

**LETTER OF EXEMPTION FOR THE PROPOSED
BALAMHLANGA RIVER BRIDGE 3505, KZN**

FOR AFZELIA ENVIRONMENTAL CONSULTANTS

DATE: 30 AUGUST 2021

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Abbreviations

HP	Historical Period
IIA	Indeterminate Iron Age
LIA	Late Iron Age
EIA	Early Iron Age
ISA	Indeterminate Stone Age
ESA	Early Stone Age
MSA	Middle Stone Age
LSA	Late Stone Age
HIA	Heritage Impact Assessment
PIA	Palaeontological Impact Assessment

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INTRODUCTION

Afzelia Environmental Consultants (Pty) Ltd have been appointed by Mott MacDonald (Pty) Ltd to undertake a Basic Assessment Report and Water Use License Application processes for the proposed upgrade of the existing D1834 culvert, located near the Town of Jozini. The proposed development is located near the intersection of the D1834 and A1188 roadways. The coordinates of the site are 27°22'1.47"S; 32°14'46.71"E. The existing culvert structure will be widened to accommodate bidirectional movement of vehicles, and a pedestrian walkway

Umlando suggested that it be exempt from further HIA provided certain criteria are met. Figures 1 – 4 show the location of the site.

FIG. 1 GENERAL LOCATION OF THE STUDY AREA

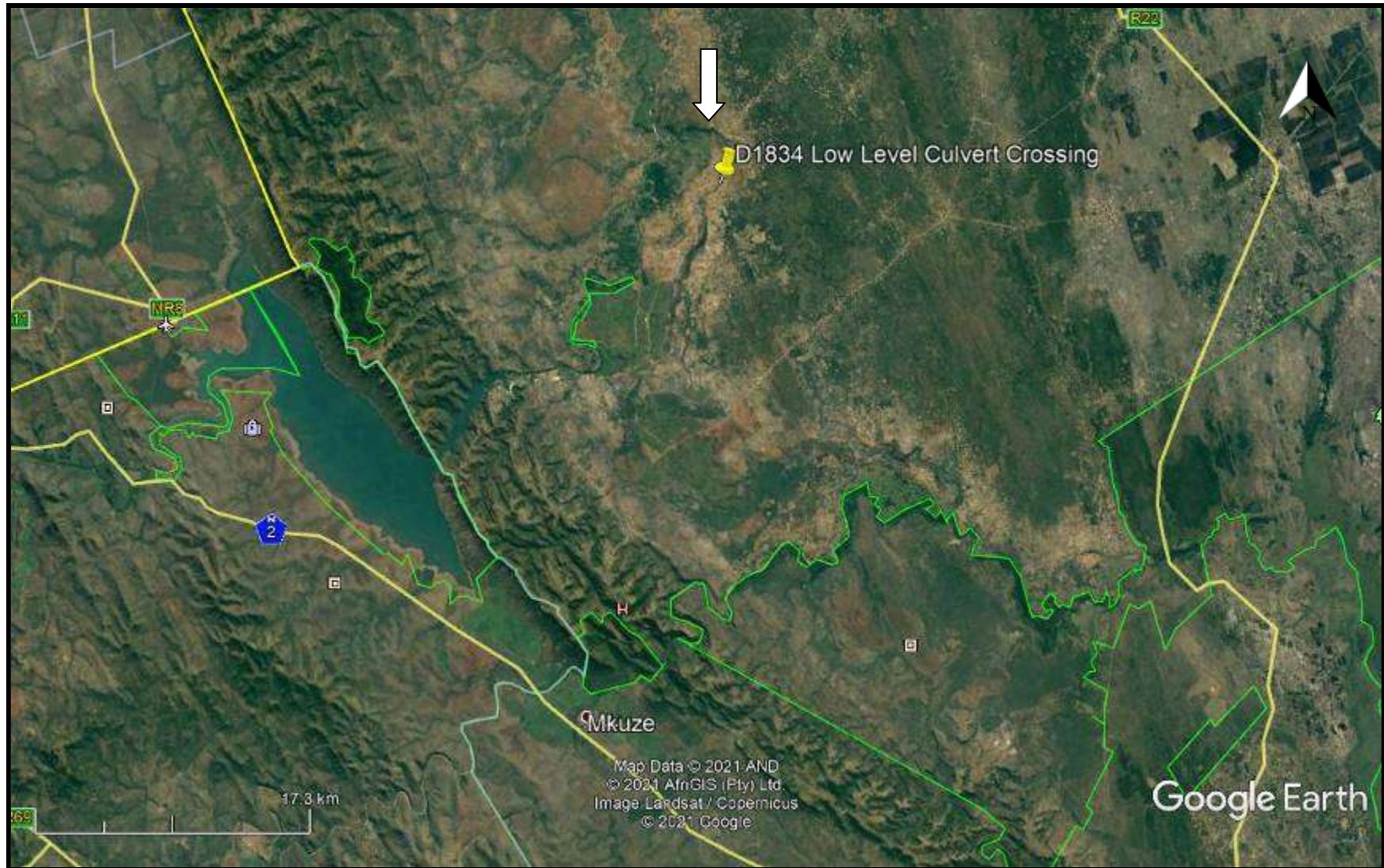


FIG. 2: AERIAL OVERVIEW OF THE STUDY AREA

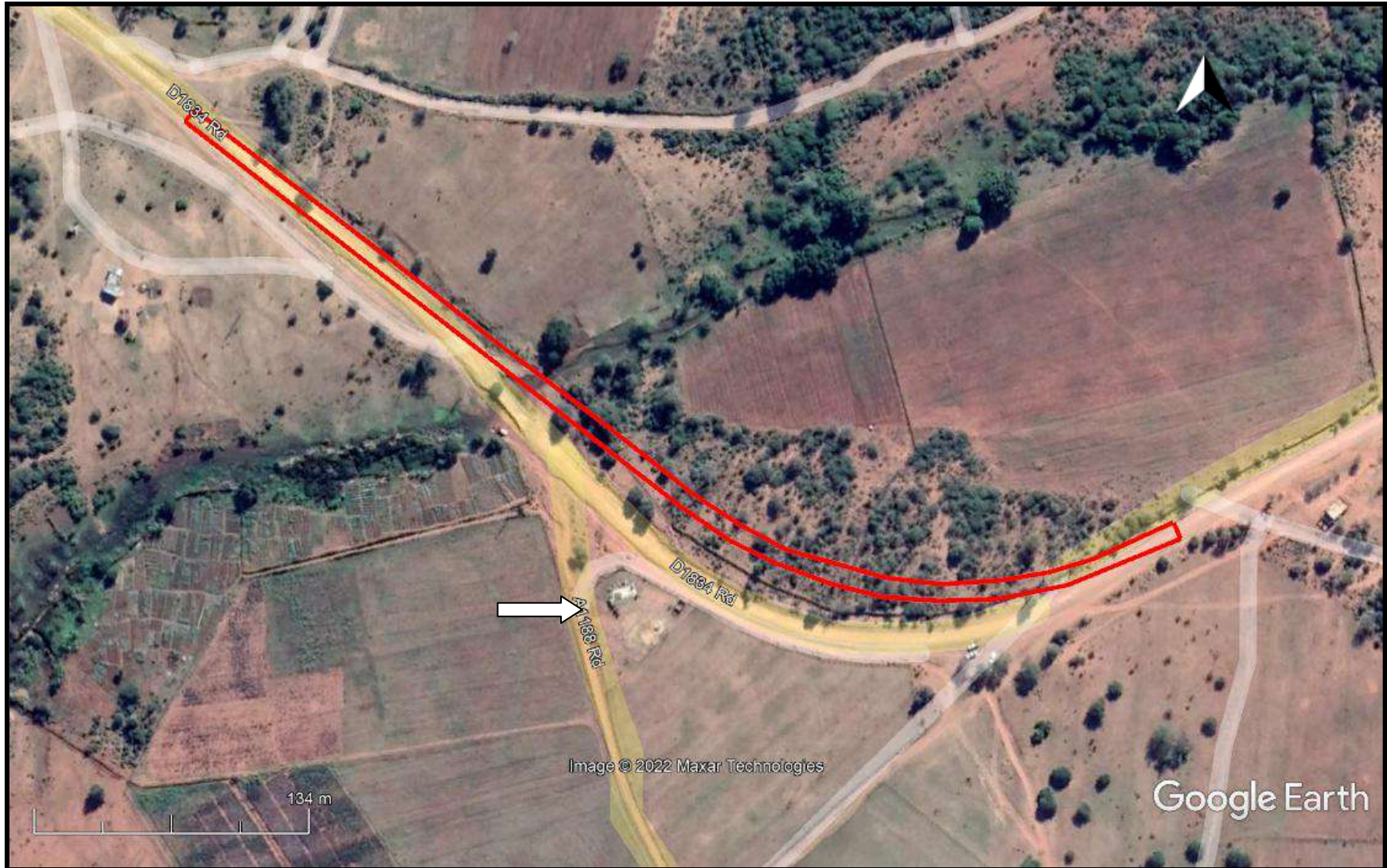
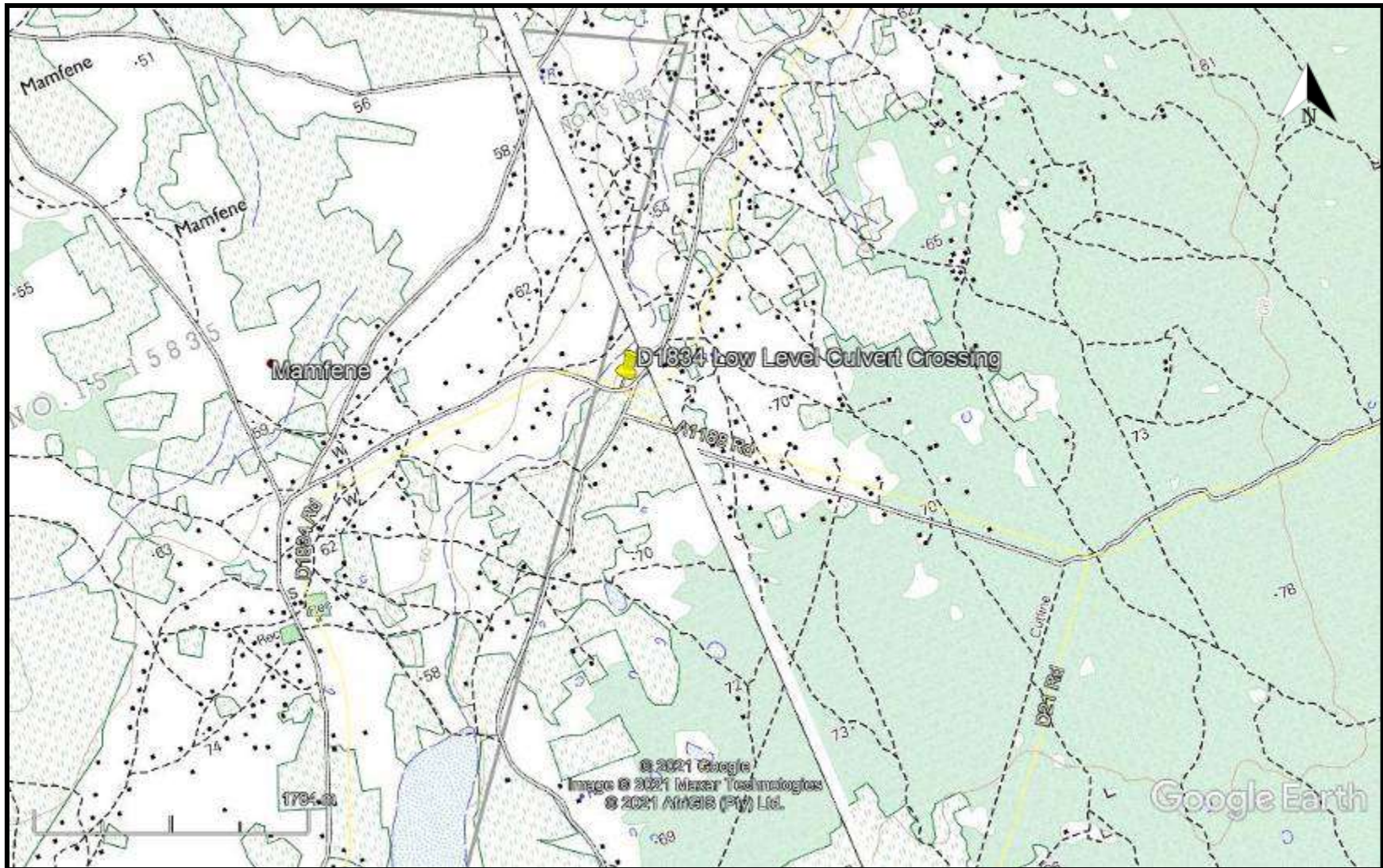


FIG. 3: TOPOGRAPHICAL OVERVIEW OF THE EASTERN STUDY AREA (2002)¹



¹ 2732AD_2002_Tshongwe 2732AC_2002_Jozini

FIG. 4: SCENIC VIEWS OF THE EXISTING CAUSEWAY



DESKTOP STUDY

The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. The archaeological database indicates that there are archaeological sites in the general area (fig. 5). These heritage sites cover the last 1.5 million years of human history in the area and they vary in significance. Many of the sites tend to be lag deposits due to the soft soils. That is the artefacts filter down the sands over time and rest on the harder underlying deposits. These sites are seldom in primary context. I have driven over this bridge on several occasions for other contracts, and did not notice any heritage features. No national monuments, battlefields, or historical cemeteries are known to occur in the study area.

The 1937 aerial map indicates that there are no settlements within the general area (fig. 6)

The 1969 topographical map indicates that the current road was part of a footpath (fig. 7). No houses occur near the proposed causeway.

The recent Google Earth imagery indicates that there is a possible Shembe Temple 70m southeast of the causeway (fig. 2). It is fenced off and should not be affected.

Umlando has driven this road several times for another contract and we did not note any features in the re-aligned area.

The study area is mostly of high palaeontological sensitivity (fig. 8). However, the causeway will not be affecting undisturbed fossil bearing layers. This can be confirmed by a geotechnical report. If the causeway cuts into rocky layers below the upper sands, then a PIA might be required. A photograph showing the soil profile at the bridge confirms this (fig. 4). Dr A. Smith undertook the desktop survey and suggested that a chance find protocol is initiated (Appendix A).

FIG. 5: LOCATION OF KNOWN HERITAGE SITES NEAR THE STUDY AREA

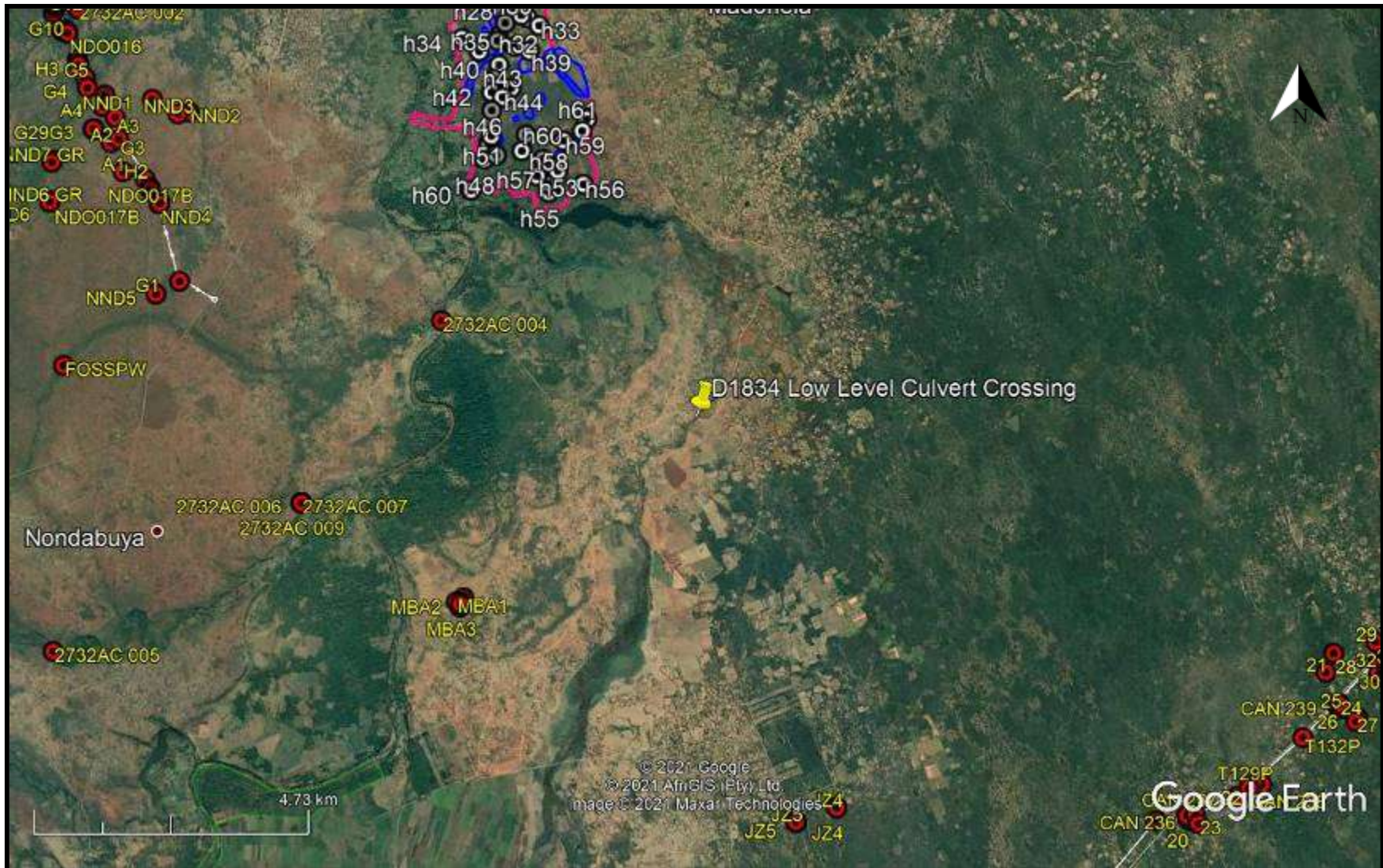


FIG. 6: STUDY AREA IN 1937

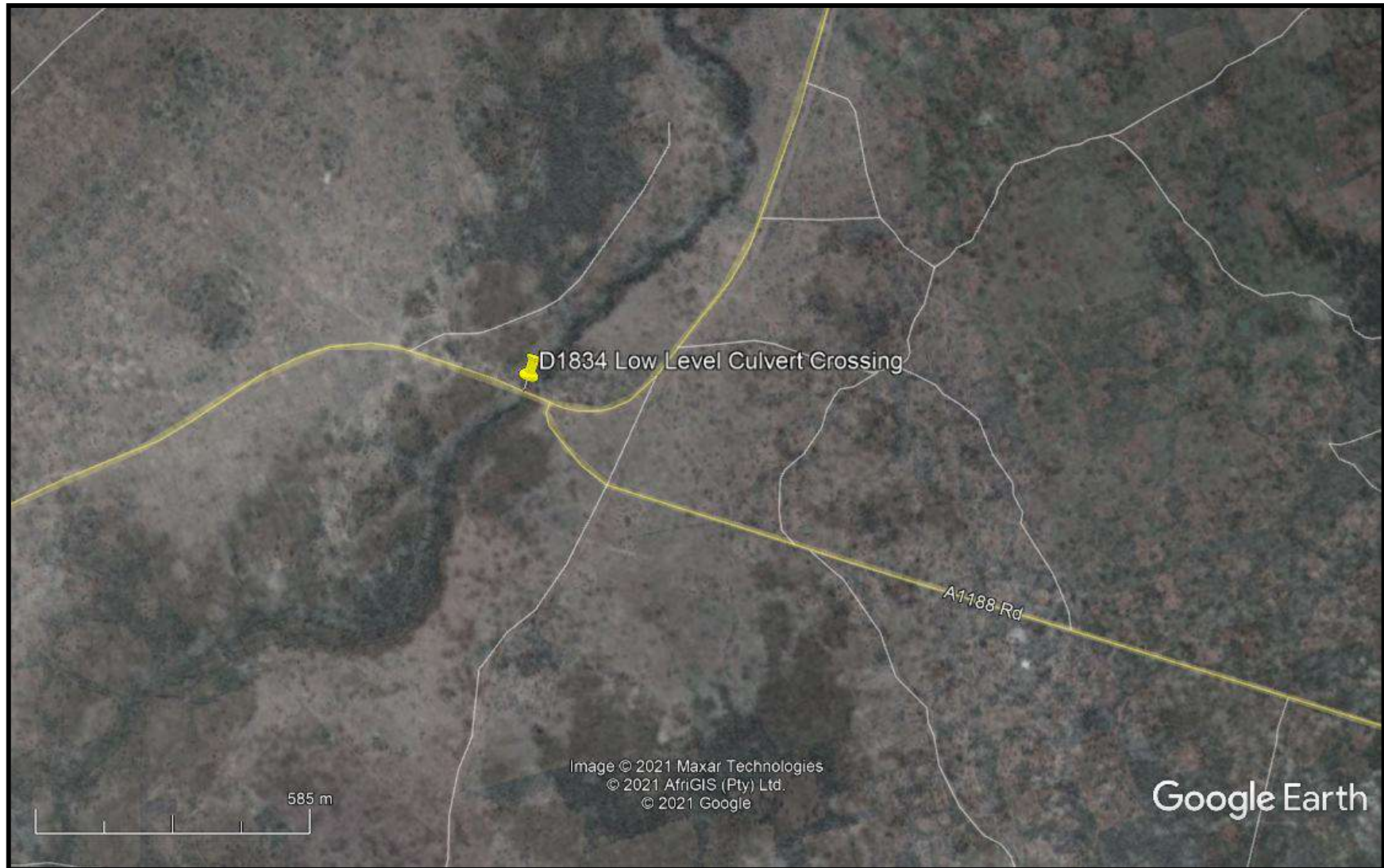


FIG. 7: LOCATION OF THE STUDY AREA IN 1969

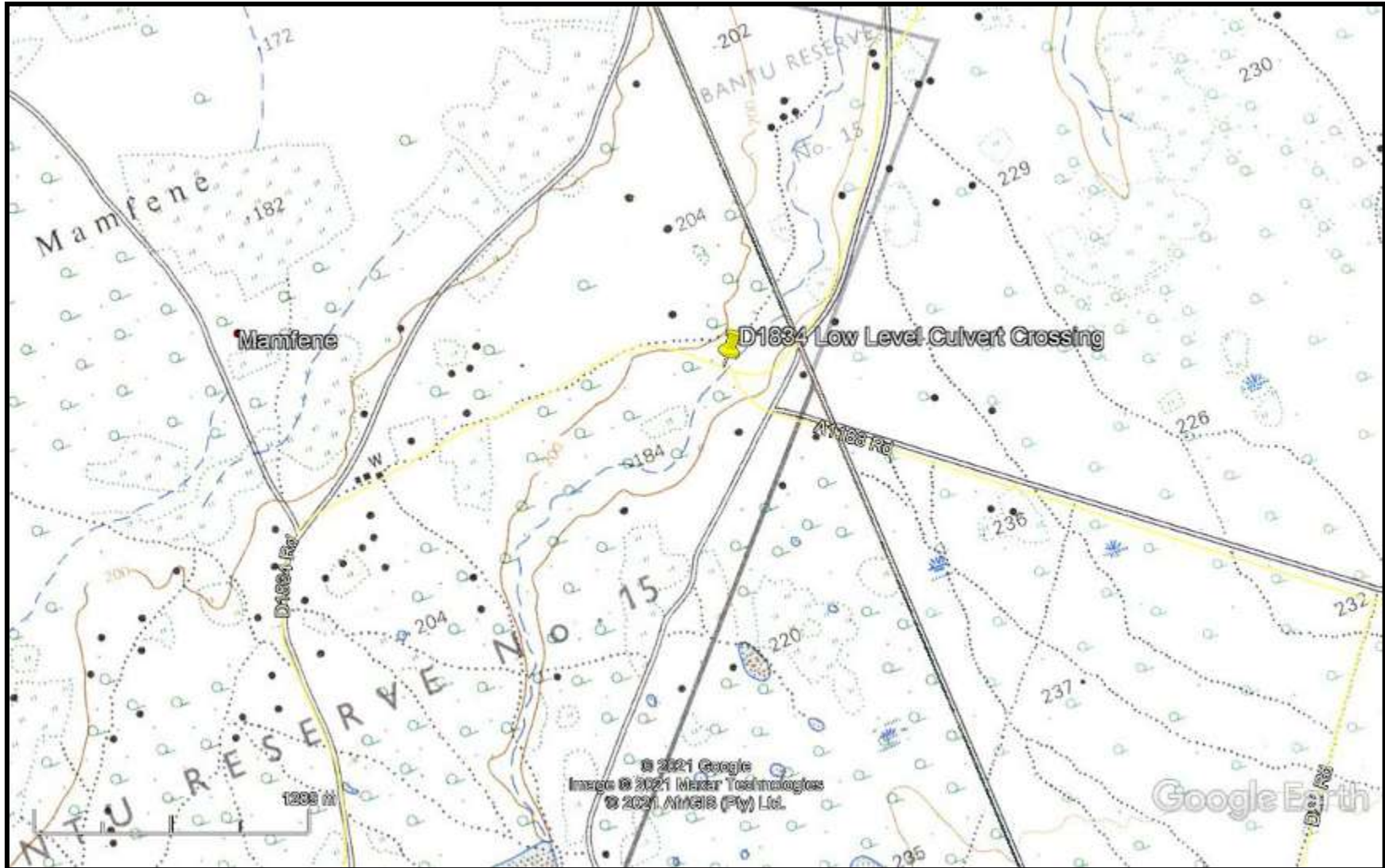


FIG. 8: PALAEOLOGICAL SENSITIVITY



COLOUR	SENSITIVITY	REQUIRED ACTION
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

The heritage desktop study suggests that no further mitigation should be required for this development.

CONCLUSION

The desktop study concludes that there is a very low probability of archaeological and palaeontological sites occurring within the study area. No further heritage mitigation should be required.

REFERENCES

2732AC Jozini 1968, 2002

2732AD Tshongwe 1968, 2002

167_014_0034

EXPERIENCE OF THE HERITAGE CONSULTANT

Gavin Anderson has a M. Phil (in archaeology and social psychology) degree from the University of Cape Town. Gavin has been working as a professional archaeologist and heritage impact assessor since 1995. He joined the Association of Professional Archaeologists of Southern Africa in 1998 when it was formed. Gavin is rated as a Principle Investigator with expertise status in Rock Art, Stone Age and Iron Age studies. In addition to this, he was worked on both West and East Coast shell middens, Anglo-Boer War sites, and Historical Period sites.

DECLARATION OF INDEPENDENCE

I, Gavin Anderson, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

A handwritten signature in black ink, appearing to read 'Gavin Anderson', with a horizontal line underneath.

Gavin Anderson
Archaeologist/Heritage Impact Assessor

APPENDIX A
PIA DESKTOP

PROPOSED MAKATINI PEDESTRIAN BRIDGE MAMFENE MUNICIPALITY, UMKANYAKUDE DISTRICT MUNICIPALITY, KWAZULU-NATAL

DESK-TOP PALAEOLOGICAL IMPACT ASSESSMENT

FOR

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EXECUTIVE SUMMARY

The Sahris Palaeosensitivity Map classifies this area Red, i.e. very high sensitivity, requiring a field assessment and protocol for finds. However the proposed pedestrian bridge is adjacent to an existing road, thus the surface has already been disturbed. In addition the pedestrian bridge has a narrow (and small) footprint. No purpose will be served by a field visit. However, a "Chance Find Protocol" has been inserted into this document.

1. BACKGROUND

According to information supplied, it is proposed to build a pedestrian bridge over the Phongola River in the Makatini Flats Mamfene Municipality, uMkanyakude District Municipality, KwaZulu-Natal (Figure 1).



Figure 1: Location map of proposed Makatini Pedestrian Bridge (purple line).

2. GEOLOGY

This area is underlain by Cretaceous strata (approx. 65 – 140 Ma) of the Zululand Group.



Figure 2: Extract from the Kosi Bay 2632: 250 000 scale Geological Map showing the area of interest. The proposed Makatini Pedestrian Bridge will be located on the Makatini Formation (Km).

The Cretaceous Rocks (Figure 2; Table 1) were deposited during the rifting of the Gondwana Supercontinent. At this time the Indian Ocean was opening up and the continent of Africa was starting to take on its present shape. In this area, Gondwana fragmentation took place in two phases. Continental break-up was initiated during the Jurassic and continued into the Early Cretaceous. Watkeys (2006) believes that Gondwana rifting commenced between 155 and 135 Ma. The break-up of Gondwana may have been initiated in the Jurassic (~183 Ma), coincident with the outpouring of the Karoo Continental Flood Basalts (Hanson et al., 2009). However, actual seafloor spreading only began at ~130 Ma (Veevers, 2012). The Falklands Islands had separated from southern Africa, along the Eastern Cape and southern KwaZulu-Natal coast, by ~125 Ma (Watkeys, 2006).

The proposed bridge will be built over the Makatini Formation which is a subdivision of the Zululand Group. This lithology comprises conglomeratic sandstone and siltstone.

4. PALAEOLOGY

The possibility of finding Significant Palaeontological Material is very high (Figure 3). The Makatini Formation contains fossil wood (extensively bored by Teredo worm)(Figure 4), plant fragments and marine invertebrate fossils. Although impressive petrified wood is considered of little palaeontological value. The Makatini Formation is an important fossil bearing rock but is the least important Formation of the Cretaceous-aged Zululand Group..



Figure 3: Palaeosensitivity map of the area in which the Makatini Pedestrian Bridge will be constructed. Red is very highly sensitive and likely to contain fossils.



Figure 4: Example of a petrified (fossil) loge.

Mitigation:

The pedestrian bridge will be constructed alongside an existing road, an area which is already disturbed. Additionally the bridge, being a pedestrian bridge, is narrow and thus has a small

footprint. In this case a field visit is unlikely to serve any purpose. A “Chance Find Protocol” has been inserted in case of a chance find.

5. CHANCE FIND PROTOCOL

This protocol is based on that of Groenevald (2017). This Protocol will ONLY kick-in if palaeontological material is found.

In the case of any unusual structures, the Palaeontologist must be notified immediately by the ECO and/or EAP, and a site visit must be arranged at the earliest possible time with the Palaeontologist.

In the case of the ECO or the Site Manager becoming aware of suspicious looking palaeo-material

- The construction must be halted in that specific area and the Palaeontologist must be given enough time to reach the site and remove the material before excavation continues.
- Mitigation will involve the attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labeled, and boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.

Functional responsibilities of the Developer

1. At full cost to the project, and guided by the appointed Palaeontological Specialist, ensure that a representative archive of palaeontological samples and other records is assembled to characterize the palaeontological occurrences affected by the excavation operation.
2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas.
3. Facilitate systematic recording of the stratigraphic and palaeo-environmental features in exposures in the fossil-bearing excavations, by described and measured geological sections, and by providing aid in the surveying of positions where significant fossils are found.
4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as “normal” fossil finds.
5. Provide covered, dry storage for samples and facilities for a work area for sorting, labeling and boxing/bagging samples.
6. Costs of basic curation and storage in the sample archive at the Museum in Durban (labels, boxes, shelving and, if necessary, specifically-tasked temporary employees) as specified by or agreed with AMAFA. Documentary record of palaeontological occurrences

7. The contractor will in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which appropriate information regarding plans for excavations and work schedules must be indicated on the plan of the excavation sites. This must be done in conjunction with the appointed specialist:

8. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period

9. Locations of samples and measured sections are to be pegged, and routinely accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation. Functional responsibilities of the appointed palaeontologist

10. Establishment of a representative collection of fossils and a contextual archive of appropriately documented and sampled palaeoenvironmental and sedimentological geodata at the Museum in Durban.

11. Undertake an initial evaluation of potentially affected areas and of available exposures in excavations.

12. On the basis of the above, and evaluation during the early stages of excavation development, in collaboration with the contractor management team, more detailed practical strategies to deal with the fossils encountered routinely during excavation, as well as the strategies for major finds.

13. Informal on-site training in responses applicable to “normal” fossil finds must be provided for the ECO and environmental staff by the appointed specialist.

14. Transport of material from the site to the Museum in Durban.

15. Reporting on the significance of discoveries, as far as can be preliminarily ascertained. This report is in the public domain and copies of the report must be deposited at ESI, AMAFA, and the South African Heritage Resources Authority (SAHRA). It must fulfill the reporting standards and data requirements of these bodies.

16. Reasonable participation in publicity and public involvement associated with palaeontological discoveries. In the event of construction exposing new palaeontological material, not regarded as normative/routine as outlined in the initial investigation, such as a major fossil plant find, the following procedure must be adhered to:

17. The appointed specialist or alternates (AMAFA, SAHRA; University) must be notified by the responsible officer (e.g. the ECO or contractor manager), of major or unusual discoveries during excavation, found by the Contractor Staff.

18. 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 specialist or scientists from the ESI at WITS University, or its designated representatives at AMAFA, have had reasonable opportunity to investigate the find. Such work will be at the expense of the Developer.

6. CONCLUSIONS & RECOMMENDATIONS

Based on the rock formations present in the proposed development area, the possibility of finding fossils is high, but as the footprint is small and the area disturbed a field visit is not warranted. However, a “Chance Find Protocol” has been inserted into this document to cover the eventuality of palaeomaterial being found.

7. REFERENCES

Groenewald, G (2012). *Palaeontological Technical Report for KwaZulu-Natal*. Amafa KwaZulu-Natal, Metsi Metseng Geology and Environmental Services. P/B 62, Bethlehem 9700.

Hanson, E.K., Moore, J.M., Bordy, E.M., Marsh, J.S., Howarth, G. and Robey, J.V.A., 2009. Cretaceous erosion in central South Africa: evidence from upper-crustal xenoliths in kimberlite diatremes. *South African Journal of Geology*, 112, 125-140.

Porat N; Botha GA (2008) The luminescence chronology of dune development on the Maputaland coastal plain, southeast Africa. *South African Journal of Geology*.

Veevers, J.J., 2012. Reconstructions before rifting and drifting reveal the geological connections between Antarctica and its conjugates in Gondwana. *Earth-Science Reviews*, 111, 249-318.

Watkeys, M.K., 2006. Gondwana break-up: a South African perspective. In: M.R. Johnson, C.R. Anhaeusser and R.J. Thomas (Editors), *The Geology of South Africa*, Geological Society of South Africa, Johannesburg/Council for Geoscience, Pretoria, 531-539.

8. DETAILS OF SPECIALIST

Dr Alan Smith Pr. Sc. Nat., I.A.H.S.

Private Consultant: Alan Smith Consulting, 29 Brown's Grove, Sherwood, Durban, 4091
&

Honorary Research Fellow: Discipline of Geology, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Durban.

Role: Specialist Palaeontological Report production

Expertise of the specialist:

- MSc in stromatolites (University of KwaZulu-Natal)
- PhD in Geology (University of KwaZulu-Natal).
- Expert in Vryheid Formation (Ecca Group) in northern KZN, this having been the subject of PhD.
- Scientific Research experience includes: Fluvial geomorphology, palaeoflood hydrology, Cretaceous deposits.
- Experience includes understanding Earth Surface Processes in both fluvial and coastal environments (modern & ancient).
- Alan has published in both national and international, peer-reviewed journals. He has published more than 50 journal articles with 360 citations (detailed CV available on request).
- Attended and presented scientific papers and posters at numerous international and local conferences (UK, Canada, South Africa) and is actively involved in research.

Selected recent palaeo-related work includes:

- Desktop PIA: Proposed middle income housing units on Portion 23 of Farm Lot H Weston 13026, Bruntville, Mpofana Local Municipality. Client: UMLANDO.
- Desktop PIA: Proposed ByPass Pipeline for Ulundi bulk water pipeline upgrade. Client: UMLANDO.
- Fieldwork PIA: Bhekuzulu Epangweni KZN water reticulation project, Cathkin Park. Client: Mike Webster, HSG Attorneys.
- Desktop PIA: Zuka valley, Ballito. Client: Mike Webster, HSG Attorneys.
- Mevamhlope proposed quarry palaeontology report. Client: Enviropro.
- Desktop PIA: Proposed Lovu Desalination site. Client: eThembeni Cultural Heritage.
- Desktop PIA: Tinley Manor phase 2 North & South banks: eThembeni Cultural Heritage
- Desktop PIA: Tongaat. Client: eThembeni Cultural Heritage.
- Palaeontological Assessment Reports (3) to Scatec Solar SA (Pty) Ltd on an Appraisal of Inferred Palaeontological Sensitivity for a Potential Photo Voltaic Park at (1) Farm Rooilyf near Groblershoop, N Cape; (2) Farm Riet Fountain No. Portions 1 and 6, 18km SE of De Aar, N Cape; and (3) Dreunberg, near Burgersdorp, Eastern Cape. Client: Sustainable Development Projects.