

UNIVERSITY OF THE
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DESKTOP PALAEOONTOLOGICAL IMPACT ASSESSMENT

Churchill Township development in Joe Morolong Local Municipality near Kuruman

Specialist report by:

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EXECUTIVE SUMMARY

Bruce Rubidge was appointed under instruction from Barzani Town Planning (Pty) Ltd to undertake a desktop Palaeontological Impact Assessment for the proposed Churchill Township Development on a Portion of the Remaining Extent of the farm Churchill 211HM and a Portion of the Remaining Extent of Portion 2 of the farm Nyra 213HM in the Joe Morolong Local Municipality near Kuruman in the Northern Cape Province.

The entire study area is deeply underlain by rocks of the Precambrian Transvaal Supergroup and more superficially by late Caenozoic wind-blown sand of the Kalahari Group. Dolomites of the Transvaal Supergroup are known to contain fossil stromatolites, and there is a slight, but unlikely, possibility that the unconsolidated wind-blown sand of the Tertiary-Quaternary Kalahari Group could contain fossils.

As the Precambrian Transvaal Supergroup rocks are overlain by thick Tertiary-Quaternary sands and are not exposed in the study area no stromatolites are evident and it is highly unlikely that palaeontological heritage will be affected by the proposed township development. The overlying Caenozoic sediments are not consolidated and it is very unlikely that any fossils will be present.

This desktop study has indicated that no stromatolites are exposed, and if deep excavations are undertaken for the development it could expose fossil stromatolites and could create an opportunity for further study. It is thus recommended that if in the unlikely event that fossils are exposed in the Precambrian Transvaal Supergroup rocks or Caenozoic sediments during 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 Palaeontological Impact Assessment was requested by Koot Raubenheimer of Maxim Planning Solutions (Pty) Ltd on instruction from Barzani Town Planning (Pty) Ltd to undertake a desktop Palaeontological Impact Assessment for the proposed Churchill Township Development on a Portion of the Remaining Extent of the farm Churchill 211HM and a Portion of the Remaining Extent of Portion 2 of the farm Nyra 213HM in the Joe Morolong Local Municipality near Kuruman in the Northern Cape Province (Figure 1). The proposed development comprises a total area of 261.3125 hectares.

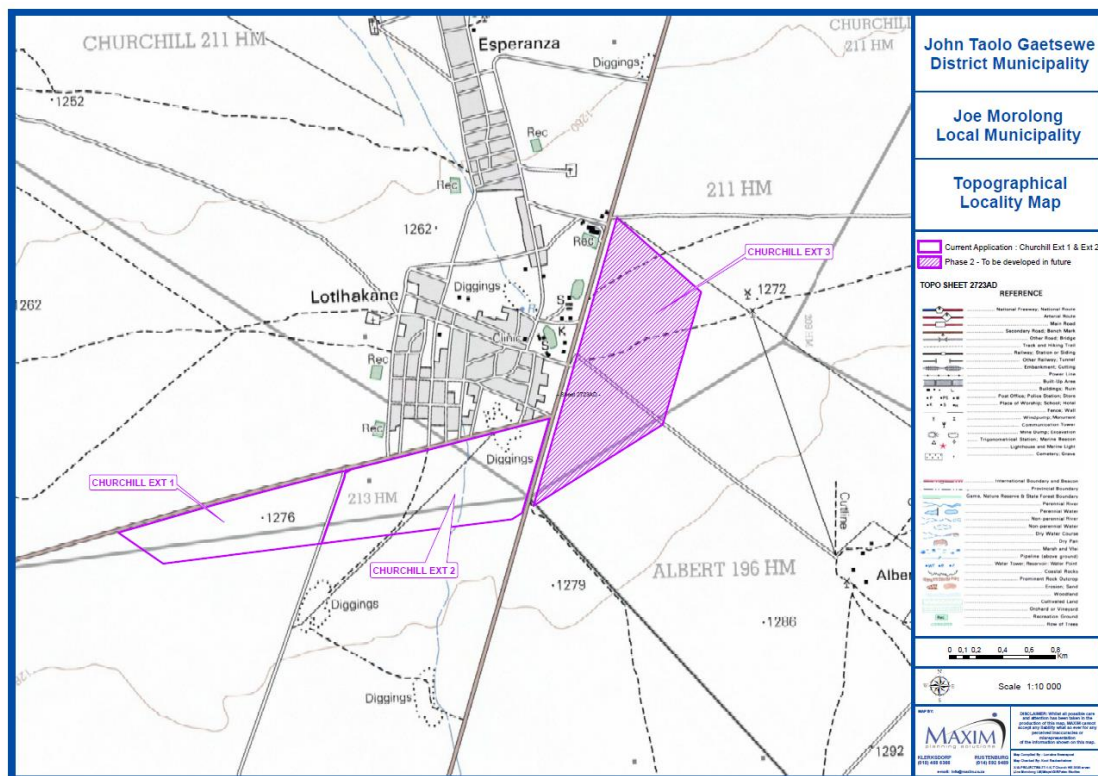


Figure 1. 1:10 000 topographic map (2723AD) showing the site (purple outline) for the proposed Churchill township development on a Portion of the Remaining Extent of the farm Churchill 211HM and a Portion of the Remaining Extent of Portion 2 of the farm Nyra 213HM in the Joe Morolong Local Municipality near Kuruman in the 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

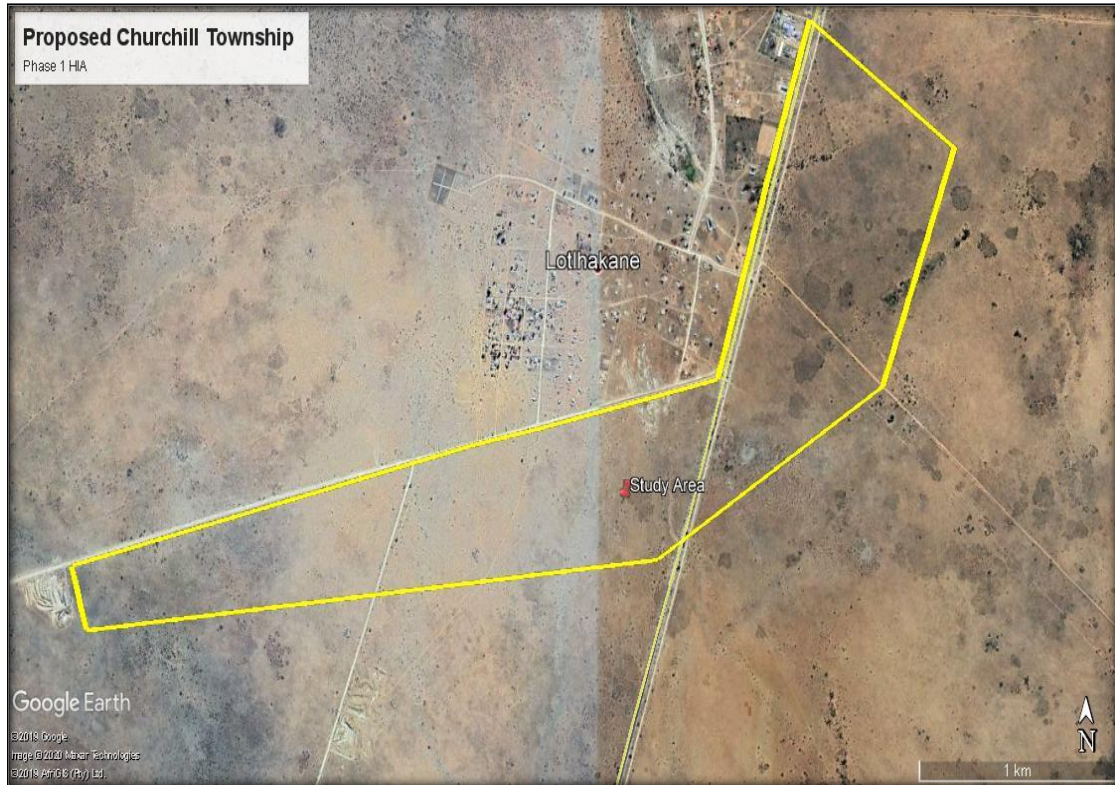


Figure 2. Google Earth image of the study area (outlined in yellow) on a Portion of the Remaining Extent of the farm Churchill 211HM and a Portion of the Remaining Extent of Portion 2 of the farm Nyra 213HM in the Joe Morolong Local Municipality near Kuruman in the Northern Cape Province. Kuruman is situated to the southwest.

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).

Details of the study area

The study area of the proposed township is located on a Portion of the Remaining Extent of the farm Churchill 211HM and a Portion of the Remaining Extent of Portion 2 of the farm Nyra 213HM in the Joe Morolong Local Municipality near Kuruman in the Northern Cape Province (Figure 1).

The topography of the study area is flat with no rocky outcrops and is covered with grassland vegetation.

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 (1979, sheet Kuruman 2722; 1:250 000 series) indicates that the entire area is deeply underlain by rocks of the Transvaal Supergroup comprising sedimentary rocks of the Precambrian Gaap Group (Campbell Rand Subgroup) which comprise dolomites (Figure 3) and in turn are overlain by thick unconsolidated wind-blown sediments of the Tertiary-Quaternary Kalahari Group.

Palaeontological Heritage

The dolomites and carbonite rocks of the Gaap Group, which are covered by sediments of the Kalahari Group, and thus not exposed in the study area, could potentially host fossil of stromatolites. The wind-blown sands of the Kalahari Group, which are also sedimentary of origin, could also potentially host much younger fossils but this is extremely unlikely.

Collections of stromatolites from the Transvaal Supergroup are present in the collections of the Evolutionary Studies Institute (ESI), formerly BPI Palaeontology, at the University of the Witwatersrand, and the Council for Geoscience in Pretoria.

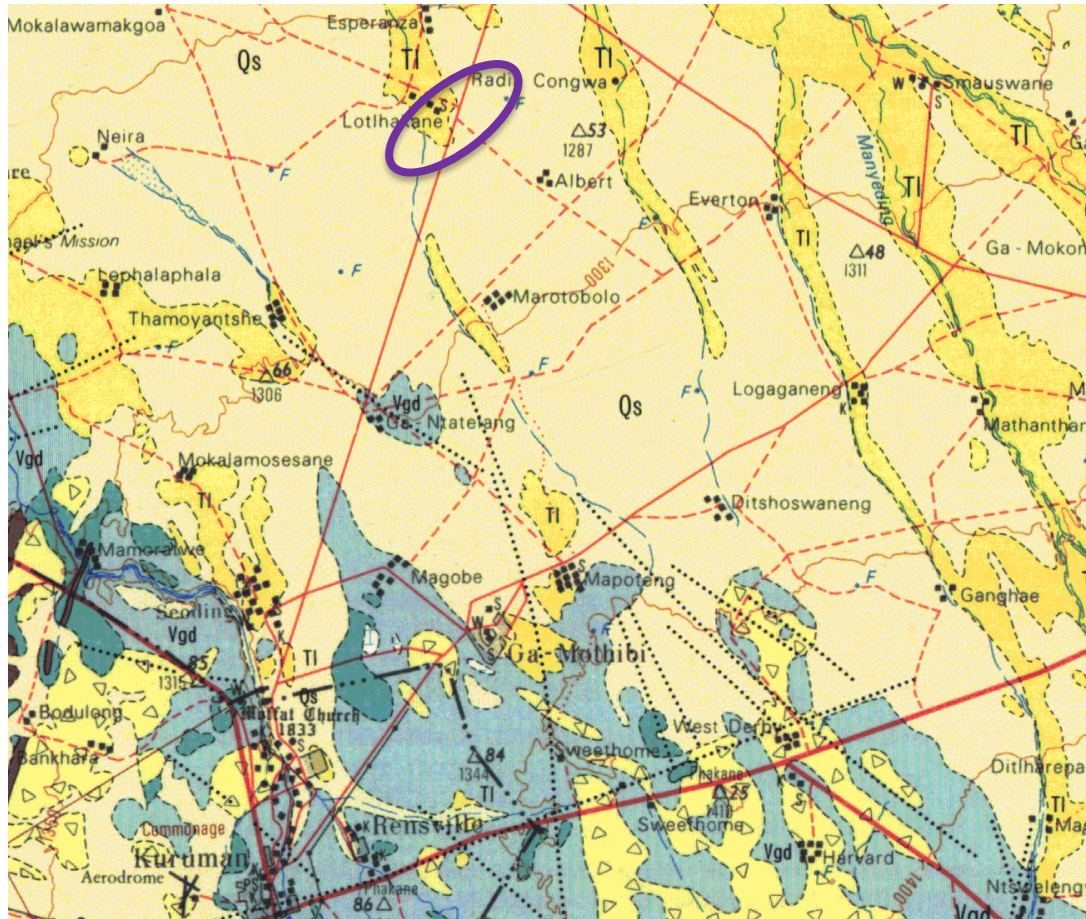


Figure 3: 1: 250 000 scale geological map (2722 Kuruman) showing the position of the proposed township development (purple ovoid) on a Portion of the Remaining Extent of the farm Churchill 211HM and a Portion of the Remaining Extent of Portion 2 of the farm Nyra 213HM in the Joe Morolong Local Municipality north-east of Kuruman in relation to the regional geology. Vgd – Gaap Group (blue and blue-green); T-Qk – Tertiary - Quaternary alluvial deposits (yellow).

Methodology

The study area is underlain by Precambrian rocks of the Transvaal Supergroup which is considered of high palaeontological sensitivity because of the possibility of finding fossil stromatolites. However, because these Precambrian rocks are overlain by thick unconsolidated sands of the Kalahari Formation in the study area and are not exposed (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 thick covering of Kalahari sand over the entire study

area covering the rocks of the Transvaal Supergroup means that a field study will not yield anything of palaeontological significance.



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

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 Gaap Group are not exposed in the study area 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 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 Churchill township development northeast of Kuruman is underlain by Precambrian aged rocks of the Gaap Group 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 (see Appendix A).

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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 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 or in the dolomites of the underlying Transvaal Supergroup 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.