

**HIA OF PROPOSED TIFFANY SUPERMARKET
EXPANSION, SALT ROCK, KZN**

FOR SIVEST (PTY) LTD

**DATE: 2 NOVEMBER 2021
REVISED 13 FEBRUARY 2023**

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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

INTRODUCTION

Umlando was requested to undertake an HIA of the proposed development. Figures 1 – 3 show the location of the development.

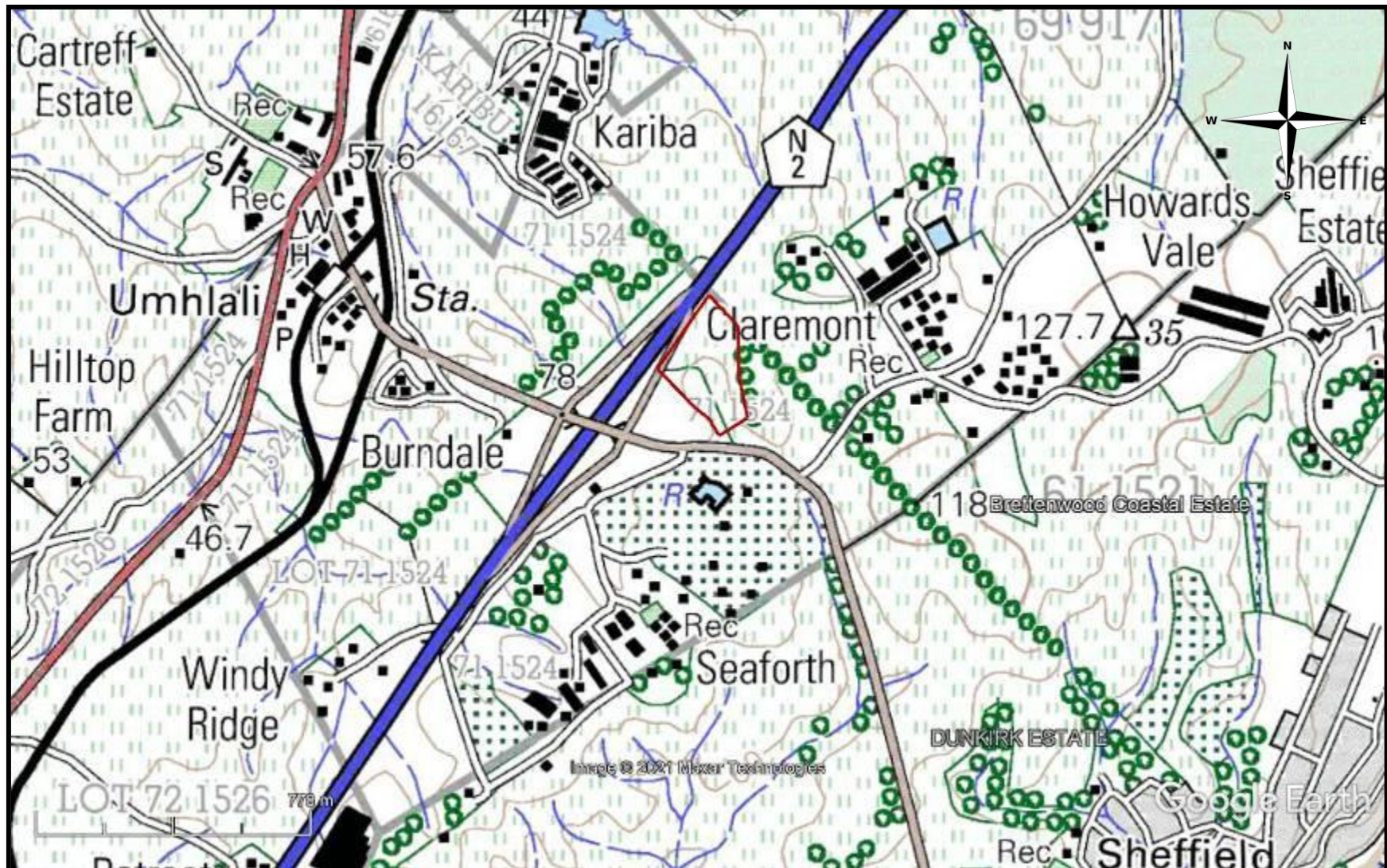
FIG. 1 GENERAL LOCATION OF THE PROPOSED DEVELOPMENT



FIG. 2: AERIAL OVERVIEW OF THE PROPOSED DEVELOPMENT



FIG. 3: TOPOGRAPHICAL MAP OF THE PROPOSED DEVELOPMENT (2000)¹



¹ 2931AC 2000 Shakaskraa

FIG. 4: SCENIC VIEWS OF THE STUDY AREA



KWAZULU NATAL AMAFA AND RESEARCH INSTITUTE, ACT 05, 2018

“General protection: Structures.—

- No structure which is, or which may reasonably be expected to be older than 60 years, may be demolished, altered or added to without the prior written approval of the Council having been obtained on written application to the Council.
- Where the Council does not grant approval, the Council must consider special protection in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
- The Council may, by notice in the *Gazette*, exempt—
- A defined geographical area; or
- defined categories of sites within a defined geographical area, from the provisions of subsection where the Council is satisfied that heritage resources falling in the defined geographical area or category have been identified and are adequately protected in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
- A notice referred to in subsection (2) may, by notice in the *Gazette*, be amended or withdrawn by the Council.

General protection: Graves of victims of conflict.—No person may damage, alter, exhume, or remove from its original position—

- the grave of a victim of conflict;
 - a cemetery made up of such graves; or
 - any part of a cemetery containing such graves, without the prior written approval of the Council having been obtained on written application to the Council.
- General protection: Traditional burial places.—
- No grave—
 - not otherwise protected by this Act; and
 - not located in a formal cemetery managed or administered by a local authority, may be damaged, altered, exhumed, removed from its original

position, or otherwise disturbed without the prior written approval of the Council having been obtained on written application to the Council.

The Council may only issue written approval once the Council is satisfied that—

- the applicant has made a concerted effort to consult with communities and individuals who by tradition may have an interest in the grave; and
- the applicant and the relevant communities or individuals have reached agreement regarding the grave.

General protection: Battlefield sites, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites.—

- No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.
- Upon discovery of archaeological or palaeontological material or a meteorite by any person, all activity or operations in the general vicinity of such material or meteorite must cease forthwith and a person who made the discovery must submit a written report to the Council without delay.
- The Council may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Council to be inappropriate within 50 metres of a rock art site.
- No person may exhume, remove from its original position or otherwise disturb, damage, destroy, own or collect any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.

- No person may bring any equipment which assists in the detection of metals and archaeological and palaeontological objects and material, or excavation equipment onto any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, or meteorite impact site, or use similar detection or excavation equipment for the recovery of meteorites, without the prior written approval of the Council having been obtained on written application to the Council.
- The ownership of any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site, on discovery, vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government.”

METHOD

The method for Heritage assessment consists of several steps.

The first step forms part of the desktop assessment. Here we would consult the database that has been collated by Umlando. This databases contains archaeological site locations and basic information from several provinces (information from Umlando surveys and some colleagues), most of the national and provincial monuments and battlefields in Southern Africa (<http://www.vuvuzela.com/googleearth/monuments.html>) and cemeteries in southern Africa (information supplied by the Genealogical Society of Southern Africa). We use 1st and 2nd edition 1:50 000 topographical and 1937 aerial photographs where available, to assist in general location and dating of buildings and/or graves. The database is in Google Earth format and thus used as a quick reference when undertaking desktop studies. Where required we would consult with a local data recording centre, however these tend to be fragmented between different institutions and areas and thus difficult to access at times. We also

consult with an historical architect, palaeontologist, and an historian where necessary.

The survey results will define the significance of each recorded site, as well as a management plan.

All sites are grouped according to low, medium, and high significance for the purpose of this report. Sites of low significance have no diagnostic artefacts or features. Sites of medium significance have diagnostic artefacts or features and these sites tend to be sampled. Sampling includes the collection of artefacts for future analysis. All diagnostic pottery, such as rims, lips, and decorated sherds are sampled, while bone, stone, and shell are mostly noted. Sampling usually occurs on most sites. Sites of high significance are excavated and/or extensively sampled. Those sites that are extensively sampled have high research potential, yet poor preservation of features.

Defining significance

Heritage sites vary according to significance and several different criteria relate to each type of site. However, there are several criteria that allow for a general significance rating of archaeological sites.

These criteria are:

1. State of preservation of:

- 1.1. Organic remains:
 - 1.1.1. Faunal
 - 1.1.2. Botanical
- 1.2. Rock art
- 1.3. Walling
- 1.4. Presence of a cultural deposit

1.5. Features:

1.5.1. Ash Features

1.5.2. Graves

1.5.3. Middens

1.5.4. Cattle byres

1.5.5. Bedding and ash complexes

2. Spatial arrangements:

2.1. Internal housing arrangements

2.2. Intra-site settlement patterns

2.3. Inter-site settlement patterns

3. Features of the site:

3.1. Are there any unusual, unique or rare artefacts or images at the site?

3.2. Is it a type site?

3.3. Does the site have a very good example of a specific time period, feature, or artefact?

4. Research:

4.1. Providing information on current research projects

4.2. Salvaging information for potential future research projects

5. Inter- and intra-site variability

5.1. Can this particular site yield information regarding intra-site variability, i.e. spatial relationships between various features and artefacts?

5.2. Can this particular site yield information about a community's social relationships within itself, or between other communities?

6. Archaeological Experience:

6.1. The personal experience and expertise of the CRM practitioner should not be ignored. Experience can indicate sites that have potentially significant aspects, but need to be tested prior to any conclusions.

7. Educational:

7.1. Does the site have the potential to be used as an educational instrument?

7.2. Does the site have the potential to become a tourist attraction?

7.3. The educational value of a site can only be fully determined after initial test-pit excavations and/or full excavations.

8. Other Heritage Significance:

8.1. Palaeontological sites

8.2. Historical buildings

8.3. Battlefields and general Anglo-Zulu and Anglo-Boer sites

8.4. Graves and/or community cemeteries

8.5. Living Heritage Sites

8.6. Cultural Landscapes, that includes old trees, hills, mountains, rivers, etc related to cultural or historical experiences.

The more a site can fulfill the above criteria, the more significant it becomes. Test-pit excavations are used to test the full potential of an archaeological deposit. This occurs in Phase 2. These test-pit excavations may require further excavations if the site is of significance (Phase 3). Sites may also be mapped and/or have artefacts sampled as a form of mitigation. Sampling normally occurs when the artefacts may be good examples of their type, but are not in a primary archaeological context. Mapping records the spatial relationship between features and artefacts. Table 1 lists the grading system.

TABLE 1: SAHRA GRADINGS FOR HERITAGE SITES

SITE SIGNIFICANCE	FIELD RATING	GRADE	RECOMMENDED MITIGATION
High Significance	National Significance	Grade 1	Site conservation / Site development
High Significance	Provincial Significance	Grade 2	Site conservation / Site development
High Significance	Local Significance	Grade 3A / 3B	
High / Medium Significance	Generally Protected A		Site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B		Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally		On-site sampling monitoring or

Protected C	no archaeological mitigation required prior to or during development / destruction
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RESULTS

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. Many archaeological sites occur in the general area. The archaeological sites tend to be open Stone Age and Iron Age sites of varying significance and some have been excavated. Some historical buildings do exist in the general area. These sites have been recorded through systematic surveys (fig. 5).

The Farm Lot 71 No. 1524 was originally surveyed and granted in 1851 (fig. 6). The study area occurs in the northeastern corner of Sub. 9. This means that any existing structures can predate the 20th century. These farms would be linked to the beginnings of Umhlali (1851), before Salt Rock became a village on its own.

The 1937 aerial photograph indicates that there is an extensive farm complex on the top of the hill (fig. 7). The entire top of the hill seems to be areas of buildings that are divided by trees

The 1968 topographical map indicates that the farm buildings still exist and the farm is referred to as Foxhill (fig. 7). The farm appears to be abandoned in 2012-2013, according to Google Earth imagery. The remaining structures are older than 60 years in age and would be protected by the KZNARI Act.

FIG. 5: LOCATION OF KNOWN HERITAGE SITES IN THE GENERAL AREA

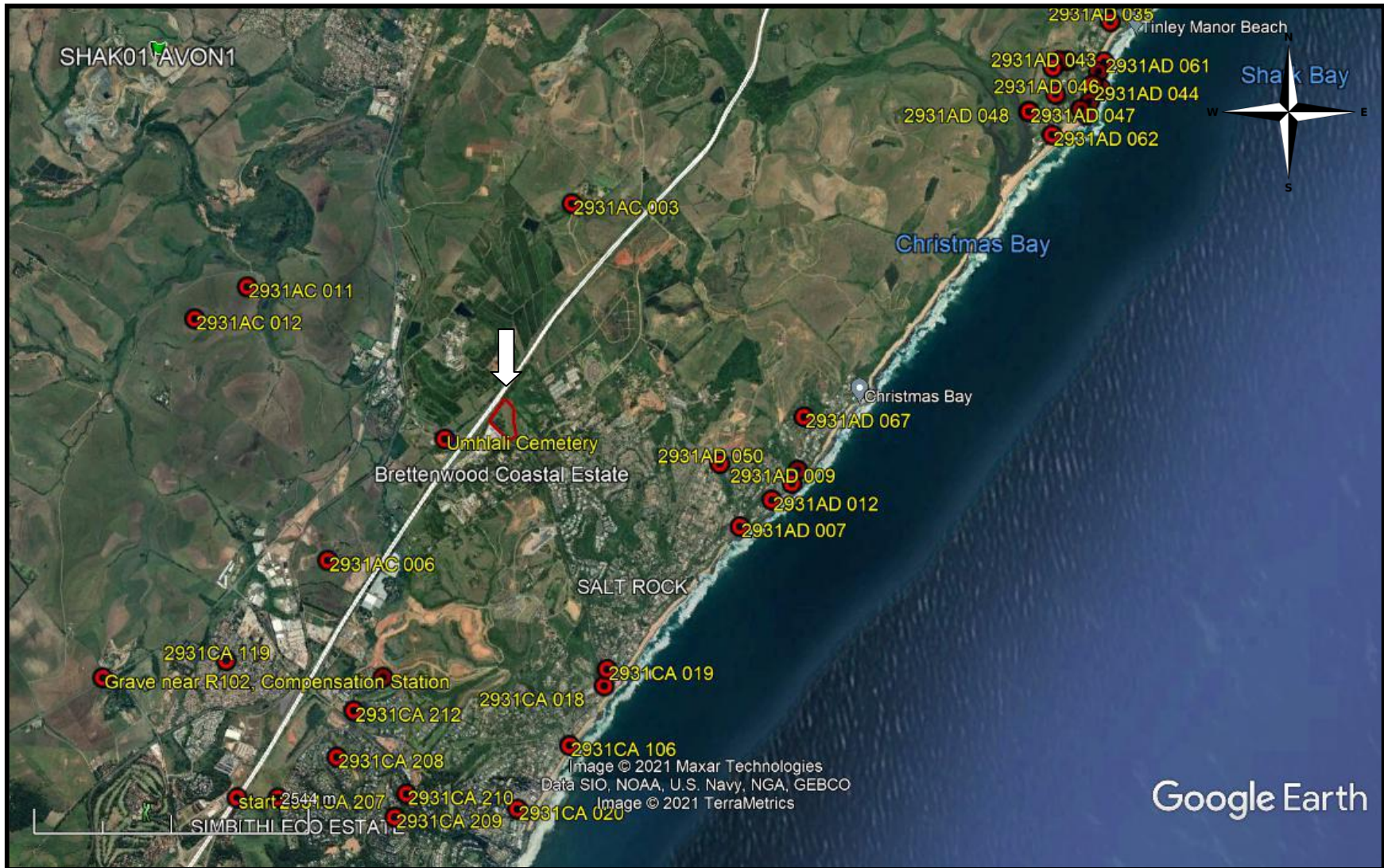


FIG. 6: LOT 71 NO 1524, GRANTED IN 1851

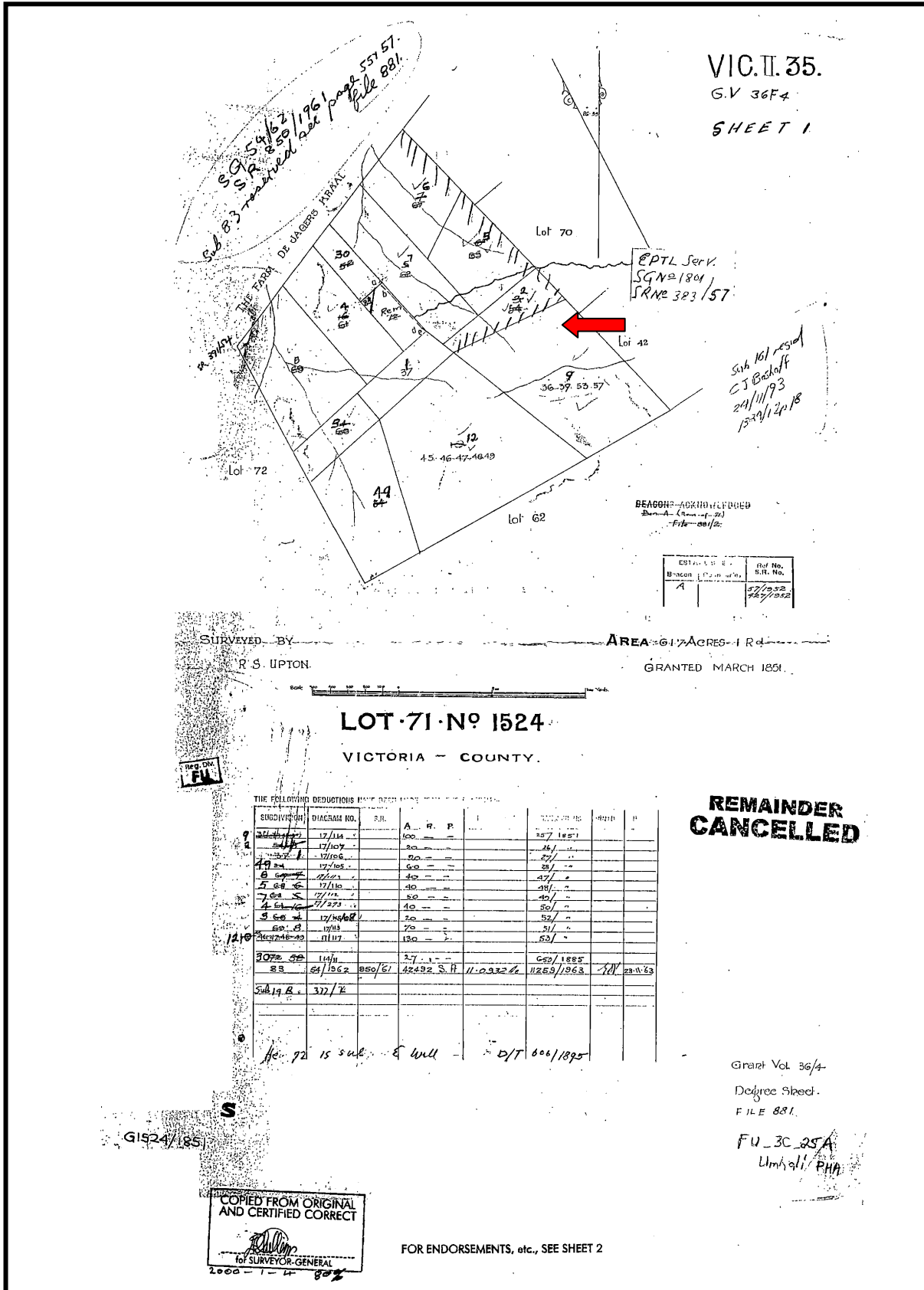


FIG. 7: LOCATION OF THE STUDY AREA IN 1937²



² 17B_053_54447

FIG. 8: LOCATION OF THE STUDY AREA IN 1968³

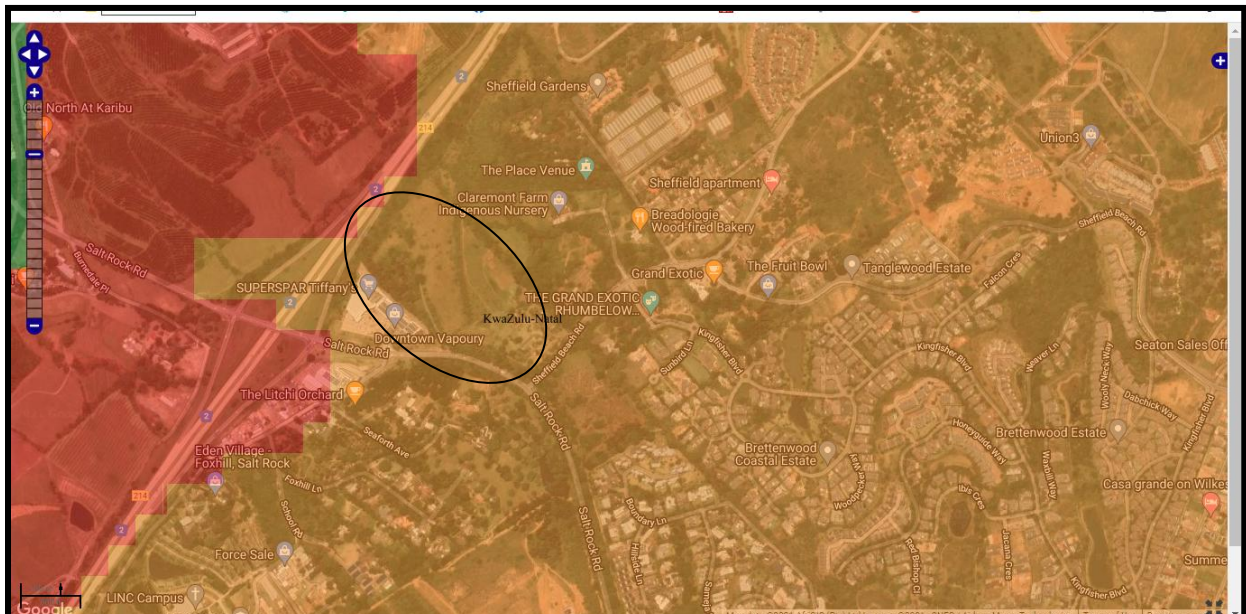


³ 2931AC 1968 Shakaskraa

PALAEONTOLOGICAL SENSITIVITY

The desktop PIA was undertaken by Dr Alan Smith (Appendix A) as it is of high palaeontological sensitivity (fig. 9). He states: “Theoretically, there is no reason why fossils should not be found in the Umkwelane Formation, but in practice nothing has been found. Although the SAHRIS Map considers this as a High Palaeosensitivity Zone ... in practice it is a Low Palaeosensitivity risk, as it consists of weathered sand where the chances of encountering palaeontological material are low. “ A Chance Find Protocol was initiated for this site.

FIG. 9: PALAEONTOLOGICAL SENSITIVITY MAP



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.

FIELD SURVEY

The field survey was undertaken on 26 October 2021. Ground visibility was very poor due to long grasses, dense vegetation and thickets (fig. 10). It was not possible to make an adequate assessment. The study area is located on steep hills with a flat top. Access to the ruins was not possible due to the thickets. Nor was it possible to see the ground for rubbish middens.

The farm complex probably predates the 1900s. Thus, any middens will yield information regarding 19th century Salt Rock and Umhlali. Any midden over 100 years in age is considered archaeological and is protected by the KZNARI Act.

Significance: To be determined. The farm complex needs to be further assessed in the archives to provide dates that are more accurate.

Mitigation: The site will need to be re-assessed after vegetation clearance. The assessment will ascertain the amount of buildings remaining, their age, and if there are any historical middens. This assessment will require an accredited built environment specialist and an archaeologist. Vegetation clearance will include ground cover and the thickets.

On site monitoring during earthmoving activity might be required pending the final results.

SAHRA Rating: pending

FIG. 10: DENSE VEGETATION AT FOXHILL FARM



SITE SENSITIVITY VERIFICATION

The DFFE screening tool rated the Archaeology and Cultural heritage as having low sensitivity. The palaeontology was rated as having high sensitivity.

In terms of the archaeology and cultural heritage the screening tool is incorrect as hills such as these, near the ocean, often have Early and/or Late Iron Age sites with shell middens and spatial features. I have excavated many such sites between the ocean and freeway. These areas also have human remains and thus the sensitivity should be increased to medium to high. The screening tool is inaccurate when it comes to archaeological sites. The screening tool should be looking at densities of known archaeological sites in an area to obtain a more accurate rating.

The archaeological and cultural heritage sensitivity of the area has been damaged by the large farm buildings and Tiffany's Mall.

The palaeontology does have high sensitivity. However, as Dr Smith states: "Although the SAHRIS Map considers this as a High Palaeosensitivity Zone ... in practice it is a Low Palaeosensitivity risk, as it consists of weathered sand where the chances of encountering palaeontological material are low."

RECOMMENDATIONS

The proposed expansion of Tiffany's shopping centre will occur on Portion 9 of Erf 71 No 1524. The expansion occurs on a farm complex that might predate 1900s. An assessment of the remaining buildings, ruins and/or middens was not possible due to the very dense vegetation. The area will need to be cleared of the thickets and much of the ground cover to make an adequate assessment of the farm complex. This assessment will require a built environment specialist for the buildings and an archaeologist for the middens. This should be undertaken as

soon as possible to avoid delays in project timing. The built environment specialist can begin with the archival work while waiting for the vegetation clearance.

A permit to destroy the house will be required from KZNARI.

CONCLUSION

A heritage survey was undertaken for the proposed Tiffany's shopping centre expansion. The desktop research indicated that there was a large farm complex on the top of the hill by 1937, and these buildings might predate 1900s. The complex appears to have been abandoned by 2012/2013. The field survey could not be undertaken adequately due to the dense vegetation around the buildings.

The survey did note that there are old buildings on site, and these will need to be further assessed, as a permit for their destruction will be required. Any middens on the site, especially those older than 100 years, will also require a permit to damage/remove.

REFERENCES

2931AC Shakaskraal 1968, 2000
17B_053_54447

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

**DESK-TOP PALEONTOLOGICAL
ASSESSMENT FOR THE PROPOSED
TIFFANY'S SHOPPING CENTRE EXPANSION,
LOCATED WITHIN THE ILEMBE DISTRICT
MUNICIPALITY OF THE PROVINCE OF KWA-
ZULU NATAL**

FOR

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29 OCTOBER, 2021

Declaration of Independence

This report has been compiled by Dr Alan Smith (Pr. Sc. Nat.) of Alan Smith Consulting, Durban. The views expressed in this report are entirely those of the author, if not then the source has been duly acknowledged. No other interest was displayed during the decision making process for the Project.

Specialist: Dr Alan Smith

Signature:



EXECUTIVE SUMMARY

Alan Smith Consulting was appointed by UMLANDO: Archaeological Surveys & Heritage Management to conduct a Desk-Top field assessment of the potential impacts to **Palaeontology Resources** that might occur through the activities of the proposed Tiffany's Shopping Centre expansion, located in the KwaDukuza Local Municipality of the iLembe District Municipality, KwaZulu-Natal

Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), requires a Palaeontological Impact Assessment (PIA) to assess any potential impacts to palaeontological heritage.

The chances of encountering fossils on this site is **Low**, but **Not Zero**; consequently a **“Chance Find Protocol”** has been included.

ACRONYMS

BA:	Basic Assessment
EDTEA:	(Department of) Economic Development, Tourism and Environmental Affairs
HIA:	Heritage Impact Assessment
PIA;	Palaeontological Impact Assessment
SAHRA:	South African Heritage Resource Agency
SAHRIS:	South African Heritage Resources Information System

1. BACKGROUND

It is proposed to expand the Tiffany's Shopping Centre within the KwaDukuza Local Municipality of the iLembe District Municipality, KwaZulu-Natal (Figure 1).

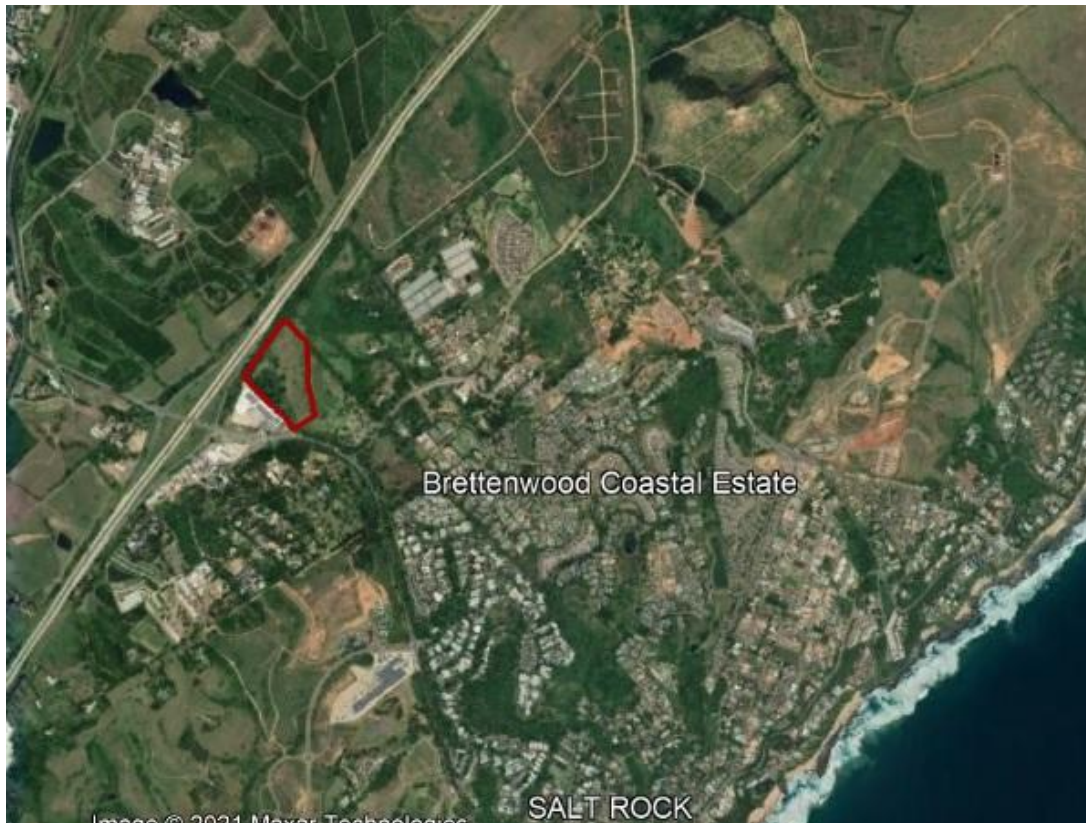


Figure 1: Location map of proposed Tiffany's Shopping Centre Expansion.

2. TERMS OF REFERENCE

Alan Smith Consulting was requested by Gavin Anderson of UMLANDO: Archaeological Surveys & Heritage Management to provide a Desk-Top Palaeo Impact Assessment for the proposed Tiffany's Shopping Centre Expansion. The work was to be based on the knowledge gained from maps, reviewed literature and personal experience (see Section 11). This report is to meet the requirements of the National Environmental Management Act (Act 107 of 1998) [as amended] Environmental Impact Assessment (EIA) regulations, Appendix 6.

3. SCOPE AND PURPOSE OF REPORT

A Palaeontological Impact Assessment (PIA) is a means of identifying any significant palaeontological material before development begins, so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This field Desk-Top investigation fulfills the requirements of the heritage authorities (SAHRA), such that a comment can be issued by them for consideration by the competent authority (EDTEA), who will review the Basic Assessment (BA) and grant or refuse authorisation. The PIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation, should this be granted.

4. METHODOLOGY

Geological maps, literature review and personal experience were used in this research.

5. GEOLOGY

The Umkwelane Formation (Qb: yellow) is present on this site (Figure 2).

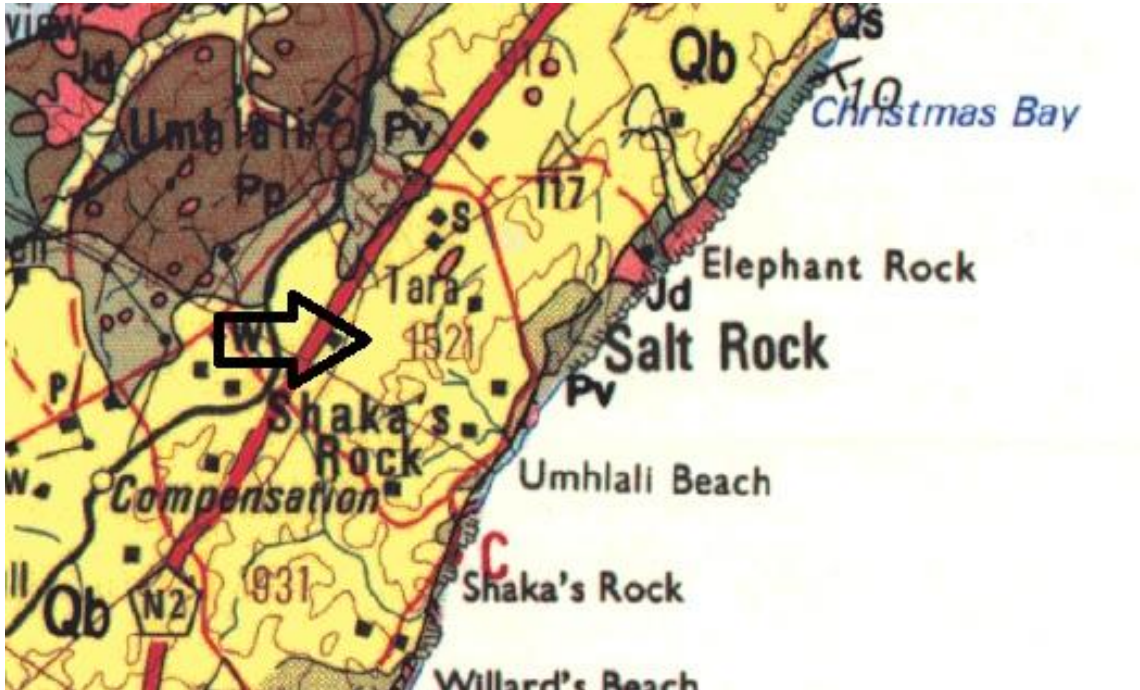


Figure 2: Approximate area of proposed Tiffany's Shopping Centre Expansion (arrowed). Extract from the Durban 2930 1:250 000 Geological map. According to this map, the proposed footprint will overly the Umkwelane Formation (Qb: yellow on map).

Umkwelane Formation (Berea Red Sand)

This is Mid-Miocene to Pliocene (14 - 4 million years ago (Ma) in age (Botha, 2018). It is an ancient coastal dune cordon, composed of fossil aeolian coastal dunes-. The feldspar component has been strongly weathered to give a red clay matrix. This soil is a characteristic red colour (Figure 3). The top metre of this lithology has been deeply disturbed due to prehistorical, historical and current agricultural practises.



Figure 3: Earthcut from south of the development site, showing the characteristic appearance of the Umkwelane Formation (also known as Berea Red Sand).

PALAEONTOLOGY

Theoretically, there is no reason why fossils should not be found in the Umkwelane Formation, but in practice nothing has been found. Although the SAHRIS Map considers this as a **High Palaeosensitivity Zone** (Figure 4 – orange shaded area – see Table 1), in practice it is a **Low Palaeosensitivity** risk, as it consists of weathered sand where the chances of encountering palaeontological material are low.

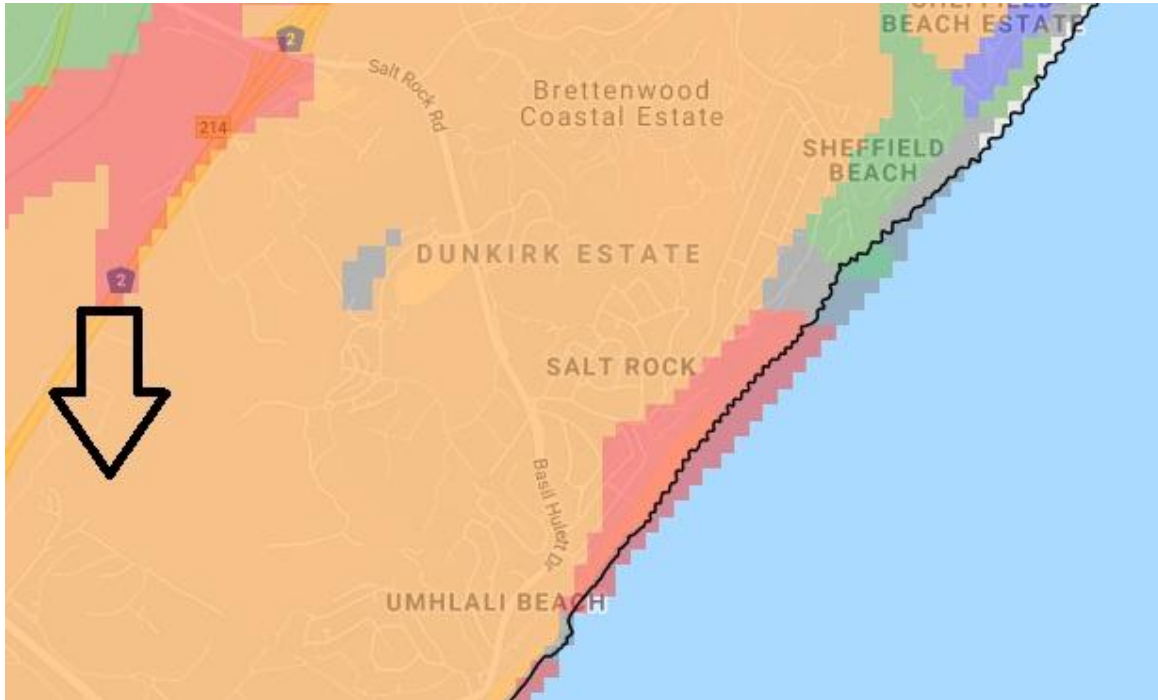


Figure 4: Palaeosensitivity of the proposed Tiffany’s Shopping Centre Expansion, the approximate location is arrowed. (Extract from Sahr’s Palaeosensitivity Map).

Table 1: Summary of SAHRIS categories

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

7. SUMMARY

The chance of fossils being found on this site is **Low**, but not **Zero**. A “**Chance Find Protocol**” has been included to cover this eventuality. No further palaeontological work is required, unless triggered by the “**Chance Find Protocol**”, which must form part of the Environmental Management Program (EMPr) for the site

8. CHANCE FIND PROTOCOL

This Chance Find Protocol must be included in the site EMPr.

If any fossils are found, a 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 until collected. Documentary record of palaeontological occurrences must be done.

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 and accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation.

9, CONCLUSIONS

This project will be constructed within soil formed from the Umkwalene Formation, and possibly the Vryheid Formation. Although paleontological material is unlikely to be encountered in the soil, a “Chance Find Protocol” has been included. No further **palaeontological work** is required unless the “Chance Find Protocol” is triggered.

10. REFERENCES

Botha, G (2018). Lithostratigraphy of the Late Cenozoic Maputaland Group. South African Journal of Geology, 121, 95-108.

Durban (2930) 1:250 000 Geological map Government Printer, Pretoria

Sahris Palaeosensitivity Map: <https://sahris.sahra.org.za/map/palaeo>

11. DETAILS OF SPECIALIST

Dr Alan Smith

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:

- PhD in Geology (University of KwaZulu-Natal), Pr. Sc. Nat., I.A.H.S.
- 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 + 50 journal articles with 497 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: Bhokuzulu Epangweni KZN water reticulation project, Cathkin Park. Client: Mike Webster, HSG Attorneys.
- Fieldwork PIA: Mpungoze water supply scheme, Empangeni. Client: Enviropro.
- Fieldwork PIA: Helpmekaar Dam. Client: Afzelia environmental consultants.

- 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 Roilyf 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.