Palaeontological Impact Assessment for Eskom Kimberley Strengthening Phase 4 Project

Ulco-Olien-Manganore

Desktop study
For

Landscape Dynamics CC

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Background

As requested here is a quote for a PIA for the third of four proposed sections of the Eskom Kimberley Strengthening Phase 4 Project: Ulco-Olien-Manganore (approximately 58km Double circuit 400kV powerline from Ulco to Olien and approximately 75km 400kV double circuit powerline from Olien to Manganore, including a new Olien Tx Substation adjacent to the existing Olien Dx Substation.) According to the national legislation (National Heritage Resources Act (Act 25 of 1999)) any 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of fossils occurring in the affected area geological maps, literature, palaeontological databases and published and unpublished records must be consulted.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 either removed to a suitable storage and curation facility (such as a Museum, geological survey or university Palaeontology department) 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.

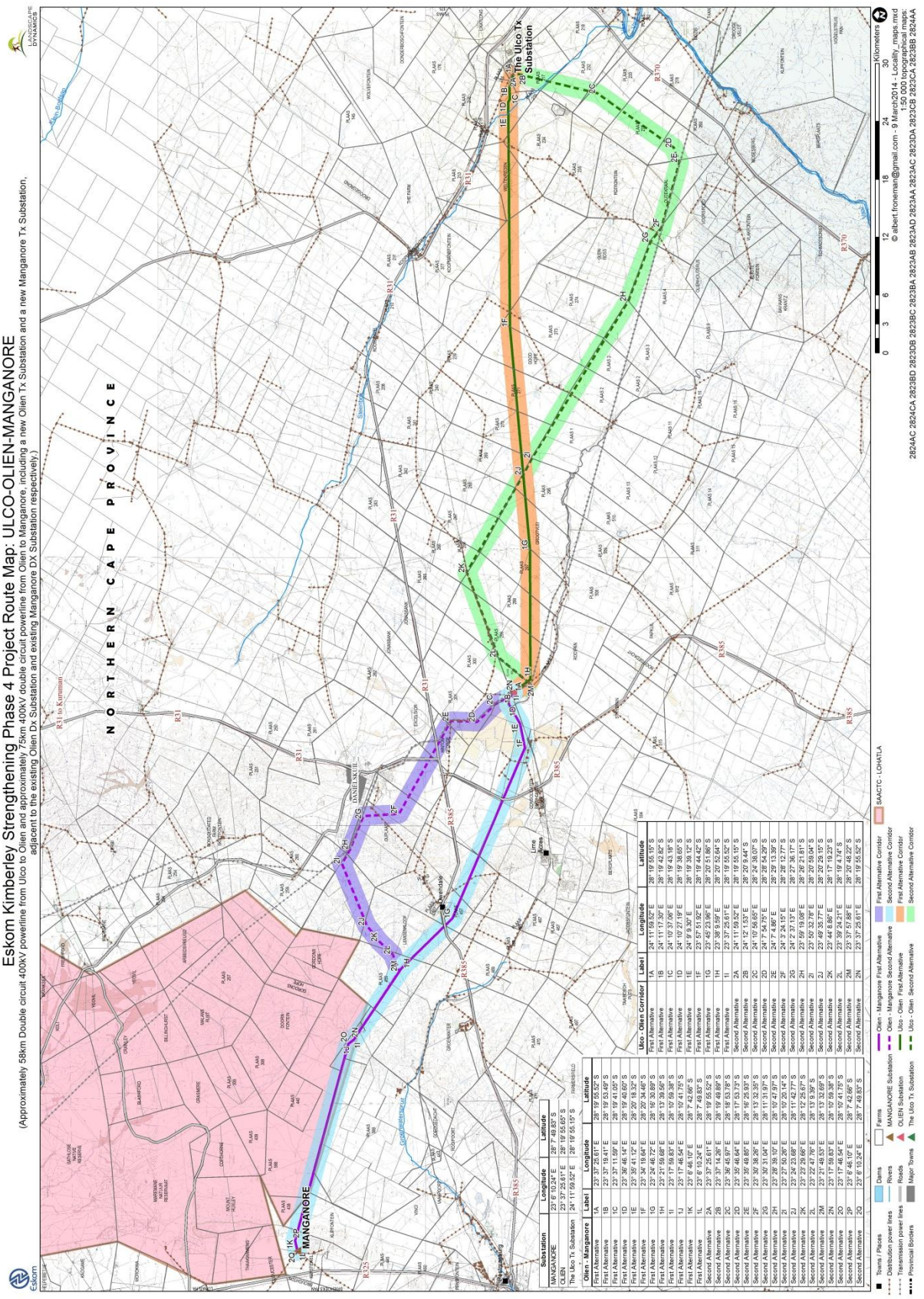

Figure 1: Map of proposed powerline routes between Ulco, Olien and Manganore (Northern Cape), provided by Landscape Dynamics and Eskom.

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, 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.

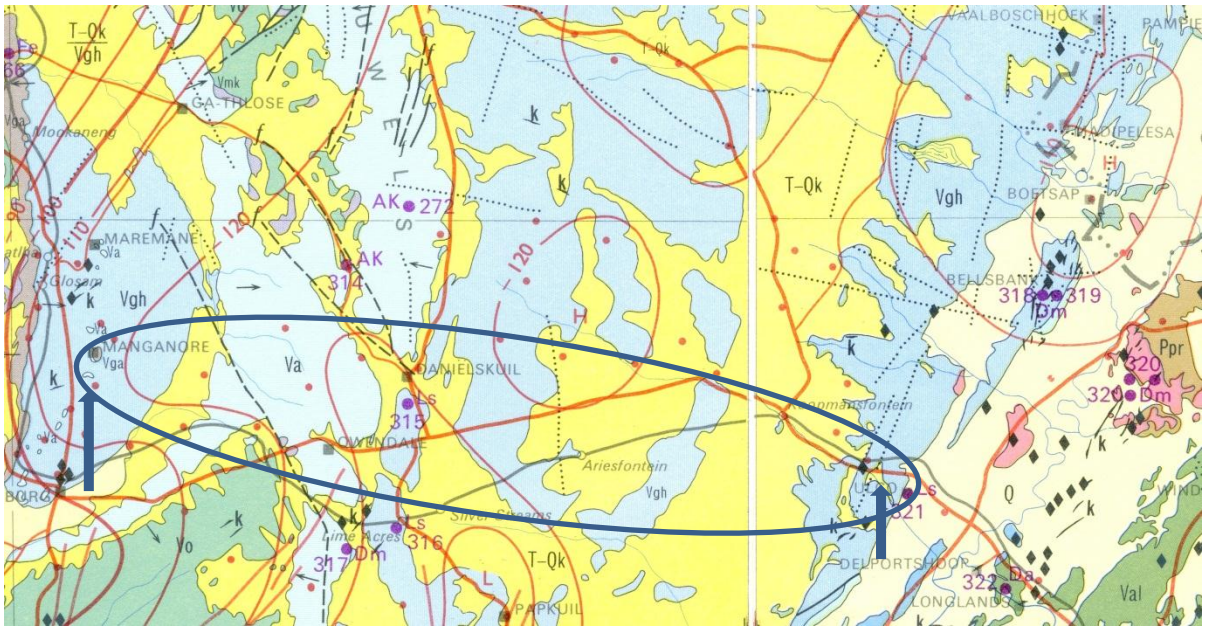

Figure 2: Geological map indicating Ulco (east arrow) and Manganore (west arrow) and the area within the oval outline includes both sets of first and second alternate corridors Symbols for geological formations are listed in Table 1; Map enlarged from Geological Survey, Pretoria; 1984, 1: 1 000 000.

Symbol	Formation	Lithology	Age
Q	Quaternary	Alluvium, calcrete, sand	Less than 2.5 Ma
T-Qk	Kalahari	Sand, limestone	Tertiary (65 – 0 Ma)
Vo	Ongeluk	andesite	Ventersdorp Supergroup; Campbell Group; approx. 2650 - 2588 Ma
Vgh	Ghaap Plateau	Dolomite, limestone, chert	
Vsc	Schmidtsdrif	Dolomite, shale	
Vv	Vryburg	Shale, sandstone, andesite	
Val	Allanridge	andesite	

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

The unpublished records at the Evolutionary Studies Institute, University of the Witwatersrand, do no 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 Ulco, Olien and Manganore, 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

Erikssen, P.G., Altermann, W., Hartzer, F.J., 2006. The Transvaal Supergroup and its pre-cursors. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. pp 237-260.

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