

**Palaeontological Impact Assessment for  
Eskom Kimberley Strengthening Phase 4 Project**

**Boundary-Ulco**

**Desktop study  
For**

**Landscape Dynamics CC**

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# **Palaeontological Impact Assessment for Eskom Kimberley Strengthening Phase 4 Project**

## **Boundary-Ulco**

### **Background**

As requested here is a quote for a PIA for the second of four proposed sections of the Eskom Kimberley Strengthening Phase 4 Project: Boundary-Ulco (Approximately 94km Double circuit 400kV powerline from Boundary to Ulco, including a new Ulco TX Substation adjacent to the existing Ulco DX Substation). According to the national legislation (National Heritage Resources Act (Act 25 of 1999)) any the site to be developed must be assessed to determine the likelihood of palaeontological remains occurring there and if so then their importance and possible protection or removal.

### **Terms of Reference**

In order to determine the likelihood of fossils occurring in the affected area geological maps, literature, palaeontological databases and published and unpublished records must be consulted.

If fossils are likely to occur then a site visit must be made to locate and assess the fossils and their importance.

Unique or rare fossils should be collected (with the relevant SAHRA permit) and removed to a suitable storage and curation facility or protected on site.

Common fossils can be sacrificed if they are of no importance but a representative collection could be made if deemed necessary.

### **Locality**

There are three possible routes for the powerline between Boundary (just east of Kimberley) and Ulco (about 94km farther to the northwest) shown in Figure 1. The maximum width between the northern and southern routes is 20km and this whole area is considered for the palaeontological impact assessment.

The land surface is currently under cultivation and there are numerous farms and some small towns. The topography is relatively flat.



## Geology and Palaeontology

The proposed substations and powerline routes fall within a number of geological formations as indicated in Figure 2 and Table 1, including ancient rocks of the Ventersdorp Supergroup, Permian aged Prince Albert and Tierberg Formations and young (Tertiary to Quaternary) Kalahari sands, alluvium and limestones. The Vryburg, Schmidtsdrif and Ghaap Plateau formations of the Campbell Group, Ventersdorp Supergroup, range in age from 2650 – 2588 Ma (Eriksson et al., 2006) which is much too old for vertebrates and plants. Algae, fungi and bacteria had evolved but were seldom preserved. These rocks are sedimentary (dolomites) and igneous (andesite) do not appear to have any microfossils.

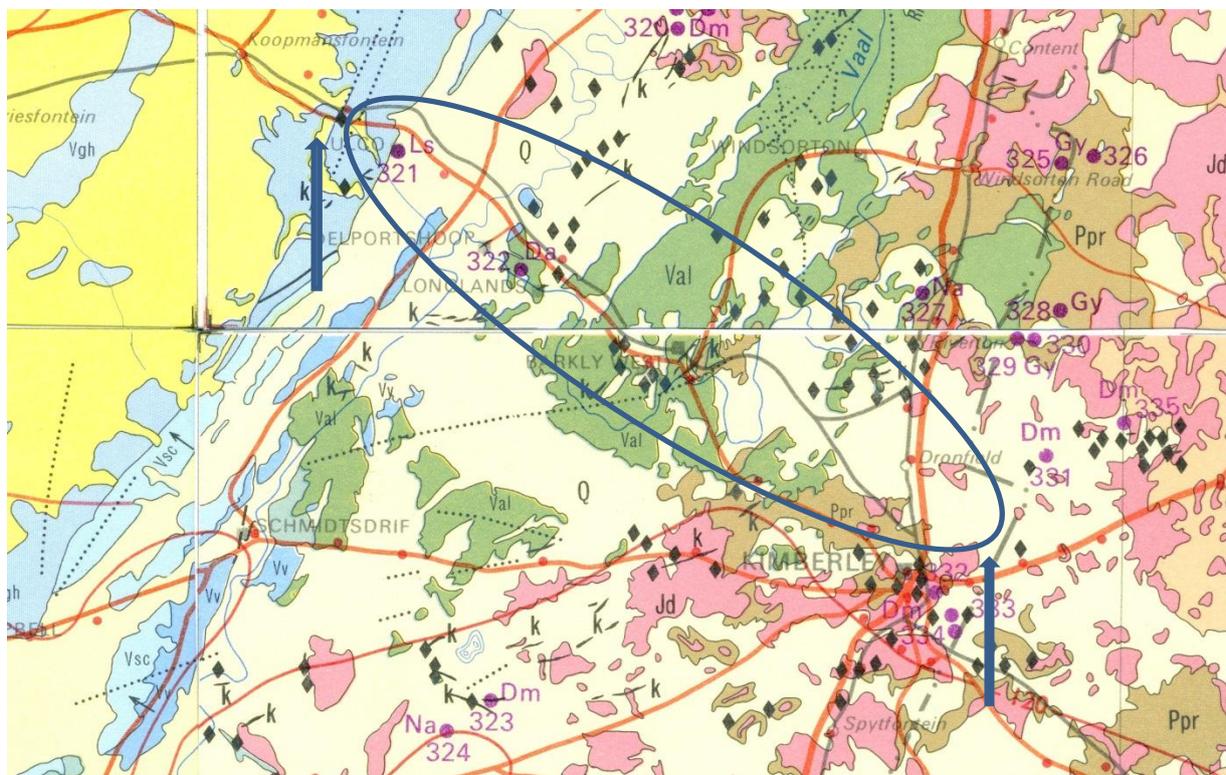


Figure 2: Geological map indicating Ulco (west arrow) and Boundary (east arrow) and the area within the northern and southern proposed routes. Symbols for geological formations are listed in Table 1; Map enlarged from Geological Survey, Pretoria; 1984, 1: 1 000 000.

Symbol	Formation	Lithology	Age
Q	Quaternary	Alluvium, calcrete, sand	Less than 2.5 Ma
T-Qk	Kalahari	Sand, limestone	Tertiary (65 – 0 Ma)
Jd	Jurassic dykes	dolerite	Drakensberg; approx. 200-160 Ma
Pt	Tierburg	shale	Permian Ecca Group; approx. 300 Ma
Ppr	Prince Albert	shale	
Vgh	Ghaap Plateau	Dolomite, limestone, chert	Ventersdorp Supergroup; Campbell Group; approx. 2650 -
Vsc	Schmidtsdrif	Dolomite, shale	

Vv	Vryburg	Shale, sandstone, andesite	2588 Ma
Val	Allanridge	andesite	

Table 1: Symbols for the geological map above and approximate ages from various sources.

Only the Permian rocks could potentially have fossils but they are too old for land vertebrates and too deep for land plants. No vertebrates, invertebrates or plants have been recorded from this region (Plumstead 1969; Anderson and Anderson 1985; Johnson et al 2006). The unpublished records at the Evolutionary Studies Institute, University of the Witwatersrand, do not record any fossils from this area. The overlying Quaternary Kalahari sands are Aeolian and there is no record of fossils.

### Recommendation

Since none of the rock formations or sediments in the region is potentially fossiliferous, being too old or too young, the project to erect powerlines and substations between Beta and Boundary, as one of the four phases of the Eskom strengthening project, may continue as far as the palaeontology is concerned. If however, any fossils are discovered during the excavations then it is strongly recommended that the fossils are rescued and a palaeontologist is called to assess their importance and make further recommendations.

No phase 2 palaeontological impact assessment is required.

### References

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