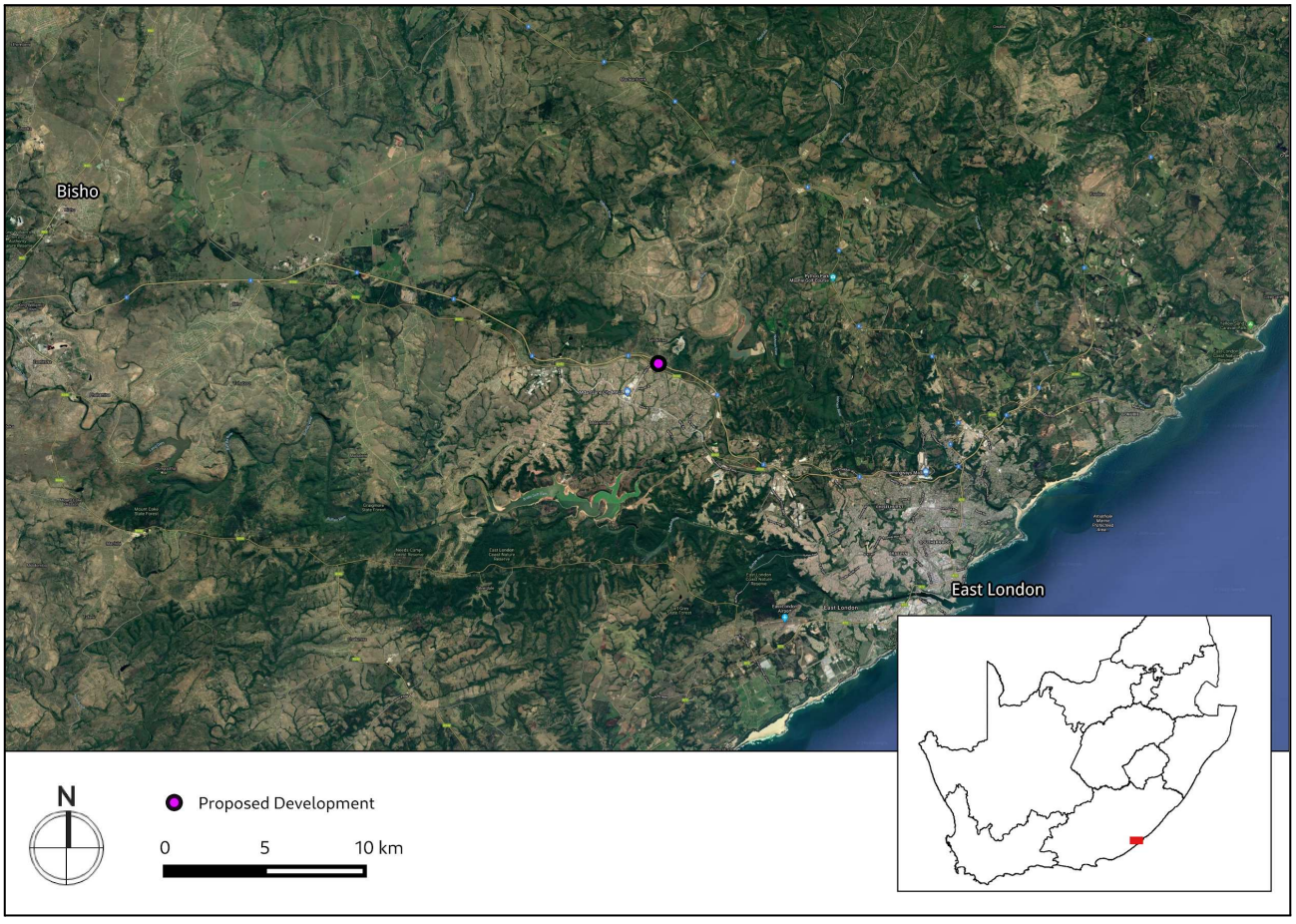

Figure 1Google Earth© satellite image of the upgrade of the Mount Ruth Intersection outside Mdantesane. Please see following two figures for more detail.

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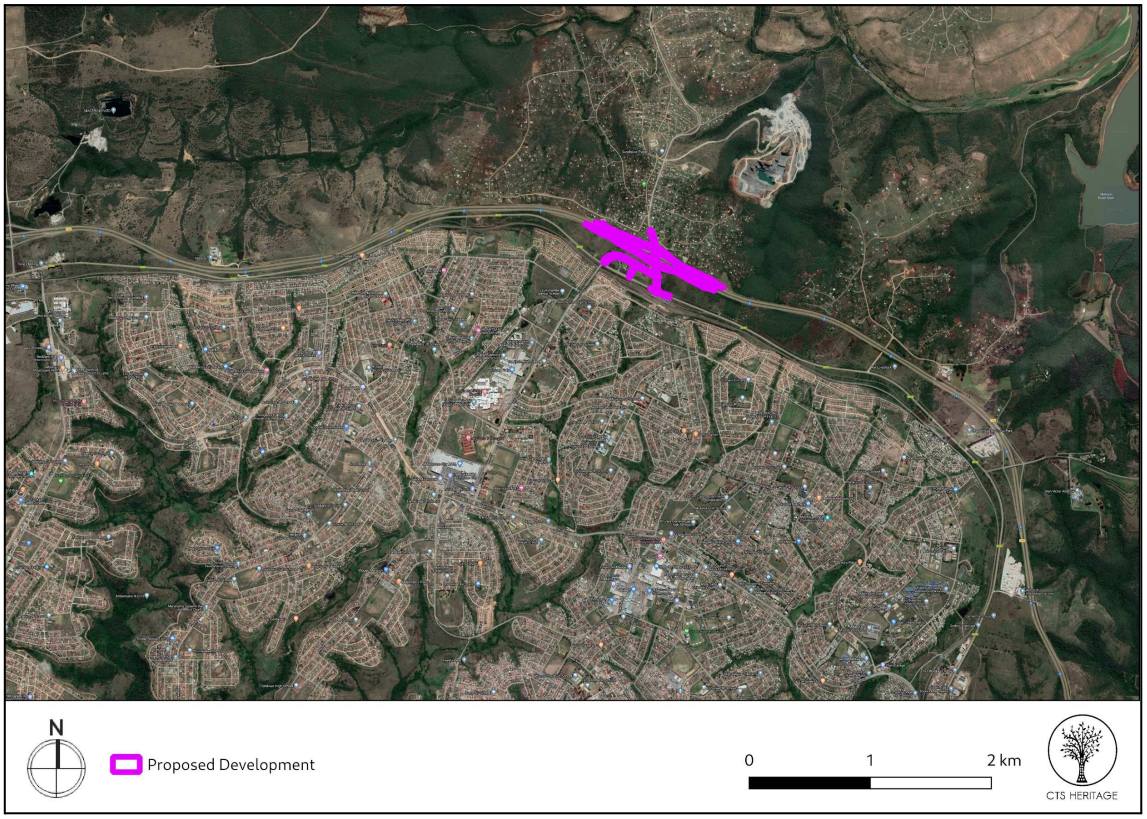

Figure 2 Google Earth© satellite image of the proposed development

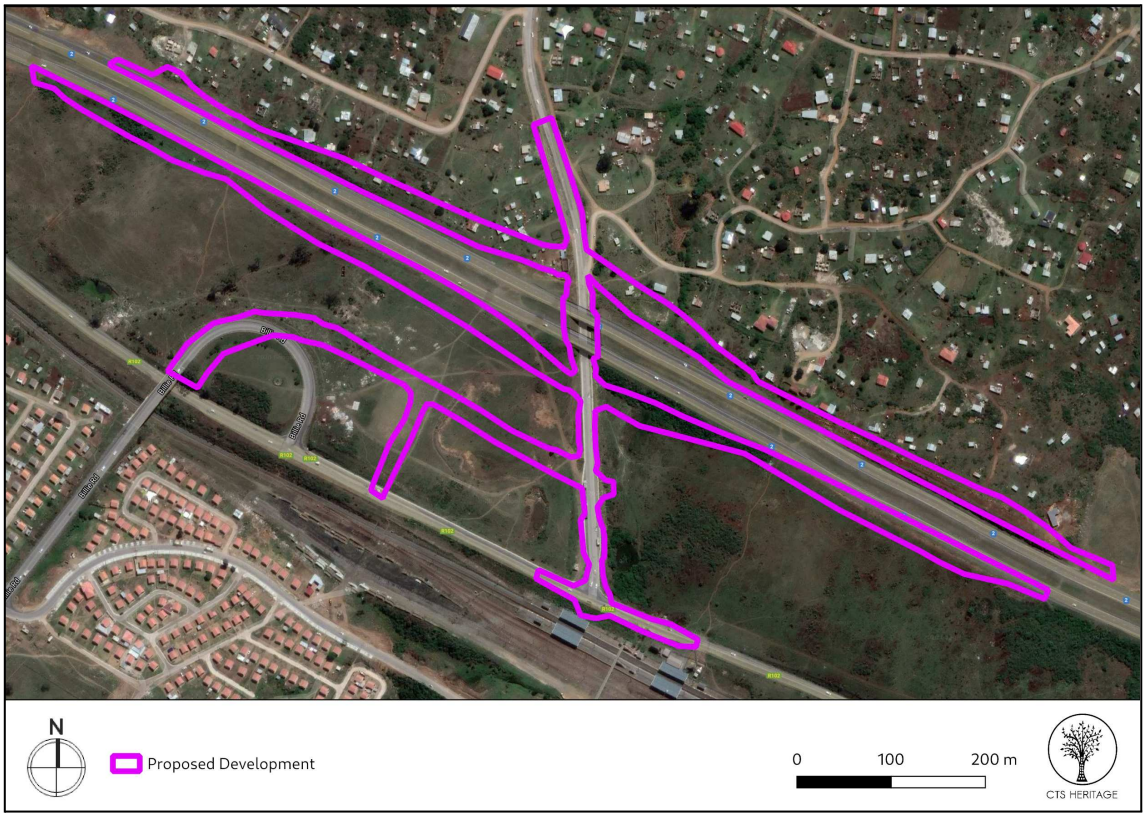

Figure 3 Google Earth© satellite image of the proposed development

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2. METHODOLOGY

2.1 Purpose of Palaeontological Study

The area proposed for development is underlain by sediments of the Middleton Formation of the Adelaide Subgroup of the Beaufort Group consisting of grey and “red” mudstone sandstone of very high palaeontological sensitivity and Jurassic Dolerite of zero palaeontological sensitivity. Although the maps indicate that the proposed interchange is located on sterile Jurassic Dolerite, the potential to impact significant palaeontological resources remains high due to the proximity of Beaufort Group sediments.

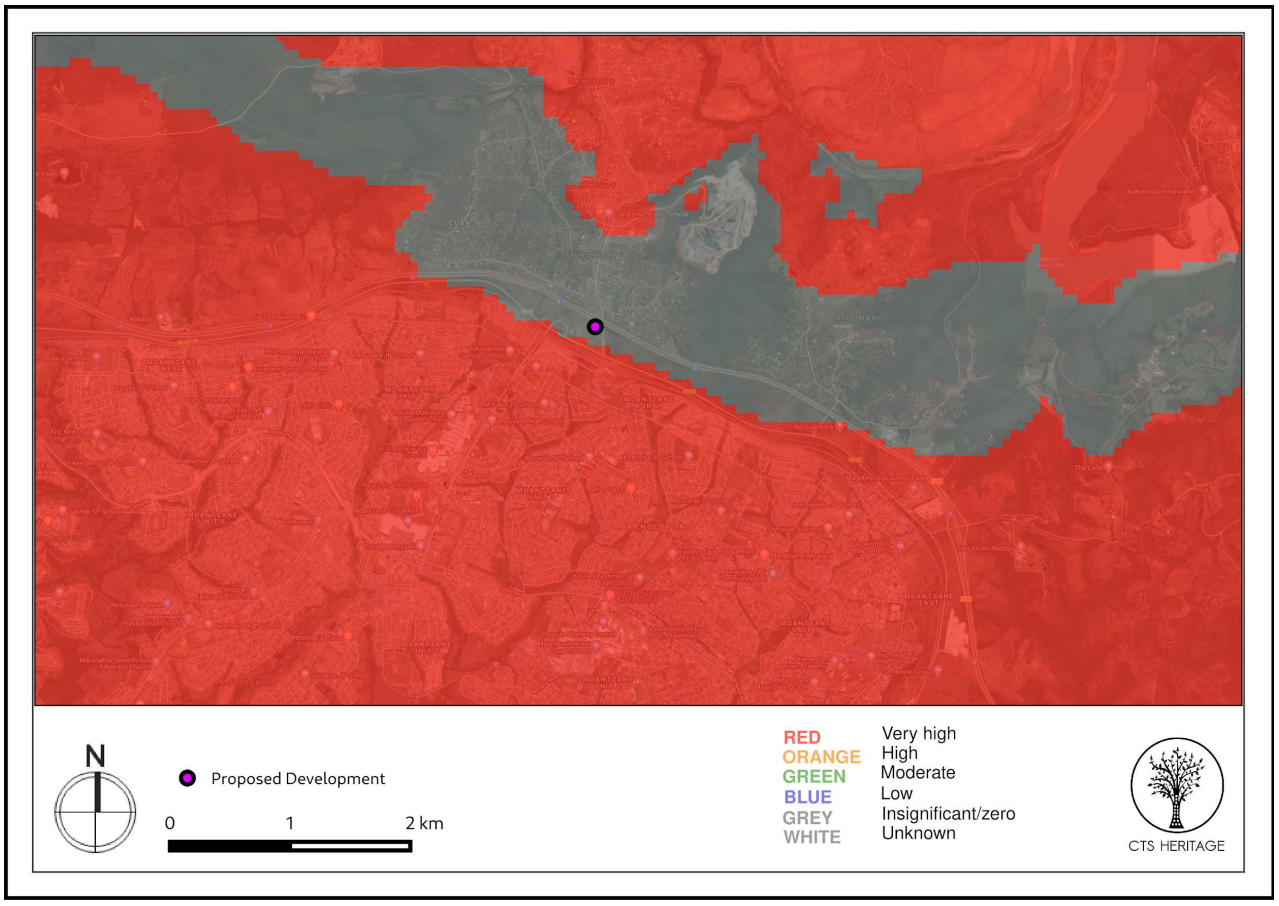

Figure 4 Palaeosensitivity Map. Indicating Zero to Very High fossil sensitivity underlying the study area.

2.2 Study approach

This PIA report provides a record of the observed or inferred palaeontological heritage resources within the broader project study area. The identified resources have been assessed to evaluate their heritage significance in terms of the grading system outlined in Section 3 of the NHRA (Act 25 of 1999). Recommendations for specialist palaeontological mitigation are made where this is considered necessary. The report is based on (1) a review of the relevant scientific literature, including previous palaeontological impact assessments in the broader study region (e.g. Bamford (2019), Groenewald, G. (2015), Groenewald (2016) Gess (2014), Almond (2017)), (2) published geological maps and accompanying sheet explanations (*e.g.* Mountain 1974, Hill 1993),

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3. GEOLOGICAL CONTEXT OF THE STUDY AREA

3.1. Stratigraphy

The area falls within the Karoo Supergroup, which is divided into 3 Groups. These are the Lebombo Group, Beaufort group and the Ecca Group. In the Eastern Cape the Lebombo Group is divided into four Formation (Drakensberg Formation, Clarens Formation, Elliot Formation, and the Molteno Formation). The Beaufort Group in divided into two subgroups, the Tarkastad Subgroup (consisting of the Burgersdorp Formation and the Katberg Formation) and the Adelaide Subroup (divided into the Balfour Formation, Middleton Formation, and the Koonap Formation). The Ecca group consists of the Waterford Formation, Fort Brown Formation, Ripon Formation, Collingham Formation, Whitehill Formation, Prince Albert Formation, and the Dwyka Formation. This can be seen in Table 1.

Table 1 The layout of the Groups, Subgroups, and Formations of the Karoo Suppergroup in the Eastern Cape area. (Adapted from the Stratigraphy of South Africa)

Karoo Supergroup	Lebombo Group		Drakensberg Formation
			Clarens Formation
			Elliot Formation
			Molteno Formation
	Beaufort Group	Tarkastad Subgroup	Burgersdorp Formation
			Katberg Formation
		Adelaide Subgroup	Balfour Formation
			Middleton Formation
			Koonap Formation
	Ecca Group		Waterford Formation
			Fort Brown Formation
			Ripon Formation
			Collingham Formation
			Whitehill Formation
			Prince Albert Formation
			Dwyka Formation

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Figure 5 Extract from the 1:250 000 Geology Map of South Africa (Council of GeoScience). Map 3226 King Williams Town. Area is underlain by Pum: Middleton Formation of the Adelaide Subgroup of the Beaufort Group consisting of grey and "red" mudstone sandstone

Table 2 Underlying geology of the project area

Symbol	Group Formation	Lithology	Approximate Age	Palaeontology
Pum	Middleton Formation of the Adelaide Subgroup of the Beaufort Group		Middle Late Permian ~260–256 Ma	Important Therapsid assemblages. Reptile, Amphibian, Fish, Invertebrates, Plant, and Trace Fossils
Jd	Jurassic Dolerite	Intrusive Dolerite dykes	Early Jurassic ~180Ma	No fossils or trace fossils

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As seen in Figure 5 and Table 2 the proposed site is directly underlain by Jurassic Dolerites that have intruded into the Middleton Formation in the form of sills and dykes. For this reason, the rest of this section will focus on the Adelaide Subgroup the Middleton Formation and the Jurassic dolerites.

The Adelaide Subgroup has a thickness of 5000m in the east which decreases rapidly towards the centre of the basin, reaching about 800m from the centre. To the north, the decrease is more gradual where it reaches a thickness of about 100-200m in the far north.

The Middleton Formation has an average thickness of about 1600m, however thicknesses of up to 2500m are reached north of Port Elizabeth. The Middleton Formation is thought to have formed during the middle Permian (Guadalupian) extinction event (Sami, K. (1992). The Middleton Formation is also the eastern correlate of the Teekloof Formation in the Karoo Basin. The mudstones in the Middleton Formation were deposited in a shallow, low energy freshwater lacustrine (lake) environment. There is evidence of this environment intermittently being disturbed by high energy fluvial events (Catuneanu et al., 2001).

The lithology consists mostly of a red mudstone with wave and current ripples similar to Figure 6. Calcareous nodules are present, these nodules tend to weather out brown. The mudstones are interlayered with minor sandstones and argillaceous layers. These sandstone layers are important stratigraphic markers for geologists and paleontologists (Manson, 2007).

Figure 6 Wave ripple surface Scale bar 15cm (e.g. from Signal Hill) Manson (2007)

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3.2. Karoo dolerites

Before discussing the karoo dolerite system two terms must be explained, namely, sills and dykes. Dykes are igneous intrusions that run vertically, forcing through cracks in the overlying rock, while sills are offshoot intrusions running horizontally into weaknesses between or through layers as seen in Figure 7 (Marshak, 2008).

The Karoo dolerites are an extensive interconnected network of dykes and sills (Figure 8), which intrude in between the sedimentary layers of the Karoo Supergroup. The dolerite intrusions signify the origin of a volcanic system and are thought to be of the same age as their extrusive counterpart, the Drakensberg basaltic eruption at 183Ma. (Bamford, 2019, Woodford and Chevallier, 2002, and Molaba, 2017). Dolerites are intrusive igneous bodies which do not contain fossils and will destroy any fossils that they come in contact with (Bamford, 2019)

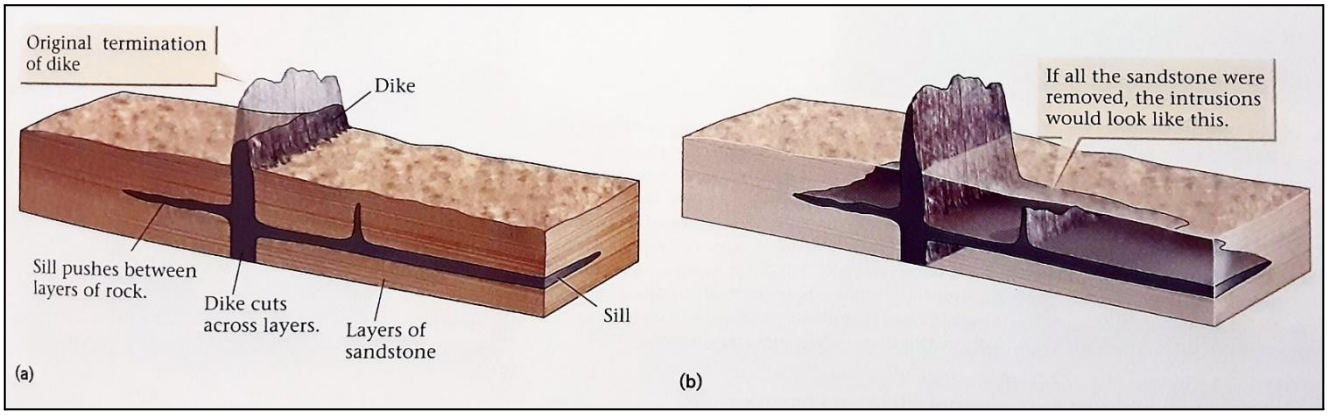

Figure 7 (a) Dykes and sills are vertical or horizontal bands of intrusive igneous rocks (b) if the surrounding rock is stripped away the igneous rock would look like vertical and horizontal planes. (Marshak (2008))

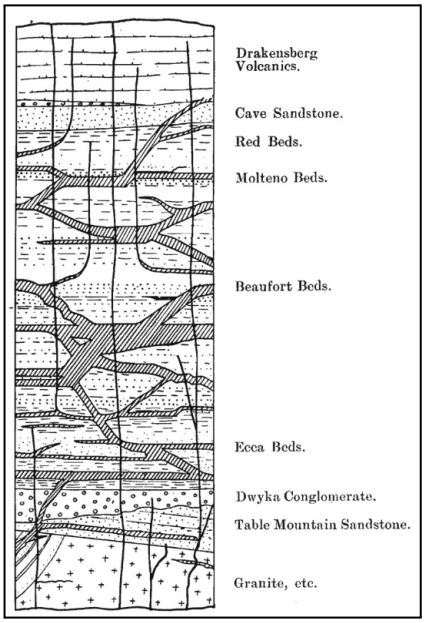

Figure 8 Diagram of basalt sills and dykes intruded into the Karoo Supergroup (sills running horizontally, dykes running vertically) du Toit (1920)

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4. PALAEONTOLOGICAL HERITAGE RESOURCES

According to Rossouw (2014, SAHRIS NID 184059); "Sedimentary bedrock in the area is primarily represented by late Permian Adelaide Subgroup rocks (Middleton Formation), made up of fine-grained, cross-bedded sandstone and grey to reddish, poorly stratified mudstones… Biozone boundaries are uncertain in the region, but the Middleton Formation (approximate equivalent of the Teekloof Formation) is biostratigraphically subdivided to include diverse terrestrial and freshwater tetrapods of the Cistecephalus Assemblage Zone (AZ) and Dicynodon AZ (Rubidge 1995). These zones are characterized by a varying suite of therapsid fossils mainly represented by the presence of Cistecephalus, Aulacephalodon and Oudenodon in the former and the first appearance of Dicynodon lacerticeps in the latter. Historically, the East London area has yielded very few vertebrate fossils. Poorly preserved reptile remains have previously been recovered from several localities believed to be along the western bank of the Buffalo River mouth as well as near Morgan Bay (Mountain 1974)."

4.1. Review of regional palaeontology

The Beaufort strata contains reptile, amphibian, fish and more importantly mammal-like reptile (therapsid) fossils. These therapsid fossils have provided great insight into the reptile-mammal evolutionary transition. In 1906 Robert Broom formalized a three-fold subdivision of the Beaufort sequence. In this subdivision he identified six distinct vertebrate zones, this was revised by Rubidge et al, (1995) to contain eight assemblage zones, characterised by specific combination of taxa as seen in Table 3.

Table 3 Past and present biozonation of the Beaufort Group Johnson et al. (2006)

<table>
<tr><th colspan="2">BROOM (1906)</th><th colspan="2">RUBIDGE ET AL. (1995)</th></tr>
<tr><th>Beds</th><th>Beds</th><th>Assemblage Zone</th><th>Formation</th></tr>
<tr><td rowspan="2">Upper Beaufort</td><td>Cynognathus</td><td>Cynognathus</td><td>Burgersdorp</td></tr>
<tr><td>Procolophon</td><td rowspan="2">Lystrosaurus</td><td rowspan="2">Katberg</td></tr>
<tr><td>Middle Beaufort</td><td>Lystrosaurus</td></tr>
<tr><td rowspan="6">Lower Beaufort</td><td rowspan="2">Kistecephalus (Cistecephalus)</td><td>Dicynodon</td><td>Balfour</td></tr>
<tr><td>Cistecephalus</td><td rowspan="3">Middleton/ Teekloof*</td></tr>
<tr><td>Endothiodon</td><td>Tropidostoma</td></tr>
<tr><td rowspan="2">Pareiasaurus (Tapinocephalus)</td><td>Pristerognathus</td></tr>
<tr><td>Tapinocephalus</td><td rowspan="2">Koonap/ Abrahamskraal</td></tr>
<tr><td></td><td>Eodicynodon</td></tr>
</table>

* Extends upwards beyond Middleton-Balfour boundary

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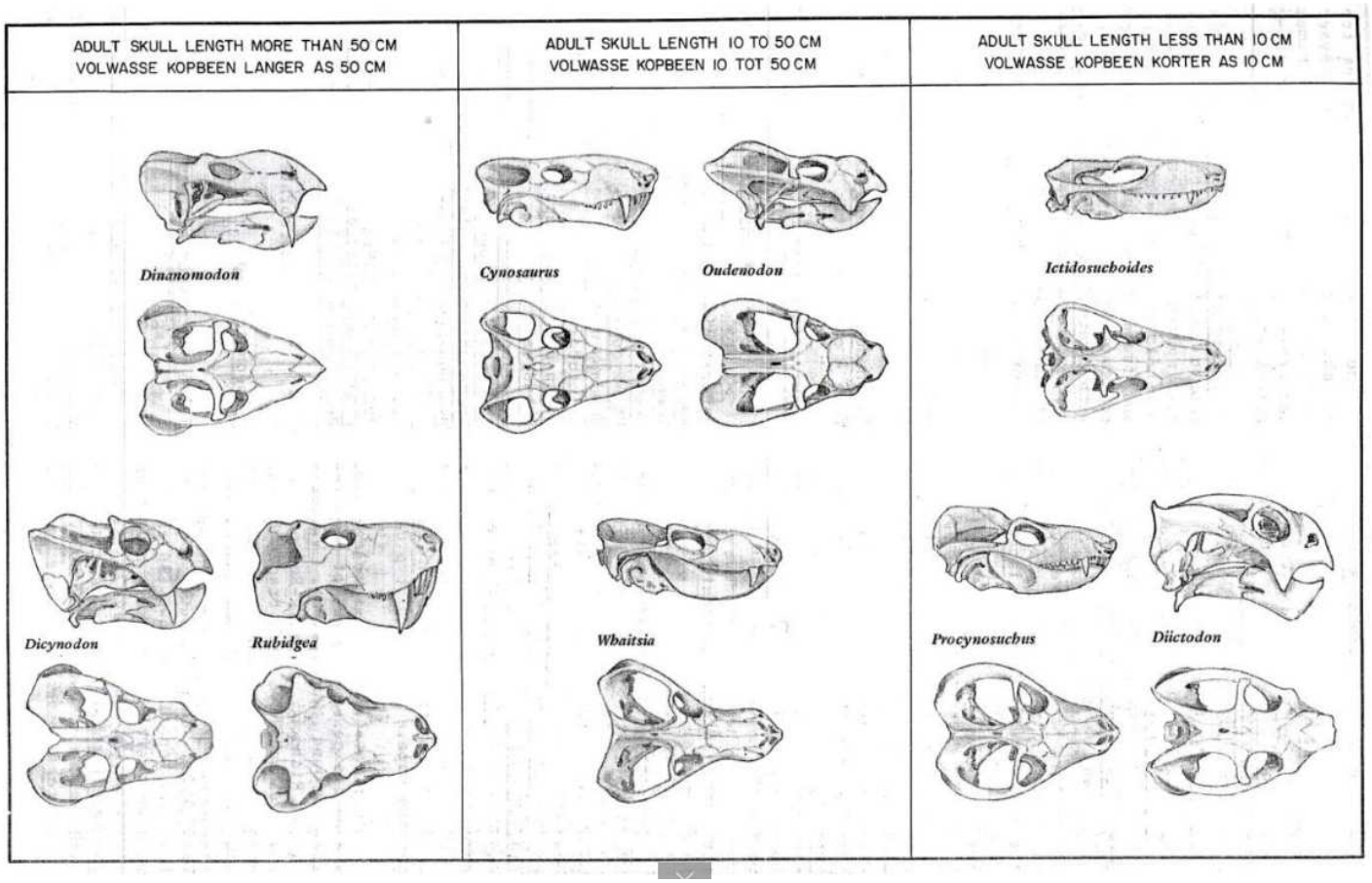

Figure 9 Skulls of characteristic fossil vertebrates – all therapsids - from the Daptocephalus (previously Dicynodon) Assemblage Zone. Among the dominant therapsids ("mammal-like reptiles"), Rubidgea and Cynosaurus are carnivorous gorgonopsians, Whaitsia (now Theriognathus) is a predatory therocephalian while Ictidosuchoides is a small insectivorous member of the same group, Procynosuchus is a primitive cynodont, and the remainder are large- to small-bodied dicynodont herbivores. Almond (2017)

Most fish fossils are found in the Cynignathus Zone. Amphibians are mostly restricted to the upper two zones. 23 genera of reptiles are found in the upper three zones. The Therapsida include Dinocepalia (20 genera found only in the Eodicynodon and Tapinocephalu zones), Dicynodontia (21 genera), Biarmosuchia (5 genera), Gorgonopsia (17 genera not found in the upper two zones), and Cynodontia (three genera found only in upper three zones) (Johnson et al., 2006). Some of these species can be seen in Figure 9, Figure 10 Figure 11 and Figure 12.

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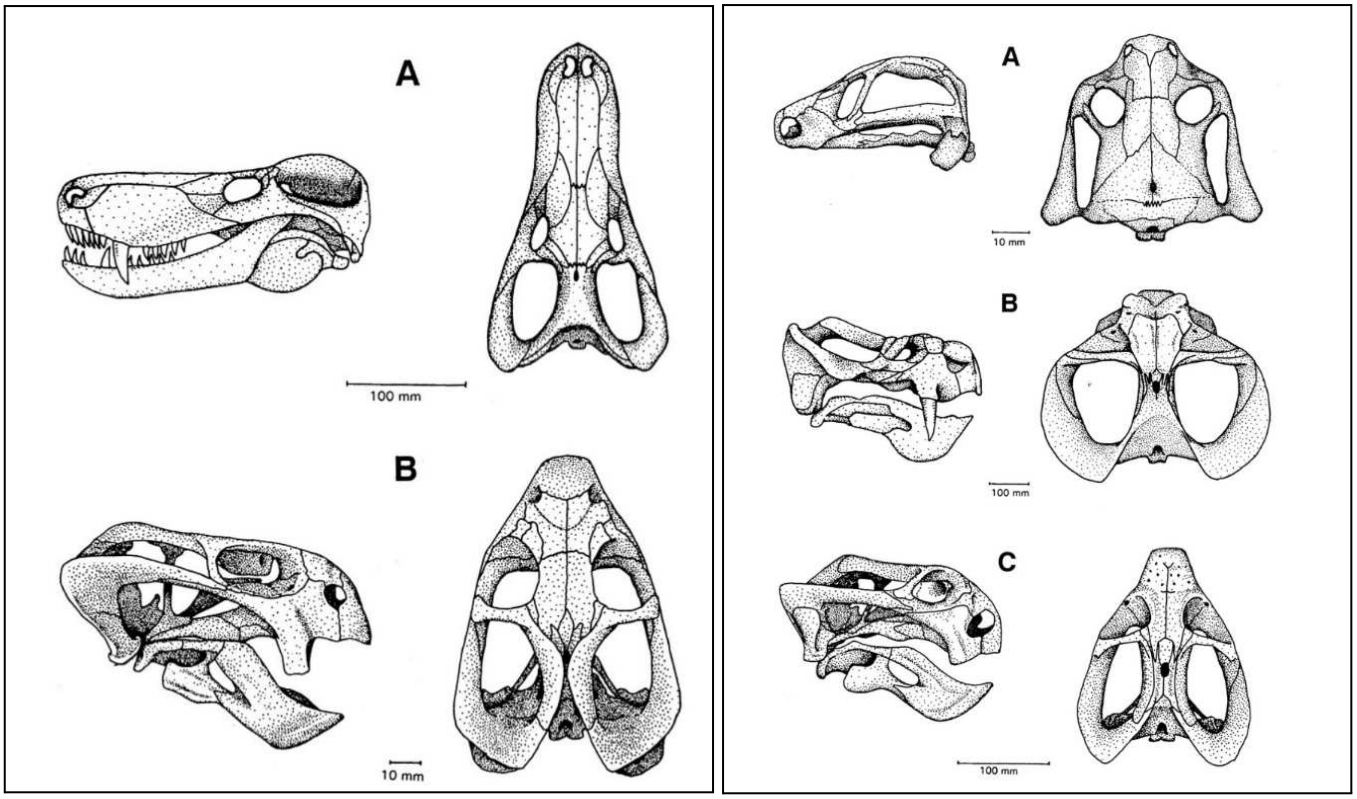

Figure 10 A Pristerognathus B Diictodon Rubidge et al. (1995)

And Figure 11 A Cistecephalus B Aulacephalus C Oudenidin Rubidge et al. (1995)

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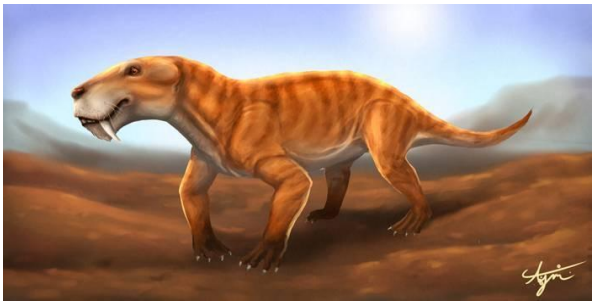
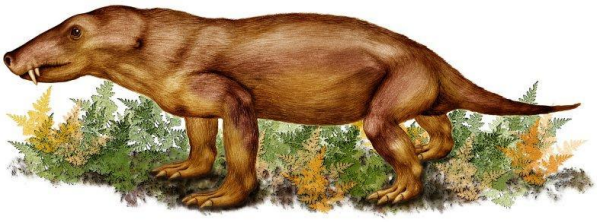
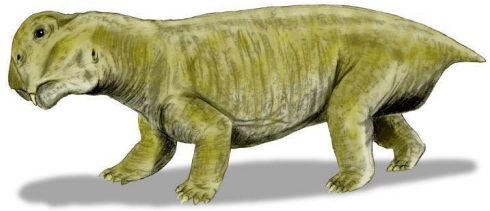
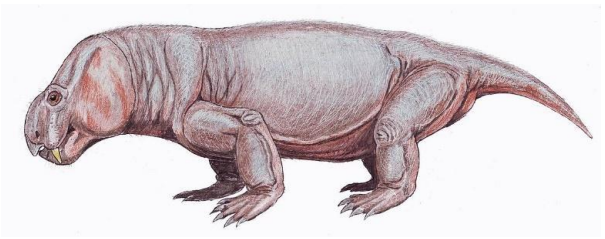
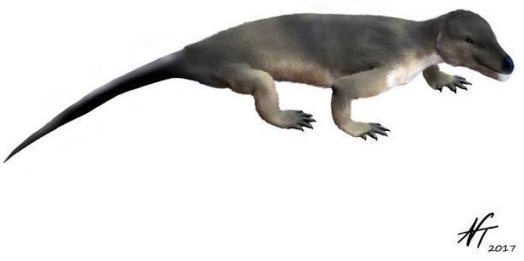
Diictodon	*Pristerognathus*
	
Rubidgea	*Theriognathus*
	
Cistecephalus	*Daptocephalus*
	
Ictidosuchoides	*Procynosuchus*

Figure 12 Artist renditions of various therapsids found in the Beaufort Group. (reference in reference list)

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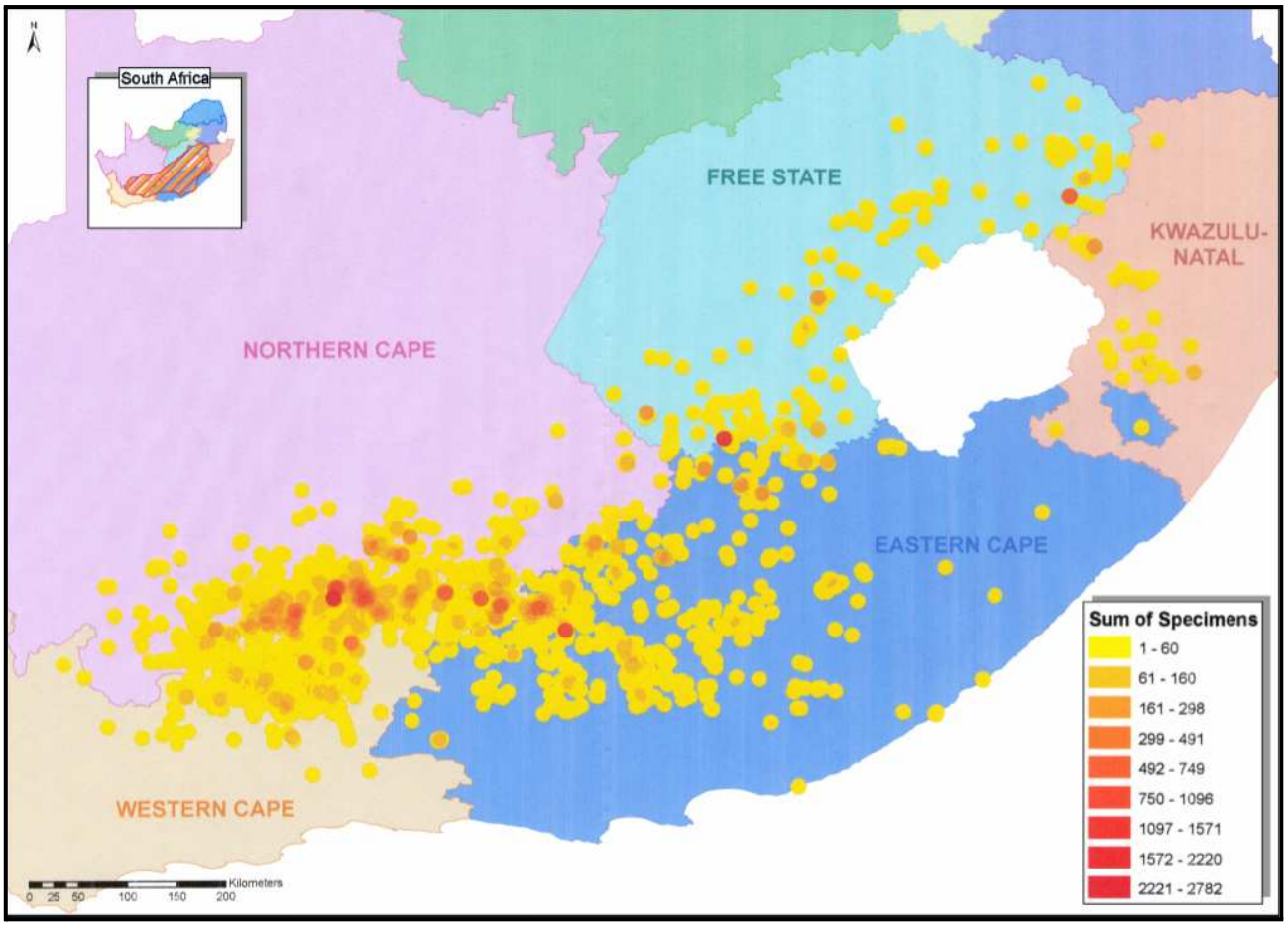

Figure 13 Distribution of vertebrate fossil sites in the Beaufort Group in the Eastern Cape Note the general scarcity of sites recorded in the eastern portion of the Main Karoo Basin. Nicolas (2007).

The Middleton Formation contains less fossils than its western counterpart, the Teekloof Formation. This lesser number of fossils are even more pronounced if only vertebrate fossils are considered (Figure 13). The reason for this is most likely the decrease in species diversity during the middle Permian (Guadalupian) extinction event (Johnson et al., 2006).

Vertebrate fossils are most frequently found in the mudstones and calcareous nodule deposits. Plant fossils are common throughout the Karoo Supergroup with the Permian Glossopteris flora found in the Adelaide Subgroup. Glossopteris is a seed fern, of which several species are found, ranging in size, shape and leaf venation. Trace fossils are more common in the Middleton Formation than vertebrate fossils. These include feeding, living and locomotion traces of invertebrates (anilids, aquatic oligochaetes, insect larvae, and planolites) living in shallow water (Johnson et al., 2006.).

4.2. Summary of palaeontological resources identified

Fossils of the Beaufort Group include, trace fossils, flora fossils of the early Glossopteris assemblage, fish fossils, amphibian fossils, reptile fossils, and an important sequence of mammal like reptile (therapsid) fossils. The therapsid fossils are most significant as they contain vital clues to the evolutionary transition from reptile to mammal.

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

The site is located on the Jurassic dolerites, which penetrated the Middleton Formation of the Adelaide Subgroup of the Beaufort Group of the Karoo Supergroup. The dolerites are sterile. The Middleton Formation is rich in trace- fish- amphibian- and reptile-mammal-like reptile (therapsid) fossils. However, few vertebrate fossils have been found in the Middleton Formation in the area in which construction is proposed. Furthermore, fossils in close proximity to the dolerites would have been destroyed by contact metamorphism during intrusion.

Due to these facts it is unlikely that the proposed construction will impact on significant palaeontological resources. It must be noted that during construction it is possible that excavation might penetrate the dolerites and expose the Middleton Formation. For this reason, a Chance Fossil Find Procedure is attached at the end of this document that should be used if any fossil material is discovered.

Table 4: Impact Assessment Criteria

Criteria	Category	Explanation
Overall Nature	***Low impact***	The site is located on sterile Jurassic dolerites, and few fossils have been found in the surrounding Middleton Formation in that area. Impact will remain negligible if the Chance Fossil Find Procedure is followed
Type	***Direct***	The development could directly impact these resources if excavation breaks through the dolerite into the Middleton Formation
Extent	***Site***	Impact is limited to sites of excavation
Duration	***Permanent***	Possible impacts will affect the heritage resources identified permanently
Severity	***Negligible***	The site is located on sterile Jurassic dolerites, and few fossils have been found in the surrounding Middleton Formation in that area. Impact will remain negligible if the Chance Fossil Find Procedure is followed
Reversibility	***Irreversible***	The impact cannot be reversed, some mitigation is possible if the Chance Fossil Find Procedure is followed in the unlikely case of any finds.
Irreplaceable Loss	***Resource may be partly destroyed***	Partial loss or destruction of the resource might occur but can be mitigated if the Chance Fossil Find Procedure is followed.
Probability	***Low***	The site is located on sterile Jurassic dolerites, and few fossils have been found in the surrounding Middleton Formation in that area.
Mitigation Potential	***Low***	Mitigation will only become necessary if excavation reached the Middleton Formation
Impact Significance	***Negligible***	The site is located on sterile Jurassic dolerites, and few fossils have been found in the surrounding Middleton Formation in that area. Impact significance will remain negligible if the Chance Fossil Find Procedure is followed

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6. ASSUMPTIONS AND UNCERTAINTIES

The Jurassic dolerites (Dykes and Sills) of the Karoo will not contain any preserved fossil material.

Based on the palaeontological record of the Middleton Formation and the geology of the area it is assumed that the Middleton Formation in this area might contain fossils of vertebrate and/or plant material. However, in areas in close proximity to the Jurassic dolerites these fossils might have been destroyed by contact metamorphism.

Assumptions identified in Groenewald (2016) also apply to this assessment in that the "key assumption for this scoping study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. There is also an inadequate database for fossil heritage for much of the RSA, due to the small number of professional palaeontologist carrying out fieldwork in RSA. Most development study areas have never been surveyed by a palaeontologist.

These factors may have a major influence on the assessment of the fossil heritage significance of a given development and without supporting field assessments may lead to either:

- an underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- an overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by weathering, or are buried beneath a thick mantle of unfossiliferous "drift" (soil, alluvium etc.)." (Groenewald, 2016)

7. CONCLUSION AND RECOMMENDATIONS

The proposed construction of the new interchange on National Route 2 may proceed. It is unlikely that this construction will impact significant palaeontological heritage.

Should important new fossil remains - such as vertebrate bones and teeth, petrified wood, plant-rich fossil lenses or dense fossil burrow assemblages - be exposed during construction, the responsible Environmental Control Officer should alert ECPHRA (*i.e.* The Eastern Cape Provincial Heritage Resources Authority. Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; smokhanya@ecphra.org.za) as soon as possible. This is so that appropriate action can be taken in good time by a professional palaeontologist at the developer's expense. Palaeontological mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as of associated geological data (*e.g.* stratigraphy, sedimentology, taphonomy).

The palaeontologist concerned with mitigation work will need a valid fossil collection permit from ECPHRA and any material collected would have to be curated in an approved depository (*e.g.* museum or university collection). All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the

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study (*e.g.* data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies recently developed by SAHRA (2013).

These recommendations are summarized in tabular form in Appendix 1 (Chance Fossil Finds Procedure) and should be incorporated into the Environmental Management Programme (EMPr) for the proposed development.

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APPENDICES

Appendix 1: Chance Fossil Finds Procedure

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Chance Fossil Finds Procedure

(Adopted from the HWC Chance Fossils Finds Procedure: June 2016)

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material. Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

Procedure to follow if it is likely that the material identified is a fossil:

- The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;

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- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
- The date
- A description of the discovery
- A description of the fossil and its context (e.g. position and depth of find)
- Where and how the find has been stored
- Photographs to accompany the preliminary report (the more the better):
- A scale must be used
- Photos of location from several angles
- Photos of vertical section should be provided
- Digital images of hole showing vertical section (side);
- Digital images of fossil or fossils.

Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sandbags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- If the find cannot be stabilised, the fossil may be collected with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

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FOSSIL DISCOVERIES: PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	Lat:	Long:
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	Digital image of vertical section (side)	
	Fossil from different angles	
	Wider context of the find	
Wider context of the find. Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil Name:		
Contact:		
Recorder Name:		
Contact:		
Photographer Name:		
Contact:		

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