

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG



DESKTOP PALAEOONTOLOGICAL IMPACT ASSESSMENT

**Powerline connection Bela-Bela Local Municipality,
Waterberg District, Limpopo Province**

Specialist report by:

Bruce Rubidge

Address: PO Box 578
Graaff-Reinet

Tel: 072 575 7752

Email: bruce.rubidge@wits.ac.za

Mr. A von Well

Address: Ages Limpopo (Pty) Ltd.
120 Marshall Street
Polokwane
0699

Tel: 015 291 1577

Email: avonwell@ages-group.com

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EXECUTIVE SUMMARY

Bruce Rubidge was appointed by AGES Limpopo (Pty) Ltd on behalf of Cetus Energy (Pty) Ltd to undertake the palaeontological impact assessment process for the proposed development and installation of a 132kV powerline connecting the approved Bela Bela Photovoltaic (PV) Power Plant on Portion 67 of the farm Tweefontein 462 KR to the Eskom “Tweekoppies - Warmbad” substation. The powerline will traverse Portion 1 of the farm Roodekuil 498 KR, Portion 147 and Remainder of the farm Roodekuil 496 KR, Portion 24 of the farm Buiskop 464 KR, as well as Portions 16, 17, 18 and 19 of the farm Tweefontein 462 KR in the Bela Bela Municipality, Waterberg District of the Limpopo Province.

The surrounding area is deeply underlain by Precambrian rocks of the Rooiberg group and the Nylstroom Subgroup of the Waterberg Group. However, the specific study area is underlain by sandstones of the Clarens Formation of the Karoo Supergroup.

There is no possibility that the Precambrian rocks could contain metazoan fossils however there is a possibility that the rocks of the Karoo Supergroup could contain fossils, but because they are deeply overlain by Quaternary unconsolidated alluvium, it is highly unlikely that palaeontological heritage will be affected by the proposed powerline development. In fact, the development could enhance the possibility of finding fossils. Thus, from a palaeontological perspective, the development should proceed.

If in the unlikely event that fossils are discovered 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. (See Appendix A – CFP).

TABLE OF CONTENTS

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

1. Introduction and Brief

A Palaeontological Impact Assessment was requested by Anton von Well on behalf of AGES Limpopo (Pty) Ltd on behalf of Cetus Energy (Pty) Ltd to undertake the palaeontological impact assessment process for the proposed development and installation of a 132kV powerline connecting the approved Bela Bela Photovoltaic (PV) Power Plant on Portion 67 of the farm Tweefontein 462 KR (DFFE Ref No: 14/12/16/3/3/2/688) to the Eskom “Tweekoppies - Warmbad” substation.

The powerline will traverse Portion 1 of the farm Roodekuil 498 KR, Portion 147 and Remainder of the farm Roodekuil 496 KR, Portion 24 of the farm Buiskop 464 KR, as well as Portions 16, 17, 18 and 19 of the farm Tweefontein 462 KR in the Bela Bela Municipality, Waterberg District of the Limpopo Province (Figure 1). This report is part of a Heritage Impact Assessment to determine the effect that the proposed powerline development over a distance of approximately 6.91 km will have on palaeontological heritage.

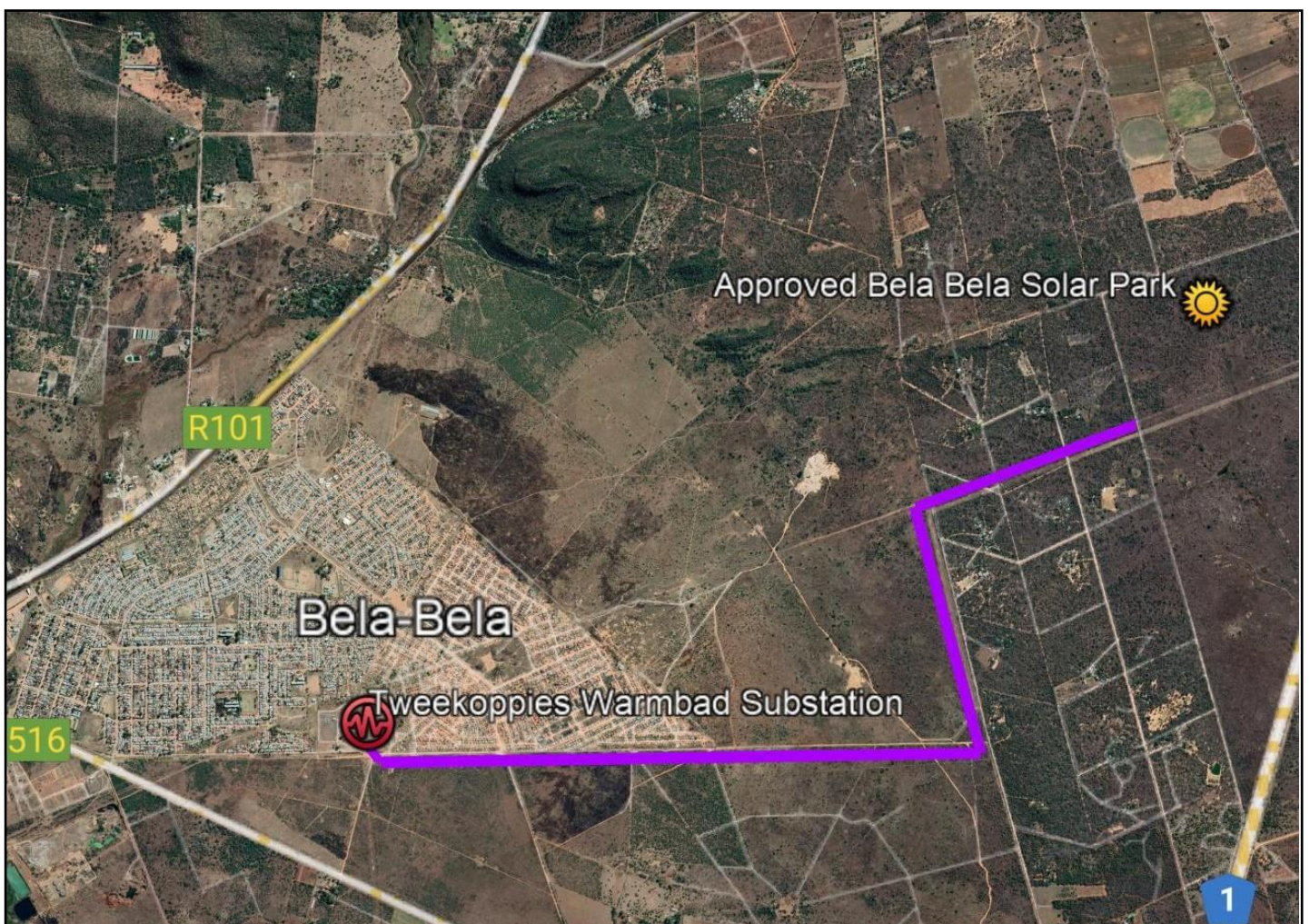


Figure 1: Google Earth projection showing the position of the proposed powerline development on Portion 1 of the farm Roodekuil 498 KR, Portion 147 and Remainder of the farm Roodekuil 496 KR, Portion 24 of the farm Buiskop 464 KR, as well as Portions 16, 17, 18 and 19 of the farm Tweefontein 462 KR in the Bela Bela Municipality, Waterberg District of the Limpopo

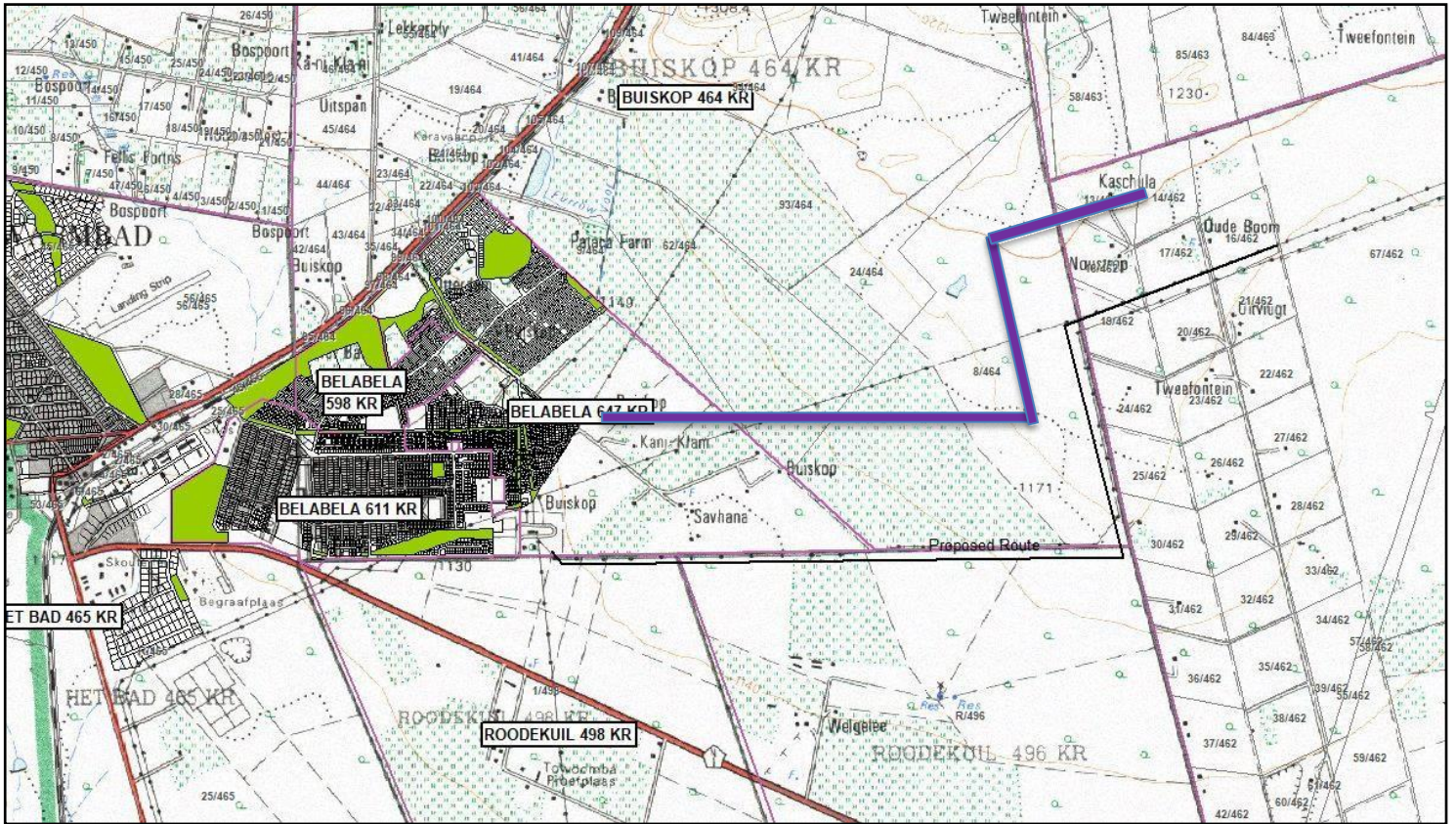


Figure 2: 1:50 000 Topographic map (2428CD) showing the position of the proposed powerline development (purple stripe) on Portion 1 of the farm Roodekuil 498 KR, Portion 147 and Remainder of the farm Roodekuil 496 KR, Portion 24 of the farm Buiskop 464 KR, as well as Portions 16, 17, 18 and 19 of the farm Tweefontein 462 KR in the Bela Bela Municipality, Waterberg District of the Limpopo

2. Legislative framework

The Department of Forestry, Fisheries and the Environment, (DFFE) through the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that developers apply to the competent authority for Environmental Authorization of the proposed development.

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).

3. Details of the study area

The study area of the proposed powerline development will traverse landscape of undulating topography on Portion 1 of the farm Roodekuil 498 KR, Portion 147 and Remainder of the farm Roodekuil 496 KR, Portion 24 of the farm Buiskop 464 KR, as well as Portions 16, 17, 18 and 19 of the farm Tweefontein 462 KR in the Bela Bela Municipality, Waterberg District of the Limpopo Province. The study area is east of Bela Bela and is covered by the 1:50 000 topographical map 2428CD (Figure 1,2,3). The proposed development area covers a distance of approximately 6.91 km.

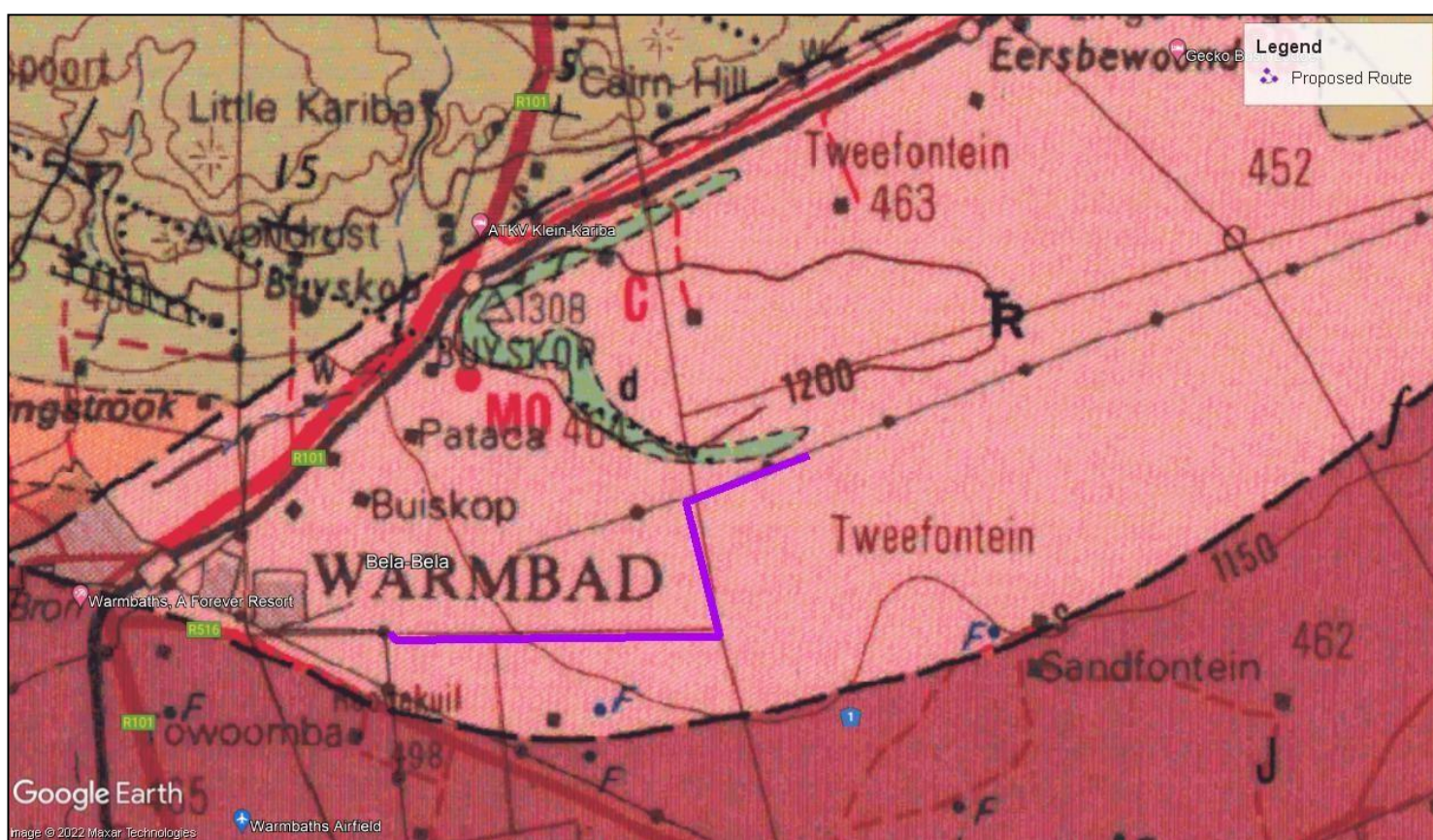


Figure 3: Geological map (2428 Nylstroom) showing the position of the study locality (purple outline) in relation to the regional geology. Tr – Clarens Formation.

4. Geological Setting

Based on the 1:250 00 geological sheet, 2428 Nylstroom (Figure 3), the study area is deeply underlain by Precambrian rocks of the Rooiberg Group and also the Nylstroom Subgroup of the Waterberg Group. However, the specific study area is underlain by sandstones of the Clarens Formation of the Karoo Supergroup in the Springbok Flats Basin (Figure 1). No rock outcrops are present in the study area as the rocks are overlain by thick Quaternary alluvial deposits (Figure 4).

5. Palaeontological Heritage

There is no possibility that the Precambrian rocks could metazoan fossils. However, the rocks of the Clarens Formation, in both the Main Karoo Basin and also the Tuli and Tshipise basins are known to host Jurassic-aged fossil tetrapods, particularly sauropodomorph dinosaurs, therapsids, crocodylomorphs and therapsids. No fossils have yet been discovered in the study area. This is because there are very few rock outcrops in the study area and the areas affected by the proposed development are overlain by Quaternary unconsolidated alluvium covered by thick vegetation.

It is thus highly unlikely that palaeontological heritage will be affected by the proposed powerline development. In fact, the development could enhance the possibility of finding fossils.



Figure 4: Photographs showing the extent of vegetation and Quaternary alluvial covering in the study area.

6. Methodology

Because the study area is entirely covered by vegetation growing in Quaternary alluvium and no rocks are currently visible, a desktop Palaeontological Impact Assessment was undertaken to identify possible sensitive fossil occurrences, assess possible fossil occurrences, and comment on the impact of the proposed development, and to make mitigating recommendations.

7. Recommendations

Because rock successions underlying the area of the proposed development are covered by vegetation growing in alluvial cover, there is very little chance that the proposed development will have any effect on palaeontological heritage.

As the rocks of the Karoo Supergroup are noted for their wealth of tetrapod and plant fossils there is the slight possibility that the proposed powerline development could expose fossils in the sandstones of the Clarens Formation. Also, there is the slight possibility that overlying Quaternary deposits could contain fossils. In the unlikely event that fossils are exposed it will create a unique opportunity to explore the area for fossils. It is thus recommended that if fossils are exposed as a result of development 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 the South African Heritage Resources Agency (SAHRA)

8. Conclusion

The proposed development of the Bela Bela Powerline extends over superficial soil cover overlying rocks of the fossil-bearing Clarens Formation which are currently not exposed. There is a possibility that that fossils could be exposed as a result of the powerline development. It is considered that, from a palaeontological perspective, the development of the proposed Bela Bela Powerline 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 (See Appendix A – CFP).

9. Bibliography

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Bruce Rubidge PhD, FGSSA, FRSSA, Pr Sci Nat
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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 development of the Bela Bela Powerline. The following procedure is required if fossils are exposed by excavations.

1. If fossils are exposed by excavation in the rocks of the Karoo Supergroup and also unconsolidated Quaternary deposits, they must be inspected by the environmental officer or designated person.
2. If fossils are noted (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.