

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG



DESKTOP PALAEOONTOLOGICAL IMPACT ASSESSMENT

**Establishment of tomato croplands on farm Coniston, Waterpoort
area, Vhembe District, Limpopo Province**

Specialist report by:

Bruce Rubidge

Address: PO Box 85346
Emmarentia
Tel: 072 575 7752
Email: bruce.rubidge@wits.ac.za

Subcontracted by environmental consultants

Linky Wendel

Address: AGES Limpopo (Pty) Ltd
120 Marshall Street
Polokwane
0699
Tel: + 27 (0) 15 291 1577
Email: lwendel@ages-group.com

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EXECUTIVE SUMMARY

Bruce Rubidge was appointed by AGES Limpopo (Pty) Ltd on behalf of Koedoespan Boerdery (Pty) Ltd to undertake a desktop Palaeontological Impact Assessment for the proposed clearance of approximately 450 ha of indigenous vegetation for tomato croplands on Portion 3 of the farm Coniston 699 MS in the Waterpoort area, Vhembe District, Limpopo Province. The development is for agricultural purposes.

The entire study area is underlain by Carboniferous-Jurassic rocks of the Tshidzi, Madzaringwe, Mikambeni, Fripp, Solitude, Klopperfontein, Bosbokpoort and Clarens formations of the Karoo Supergroup. Although fossils have not yet been reported from this specific locality the Karoo Supergroup is known to host fossil plants and tetrapods.

However, as these rocks do not outcrop in the study area because of alluvium and vegetation cover, it is unlikely that rocks are exposed in the affected area and thus, in my opinion, this development will not negatively affect palaeontological heritage. However, if rock outcrops are exposed in the course of stabling the tomato croplands, a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

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Introduction and Brief

A Palaeontological Impact Assessment was requested by Linky Wendel, AGES Limpopo (Pty) Ltd on behalf of Koedoespan Boerdery (Pty) Ltd on Remainder of Portion 3 of the farm Coniston 699 MS in the Waterpoort area, Makhado Local Municipality, Vhembe District, Limpopo Province (Figure 1). This report is part of a Heritage Impact Assessment to determine the effect that the proposed establishment of tomato croplands will have on palaeontological heritage.

The study was commissioned by Africa Geo-Environmental Services Limpopo (Pty) Ltd (AGES) and I was asked to provide a desktop assessment of the effect that the proposed development will have on the palaeontological heritage.

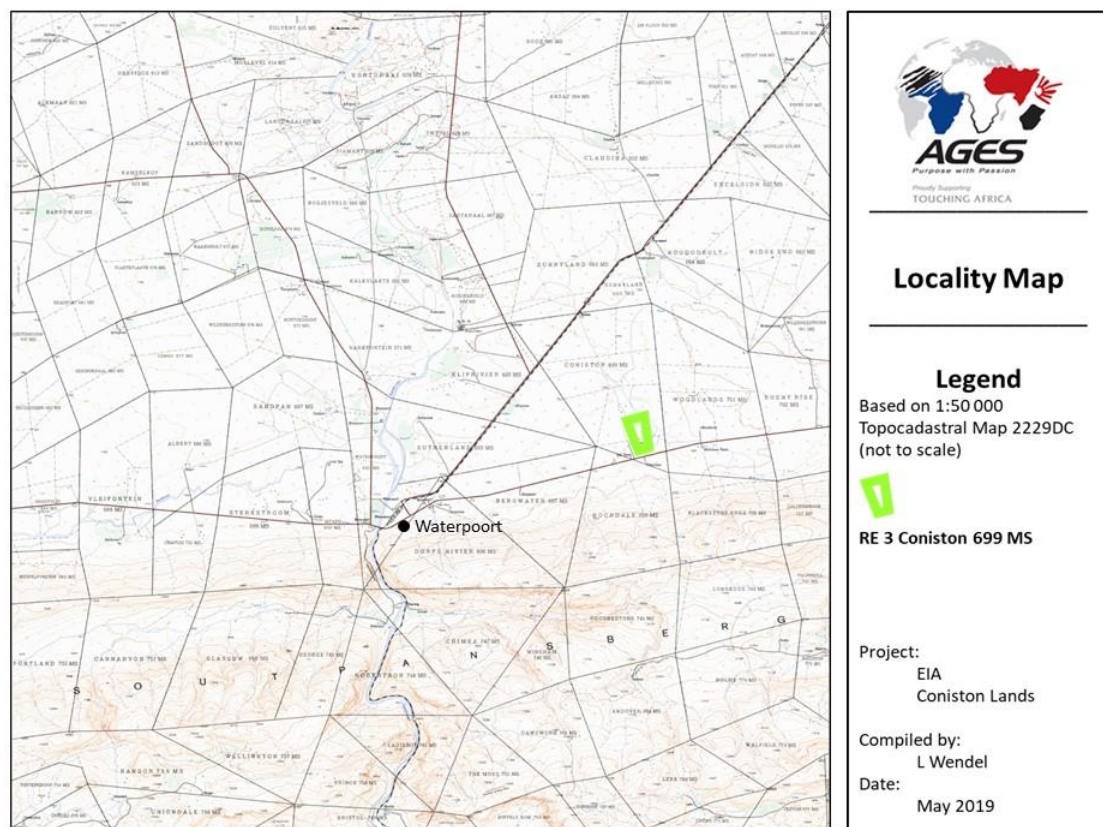


Figure 1: Topographic map showing the position (in green) of the proposed tomato croplands situated on Portion 3 of the farm Coniston 699 MS in the Waterpoort area, Makhado Local Municipality, Vhembe District, Limpopo Province (Map Sheet 2229DC).

Legislative framework

The Department of Environmental Affairs (DEA) through the National Environmental Management Act (NEMA Act 107 of 1998) requires that developers apply to the competent authority (which is the Limpopo Department of Economic Development, Environment and Tourism – LEDET) for Environmental Authorization of the proposed development as more than 1 hectare or more than 300m² in protected environments of indigenous vegetation is to be removed (Listing Notice 1 and 3 of the EIA regulations, 2014, as amended).

National Heritage is protected by the South African Heritage Resources Act (Act No 25) of 1999. Developers are required to submit development plans to SAHRA for approval. These plans must include documentation detailing the expected impact that the development will have on national heritage.

Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act include:

- Geological sites of scientific or cultural significance.
- Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, material, meteorites and rare geological specimens.
- Objects with the potential to contribute to understanding South Africa's natural or cultural heritage.

Accordingly, a Heritage Impact Assessment (HIA) is required to assess the possible impacts of a proposed development on archaeological and palaeontological heritage. This report addresses the palaeontological aspects of the HIA as part of the Environmental Management Plan (EMP).

Details of the study area

The study area of the proposed establishment of tomato croplands is located on the Remainder of Portion 3 of the farm Coniston 699 MS in the Waterpoort area, Makhado Local Municipality, Vhembe District, Limpopo Province. This is situated north of the R523 highway between the towns of Waterpoort and Thohoyandou and is approximately 7 km east north-east of Waterpoort. The study area is covered by the 1:50 000 topographical map 2229DC (Figure 1). The proposed development area covers about 450 ha.

The infrastructure establishment will comprise the clearance of indigenous vegetation for tomato croplands on Figure 1. The expansion is necessary to provide enough space for a crop rotation cycle of 3-7 years. Water for irrigation is available from the current Legal Water Use for the adjacent farms owned by ZZ2.

Geological Setting

Following the 1:250 000 geological map (2228 Alldays) published by the Council for Geosciences (2000), the underlying geology of the entire study area comprises Carboniferous- Jurassic rocks of the Karoo Supergroup in the Tshipise Basin, specifically the Tshidzi, Madzaringwe, Mikambeni, Fripp, Solitude, Klopperfontein, Bosbokpoort and Clarens formations. Most of the affected area is on the Bosbokpoort and Clarens formations (Figure 2). The entire study area is in turn overlain by thick alluvial deposits (Figure 3).

Tshidzi, Madzaringwe, Mikambeni formations – only the southernmost portion of the study area is situated on these Carboniferous to Permian aged formations which comprise carbonaceous shale, mudstone, sandstone and conglomerate.
 Fripp Formation - comprises white feldspathic sandstone, grit and conglomerate
 Klopperfontein Formation –comprises coarse sandstone and conglomerate
 Bosbokpoort Formation – comprises red-purplish mudstone and siltstone
 Clarens Formation – comprises white sandstone

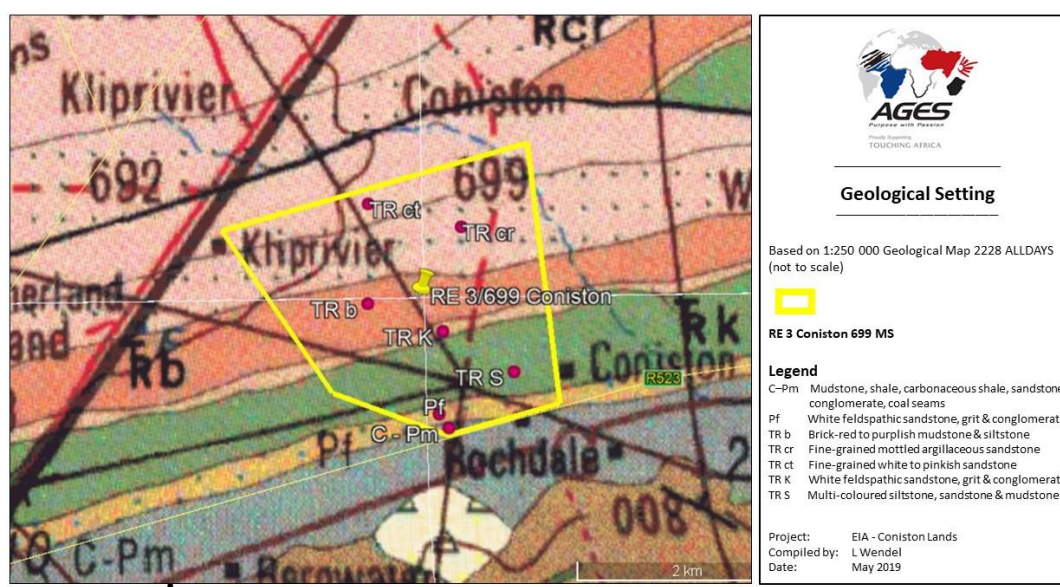


Figure 2: Geology of the study area (1:250 000 Geological Map Series of the Republic of South Africa, Sheet number 2228 Alldays). Yellow quadrangle shows the extent of the area to be developed.

Palaeontological Heritage

The rocks of the Karoo Supergroup in the Main Karoo Basin and also the Tuli basin are known to host Permian-aged fossil plants and tetrapods, particularly therapsids and archosaurs. No fossils have yet been discovered in the study area Tshipise Basin. This is because there are very few rock outcrops in the study area and the portion of

the farm affected by the proposed development is covered by more than 1.5 metres of thick alluvium and vegetation (Figure 3, 4).



Figure 3: Test pit shows the thick covering of alluvial deposits in the study area.

Methodology

Although the study area is underlain by Carboniferous – Jurassic rocks of the Karoo Supergroup, which is of high palaeontological sensitivity, careful study of Google Earth images show that the entire study area, which is only 450 hectares, is covered by vegetation and alluvium and no rocks are exposed. As a site visit would thus not reveal fossils, a desktop Palaeontological Impact Assessment was undertaken to identify possible sensitive fossil occurrences, assess the significance of possible fossil occurrences, comment on the impact of the proposed development, and to make mitigating recommendations. The Google Earth palaeontological survey showed that rocks may be exposed in the centrally positioned north-south drainage line, but this strip (coloured clear on the Google Earth image, Figure 4) has been excluded from development for ecological reasons.

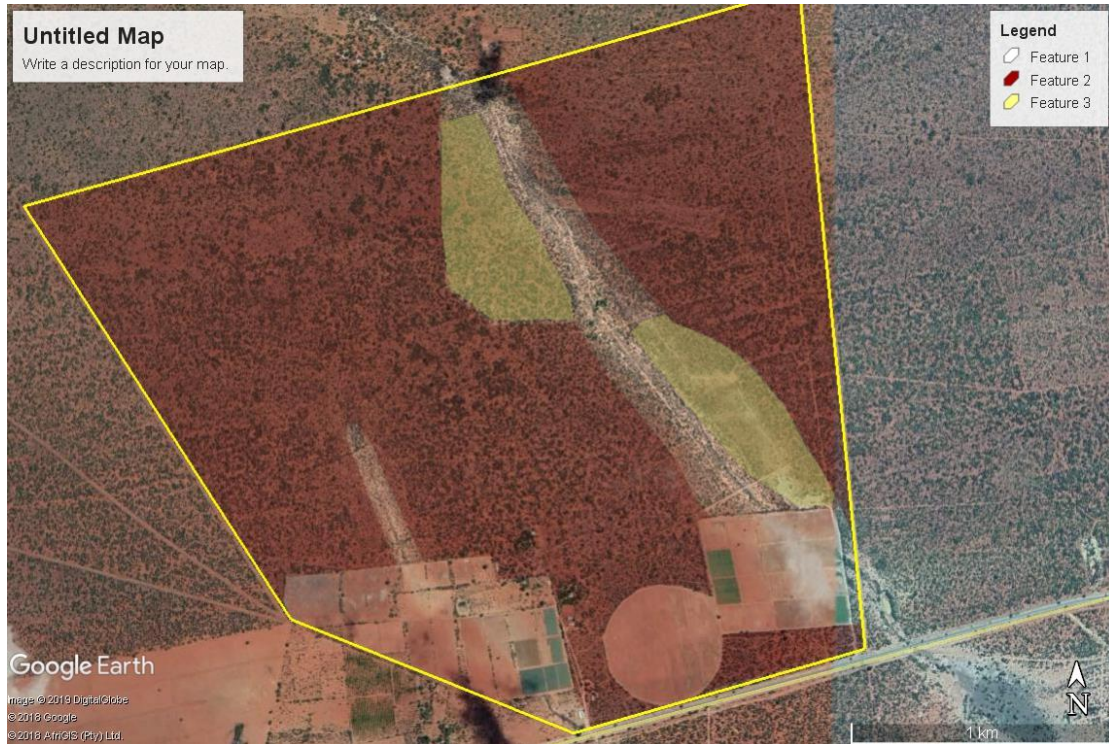


Figure 4: Google Earth image showing the position of the proposed new tomato croplands development (yellow quadrangle). Notice the vegetation and alluvium cover and the lack of visible rock outcrops of the Karoo Supergroup. The area (clear region) along the drainage canal is excluded from the area to be developed.

Recommendations

It is extremely unlikely that the proposed establishment of tomato croplands will have any effect on palaeontological heritage. However, because the Karoo Supergroup is known to host fossils in other parts of South Africa where Karoo Supergroup rocks are exposed, this development will create a unique opportunity to explore the area for fossils.

It is thus recommended that if extensive rock outcrops are exposed as a result of activities to establish the tomato croplands, a qualified palaeontologist must be contacted to assess the exposure for fossils before further development takes place so that the necessary rescue operations are implemented. Depending on the nature of the fossils discovered this could entail excavation and removal to a registered palaeontological museum collection. A list of professional palaeontologists is available from South African Heritage Resources Agency (SAHRA).

Conclusion

The proposed tomato croplands development project on the Remainder of Portion 3 of the farm Coniston 699 MS in the Waterpoort area, Vhembe District, Limpopo

Province extends over superficial soil and vegetation cover overlying rocks of the fossil-bearing Karoo Supergroup which are currently not exposed. There is a possibility that fossils could be exposed as a result of the development. It is considered that, from a palaeontological perspective, the establishment of the proposed tomato croplands should proceed, but if rock outcrops are exposed in the course of construction activities, the developer immediately calls in a qualified palaeontologist to assess the situation and, if necessary, undertake excavation of the fossils.

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Bruce Rubidge PhD, FGSSA, FRSSA, Pr Sci Nat
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