

# **PALAEONTOLOGICAL ASSESSMENT: RECOMMENDED EXEMPTION FROM FURTHER PALAEONTOLOGICAL STUDIES**

## **PROPOSED LUXURY RESORT AT SPRINGBOKOOG NEAR VANWYKSVLEI, KAREEBERG LOCAL MUNICIPALITY, NORTHERN CAPE**

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### **Executive summary**

The proposed luxury resort will be situated on the Remaining Extent of Farm 27 Springbokoog, c. 28 km northwest of Vanwyksvlei in the Kareeberg Municipality of the Northern Cape. The great majority of the development, including the resort itself, will overlie unfossiliferous dolerite bedrocks of no palaeontological significance. Very small areas of Late Caenozoic superficial sediments (e.g. alluvium, scree) will be impacted by other infrastructure, such as the reed bed waste water treatment system, but these sediments are only sparsely fossiliferous at most. Potentially fossiliferous mudrocks of the Prince Albert Formation (Ecca Group) will not be directly impacted by the proposed development. In view of the very small development footprint and the very low palaeontological sensitivity of the study region, no further specialist studies or mitigation are considered necessary for this luxury resort project as far as fossil heritage is concerned. However, should substantial fossil remains (e.g. vertebrate bones and teeth) be encountered during construction, the responsible ECO should inform SAHRA at the earliest opportunity to consider possible mitigation measures.

### **1. Project description**

It is proposed to develop a luxury resort on the Remaining Extent of Farm 27 Springbokoog, situated c. 28 km northwest of Vanwyksvlei in the Kareeberg Municipality of the Northern Cape (Fig. 1). The resort will consist of a tented lodge of approximately 400 m<sup>2</sup> comprising a dining area, kitchen, bar and possibly a spa as well as sixteen tented guest units. The development and walkways will be built on posts to limit the impact to the environment to the absolute minimum. The kitchen will most probably straddle a drainage line. A small wall will be built on either side with a concrete slab on top of it. Associated infrastructure will include a parking area, four water storage tanks, and water pipeline, a sewage system including reed bed waste water treatment systems (WWTW), a general waste area, batteries, a generator and photovoltaic panels for electricity. No site clearing will be carried out apart from the two parking areas.

This report will contribute to the HIA for the proposed development that is being co-ordinated on behalf of the developer by Van Zyl Environmental Consultants CC (P.O. Box 567, UPINGTON, 8800. Mobile: 072 222 6194. Telephone: 054 338 0722. Facsimile: 086 624 0306. Email: ibvanzyl@telkomsa.net). A Letter of Exemption for the associated airstrip development has previously been submitted by Almond (2010). The SAHRA APM Unit has subsequently requested that a letter from a qualified palaeontologist be submitted confirming that there is no need for further palaeontological studies for the proposed development (Case ID 10137, Interim Comment Thursday October 20, 2016).



Figure 1. Google earth© satellite image showing the outline of the study area on the Remaining Extent of Farm 27 Springbokoog, c. 28 km northwest of Vanwyksvlei, Northern Cape (red polygon) as well as the location of the various infrastructural components connected with the proposed luxury resort (See arrow for location of the resort itself).

## 2. Geological context

According to the 1: 250 000 scale geological map sheet 3020 Sakrivier (Siebrits, 1989, Council for Geoscience, Pretoria) (Fig. 2) the study area for the proposed luxury resort and associated infrastructure at Springbokoog near Vanwyksvlei is almost entirely underlain by Early Jurassic dolerites of the **Karoo Dolerite Suite** (c. 182-183 million years old). An extensive dolerite sill here builds a deeply-dissected rocky plateau at elevations of around 1060-1080 m amsl. The plateau, on whose northern edge the resort will be sited, faces northwards across an ancient (Tertiary) palaeovalley known as the Carnarvonleegte (*cf* Almond 2008 and refs. therein). The valley floor and lower plateau slopes are built of Early Permian basinal mudrocks of the **Prince Albert Formation** (Ecca Group, Karoo Supergroup) (Siebrits 1989, Johnson *et al.* 2006). The Palaeozoic bedrocks here are largely mantled with much younger, Late Caenozoic **superficial sediments** of Neogene to Recent age. Away from the main drainage courses these largely comprise surface gravels (mainly alluvial, sheetwash and deflation deposits), scree breccias derived from local elevated exposures of bedrock, reddish aeolian and locally-derived sands and perhaps near-surface calcretes, the last especially over lime-rich bedrock. The red sands may in part be assigned to the upper part of the **Kalahari Group (Gordonia Formation)** of late Caenozoic (Neogene / Quaternary) age and the remaining alluvial sediments and probably of a similar, geological youthful age (Partridge *et al.* 2006).

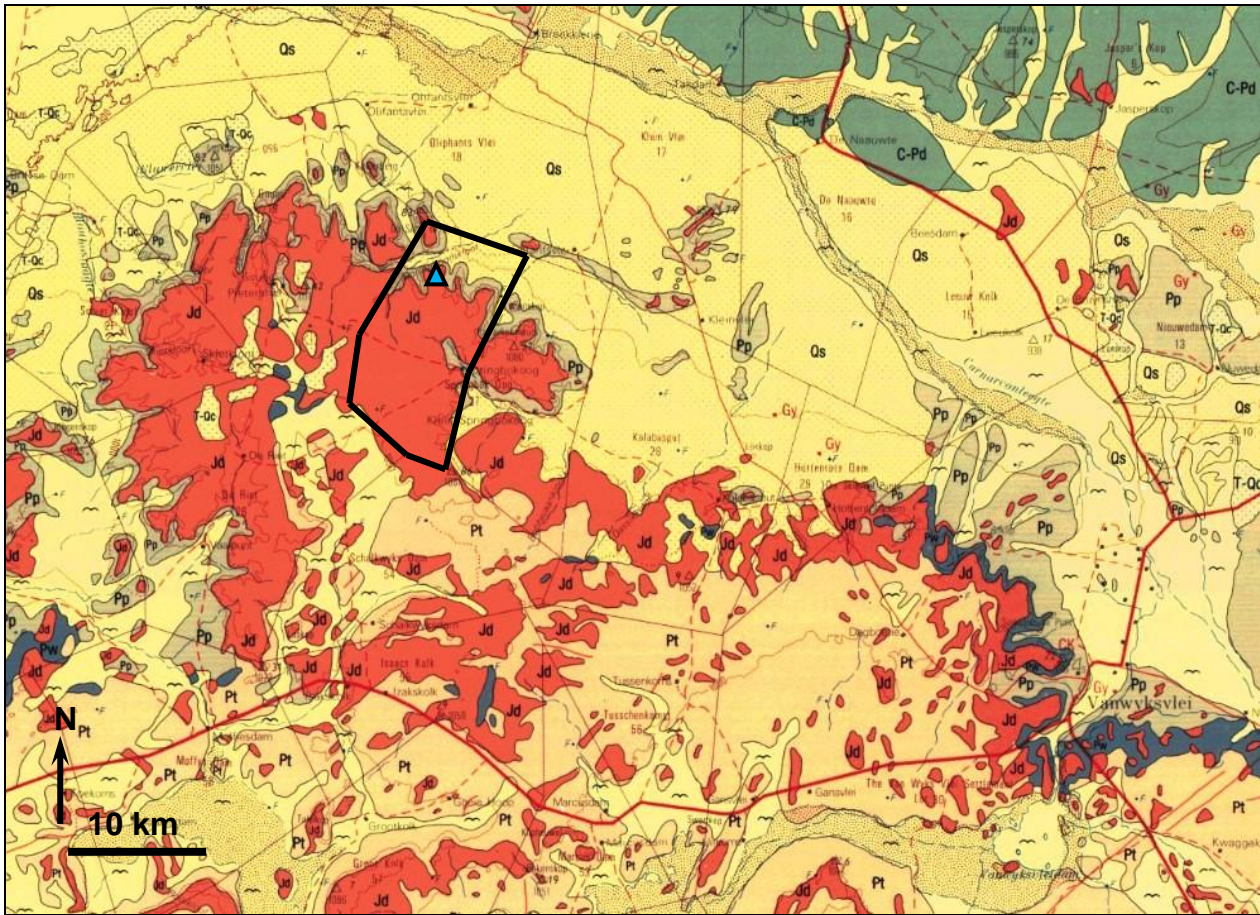
The great majority of the infrastructure concerned with the proposed luxury resort is located on the dolerite plateau (Figs. 1 & 2). The reedbed waste water treatment system on the lower plateau slopes as well as possible staff accommodation (Alternative 2) overlie superficial Late Caenozoic sediments.

## 3. Palaeontological heritage

The **Karoo Dolerites** underlying the greater part of the proposed development are intrusive igneous rocks that are entirely unfossiliferous.

Elsewhere in southern Africa Early Permian basinal mudrocks of the **Prince Albert Formation** (Lower **Ecca Group**) have yielded low diversity marine invertebrates (bivalves, nautiloids, brachiopods), palaeoniscoid fish, sharks, fish coprolites, protozoans (foraminiferans, radiolarians), petrified wood, palynomorphs (spores, acritarchs), a variety of non-marine trace fossils (especially arthropods, fish, also various “worm” burrows), possible stromatolites, and oolites (Siebrits 1989, Almond 2008, Almond & Pether 2008). The potentially fossiliferous bedrocks are unlikely to be directly impacted by the proposed development, however.

Fossil remains are occasionally encountered in the overlying Late Caenozoic fluvial and terrestrial units – for example reworked mammalian bones and teeth, freshwater molluscs, calcretised root casts, termitaria, ostrich egg shells and land snail shells (Almond 2008, Almond & Pether 2008 and refs. therein). However, these fossils tend to be sparsely distributed and occur over a very wide area, so the chances of serious impacts on unique fossil heritage resources here are only slight, especially given the very small footprint of the proposed development.



**Figure 2. Extract from 1: 250 000 sheet 3020 Sakrivier (Council for Geoscience, Pretoria) showing the geology of the luxury resort study area on the Remaining Extent of Farm 27 Springbokoo, c. 28 km NW of Vanwyksvlei, Northern Cape. The great majority of the proposed infrastructure, including the resort itself (blue triangle), will be underlain by unfossiliferous Early Jurassic dolerite (Jd, red). The lower slopes of the plateau are built of Prince Albert Formation (Ecca Group) mudrocks (Pp, grey) that will not be directly impacted by the development. Small areas of Quaternary sandy and gravelly sediments of the Kalaharo Group (Qs, yellow) underlie the reed bed WWTW and Alternative 2 staff housing sites.**

#### **4. Conclusions & recommendations**

In view of (1) the low palaeontological sensitivity of both the Karoo dolerites bedrocks underlying the greater part of the luxury resort as well as of the geologically recent superficial sediments in lower-lying areas (e.g. reed bed WWTW) and (2) the very small development footprint, the proposed luxury resort is not considered to pose a significant threat to local palaeontological heritage.

**Pending any significant new fossil discoveries in the area, no further specialist studies or mitigation are considered necessary for this luxury resort project.**

All South African fossil heritage is protected by the National Heritage Resources Act, 1999. Should substantial fossil remains - such as vertebrate bones and teeth, or petrified logs of fossil wood - be encountered at surface or exposed during construction, the ECO should safeguard these, preferably *in situ*. They should then alert the relevant provincial heritage management authority as soon as possible - i.e. SAHRA (Contact details: Dr Ragna Redelstorff, SAHRA, P.O. Box 4637, Cape Town 8000. Tel: 021 202 8651. Email: rredelstorff@sahra.org.za). This is to ensure that

appropriate action (*i.e.* recording, sampling or collection of fossils, recording of relevant geological data) can be taken by a professional palaeontologist at the developer's expense.

These mitigation recommendations should be incorporated into the Environmental Management Programme (EMPr) for this luxury resort project. Please note that:

- All South African fossil heritage is protected by law (South African Heritage Resources Act, 1999) and fossils cannot be collected, damaged or disturbed without a permit from SAHRA or the relevant Provincial Heritage Resources Agency;
- The palaeontologist concerned with potential mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (*e.g.* museum or university collection);
- All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (*e.g.* data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies developed by SAHRA (2013).

#### **4. References**

ALMOND, J.E. 2008. Fossil record of the Loeriesfontein sheet area (1: 250 000 geological sheet 3018). Unpublished report for the Council for Geoscience, Pretoria, 32 pp.

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JOHNSON, M.R., VAN VUUREN, C.J., VISSER, J.N.J., COLE, D.I., WICKENS, H. DE V., CHRISTIE, A.D.M., ROBERTS, D.L. & BRANDL, G. 2006. Sedimentary rocks of the Karoo Supergroup. In: Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (eds.) The geology of South Africa, pp. 461-499. Geological Society of South Africa, Johannesburg & the Council for Geoscience, Pretoria.

PARTRIDGE, T.C., BOTHA, G.A. & HADDON, I.G. 2006. Cenozoic deposits of the interior. In: Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.) The geology of South Africa, pp. 585-604. Geological Society of South Africa, Marshalltown.

SAHRA 2013. Minimum standards: palaeontological component of heritage impact assessment reports, 15 pp. South African Heritage Resources Agency, Cape Town.

SIEBRITS, L.B. 1989. Die geologie van die gebied Sakrivier. Explanation of 1: 250 000 geology sheet 3020, 19 pp. Council for Geoscience, Pretoria.

## 5. Qualifications & experience of the author

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral research fellowships at Cambridge University and in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape, Limpopo, Mpumalanga, Northwest and Free State under the aegis of his Cape Town-based company *Natura Viva cc*. He was a long-standing member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHP (Association of Professional Heritage Assessment Practitioners – Western Cape).

### Declaration of Independence

I, John E. Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.



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