

**RECOMMENDED EXEMPTION FROM PALAEOLOGICAL IMPACT
ASSESSMENT OR FURTHER PALAEOLOGICAL STUDIES AND
MITIGATION:**

Proposed filling station, located on Zamazama No. 16924, within the Umhlabuyalingana local and Umkhanyakude District Municipality, Lulwane-Ephondweni Reserve, KwaZulu-Natal

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Declaration of Consultants independence

I, Gary Trower, am an independent consultant and have no business, financial, personal or other interest in the proposed development project in respect of which I was appointed to do a palaeontological assessment other than fair remuneration for work performed. There are no circumstances whatsoever that compromise the objectivity of this specialist performing such work.

A handwritten signature in black ink, appearing to read 'G. Trower', with a stylized flourish above the name.

Gary Trower

Introduction

This exemption letter relates to a proposed establishment of a petrol station by Sukamani Multiserve in the Lulwane-Ephondweni Reserve at Zamazama No. 16924. It is to be located on a 0.4 ha piece of land to the south of the P522-2 at GPS coordinates 27° 02' 31.85" S 32° 16' 34.82" E (Figure 1 & 2). The proposed development is situated within an area where the underlying geology is given a low palaeo-sensitivity rating on the SAHRIS map (www.sahra.org.za/sahris/map/palaeo), and these deposits are unlikely to contain palaeontological material. As part of the overall EIA process, a Palaeontological Impact Assessment may have been necessary as the underlying geology of this region is predominated by moderate to very highly palaeo-sensitive bedrock. But due to the fact that the proposed is situated on a patch of redistributed sand, which is given a low palaeo-sensitivity rating on the South African Heritage Resources Agency map (www.sahra.org.za/sahris/map/palaeo), no desktop PIA or Phase 1 ground survey was necessary.

In terms of the National Environmental Management Act 107 of 1998 and Section 38 (8) of the National Heritage Resources Act 25 of 1999 (sections 34-36), all aspects of heritage are protected. Proposed developments that are likely to impact on heritage resources (i.e. historical, archaeological, palaeontological & cosmological) require a desktop and/or field assessment to gauge the importance of such resources in order to ensure that such sites are not damaged or destroyed by developments which could negatively impact them. Identified heritage resources should be recorded through detailed documentation, mitigation measures applied if resources are threatened, or collection and/or a rescue excavation carried out if necessary.

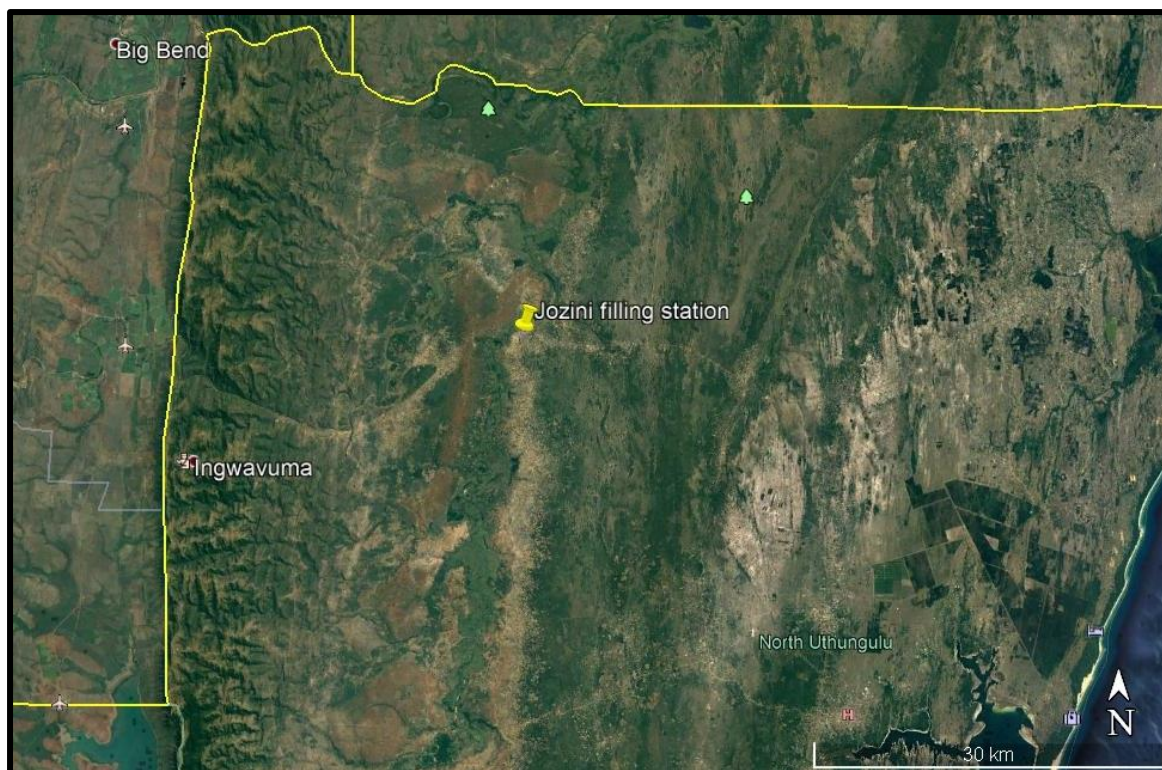


Figure 1: Satellite image of the regional landscape surrounding the site footprint, with the proposed filling station indicated by the yellow pin and the yellow lines marking international borders. To the north is Mozambique, to the west is Swaziland and to the east is the Indian Ocean. Modified from Google Earth, AfriGIS 2021

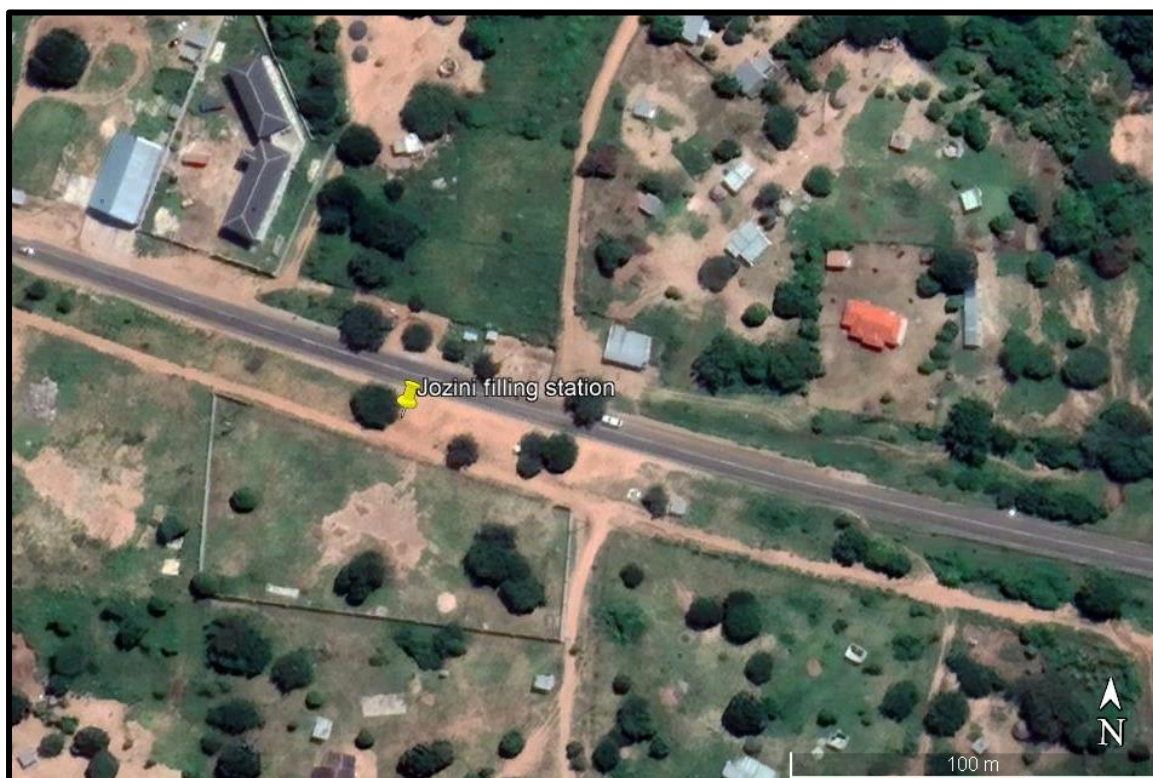


Figure 2: Satellite image of the site footprint, showing a close-up view of the location for the proposed filling station. As can be seen in the image, the area is already fairly developed with homesteads, buildings, a network of roads and other associated infrastructure. Modified from Google Earth, AfriGIS 2021

Geology

Several rock-types which occur in South Africa are rich repositories for palaeontological material, necessitating measures to minimize activities which may disturb or destroy fossils preserved in underlying beds. Although this region contains several fossiliferous rocks, the geology in the area of the proposed filling station consists of yellowish redistributed sands (Qs, Figure 3). This geological unit is the reason why this area has a palaeo-sensitivity rating of low (Figure 4).

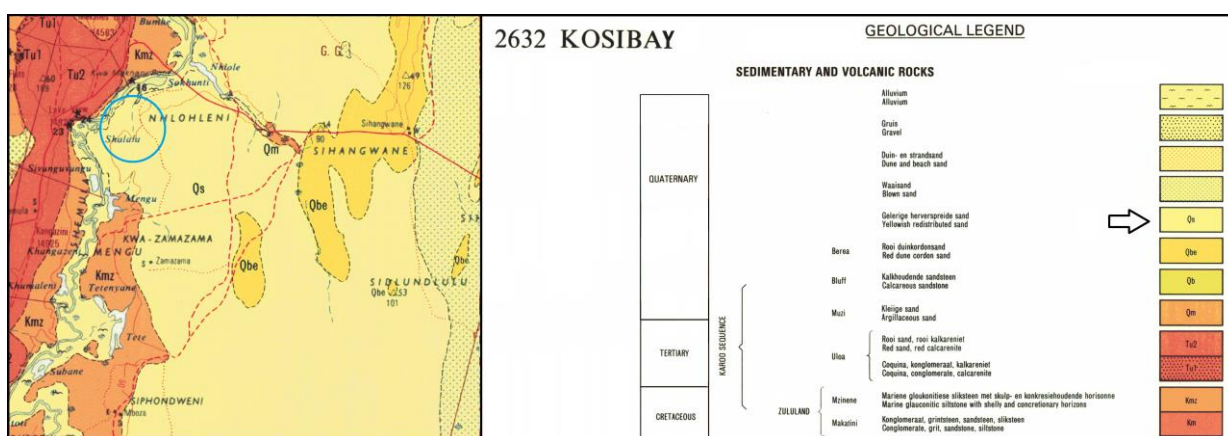


Figure 3: Map showing the geology of the region, with the site footprint falling within the blue circle. The proposed filling station will be built on top of redistributed sands, a geological unit with a low palaeo-sensitivity rating (Fig.4). Modified from 2632 Kosibay, 1:250 000 Geological Series, Council for Geoscience, 1985)

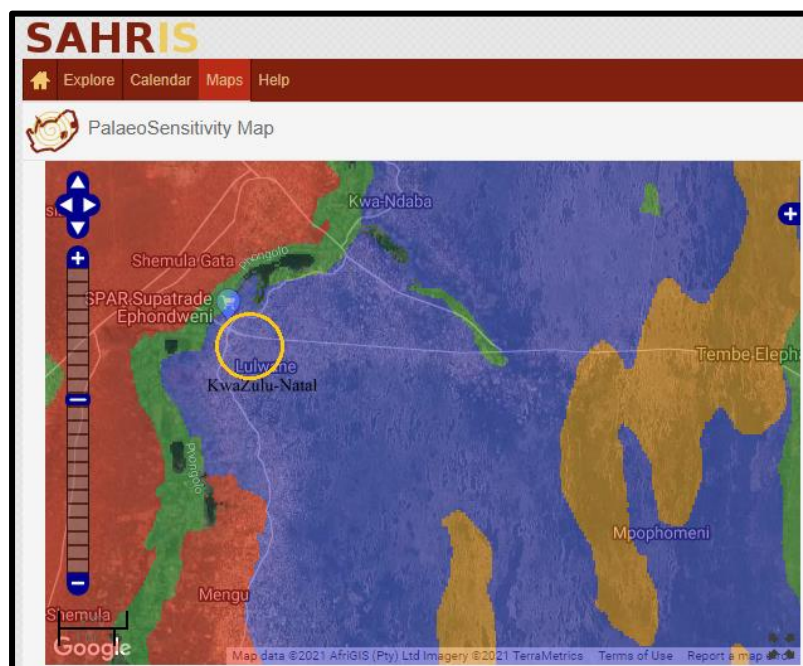


Figure 4: Map of how the geology in Fig.3 translates into palaeo-sensitivity. The proposed site footprint is located within the yellow circle and the geological unit which occurs beneath the site footprint has a ranking of blue, which corresponds to a low rating due to the disturbed nature of the deposits. As can be seen in the image, Tertiary and Cretaceous deposits with a high to very high rating occur just to the east and west of the site. Modified from the SAHRIS map, www.sahra.org.za/sahr/smap/palaeo

Site observations

An aerial survey of the study site was carried out using Google Earth, the relevant geology map of the area (2632 Kosibay) and the SAHRIS palaeo-sensitivity map, which were all used in combination to gain an understanding of the underlying bedrock at the study site, and how it ranked in terms of possible fossil occurrences. The site occurs on redistributed yellow sands (Qs) and these deposits have a low chance of containing fossils.

The two tables below summarize the palaeontological impact significance at the site:

Assessing Impact Significance

Criteria	without mitigation	with mitigation
Extent/spatial scale of impact	local	local
Duration of impact	permanent	permanent
Intensity/severity of impact	zero to very low	zero to very low
Probability of impact	improbable	improbable
Consequence	low	low
Confidence	high	high
Significance	insignificant	insignificant
Reversibility	irreversible	
Loss of resource	very low	
Mitigation potential	none	

Identified heritage resources (NHRA status)

Formal protections	
National Heritage site (Section 27)	none
Provincial Heritage site (Section 27)	none
Provisional Protection (Section 29)	none
Place listed in heritage register (Section 30)	none
General protections	
Palaeontological site or material (Section 35)	none

Contingency plan for possible palaeontological discoveries:

CHANCE FIND PROTOCOL

Based on the work of Almond *et al.* (2009) and Groenewald *et al.* (2014) and summarised on the SAHRIS website (www.sahra.org.za/sahris/map/palaeo), if a development occurs within a red zone a desktop study is required, as well as a phase 1 Palaeontological Impact Assessment (PIA) comprising a field survey and recording of fossils. A phase 2 PIA is also required, which entails the rescue of fossil material during construction activities, as well as the compulsory application for a collection and destruction permit. If the development occurs in an orange zone, a desktop survey as well as a phase 1 PIA comprising of a field survey and collection of fossils is compulsory. A prior application for a collection permit is therefore recommended and a phase 2 PIA may be necessary during the construction phase of the project. If the development occurs in a green zone, a desktop survey as well as phase 1 PIA comprising a field survey is recommended. Lastly developments which occur in a **blue** or grey zone may require a desktop study, based on the nature of surrounding geological units but will often only require an exemption letter as is the case with this report. Developments which occur on a blue zone do however require a protocol for finds.

The normal procedure for recovering palaeontological material would be to identify areas which show investigative potential through a concentration of fossils and whose recovery and preparation could address certain scientific questions. The process would then entail obtaining permission from the landowner/s and applying to SAHRA (South African Heritage Resources Agency) or another provincial heritage agency for a collection permit to excavate or remove blocks of bedrock for preparation in the lab. This is a slow and time-consuming process which requires the skills of a field archaeologist/palaeontologist to spot worthy

material within geological/stratigraphic exposures, and skilled fossil excavators and/or preparators who can successfully recover fossils from sediment or slabs of bedrock.

But in the case of developments fossils may be exposed which were not being targeted as a part of a formal scientific investigation, which then requires intervention to ensure that such heritage resources are documented and evaluated, and possibly recovered. In this way, construction activities can provide an opportunity for scientists in that sediments or bedrock and other heritage related material will be exposed which otherwise would have gone unnoticed as it was hidden from view and would have been costly to excavate.

Heritage consultants such as palaeontologists are required to evaluate proposed development sites in the hope of recording and/or recovering important objects and artefacts before they are damaged or destroyed, but during the entire timeline of a project a PIA consultant is generally only on site for a few hours. Having a palaeontologist on site to examine every scoop of a back actor/JCB would be very costly and impractical, so additional site visits may be required for certain large-scale projects, or developments in highly sensitive areas. If fossils are unearthed during the rest of the project timeline when no palaeontologist is on site, they may be difficult for the on-site layman to identify as many geological formations superficially resemble palaeontological material. Pseudo-fossils and certain mineral deposits often form into a variety of shapes which may closely resemble plant and animal fossils, making it more difficult for laypersons to positively identify chance finds in the field. With certain projects it is therefore recommended that training be provided to on-site staff on fossil identification in order to increase the chances of observing palaeontological material that may be present within the boundaries of the site footprint.

It is not the responsibility of site workers to keep an eye out for heritage objects neither are they likely to have had the appropriate training on what to look for, but they are on the

ground witnessing and observing. This is a helpful tool when there is a flow of information from on-site staff to management and protocol dictates that you convey when something unusual or out of the ordinary is observed during work operations. The probability of on-site foremen or construction workers operating heavy earth moving equipment and working to a strict time schedule spotting heritage objects amongst tons of bedrock or sediment is unlikely but nonetheless possible, especially after having received basic training on what to look out for. In South Africa and around the world many important archaeological and palaeontological discoveries have been made during construction projects, and companies and individuals can play their part by following the law and making the effort to report heritage resources which have been unearthed during digging operations. In so doing, developers can improve their public image and potentially contribute to a rare fossil or object reaching a museum or tertiary institution where it can be studied and eventually displayed to the public as heritage belongs to the entire nation and should be preserved as best as possible.

If by chance fossils or any other heritage-related material were to be discovered which was not anticipated in this exemption letter, construction would need to cease immediately and a protocol should be followed whereby the relevant provincial or national heritage custodians in the relevant province would need to be informed. Developers would also need to acquire the services of a suitably qualified palaeontologist to rank the significance of the discoveries. If anything relevant is observed, mitigation measures may be necessary and an application for a collection permit may be required. A site visit (Phase 1) may be necessary so that scientists can be given the opportunity to record and/or recover fossil material if it is ranked as significant and likely to make a positive contribution to the field of science.

Conclusion and recommendations

This document serves as a letter of exemption. The proposed filling station will be constructed on a geological unit with a low palaeo-sensitivity rating for possible fossil occurrences. It is therefore very unlikely that any fossils will be unearthed during construction activities as the geology comprises of redistributed sand so the chances of finding *in situ* material is greatly reduced. This development is unlikely to have any impact on palaeontological resources, and in light of these facts a desktop Palaeontological Impact Assessment will not be necessary and no further palaeontological investigation is required (Groenewald & Groenewald 2014).

In order to ensure that developments comply with the law, land-owners and/or the developers they appoint are reminded that if any palaeontological or any other heritage-related material were to be unearthed during current or planned future projects, that construction activities should immediately cease (National Heritage Resources Act 1999, Act No. 25, and KwaZulu-Natal Heritage Act 2008, Act No. 4). This is to ensure that accidentally unearthed rare objects stand a good chance of being recorded and/or relocated to a museum, university or other relevant tertiary institution

References

- 1) Almond, J.E., De Klerk, B. & Gess, R., 2009. *Palaeontological Heritage of the Eastern Cape*. Internal report, SAHRA
- 2) Environmental Impact Regulations of 2014, amended 2017
- 3) Evolutionary Studies Institute fossil collection database

4) Groenewald, G.H., Groenewald, D.P. & Groenewald, S.M., 2014. *Palaeontological Heritage of the Free State, Gauteng, Limpopo, Mpumalanga and North West provinces.*

Internal Palaeotechnical Reports, SAHRA

5) KwaZulu-Natal Heritage Act 4 of 2008

6) National Environmental Management Act 107 of 1998

7) National Heritage Resources Act 25 of 1999, section 38 (8)