

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG



DESKTOP PALAEOONTOLOGICAL IMPACT ASSESSMENT

**Mahikeng Extension 40 township development
Mahikeng Local Municipality, North West Province**

Specialist report by:

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EXECUTIVE SUMMARY

Bruce Rubidge was appointed by Maxim Planning Solutions (Pty) Ltd to undertake a desktop Palaeontological Impact Assessment on behalf of the Mahikeng Local Municipality for the proposed township development located on Portion 54 of the farm Mmabatho Town and Townlands- 301 JO, Mafikeng, Northwest Province.

The area is underlain by Precambrian rocks of the Allanridge and Rietgat formations of the Platberg Group, of the Ventersdorp Supergroup which in turn are overlain by unconsolidated alluvial deposits of the Quaternary Kalahari Formation.

As the Precambrian Ventersdorp Supergroup is not known to host fossils it is highly unlikely that palaeontological heritage will be affected by the proposed township development. The overlying Tertiary and Quaternary sediments, which are mostly covered by vegetation in the study area, are the only sedimentary deposits in the area which could host palaeontological heritage. As these deposits are not consolidated it is very unlikely that any fossils will be present.

If in the unlikely event that fossils are exposed in the Tertiary and Quaternary sediments in the course of the proposed development, 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 desktop Palaeontological Impact Assessment was requested by Koot Raubenheimer of Maxim Planning Solutions (Pty) Ltd on behalf of the Mahikeng Local Municipality for the proposed township development located on Portion 54 of the farm Mmabatho Town and Townlands- 301 JO, Mafikeng, Mahikeng township Extension 40 is located north of Mmabatho and to the west of the N18 road in Northwest Province (Figure 1). The proposed development comprises a total area of 481.8139 hectares.

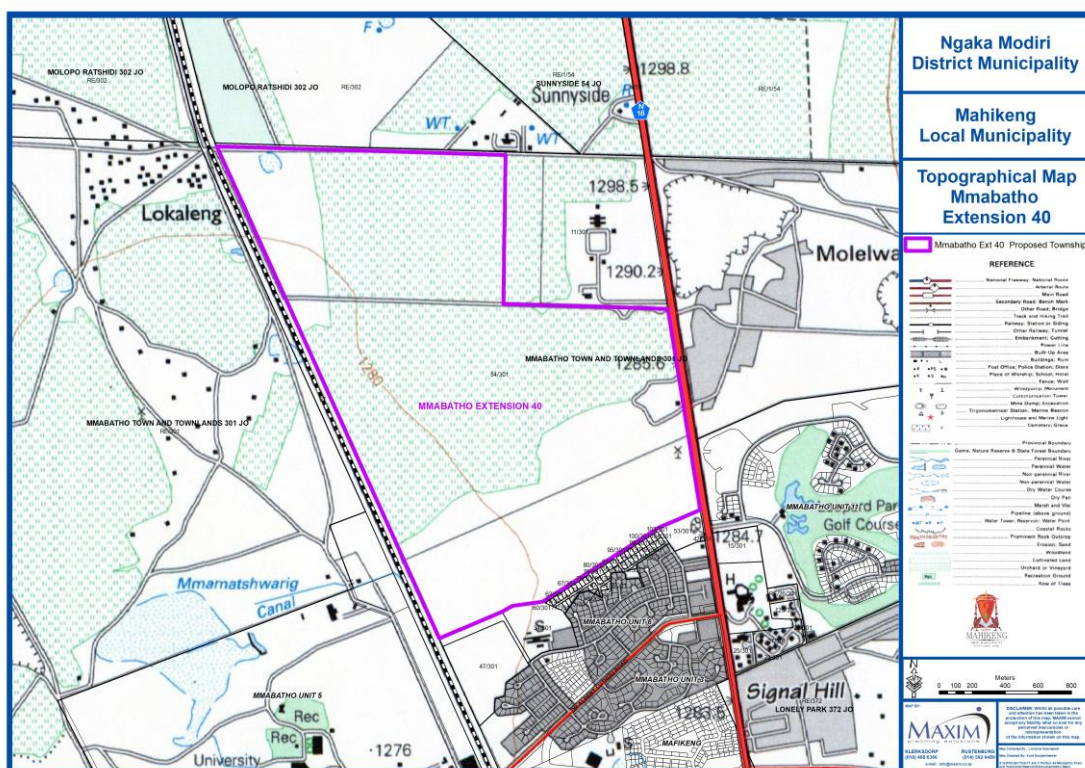


Figure 1. 1:50 000 topographic map (Sheet 2525DC Mahikeng) showing the site (purple outline) for the proposed Mahikeng Extension 40 township development on Portion 54 of the farm Mmabatho Town and Townlands- 301 JO, Mafikeng

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).

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).

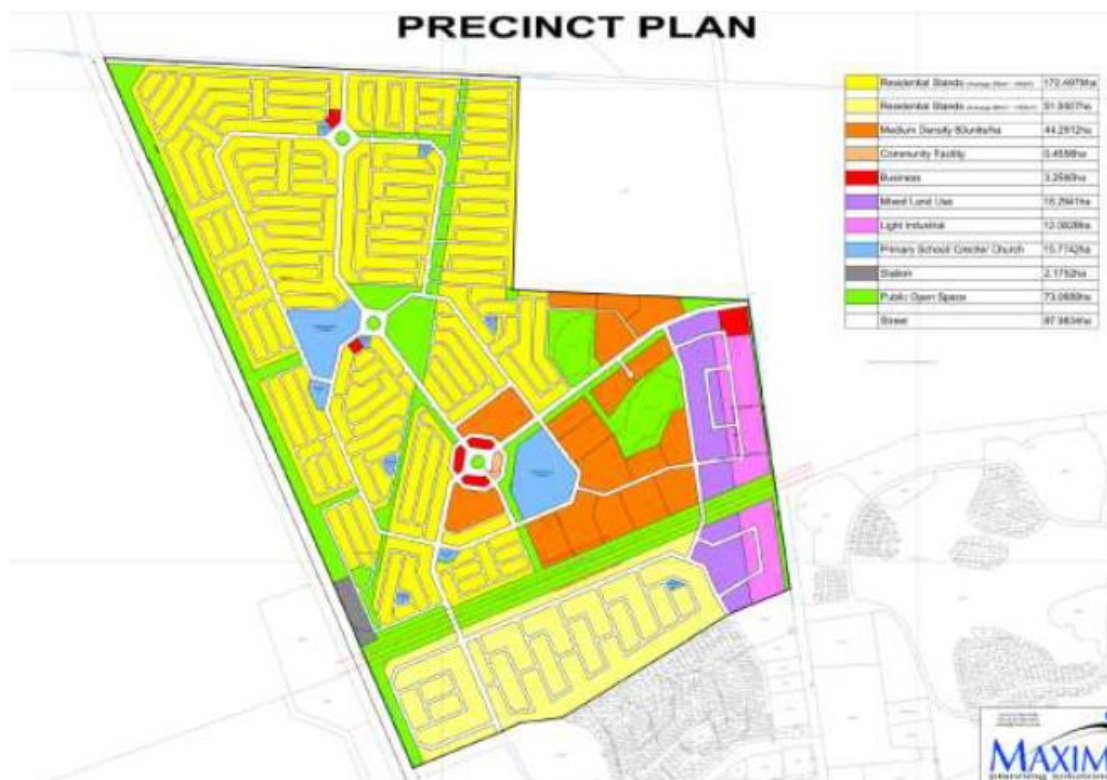


Figure 2: Layout plan of the proposed township development on Portion 54 of the farm Mmabatho Town and Townlands- 301 JO, Mafikeng

Details of the study area

The study area of the Mahikeng Extension 40 township development is situated on Portion 54 of the farm Mmabatho Town and Townlands- 301 JO, Mafikeng, Mahikeng township Extension 40 is located north of Mmabatho and to the west of the N18 road (Nelson Mandela Drive) in Northwest Province (Figure 1). This is between the Mmabatho Unit 6 and the Joint Tactical Headquarters of the North West Province. The Mmabatho railway line is located on the western boundary of the site The study area is covered by the 1:50 000 topographical map 2525DC Mahikeng (Figure 1). The proposed development area covers 481.8139 hectares.

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 (Figure 2).

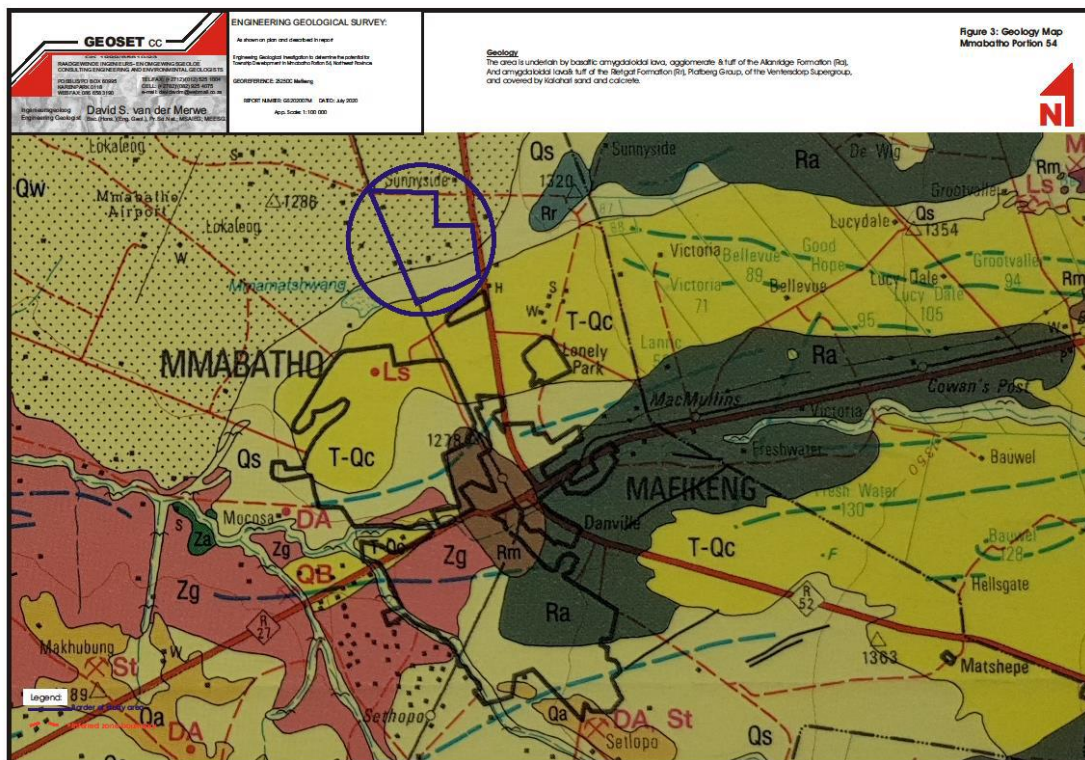


Figure 3: 1: 250 000 scale geological map (2524 Mafikeng) showing the position (purple quadrangle) of the proposed Mahikeng Extension 40 township development on Portion 54 of the farm Mmabatho Town and Townlands- 301 JO, Mafikeng. Va – Griquatown Group (white); T-Qc – Tertiary - Quaternary alluvial deposits (dark yellow); Qw - Quaternary alluvial deposits (light yellow).

Geological Setting

Referral to the geological map (sheet Mafikeng 2524; 1:250 000 series) indicates that the entire study area is covered by Tertiary limestones and unconsolidated wind-blown sand of the Quaternary Kalahari Formation. From the proximity of the mapped outcrops on the geological map it is evident that the study area is underlain by Precambrian rocks of the Allanridge Formation (Ra) (comprising basaltic amygdaloidal lava, agglomerate & tuff) and the Rietgat Formation (Rr) (comprising amygdaloidal lava & tuff) of the Ventersdorp Supergroup (Figure 3).



Figure 4: Photographs of the study area showing the alluvial cover (AB Enviro Consult, 2020).

Palaeontological Heritage

The Precambrian rocks of the Ventersdorp Supergroup, which are not known to host fossils, are overlain by thick deposits of Tertiary limestone and Quaternary sands of the Kalahari Formation (Figure 3 & 4). As these are sedimentary deposits there is the possibility that the Kalahari Formation could preserve fossils of animals and plants, but this is unlikely as these deposits are not consolidated. If fossils are present their occurrence will be sporadic.

Methodology

Because the study area is underlain by Precambrian rocks of low palaeontological sensitivity, 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.

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 rocks of the Allanridge and Rietgat formations, Platberg Group, of the Ventersdorp Supergroup are not exposed in the study area and are not known to preserve fossils. However if fossils are exposed in the overlying Tertiary-Quaternary alluvial deposits it will create a unique opportunity to explore the area for fossils.

It is thus recommended that, in the unlikely event that fossils are exposed 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 Mahikeng Extension 40 township development area is underlain by Precambrian aged rocks of the Ventersdorp Supergroup which in turn is overlain by unconsolidated Tertiary-Quaternary aged alluvial deposits. It is extremely unlikely that fossils will be exposed as a result of the development. From a palaeontological perspective, 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.

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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 destroyed or disrupted as a result of the Mahikeng Extension 40 township development north of Mmabatho. The following procedure is required if fossils are exposed by excavations.

1. If fossils are exposed by excavation in unconsolidated Tertiary- Quaternary alluvial deposits they must be inspected by the environmental officer or designated person.
2. If fossils are noted in the unconsolidated Tertiary-Quaternary alluvial deposits (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.