

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG



DESKTOP PALAEOONTOLOGICAL IMPACT ASSESSMENT

**Proposed Township Barkly West,
Dikgatlong Local Municipality, Northern Cape Province**

Specialist report by:

Bruce Rubidge

Address: 20 Donkin Street
Graaff-Reinet
Tel: 072 575 7752
Email: bruce.rubidge@wits.ac.za

Subcontracted by environmental consultants

Koot Raubenheimer

Address: Maxim Planning Solutions
Unit 35 Corpus Novem Office Park,
PO Box 6848,
Flamwood, 2572
Tel: 018 468 6366
Fax: 018 468 6378
Cell: 083 263 4960
Email: koot@maxim.co.za | www.maxim.co.za

DATE: 24 March 2021

EXECUTIVE SUMMARY

Bruce Rubidge was appointed by Maxim Planning Solutions (Pty) Ltd on behalf of Dikgatlong Local Municipality to undertake a desktop Palaeontological Impact Assessment for a township development on the Remaining Extent of Erf 687, Barkly Wes, Dikgatlong Local Municipality, Northern Cape Province.

The entire study area is underlain by rocks of the Precambrian Allanridge Formation of the Ventersdorp Supergroup and more superficially by late Caenozoic wind-blown sand of the Kalahari Group. The igneous Allanridge does not host fossils and there is a slight, but unlikely, possibility that Quaternary Kalahari Group could contain fossils.

As the Precambrian Allanridge Formation of the Ventersdorp Supergroup does not host fossils, and the overlying Quaternary sediments are not known to have fossils it is highly unlikely that palaeontological heritage will be affected by the proposed township development.

This desktop study has indicated that the development is not positioned in a palaeontologically sensitive area. It is thus recommended that if in the unlikely event that fossils are exposed in the Quaternary sediments by the proposed development, a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

TABLE OF CONTENTS

1. Introduction and brief	4
2. Legislative Framework	4
3. Details of the study area	6
4. Geological Setting	7
5. Palaeontological Heritage	7
6. Methodology	7
7. Recommendations	8
8. Conclusion	8
9. Bibliography	9
10. Appendix A: Chance Find Protocol	9

Introduction and Brief

A Palaeontological Impact Assessment was requested by Koot Raubenheimer of Maxim Planning Solutions (Pty) Ltd on behalf of the Dikgatlong Local Municipality. The proposed development is for a township on a Portion of the Remaining Extent of Erf 687, Barkly Wes, Northern Cape Province (Figure 1). The proposed development is conducted on instruction from Barzani Town Planning (Pty) Ltd., and comprises a total area of about 188 hectares.

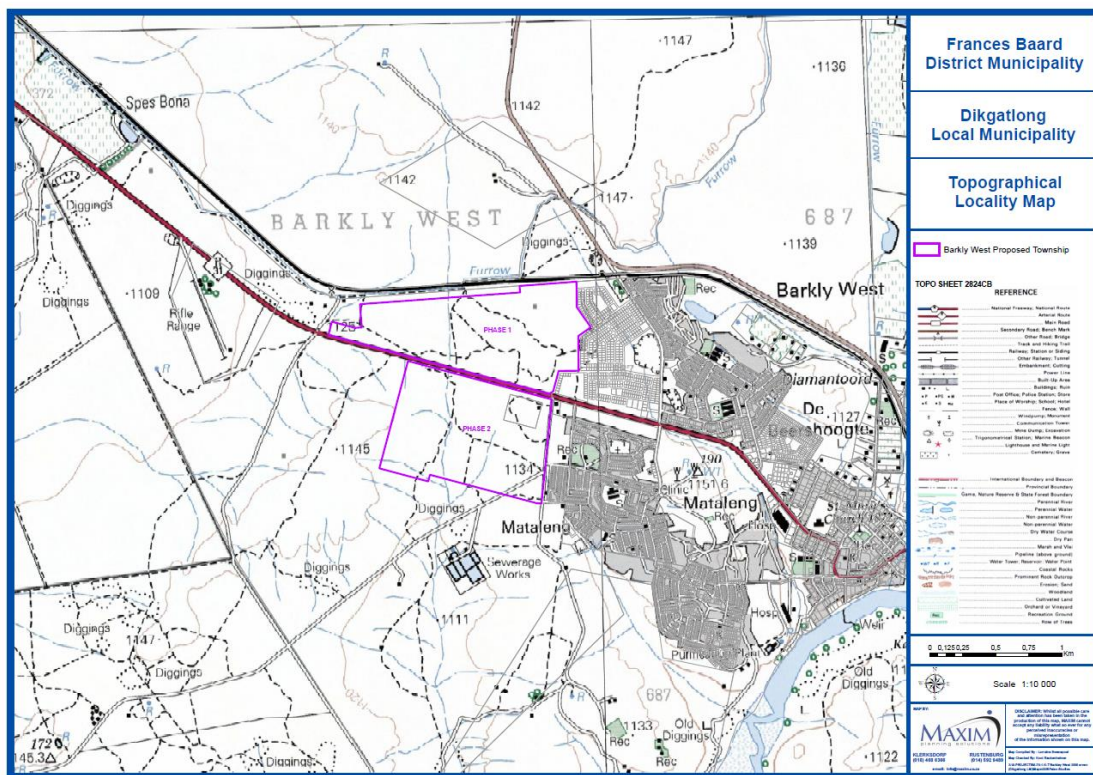


Figure 1. 1:10 000 topographic map (2824CB) showing the site (purple outline) for the proposed township development on a Portion of the Remaining Extent of Erf 687, Barkly Wes, Northern Cape Province

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 for approval of the proposed development as more than 1 hectare of indigenous vegetation is to be removed (Listing Notice 1 of the EIA regulations).

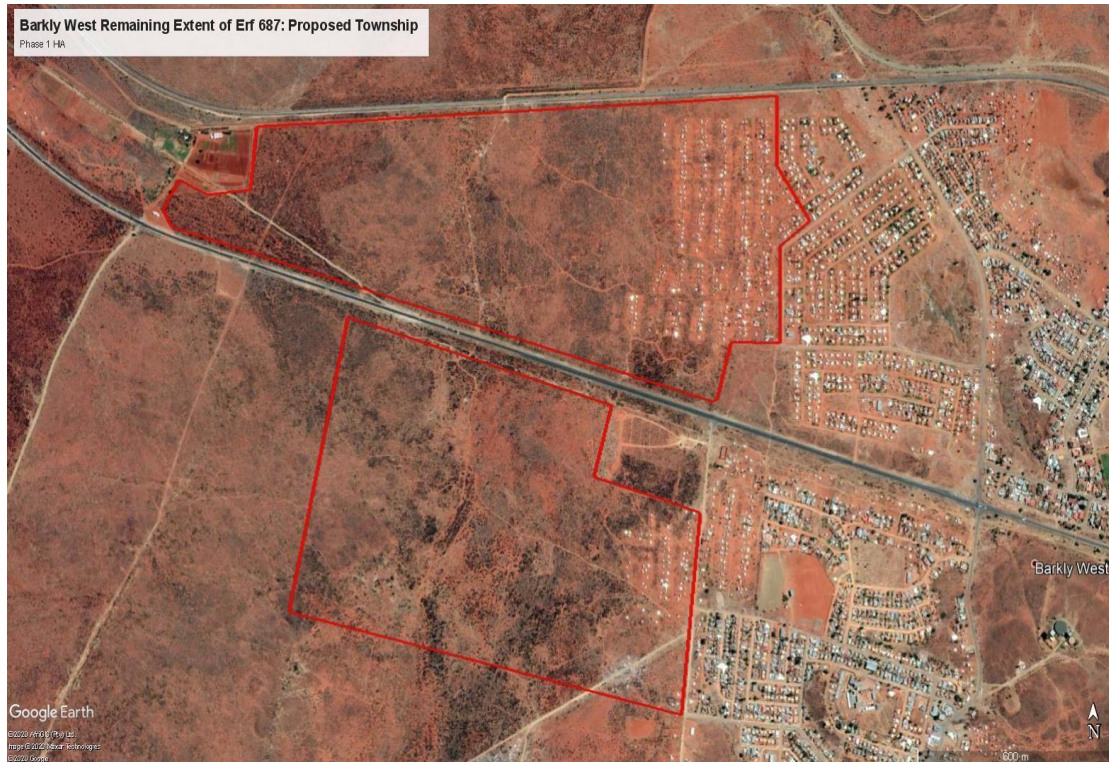


Figure 2. Google Earth image of the study area (outlined in red) on a Portion of the Remainder of Erf 687 in Barkly West Northern Cape Province.

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 township at Barkly West is located on a Portion of the Remaining Extent of Erf 687, Barkly Wes, Northern Cape Province at Dikgatlong Local Municipality, north of the town of Barkly West on either side of the R31 road (Figure 2). The study area is covered by the 1:50 000 topographical map Sheet 2824CB (Figure 1). The proposed development area covers about 188 hectares.

The topography of the study area is flat with small rocky outcrops of the Allanridge Formation. The area has been disturbed by informal housing in places and is covered by shrubs and grass.

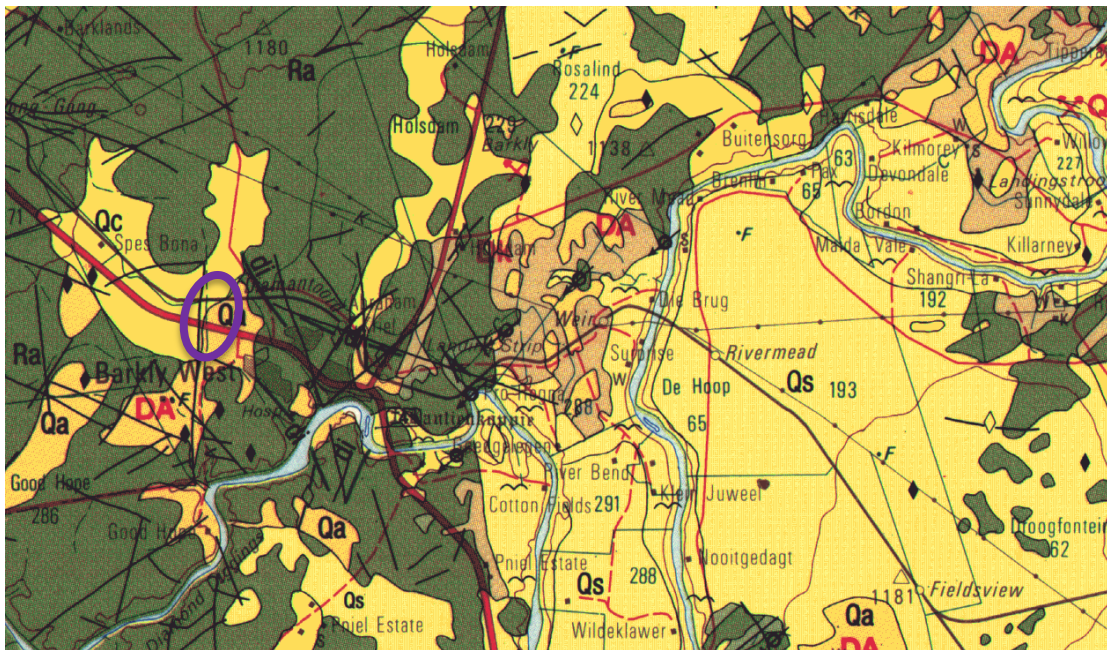


Figure 3: 1: 250 000 scale geological map (1993, Kimberley 2824) showing the position of the proposed township development (purple ovoid) on a Portion of the Remainder of Erf 687 in Barkly West Northern Cape Province, north of Barkly West. in relation to the regional geology. Ra – Allanridge Formation (green); Q - Quaternary alluvial deposits (yellow).

The main infrastructure expansion is associated with the layout of a new township which will be developed and will include Residential, Business, Institutional and Public Open Space erven as well as streets. With regard to services infrastructure, the proposed township area will be supplied with potable water. All sewerage generated is from a full waterborne system.

Geological Setting

Referral to the geological map (1993 sheet 2824 Kimberley; 1:250 000 series) indicates that the entire area is underlain by rocks of the Ventersdorp Supergroup comprising lavas and pyroclastic rocks of the Allanridge Formation (Figure 3) and in turn are overlain by unconsolidated wind-blown sediments of the Quaternary Kalahari Group.

Palaeontological Heritage

The igneous rocks of the Precambrian Allanridge Formation of the Ventersdorp Supergroup do not host fossils. The predominantly wind-blown sands of the Kalahari Formation could possibly host Quaternary fossils but this is extremely unlikely.



Figure 4: Photographs of the study area to show the covering of Tertiary-Quaternary Kalahari Group

Methodology

The study area is underlain by Precambrian rocks of the Ventersdorp Supergroup which are considered to be of low palaeontological sensitivity. However, because these Precambrian rocks are overlain by unconsolidated sands of the Kalahari Group in the study area (Figure 4), 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 only possibility for finding fossils is in the overlying Kalahari Group and it is extremely unlikely that fossils will be preserved in these unconsolidated sediments.

Recommendations

From the documentation supplied regarding the development it is extremely unlikely that the proposed development will have any affect on palaeontological heritage. The underlying Precambrian igneous rocks of the Ventersdorp Supergroup do not host fossils and it is unlikely that fossils will be preserved in the overlying Quaternary alluvial deposits.

It is thus recommended that, in the unlikely event that fossils are exposed in the unconsolidated Quaternary sands as a result of construction activities, 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 township development near Barkly West is underlain by Precambrian aged rocks of the Ventersdorp Supergroup which in turn is overlain by unconsolidated Quaternary aged alluvial deposits. It is extremely unlikely that fossils will be exposed as a result of the development. From a palaeontological perspective it is recommended that the proposed township development should proceed but if fossils are uncovered in the course of construction activities, the developer must immediately call in a qualified palaeontologist to assess the situation and, if necessary, undertake excavation of the fossils.

Bibliography

Mac Rae C. 1999. *Life etched in stone: fossils of South Africa*. The Geological Society of South Africa, Johannesburg, pp 305.

McCarthy TS., & Rubidge BS. 2005. *The story of Earth and Life – a southern African perspective on the 4.6 billion year journey*. Struik Publishers, Cape Town. pp 333.

Partridge TC., Botha GA., & Haddon IG. 2006. Cenozoic deposits of the interior. *In: Johnson MR, Anhaeusser and Thomas RJ (Eds). The Geology of South Africa*. Geological Society of South Africa, Johannesburg/Council for Geoscience, Pretoria. pp. 585-604.

SAHRA. 2013. Minimum standards: palaeontological component of heritage impact assessment reports. South African Heritage Resources Agency, Cape Town. pp15.

Van der Westhuizen W.A., de Bruijn H. & Meintjes P.G. The Ventersdorp Supergroup. *In: Johnson MR, Anhaeusser and Thomas RJ (Eds). The Geology of*

South Africa. Geological Society of South Africa, Johannesburg/Council for Geoscience, Pretoria. pp. 187-208.



Bruce Rubidge PhD, FGSSA, FRSSA, Pr Sci Nat

24 March 2021

APPENDIX A – CHANCE FIND PROTOCOL (CFP)

It is noted that following the findings of this desktop Palaeontological Impact Assessment it is unlikely that fossils will be recovered as a result of the proposed township development. The following procedure is required if fossils are exposed by excavations.

1. If fossils are exposed by excavation in the sands of the Kalahari Group they must be inspected by the environmental officer or designated person.
2. If fossils are noted in the unconsolidated Quaternary sands (includes bones, insects or plants) a suitably qualified palaeontologist must be approached for a verdict.
3. Fossil material displaced by excavation should be placed in a protected area, in this way development activities will not be held up.
4. Appropriate photographs of the fossils which have been noted should be sent to a qualified palaeontologist for a verdict on how to proceed. This may require a site inspection and excavation by the palaeontologist.
5. Fossils that are deemed to be of good quality or of scientific importance by the palaeontologist must be removed and curated in a recognised palaeontological museum collection where they can be made available for further study.
6. Before fossils are removed from the site a collecting permit must be obtained from SAHRA, and the required permitting procedures and requirements must be followed.
7. If the fossil material is deemed by the registered palaeontologist (as a result of photographic evidence or a site visit) to not be worthy of excavation and curation in a museum collection, the material will not be removed.
8. Mitigation will involve an attempt to capture all rare fossils and systematic collection of all fossils discovered by a registered palaeontologist. This will require routine collecting protocols involving descriptive, diagrammatic and photographic recording of fossils and exposures. The fossils and appropriate contextual samples will be processed to create an archive collection.

9. Should a major *in situ* occurrence be exposed, excavation will immediately cease in that area so that the discovery is not disturbed or altered in any way until the appointed palaeontologist has investigated the find.
10. Should no fossils be discovered in the process of development and excavations have been completed, no further monitoring will be required.
11. Any site visits by a registered palaeontologist and/or excavation of fossil material required, will be undertaken at the cost of the developer.