

# **Palaeontological Assessment Proposed sites for 66kV Substation, Calitzdorp (3321DA Calitzdorp)**

**Prepared by**

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Archaeozoology, Stone Age Archaeology and Quaternary Palaeontology

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## **Contents**

Executive Summary.....	3
Location of proposed Sub-Station .....	3
Method .....	4
Results of Survey.....	4
Conclusion .....	5
Recommendations .....	5
Heritage Permits Required .....	6
References.....	6
IMPACT .....	7
DECLARATION.....	8

## Executive Summary

Graham Avery was commissioned by SIVEST to conduct a desktop survey of the palaeontological potential of a site on which Eskom is proposing to build a new 66kV substation. Of the two sites proposed, Site B is preferred.

Applicant: Eskom  
Proposed activity: Electricity supply facility  
Location: Calitzdorp

A review of potential sources indicates that Calitzdorp is located in the western end of the Little Karoo Basin. Geologically, three major forms may have contributed to the surface sediments of the proposed sites over considerable time, while the underlying hard substrate (bedrock) is unknown, unless drilling and/or a geotechnical study have been undertaken. Images provided by J. Orton indicate a sandy/gravelly surface, suggesting that sediments are alluvium and/or colluvium of Tertiary and Quaternary age derived from the surrounding hard rock geology.

The occurrence of fossils in underlying sediments is unlikely. However, any excavation for foundations and/or infrastructure that penetrates into underlying older sediments may encounter old wetland deposits and/or fossils. Collaboration between the contractor and a suitably-qualified palaeontologist will be required during excavations for foundations and infrastructure that extend below the plough zone monitored so that information and/or material can be recorded appropriately. Geotechnical information and details of the depth to which any excavations will extend would assist in assessing whether monitoring will be necessary.

**Provided that the recommendations of this assessment are complied with, there is no palaeontological reason why the proposed development should not proceed.**

### Location of proposed Sub-Station

The proposed area falls on 1:50 000 map sheet 3321DA Calitzdorp and see Figures 1, 2, 3.



**Figure 1.** The location of the proposed sites in relation to Calitzdorp (3321DA Calitzdorp).

### **Method**

A desktop study was conducted, by Dr G. Avery. Images of the surface were provided by J. Orton (Figures 2 and 3).

### **Results of Survey**

No surface palaeontological material was recorded during the archaeological survey (J. Orton, ACO Associates) or in the literature.

The 1:250 000 geological map (3320 Ladismith) shows that the area is surrounded by three major hard geological forms—the Huis Rivier Formation of the Kanga Group, Table Mountain Group, the Kirkwood Formation of the Uitenhage Group and younger Tertiary and Quaternary sediments of Cenozoic age. Images and detail provided by J. Orton indicate a sandy/gravelly surface (Figures 1 and 2). The surface sediments of the proposed sites are alluvium and/or colluvium of Tertiary and Quaternary age derived over time from the local hard rocks.

Bone is not normally preserved in these deposits. However, it is possible that fossils or sub-fossils of interest could be encountered during any excavation that cuts into undisturbed sediments; small pockets of bone can occur in alluvium, for instance, or where bone accumulators like hyaenas, Jackals or porcupines used holes/burrows dug by aardvarks. The Cretaceous-aged Kirkwood Formation has produced fossils elsewhere (McCarthy and Rubidge 2005), but, if it were to underlie the site, would be at depth. The depth and nature of the bedrock underlying the softer sediments is unknown.



**Figure 2.** View of surface on Site B showing sandy gravels (photo: J. Orton).



**Figure 3.** Gravel on surface on Site B with a large Stone Age flake (photo: J. Orton).

### **Comments**

Good communication with contractors and, possibly, periodic on-site monitoring during excavations will be required.

While it is unlikely that fossils will be encountered during excavation of foundations and infrastructure, it should be borne in mind that small pockets of bone can occur in alluvium or where bone accumulators like Hyaenas, Jackals or porcupines used holes/burrows dug by, for instance, aardvarks.

### **Conclusion**

Palaeontological remains are unlikely to be found during this project but, if encountered, must be recorded by an appropriately qualified person.

Provided that the recommendations in this report are followed, current information indicates that the proposed development will not impact significantly on palaeontological remains. Appropriately conducted the development may provide opportunities to access rare fossil material and to better understand the local geological sequence.

**From the palaeontological perspective the development can/cannot be allowed to proceed.**

### **Recommendations**

Bulk earth works and excavation for deep foundations/infrastructure should be monitored by a palaeontologist or suitably-experienced archaeologist (no need to have both in this instance), who would be on call, if not on the spot. The frequency, if any, of monitoring to be worked out *a priori* with the contractor to minimize time spent on site.

If possible, geotechnical information together with the proposed depths of excavations for foundations and/or infrastructure should be provided prior to the commencement of construction. This may enable a better estimation of whether monitoring would be necessary.

Protocols for dealing with palaeontological/palynological monitoring/mitigation must be included in the Environmental Management Plan (EMP). Any such material is likely to be fragile and due care must be exercised.

Any material recovered will be lodged in the collections of Iziko South African Museum. Funds must be available *a priori* to cover costs.

### **Heritage Permits Required**

The primary heritage legislation that needs to be considered is The South African Heritage Resources Act 25 of 1999 and regulations (details at [www.sahra.org.za](http://www.sahra.org.za)).

Clearance in terms of the National Heritage Act of 1999 will be required before the development can proceed.

Although not required by the Act, it is suggested that, to obviate possible delays should fossil material be encountered, a palaeontological permit be applied for ahead of any excavation. This would enable the monitor to readily recover material, should it be encountered during construction activities.

### **References**

McCarthy, T. and Rubidge, B. 2005. The Story of Earth and Life: a southern African perspective on a 4.6-billion-year journey. Cape Town: Struik.



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## IMPACT

IMPACT	
<b>NATURE</b>	Proposed 66kV Substation at Calitzdorp; potential that excavations for foundations will encounter sub-surface fossils of palaeontological heritage importance
<b>EXTENT (GEOGRAPHICAL)</b>	Very small area
<b>DURATION</b>	Short term
<b>PROBABILITY</b>	Small, but possible, since such resources can be patchy
<b>REVERSIBILITY</b>	100% with minimal loss if recommendations are followed
<b>IRREPLACEABLE LOSS OF RESOURCES</b>	Potentially high if fossils are encountered and if recommendations are not followed
<b>CUMULATIVE IMPACTS</b>	Low
<b>SIGNIFICANCE RATING – PRE MITIGATION</b>	Medium
<b>MITIGATION MEASURE</b>	Monitoring of foundation excavations during construction. Recording/collection/excavation of finds, if encountered
<b>SIGNIFICANCE – POST MITIGATION</b>	Permanent loss of material and information, if fossils encountered and recommendations not followed; potential that valuable additions could be made to Iziko Museums permanent Natural History Collections (High significance); site specific and short-term construction (Low significance—could offer opportunity to recover otherwise inaccessible fossil remains), if recommendations followed

## DECLARATION

by the independent person who compiled a specialist report or undertook a specialist process

I Graham Avery 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 provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable 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.

Note: The terms of reference must be attached.



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Signature of the specialist:

Graham Avery Sole Proprietor

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Name of company:

23 July 2012

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Date: