HERITAGE IMPACT ASSESSMENT (RETROSPECTIVE) FOR THE ESTABLISHMENT OF A WEDDING VENUE WITHOUT PRIOIR APPROVAL, RESULTING IN UNLAWFUL ACTIVITIES ON PORTION 46 OF DRIEFONTEIN No.1389, OKHAHLAMBA LOCAL AND uTHUKELA DISTRICT MUNICIPALITY, NEAR WINTERTON, 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 heritage impact assessment, other than fair remuneration for work performed. There are no circumstances whatsoever that compromise the objectivity of this specialist performing such work.

Gary Trower

Introduction

The applicant, Champagne Sky (Pty) Ltd, wishes to obtain retrospective environmental authorization for unlawful activities which stemmed from the partial building of a wedding venue on Portion 46 (of 5) of the Farm Driefontein No. 1389 near Winterton, KwaZulu-Natal. The development will also include an amphitheatre, chalets and hotel rooms, staff accommodation and a lemon orchard. The site is located roughly 21 kilometres south-west of Winterton, off the R600 and situated on the slope of a hillside (Figure 1 & 2).

The site footprint is located within an area where the underlying geology is given a high (red) palaeo-sensitivity rating on the SAHRIS map (www.sahra.org.za/sahris/map/palaeo), and these deposits are very likely to contain some palaeontological material. In addition, archaeological material and/or sites may also be present in the area. A heritage impact assessment was thus necessary to evaluate whether any fossils or any other heritage-related material could be located within the boundaries of the proposed development, and whether any mitigation measures would be 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 showing the layout of the site footprint, located to the west of Winterton. The site has been established on the slopes of a south-facing hill, where several levelled out areas have been cut into the hillside. The southern portion of the property drops down into a forested valley cut by various drainage lines which join into one stream. Modified from Google Earth, Maxar Technologies 2022

Figure 2: Satellite image showing the portion of the property where the development will take place (within the yellow square), located to the south of a gravel road. Modified from Google Earth, Maxar Technologies 2022

Geology

Rocks of the Karoo Basin are rich repositories for palaeontological material, necessitating measures to minimize activities which may disturb or destroy fossils preserved in underlying beds. The geology in the area of the proposed development comprises of Late Permian deposits of the Adelaide Subgroup and early Triassic deposits of the Tarkastad Subgroup of the Beaufort Group (Figure 3). The stratigraphic sequence making up these Subgroups accumulated as sediments originating from a radial-type network of drainages spread across Gondwana entering into a giant inland sea. The stratigraphic sequence preserved in the bedrock beneath the site represents sediments from tranquil depositional settings, such as an overbank or floodplain environment. The Tarkastad Subgroup comprises of fine- to medium-grained sandstone and red, blue and green mudstone whereas the sediments of the Adelaide Subgroup predominantly comprise of greenish-grey to blueish-grey mudstone, as well as siltstone, sandstone and dark-grey shale (which is often carbonaceous). These deposits could preserve trace fossils, as well as insect, plant and vertebrate fossils (especially therapsid fossils).

These deposits form an important component and subdivision of the stratigraphy of the Karoo Supergroup, an extensive inland basin which preserves a rich array of fossil plants, insects, fish and tetrapod fauna which existed through the Carboniferous, Permian, Triassic and Jurassic of southern Gondwana (Rubidge 2005, Smith *et al*. 1993). The existence of a depositional environment in this palaeo-landscape means that fossil lifeforms which flourished during the Late Permian and Early Triassic may be present within these geological units, and this is also the reason why this sedimentary package has a high palaeo-sensitivity rating of red (Fig.4). In addition, one of the largest extinction events in the history of the planet (Permo-Triassic extinction) occurred during this period so fossils representing this occurrence may be preserved within the underlying beds.

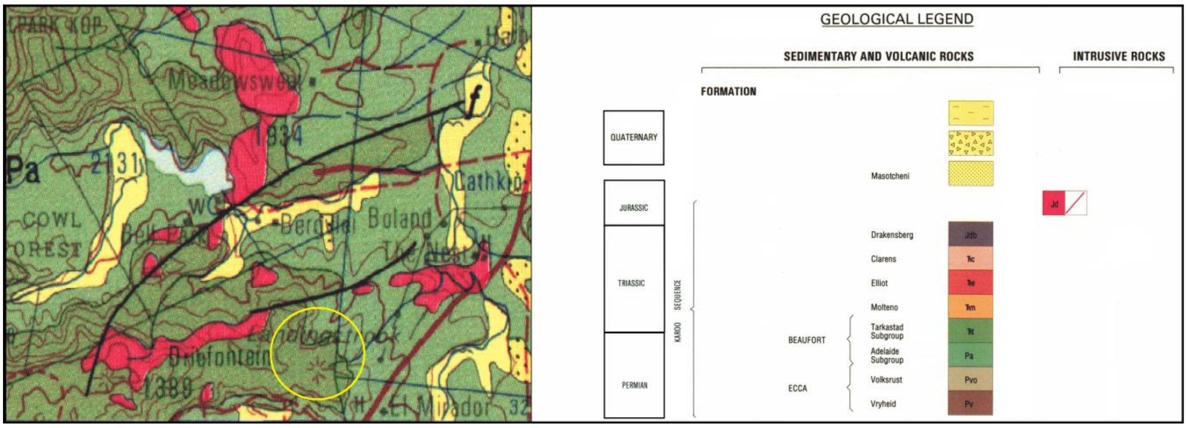

Figure 3: Map showing the geology of the region, with the location of the proposed development occurring within the yellow circle. The green patches represent the Tarkastad (TRt) and Adelaide Subgroups (Pa) of the Beaufort Group, deposits which are Late Permian to Early Triassic in age, with most of the development occurring on the former rock type. The yellow patches represent Quaternary deposits and the pink patches represent dolerite, which are Jurassic in age. Modified from 2828 Harrismith, 1:250 000 Geological Series, Council for Geoscience, 1981

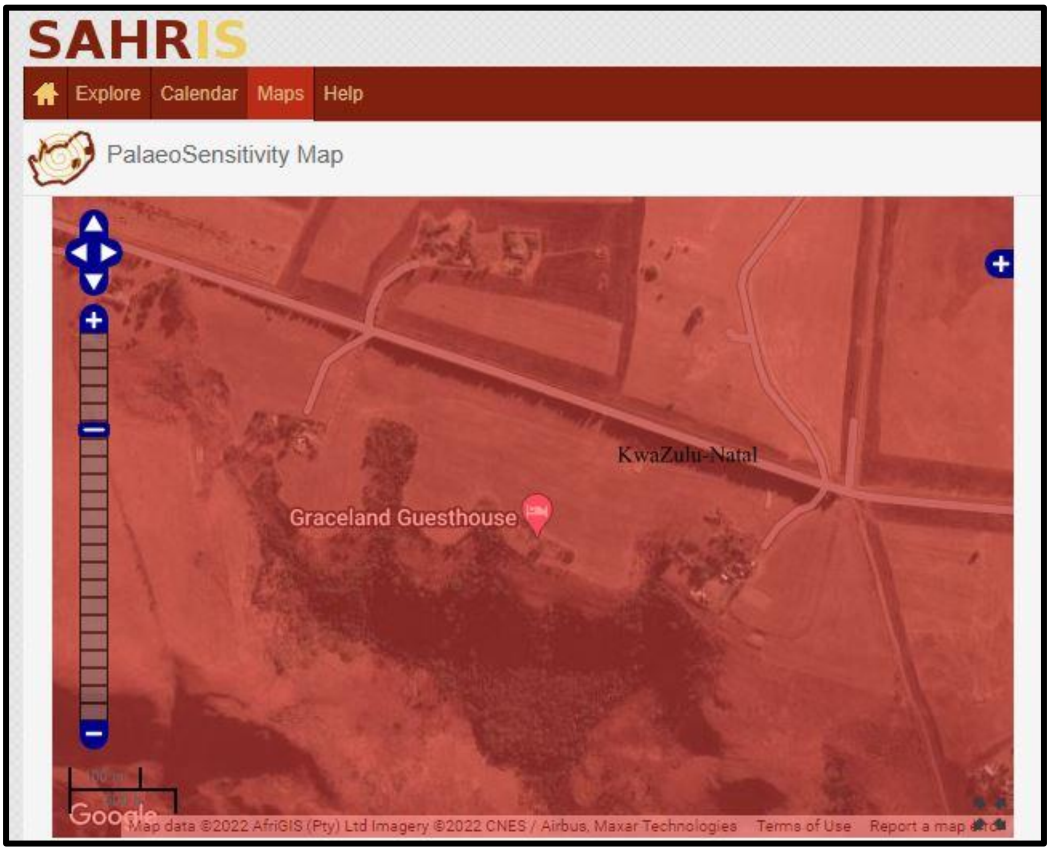

Figure 4: Map of how the geology in Fig.3 translates into palaeo-sensitivity. The geological units which occur beneath the site footprint have a ranking of red and correspond to the Adelaide and Tarkastad Subgroups of the Beaufort Group, rock types which have a high likelihood of significant fossil occurrences. Modified from the SAHRIS map, www.sahra.org.za/sahris/map/palaeo

Site observations

The site footprint is located approximately 21 kilometres south-west of Winterton, at GPS coordinates 28º 59' 34.95" S, 29º 27' 18.97" E (Figure 1 & 2). Before the ground survey took place an aerial survey of the site was first carried out using Google Earth, and the relevant geology map of the area (2828 Harrismith) and the SAHRIS palaeo-sensitivity map were also consulted. These were all used in combination to gain an understanding of the site features, as well as the underlying bedrock within the site footprint and how it ranked in terms of possible fossil occurrences.

The site footprint was located on the side of a gently sloping hill. Several levelled-out areas were cut into the slope, and the frames and roofs of two large structures had already been erected on the lower platform (Fig.5-10). Two storage containers joined by a corrugated iron roof functioned as a tool shed, and were located on the levelled-out western edge of the site footprint (Fig.10). Quarried bedrock had been laid out on the floors of these platforms to form a solid base and had been compacted and levelled out (Fig.11 & 12). Unfortunately this bedrock is fossiliferous and is therefore not the appropriate material for such a purpose. This quarried bedrock had many embedded structures which resembled fossils, but most of them were from pebbles or mineral deposits within the rock (Fig.13 & 14). One or two possible fossils were noted (Fig.15 & 16), but due to the fact that most of the rock had been crushed and compacted there were not many loose rocks around that were not embedded in the floor and were large enough to be examined. This bedrock was not quarried on site as the deepest cuttings into the mountain slope only revealed the upper soil horizon, with no exposures of bedrock. The stratigraphy of the exposed soil profile was examined for archaeological material such as lithics or ceramics, but nothing was observed (Fig.17 & 18). Besides one or two possible fossils observed within pieces of quarried bedrock, no other heritage-related material was observed on site. Being located on an exposed slope and not close to a stream, rock overhang or raw material source reduced the chances that humans would have used such an open, uneven location as a working or living area.

The above-mentioned aspects of the development were done before environmental authorisation was obtained (white square), but within the larger yellow rectangle (Fig.2) other areas on the slope will also be terraced for an orchard to be planted and buildings to be erected. As this style of terracing is very shallow, it is expected that the same upper soil horizon will be exposed without cutting down deep enough to expose bedrock. This larger area was also surveyed but only comprised of the same grass-covered slopes. The tall grass made it difficult to spot any possible archaeological material lying on the surface. No graves, stone-walled features or historical buildings were observed on the site footprint.

During a meeting for interested and affected parties some locals claimed that the graves of their ancestors were buried on the property, but this did not appear to be a legitimate claim as they were very vague in their description and could not point to a precise location of the graves. Based on the ground survey it is unlikely that this claim has any validity as there was no indication that any graves were present within the boundaries of the site footprint.

Figure 5-10: Several terraces had been cut into the slope of the mountain, with two partially built shed-like structures erected on the largest of these clearings. An adjacent terrace on a higher level was in the process of being levelled out and stones were being added for flooring foundations (Fig.7). The lower terrace extended to the west of the two built structures where some shipping containers had been placed for equipment storage (Fig.10). The exposed walls of red sediment created by the cutting revealed a stratified upper soil layer which did not appear to contain any archaeological material. Fossil-bearing rock had been used as a foundation to strengthen the floor of the terraces, so another rock type will have to be used to finish the remainder of the flooring for this development

Figure 11 & 12: The floors of the terraced areas were levelled out and strengthened through the addition of rocks and stone. This material was then compacted to form a solid base. However, this material is fossiliferous and another suitable rock type (e.g. dolerite) will have to be found to finish off the remainder of the floor's foundation

Figure 13 & 14: Several of the rocks and stones used for the foundation of the flooring had embedded structures which superficially resembled fossils. However, most of these turned out to be pebbles or mineral deposits within the sedimentary rock

Figure 15 & 16: The rocks and stones used for the foundations of the flooring were full of mineral deposits resembling chalk or lime. This made it quite challenging to distinguish fossil material from mineral deposits. However at least one or two fossils were observed, indicating that this flooring material is fossiliferous

Figure 17 & 18: The cutting into the slope of the mountain side revealed a stratified upper soil column, with three or four layers visible. This exposed sediment was examined for the presence of lithics or ceramics but nothing was observed. Being located on an uneven mountain slope with no protection from the elements (e.g. rock overhang) would have reduced the likelihood that such an area would have been extensively utilised by humans, thereby decreasing the chances that any evidence would be left behind

To better evaluate the site, the table below summarizes the heritage impact significance:

Assessing Impact Significance

Criteria	without mitigation	with mitigation
Extent/spatial scale of impact	local	local
Duration of impact	permanent	permanent
Intensity/severity of impact	low	low
Probability of impact	improbable	improbable
Consequence	low	low
Confidence	medium	medium
Significance	very low	very low
Reversibility	irreversible	
Loss of resource	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 heritage-related discoveries:

Chance Find Protocol

Heritage-related discoveries are ranked by their nature and context; their uniqueness and completeness; their rarity and significance; as well as the contribution they can make to science. However any artefact or occurrence can turn out to be important, therefore all discoveries need to be assessed and ranked in order to determine their relevance and whether further action is required.

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 survey, based on the known heritage sites in the area as well as the nature of surrounding geological units.

The normal procedure for recovering archaeological/palaeontological material would be to identify areas which show investigative potential through a concentration of fossils or artefacts, 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 or artefacts 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 archaeologists and palaeontologists are required to evaluate the sites of proposed development 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 such a consultant is generally only on site for a few hours. Having a palaeontologist or archaeologist 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 always 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 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 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 report, 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 or archaeologist 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 second site visit (Phase 2) 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.

Assumptions and limitations

A key assumption for this report is that the kml/kmz file sent to the heritage specialist accurately conveys the layout and nature of the development, which is not always the case as plans are often revised; because the site layout has not been accurately drawn in Google Earth; or lastly because the developers have understated and downplayed the degree, severity, nature or extent of the development so as to make it seem less impactful to the environment. A further assumption is that the geological maps used in this assessment are accurate and up to date, which may not be the case as there is a continuous refinement and revision of the geological model through new scientific research, some of which may still need to become incorporated into available maps.

A limitation with large scale maps (1:250 000) is that smaller outcrops of fossiliferous bedrock may not be indicated within the represented geological model. In addition, several potentially fossiliferous outcrops may have been weathered and eroded over millennia, buried under younger deposits such as alluvial and colluvial sediments, or capped by topsoil. Palaeontologically-sensitive bedrock may have also been metamorphosed through its contact with intrusive lavas, damaging or destroying fossil specimens along the contact zone.

The professional opinion given in this HIA report is based on the results of a site visit, which was used to gauge the fossiliferous potential of the bedrock likely to be exposed during the proposed development, and the impact significance. This process involved careful scrutiny of the best available maps and data sets as well as a ground survey, and all attempts were made to take a holistic, informed decision. Yet in spite of this, it is possible that fossils may be present somewhere along the route of the proposed development but were not visible due to their buried nature. Moreover, certain predictions about the likelihood of encountering fossils was based on all available evidence and may prove to be less or more likely than anticipated.

As a general rule direct field observations are the best method to gauge the degree to which palaeontological material may be present on site, whether eroding out or visible on the surface. As many developments require a degree of digging down into the soil and/or underlying stratigraphy, fossils will be hidden from view due to their buried nature and will only be exposed by the action of a back-actor or once they have started eroding out from the stratigraphy they are preserved in.

Lastly, it is assumed that the developers will respect the guidelines set out in the laws of South Africa with regards to good environmental management practices and policies, and will immediately cease all construction if any fossiliferous material is discovered. It is also assumed that developers will practice integrity and embrace an unwavering mind-set with regards to respecting and protecting all aspects of heritage, including due consideration for the fact that such objects cannot simply be sacrificed to meet project deadlines.

Conclusion and recommendations

No rocks were exposed at the surface within the boundaries of the site footprint and as a result, no fossil material was observed within the cutting. This is due to the fact that the soil column caps the bedrock and acts as a kind of protective buffer for buried fossiliferous rock strata against construction activities happening at the surface. The exposed upper soil column was stratified and revealed a few metres of what appeared to be sterile sediment, as no lithics or pottery could be seen sticking out of the walls of the topsoil. However, quarried fossil-bearing bedrock had been brought onto site to strengthen and stabilize the floor of the site footprint. Due to the possibility of damaging fossils through further quarrying of this rock type, the use of this material will need to stop and another suitable material will have to be sourced for the remainder of the floor. Dolerite is abundant in the region and this material can be sensitively quarried without ruining the aesthetic of the landscape and with no chance of encountering palaeontological material as this rock type is not fossiliferous. Alternatively, crushed stone from a building co-op could also be used for this purpose.

If any palaeontological or heritage-related material were to be unearthed during construction activities, developers and/or landowners are reminded that according to the National Heritage Resources Act 1999 (Act No. 25) and KwaZulu-Natal Heritage Act 2008 (Act No. 4), work should immediately cease and the **Chance Find Protocol** outlined above should be followed to ensure that developments comply with the law, and to ensure that a rare object/fossil stands a good chance of being recorded and/or relocated before being damaged or destroyed by construction activities present on-site.

References

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