

Palaeontological desktop study of the proposed new Mogalakwena pipeline Cluster 1 and 5, near Mokopane, Limpopo Province.

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Summary

The desktop investigation indicates that both pipeline footprints are located on unfossiliferous Bushveld Complex granites and Waterberg Group arenites. There is little chance of finding fossil material within the superficial overburden within the vicinity of the Cluster 1 and 5 footprints mainly because of a lack of alluvium in the area. However, pipeline footprints located within 50 m of the Mogalakwena River and river crossings may affect suitably developed overbank sediments (superficial alluvial deposits) that could yield Quaternary vertebrate fossil remains. As far as the palaeontological heritage is concerned, the proposed development may proceed with no further palaeontological assessments required, provided that all excavation activities are restricted to within the boundaries of the development footprint and that the ECO of the project adheres to recommendations with regard to chance fossil finds procedures.

Introduction

The report is a preliminary assessment of potential palaeontological impact with regard to the installation of an underground water pipelines designated Mogalakwena Cluster 1 and 5, respectively located west of the N11 national road and north of the R518 provincial road, going to Mokopane (Cluster 1) and next to the N11 national road near Thabaleshoba about 90 km northwest of Polokwane (Cluster 5) (**Fig. 1**). Both footprints are located within the Mogalakwena River drainage area (**Fig. 2**).

Centroid coordinates:

Cluster 1: 23°49'10.62"S 28°39'43.34"E

Cluster 5: 23°28'7.79"S 28°38'45.89"E

Methodology

The assessment was carried out in accordance with National Heritage Resources Act 25 of 1999 with the aim to assess the potential impact on palaeontological heritage resources that may result from the proposed development. The palaeontological significance of the affected areas were evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature.

Assumptions and Limitations

The assessment provided within this report is based upon a desktop study without the benefit of a site visit. As such, the presentation of geological units present within the study area is derived from 1: 1 000 000 and 1:250 000 geological maps that may vary in their accuracy. It is also assumed, for the sake of prudence, that fossil remains are always uniformly distributed in fossil-bearing rock units, although in reality their distribution may vary significantly.

Background

According to the 1:250 000 scale geological map 2428 Modimole / Nylstroom, the Cluster 1 and 5 Mogalakwena pipeline footprints are entirely underlain by basic intrusive igneous rocks of the Late Vaalian (Proterozoic) Rustenberg Layered Suite and Lebowa Granite Suite, which forms part of the Bushveld Complex, as well as sedimentary strata of the Mokolian (Proterozoic) Waterberg Group (Barker *et al.* 2006). The Bushveld Complex represents largest layered igneous complex in the world that is also situated almost entirely within the bounds of the Transvaal sedimentary basin (Transvaal Supergroup) (Cawthorn *et al.* 2006) (Fig. 3).

Impact Statement Recommendation

The desktop investigation indicates that both pipeline footprints are located on unfossiliferous Bushveld Complex granites and Waterberg Group arenites. Palaeontologically sensitive cave breccias are not anticipated in the study area as opposed to the Malmani dolomites, which hosts the paleontologically significant Makapansgat Valley, located about 16 km east of Mokopane where local karst conditions resulted in the formation of several late Cenozoic, fossil-rich breccia caves, including Limeworks Cave, Buffalo Cave, Cave of Hearth and Katsenjammer Cave. (Maguire *et al.* 1980; Latham *et al.* 2003; Herries *et al.* 2006; Hopley *et al.* 2006). There is little chance of finding fossil material within the superficial overburden

within the vicinity of the Cluster 1 and 5 footprints mainly because of a lack of alluvium in the area. However, pipeline footprints located within 50 m of the Mogalakwena River and river crossings may affect suitably developed overbank sediments (superficial alluvial deposits) with a low to moderate likelihood that it could yield Quaternary vertebrate fossil remains.

Recommendation

As far as the palaeontological heritage is concerned, the proposed development may proceed with no further palaeontological assessments required, provided that all excavation activities are restricted to within the boundaries of the development footprint and that the ECO of the project adheres to the following chance fossil finds procedure:

- The ECO of the project must take into consideration the proximity of both clusters to the Mogalakwena River and must monitor bedrock excavations here in case of potential impact on intact Quaternary vertebrate fossil remains (large bones). In the event of fossil exposure, a professional palaeontologist must be called in immediately to confirm and record the finds and follow appropriate mitigation procedures where necessary.
- If, in the event that localized fossil material is discovered within the superficial overburden during the construction phase of the project (i.e. modern-looking but more or less lithified animal bones and teeth), it is recommended that a professional palaeontologist be called in to record and remove the material.

References

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Latham *et al.* 2003. The formation and sedimentary infilling of the Limeworks Cave, Makapansgat, South Africa. *Palaeontologia africana* 39: 69–82

Maguire, J.M., Pemberton, D. & Collett, M.H. 1980. The Makapansgat Limeworks grey breccia: hominids, hyaenas, hystricids or hillwash? *Palaeontologia africana* 23: 75–98.

DECLARATION OF INDEPENDENCE

I, Lloyd Rossouw, declare that I act as an independent specialist consultant. I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference. I have no interest in secondary or downstream developments as a result of the authorization of this project and have no conflicting interests in the undertaking of the activity.

A handwritten signature in dark ink, appearing to read 'L Rossouw', with a stylized, cursive script.

23 / 03 / 2017

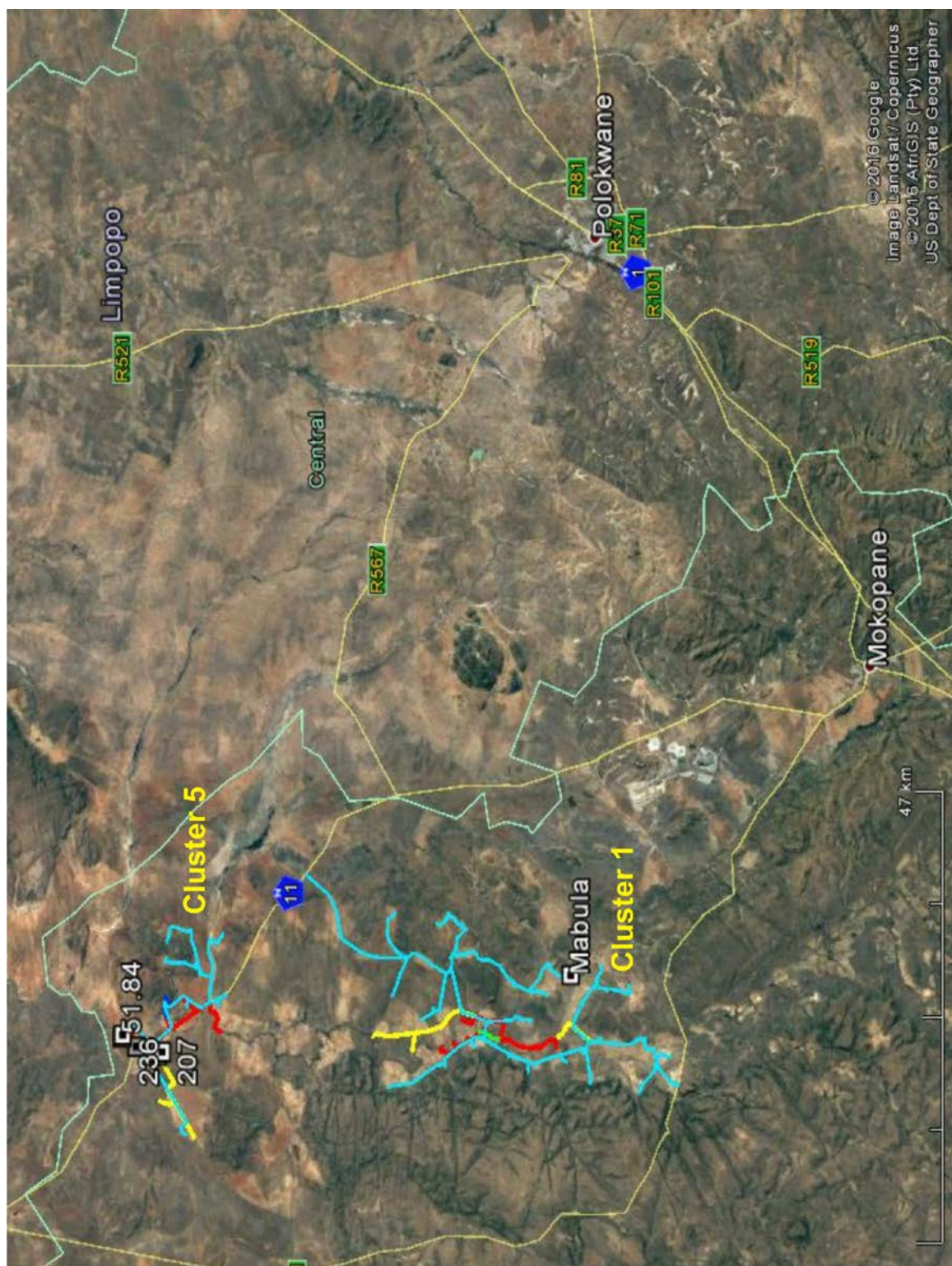


Figure 1. Aerial view of the proposed pipeline footprints.

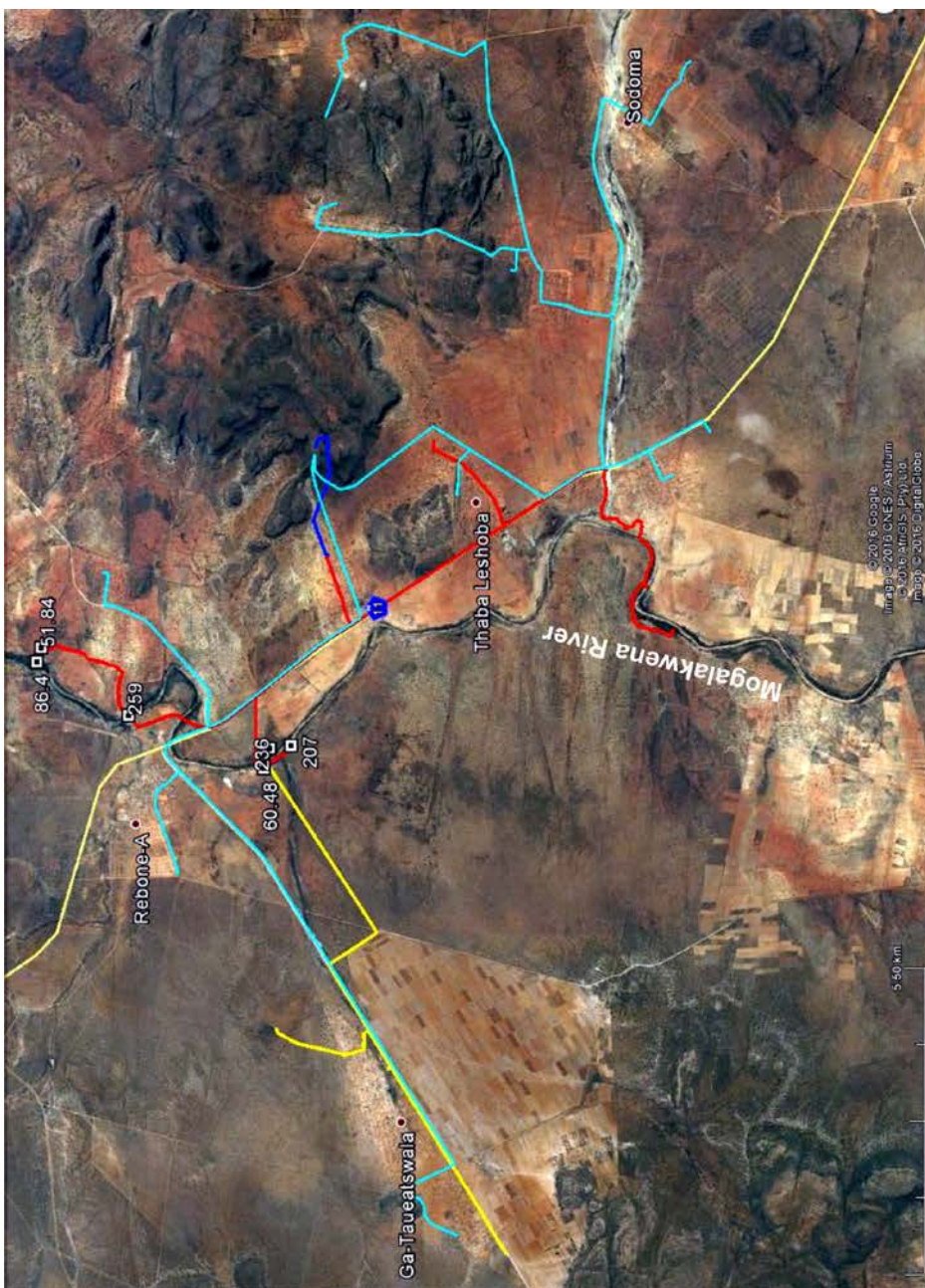


Figure 2. Layout Cluster 1 (left) and Cluster 5 (right).

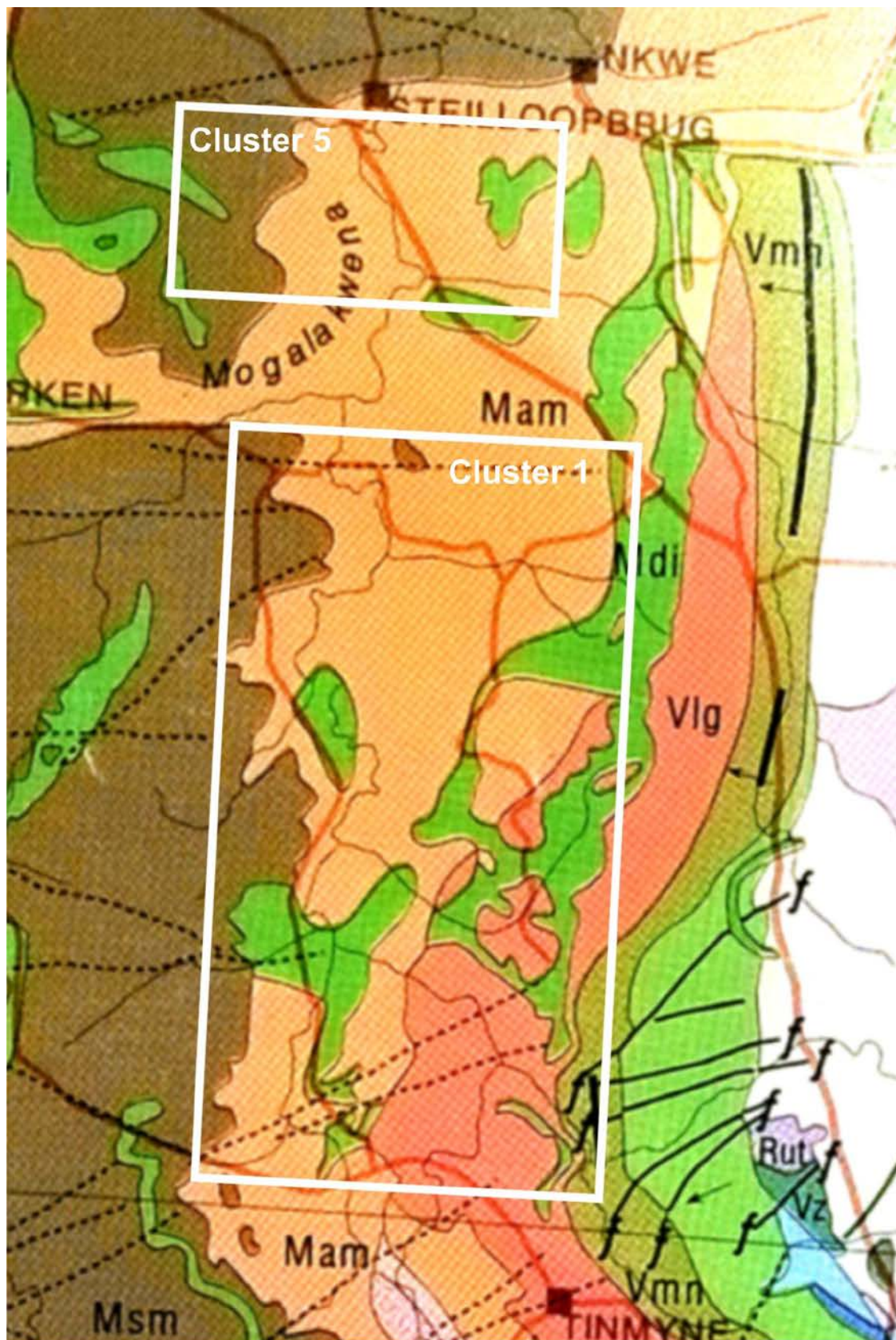


Figure 3. Extract from 1:1 000000 geological map showing the proposed Mogalakwena Cluster 1 and 5 footprint areas. The study area is respectively underlain by unfossiliferous igneous and sedimentary rocks of the Palaeoproterozoic Bushveld Complex and Waterberg Group.