HWC Case No: 20190809SB0909E

BRIEF PALAEONTOLOGICAL ASSESSMENT
PROPOSED RESIDENTIAL DEVELOPMENT ON ERF 3927, STILL BAY WEST
HESSEQUA MUNICIPALITY, RIVERSDALE DISTRICT

By

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Prepared at the Request of

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SUMMARY

The land owner, Daily Double Trading 447 CC, proposes to construct a residential development on Erf 3927, Still Bay West (Figure 1). Pending approvals, it is proposed to subdivide Erf 3927 into twelve General Residential II (Group Housing) erven, one Open Space II (Private Open Space) erf and one portion of Private Road.

The proposed development is assumed to entail conventional buildings where subsurface disturbance during the Construction Phase involves shallow trenches for foundations, for services infrastructure and for stormwater drainage. Such trenches will mainly affect the **Qg coversands** and may superficially affect the **calcrete capping of the Wankoe Formation** in places (Figure 2).

Overall, the Qg coversands have low fossil bone potential, evidently due to leaching and reworking of the surface sands during the last 100 000 years, and consequently the palaeontological sensitivity is classified as LOW/BLUE (Figure 3).

The Wankoe Fm., which includes the capping calcrete, is left unclassified on the SAHRIS Palaeo-sensitivity Map (Figure 3), but may be assigned LOW palaeontological sensitivity.

The possible presence of fossils in the subsurface does not impede the decision to proceed with the proposed development.

Although the intensity of impact on fossil resources is rated as LOW and fossil finds are improbable, a chance occurrence of fossil material cannot be entirely dismissed.

It is advisable that a protocol for finds of fossil bones, the Fossil Finds Procedure (FFP), is included in the Environmental Management Plan (EMP) for the project (Section 7).

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CONTENTS

1 BACKGROUND

The land owner, Daily Double Trading 447 CC, proposes to construct a residential development on Erf 3927, Still Bay West (Figure 1). PERCEPTION Planning has submitted a Notification of Intent to Develop (NID) to Heritage Western Cape (HWC) and a Heritage Impact Assessment (HIA) inclusive of a Palaeontological Desktop Study has been requested. This brief Palaeontological Assessment is to inform about the palaeontological sensitivities of the site and the probability of fossils being uncovered in the subsurface and being disturbed or destroyed during the Construction Phase of the proposed development.

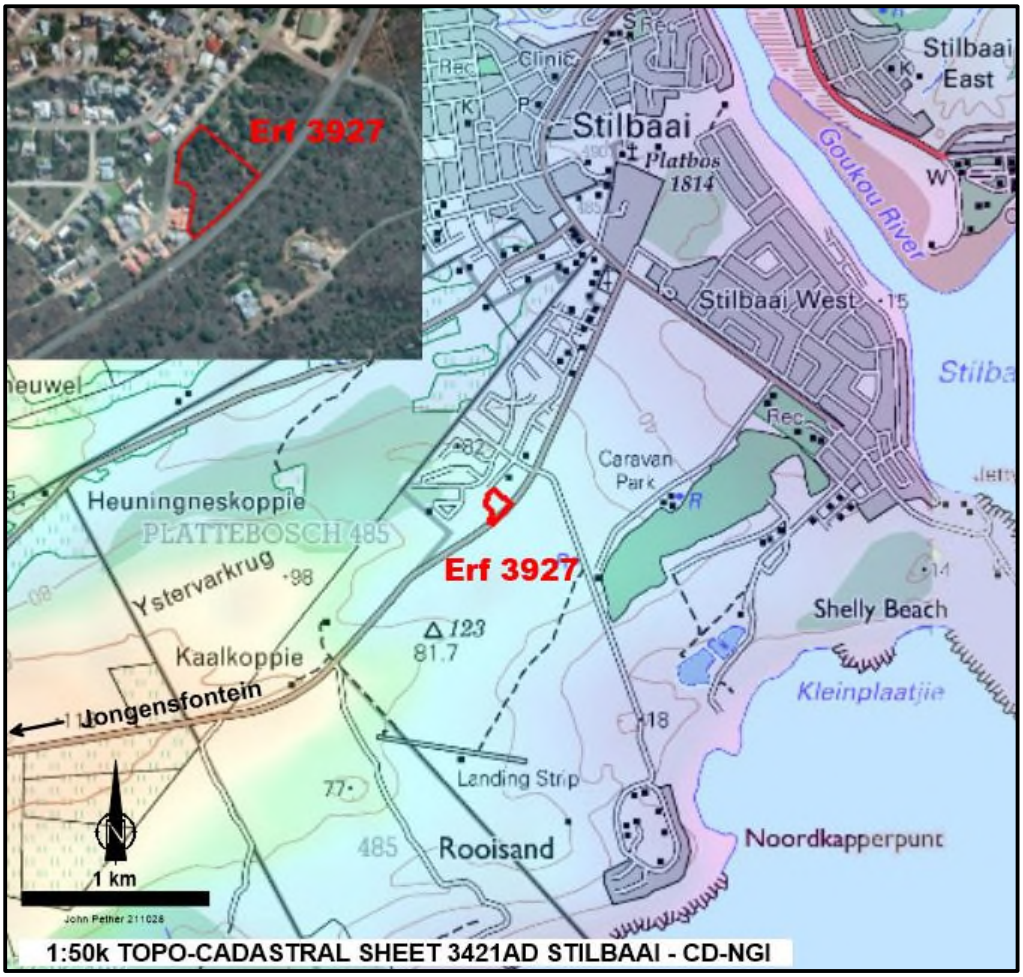

Figure 1. Location of Erf 3927, Stilbaai Wes.

2 LOCATION

Erf 3927, 8010 m^2 in extent, is located on the outskirts of Stilbaai Wes adjacent to the Stilbaai – Jongensfontein road (Figure 1), where it is public open space in an existing development, wherein it is bordered by Bessie Str.

Centre co-ordinates: -34.385802°S / 21.402989°E.

3 DESCRIPTION OF THE PROPOSED ACTIVITY

The proposed development entails applications for the rezoning of Erf 3927 from Open Space to Subdivisional Area and to increase the permitted density of the residential development from

low to medium density. Consequent to such approvals it is proposed to subdivide Erf 3927 into twelve General Residential II (Group Housing) erven, one Open Space II (Private Open Space) erf and one portion of Private Road.

4 GEOLOGICAL CONTEXT

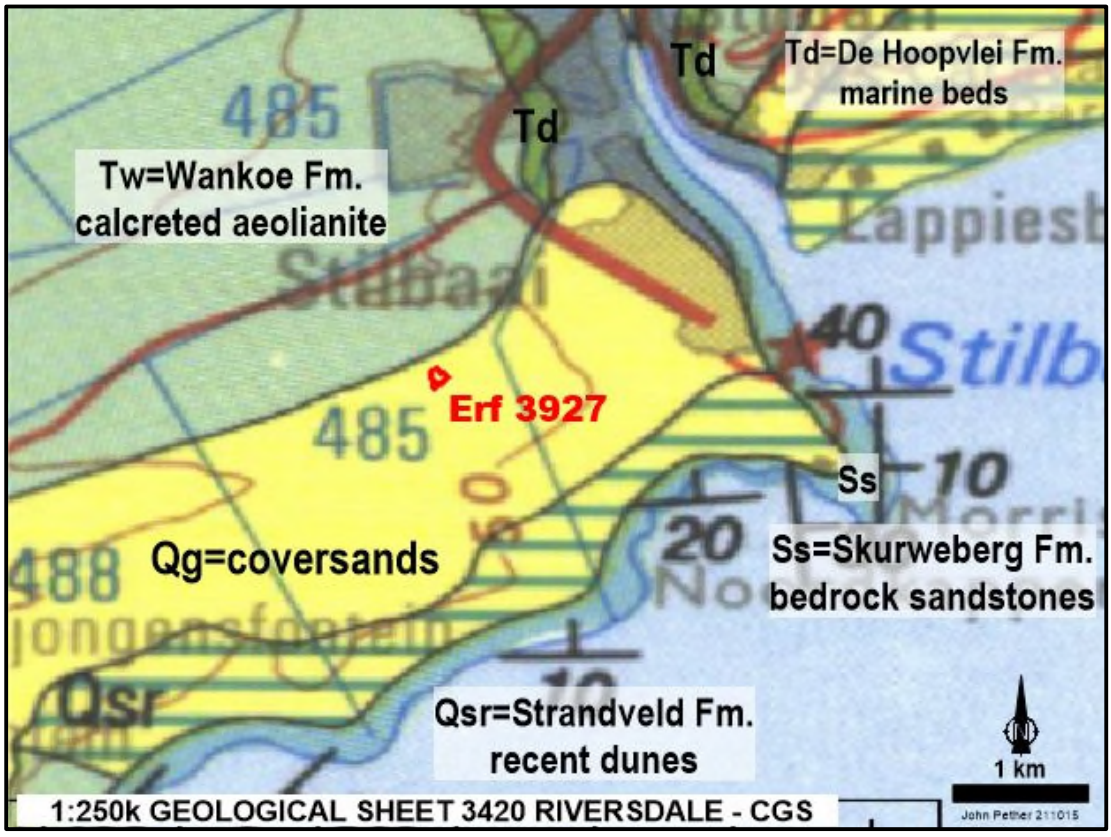

Figure 2. Surface geology of the area and context of Erf 3927.

The coastal plain to the west and east of Stilbaai is distinguished by a huge accumulation of ancient dunes, now cemented to dune rock called aeolianite, which exhibits a topography of large-scale dune ridges, exceeding 200 m thickness in places, and inter-ridge valleys orientated approximately east-west to parallel to the coast. The aeolianites have a high content of calcareous marine shell as “shell-sand” and fine fragments attesting to their sand source from ancient shorelines, while dune crossbedding indicates accumulation under the influence of westerly winds. These older aeolianites are named the **Wankoe Formation** (Figure 2), after the typical or “type area” area NW of Stilbaai (Malan, 1990). The formation is a composite of ages overlying the marine deposits of the De Hoopvlei Formation and is mainly of Pliocene to early Quaternary age (5-2 million years old. The Wankoe Fm. aeolianites or “Harde Duine” have a capping of calcrete formed from dissolved and re-precipitated shell carbonate (lime) in the surface soils. The calcrete outcrops are weathered and in places substantially dissolved by groundwaters, forming solution pits of various sizes from potholes to small wetlands.

Erf 3927 is situated at ~70 m asl. on the gently sloping eastern end of a younger ridge of Wankoe Fm. aeolianite close to the coast. The Wankoe Fm. calcrete ridges are thinly covered by loose sandy soil overall, but closer to the coast a thicker blanket of pale aeolian coversands has accumulated in the form of degraded dunes and sand sheets. Erf 3927 is located on the margin of these coversands which are mapped as **coversand unit Qg** (Figure 2). The SAHRIS

Palaeo-Map is a bit off by about 500 m to the SSE, but this Tw/Qg boundary is rather approximate anyway.

5 ANTICIPATED IMPACT ON PALAEONTOLOGICAL RESOURCES

The potential intensity of a palaeontological impact is related to the degree of subsurface disturbance (depths and volumes), together with the palaeontological sensitivities of the affected formations based on previous fossil finds. In this geological context the focus is on the fossil bones and teeth of land animals.

The proposed development is assumed to entail conventional buildings where subsurface disturbance during the Construction Phase involves shallow trenches for foundations, for services infrastructure and for stormwater drainage. Such trenches are generally between 1 to 1.5 m depth and ~1.2 m wide and will mainly affect the Qg coversands and may superficially affect the calcrete capping of the Wankoe Formation in places.

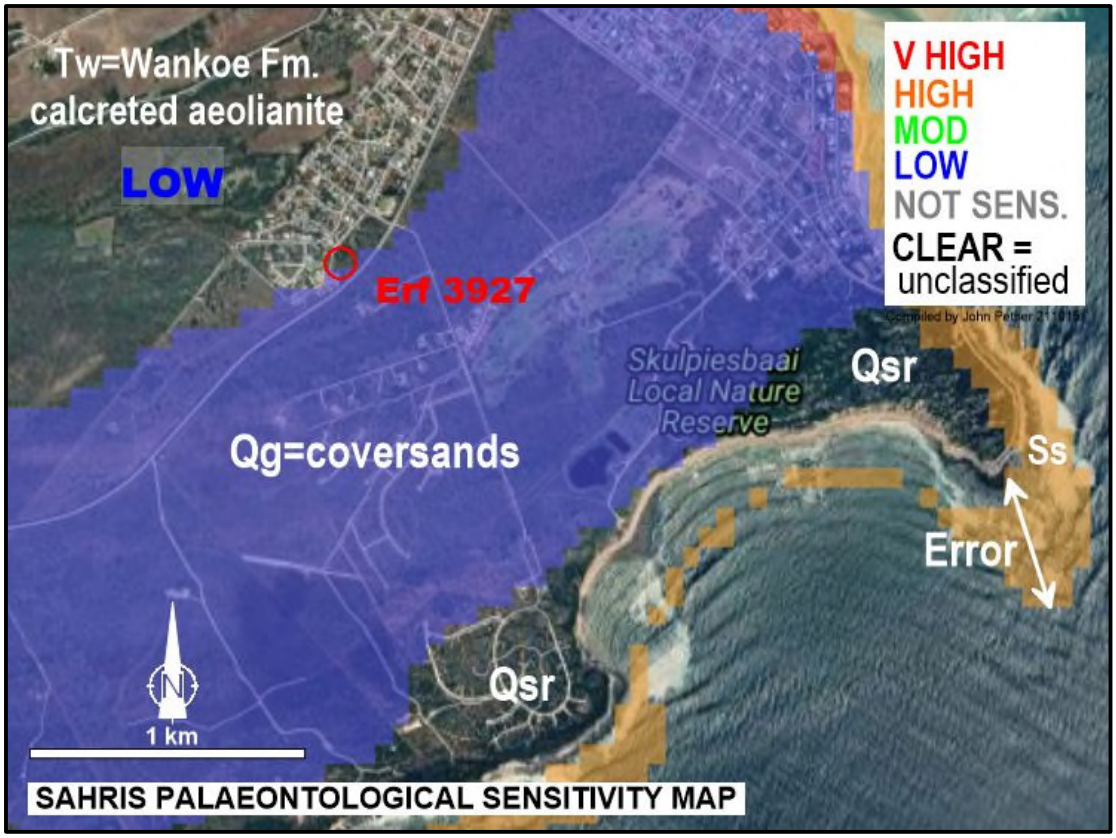

Figure 3. Palaeontological Sensitivity, based on 3420 RIVERSDALE Map (Figure 2).

Overall, the Qg coversands have low fossil bone potential, evidently due to leaching and reworking of the surface sands during the last 100 000 years, and consequently the palaeontological sensitivity is classified as LOW/BLUE (Figure 3). However, in places, such as the surrounds of springs associated with the greater availability of water in the past, fossil material is more prevalent beneath the coversands, but this context is not expected beneath Erf 3927.

The recorded fossil content of the Wankoe Fm. is limited to the ambient content of terrestrial snails and the sand-grain-size marine microfossils blown from the shoreline (Malan, 1990). Fossil bone finds are not recorded, but must have been sparsely prevalent, as is the case with aeolianite formations on the West Coast. However, the aeolianites of the Wankoe Fm. have

been more extensively altered by weathering, dissolution and soil-forming processes destructive to fossil content, a condition which pertains increasingly eastwards, as is evident in lateritic soil profiles and colluvial mantles bearing Early Stone Age artefacts, but not fossil bones (Marker & Holmes 1999; Butzer & Helgren 1972, Helgren & Butzer 1977, Pether & Archer 2012). The Wankoe Fm., which includes the capping calcrete, is left unclassified on the SAHRIS Palaeo-sensitivity Map (Figure 3), but may be assigned LOW palaeontological sensitivity.

Notwithstanding, the interface or palaeosurface beneath the coversands and on top of the calcrete has fossil bone potential. This includes small fossil bones accumulated in solution pits and in cavities burrowed into softer layers in the calcrete. Fossil bones may also be embedded in the upper part of the calcrete, as this incorporates the surficial soils of a preceding palaeosurface. Archaeological material may also occur.

6 RECOMMENDATIONS

The possible presence of fossils in the subsurface does not impede the decision to proceed with the proposed development.

Although the intensity of impact on fossil resources is rated as LOW and fossil finds are improbable, a chance occurrence of fossil material cannot be entirely dismissed.

It is advisable that a protocol for finds of fossil bones, the Fossil Finds Procedure (FFP), is included in the Environmental Management Plan (EMP) for the project, basically "If fossil bones are uncovered during excavations for the services and foundations, stop work and report to the standby archaeologist and/or Heritage Western Cape. Links to the HWC FFP are below:

https://www.hwc.org.za/sites/default/files/3_11%20Protocol%20Fossil%20Finds%20Final%20June%202016.pdf

https://www.hwc.org.za/sites/default/files/3_12%20Fossil%20Finds%20Poster.pdf

7 SUMMARY FOSSIL FINDS PROCEDURE

Should fossil bones and teeth be encountered in the deposits, work must cease at the site and the works foreman and the ECO for the project must be informed immediately. Scattered, unearthed parts/fragments of the find must be retrieved and returned to the main find site which must be protected from further disturbance.

Heritage Western Cape must be informed and supplied with contextual information:

- A description of the nature of the find.
- Detailed images of the finds (with scale included).
- Position of the find (GPS) and depth.
- Digital images of the context. *i.e*. the excavation (with scales).

HWC and an appropriate specialist palaeontologist will assess the information and liaise with the owner, the environmental consultants and the ECO and a suitable response will be established.

In the event of a significant fossil find, a professional palaeontologist must be appointed to undertake the excavation of the fossils and to record their contexts. Said palaeontologist must also undertake the recording of the stratigraphy and sedimentary geometry of the exposures and must undertake the compilation of the detailed report.

A permit from HWC is required to excavate fossils. The applicant should be the qualified specialist responsible for assessment, collection and reporting (palaeontologist). Should fossils be found that require rapid collecting, application for a palaeontological permit will immediately be made to HWC. The application requires details of the registered owners of the sites, their permission and a site-plan map. All fossil finds must be recorded and the fossils and their contextual information (a report) must be deposited at a SAHRA/HWC-approved institution.

8 REFERENCES

Butzer, K.W. & Helgren, D.M. 1972. Late Cenozoic evolution of the Cape Coast between Knysna and Cape St. Francis, South Africa. Quaternary Research 2: 143-169.

Helgren, D.M. & Butzer, K.W. 1977. Paleosols of the southern Cape coast, South Africa: Implications for laterite definition, genesis and age. Geographical Review 67: 430–445.

Malan, J.A. 1990. The stratigraphy and sedimentology of the Bredasdorp Group, southern Cape Province, South Africa. M.Sc. thesis, University of Cape Town, Cape Town: 197 pp.

Marker, M.E. & Holmes, P.J. 1999. Laterisation on limestones of the Tertiary Wankoe Formation and its relationship to the African Surface, southern Cape, South Africa. Catena 38: 1-21.

Pether, J & Archer, W. 2012. Reconnaissance of Early Stone Age Artefact Context (Review And Field Observations). Proposed Developments On Farm Brakkloof 443 Portions 59, 62 & 63, Plettenberg Bay, Western Cape. For Heritage Western Cape, Case ID 1136: 31 pp.

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9 APPENDIX 1. PALAEONTOLOGICAL SENSITIVITY RATING

Palaeontological Sensitivity refers to the likelihood of finding significant fossils within a geologic unit.

VERY HIGH: Formations/sites known or likely to include vertebrate fossils pertinent to human ancestry and palaeoenvironments and which are of international significance.

HIGH: Assigned to geological formations known to contain palaeontological resources that include rare, well-preserved fossil materials important to on-going palaeoclimatic, palaeobiological and/or evolutionary studies. Fossils of land-dwelling vertebrates are typically considered significant. Such formations have the potential to produce, or have produced, vertebrate remains that are the particular research focus of palaeontologists and can represent important educational resources as well.

MODERATE: Formations known to contain palaeontological localities and that have yielded fossils that are common elsewhere, and/or that are stratigraphically long-ranging, would be assigned a moderate rating. This evaluation can also be applied to strata that have an unproven, but strong potential to yield fossil remains based on its stratigraphy and/or geomorphologic setting.

LOW: Formations that are relatively recent or that represent a high-energy subaerial depositional environment where fossils are unlikely to be preserved, or are judged unlikely to produce unique fossil remains. A low abundance of invertebrate fossil remains can occur, but the palaeontological sensitivity would remain low due to their being relatively common and their lack of potential to serve as significant scientific resources. However, when fossils are found in these formations, they are often very significant additions to our geologic understanding of the area. Other examples include decalcified marine deposits that preserve casts of shells and marine trace fossils, and fossil soils with terrestrial trace fossils and plant remains (burrows and root fossils)

MARGINAL: Formations that are composed either of volcaniclastic or metasedimentary rocks, but that nevertheless have a limited probability for producing fossils from certain contexts at localized outcrops. Volcaniclastic rock can contain organisms that were fossilized by being covered by ash, dust, mud, or other debris from volcanoes. Sedimentary rocks that have been metamorphosed by the heat and pressure of deep burial are called metasedimentary. If the meta sedimentary rocks had fossils within them, they may have survived the metamorphism and still be identifiable. However, since the probability of this occurring is limited, these formations are considered marginally sensitive.

NO POTENTIAL: Assigned to geologic formations that are composed entirely of volcanic or plutonic igneous rock, such as basalt or granite, and therefore do not have any potential for producing fossil remains. These formations have no palaeontological resource potential.

Adapted from Society of Vertebrate Paleontology. 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources - Standard Guidelines. News Bulletin, Vol. 163, p. 22-27.

10 APPENDIX 2. DECLARATION OF INDEPENDENCE

BRIEF PALAEONTOLOGICAL ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT ON ERF 3927, STILL BAY WEST

HESSEQUA MUNICIPALITY, RIVERSDALE DISTRICT

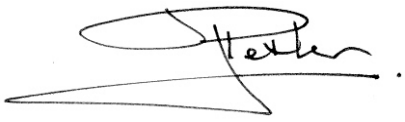
Terms of Reference

This assessment forms part of the Heritage Assessment and it assesses the overall palaeontological (fossil) sensitivities of formations underlying the Project Area.

Declaration

I …**John Pether**……, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in the compilation of the above report;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have any vested interest in the proposed activity proceeding;
- have disclosed to the EAP any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management act;
- have provided the EAP with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.



Signature of the specialist

Date: 30 October 2021

11 APPENDIX 3. CURRICULUM VITAE

John Pether, M.Sc., Pr. Sci. Nat. (Earth Sci.)

Independent Consultant/Researcher recognized as an authority with 38 years' experience in the field of coastal-plain and continental-shelf palaeoenvironments, fossils and stratigraphy, mainly involving the West Coast/Shelf of southern Africa. Has been previously employed in academia (South African Museum) and industry (Trans Hex, De Beers Marine). At present an important involvement is in Palaeontological Impact Assessments (PIAs) and mitigation projects in terms of the National Heritage Resources Act 25 (1999) (~300 PIA reports to date) and is an accredited member of the Association of Professional Heritage Practitioners (APHP). Continues to be involved as consultant to offshore and onshore marine diamond exploration ventures. Expertise includes:

- Coastal plain and shelf stratigraphy (interpretation of open-pit exposures, on/offshore cores and exploration drilling).
- Sedimentology and palaeoenvironmental interpretation of shallow marine, aeolian and other terrestrial surficial deposits.
- Marine macrofossil taxonomy (molluscs, barnacles, brachiopods) and biostratigraphy.
- Marine macrofossil taphonomy.
- Sedimentological and palaeontological field techniques in open-cast mines (including finding and excavation of vertebrate fossils (bones).

Membership of Professional Bodies

- South African Council of Natural Scientific Professions. Earth Science. Reg. No. 400094/95.
- Geological Society of South Africa.
- Palaeontological Society of Southern Africa.
- Southern African Society for Quaternary Research.
- Association of Professional Heritage Practitioners (APHP), Western Cape. Accredited Member No. 48.

Past Clients Palaeontological Assessments

AECOM SA (Pty) Ltd.	Guillaume Nel Environmental Management Consultants.
Agency for Cultural Resource Management (ACRM).	Klomp Group.
AMATHEMBA Environmental.	Megan Anderson, Landscape Architect.
Anél Blignaut Environmental Consultants.	Ninham Shand (Pty) Ltd.
Arcus Gibb (Pty) Ltd.	PD Naidoo & Associates (Pty) Ltd.
ASHA Consulting (Pty) Ltd.	Perception Environmental Planning.
Aurecon SA (Pty) Ltd.	PHS Consulting.
BKS (Pty) Ltd. Engineering and Management.	Resource Management Services.
Bridgette O'Donoghue Heritage Consultant.	Robin Ellis, Heritage Impact Assessor.
Cape Archaeology, Dr Mary Patrick.	Savannah Environmental (Pty) Ltd.
Cape EAPrac (Cape Environmental Assessment Practitioners).	Sharples Environmental Services cc
CCA Environmental (Pty) Ltd.	Site Plan Consulting (Pty) Ltd.
Centre for Heritage & Archaeological Resource Management (CHARM).	SRK Consulting (South Africa) (Pty) Ltd.
Chand Environmental Consultants.	Strategic Environmental Focus (Pty) Ltd.
CK Rumboll & Partners.	UCT Archaeology Contracts Office (ACO).
CNdV Africa	UCT Environmental Evaluation Unit
CSIR - Environmental Management Services.	Urban Dynamics.
Digby Wells & Associates (Pty) Ltd.	Van Zyl Environmental Consultants
Enviro Logic	Western Cape Environmental Consultants (Pty) Ltd, t/a ENVIRO DINAMIK.
Environmental Resources Management SA (ERM).	Wethu Investment Group Ltd.
Greenmined Environmental	Withers Environmental Consultants.

Stratigraphic consulting including palaeontology

Afri-Can Marine Minerals Corp	Council for Geoscience
De Beers Marine (SA) Pty Ltd.	De Beers Namaqualand Mines.
Geological Survey Namibia	IZIKO South African Museum.
Namakwa Sands (Pty) Ltd	NAMDEB