

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

## **Proposed Photovoltaic Solar Plant on the Farm Rooipad No. 15 near Augrabies, Northern Cape Province**

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### **Executive summary**

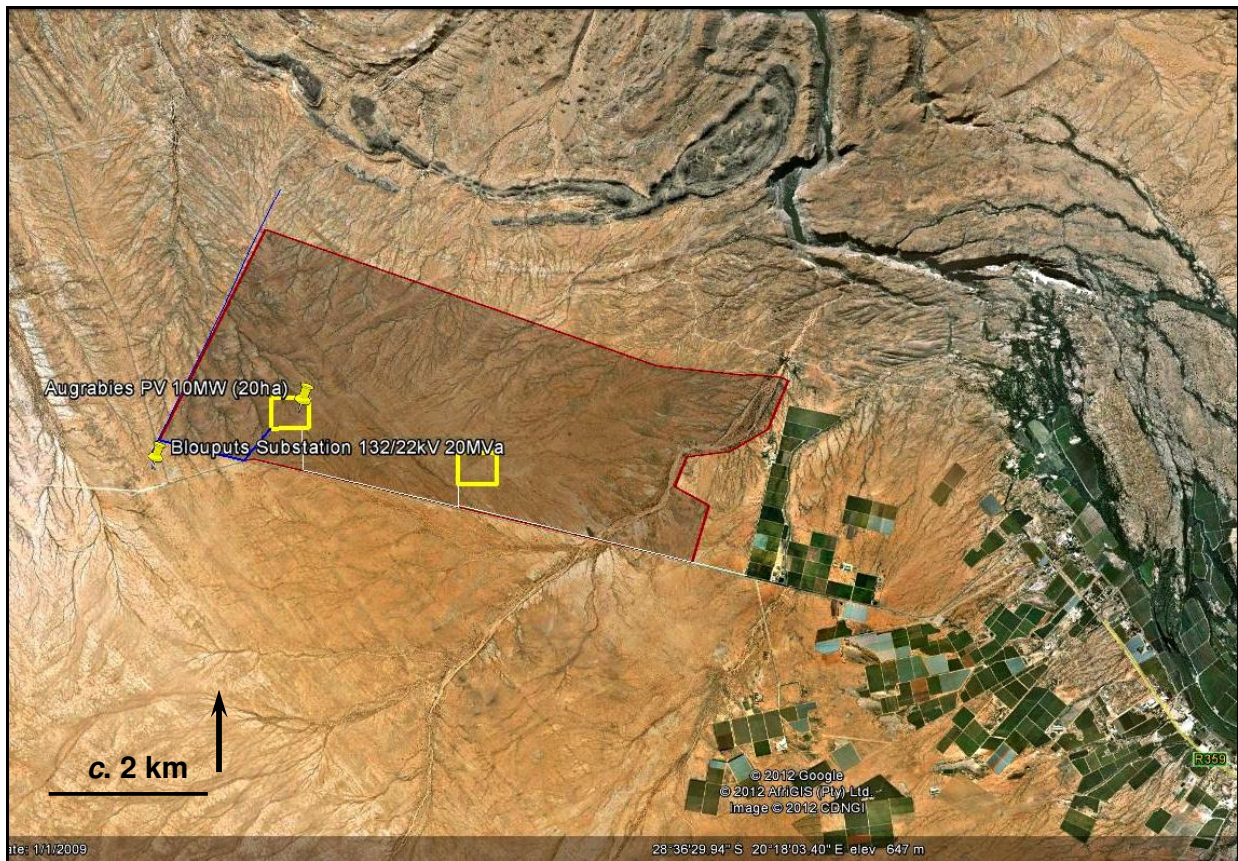
The proposed small solar plant development near Augrabies, 2 to 5 km south of the River Orange, Northern Cape, is underlain by (1) ancient Precambrian igneous and metamorphic bedrocks that do not contain fossils as well as (2) sparsely fossiliferous or unfossiliferous superficial sediments of probable Quaternary to Recent age. In view of the very low palaeontological sensitivity of the study region, no further specialist studies or mitigation are considered necessary for this project as far as fossil heritage is concerned. Neither of the alternative development options is preferred on palaeontological heritage grounds. 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**

The company Mulilo Renewable Energy Pty Ltd is proposing to construct a 10 Megawatt Photovoltaic (PV) Solar Energy Generation Facility close to the Blouputs Electrical substation near Augrabies in the Kai! Garib Local Municipal area (Siyanda District Municipality) Northern Cape Province. The study area on Portion 9 of the Farm Rooipad No. 15 is located about 37 km northwest of the small town of Kakamas, just north of the R359 tar road and within 2 to 5 km of the Orange River (Fig. 1).

The proposed solar generation facility would consist of an array of black coloured panels up to three metres high covering an area of less than 20 hectares. Two alternative sites are currently under consideration (See Fig. 1). Additional infrastructure includes a short access road, internal roads, a small office and car park, a 22 kV transmission line connecting to an existing line running to the nearby Blouputs Substation, and a possible irrigation pipeline.

A basic assessment for this alternative energy proposal is being co-ordinated by Rosenthal Environmental (Postnet 114, P/Bag X18, Rondebosch, 7701; Tel/fax (021) 685 4500; Email mail@PhilipRosenthal.com).



**Figure 1. Google earth© satellite image showing the proposed study site on Farm Rooipad No. 15 c. 37 km NW of Kakamas and just south of the Augrabies Falls National Park, Orange River, Northern Cape. The two alternative sites for the PV solar energy plant are shown by small yellow rectangles (Image kindly provided by Rosenthal Environmental, Rondebosch).**

## 2. Geological context

Field photos and satellite images show an arid, sparsely-vegetated, fairly flat study area at 640-730m amsl that is mantled in orange-brown sandy soils and gravels and drained by numerous dendritic ephemeral stream systems. The geological setting of the proposed PV solar energy plant study area is shown on the 1: 250 000 geology sheet 2820 Upington (Fig. 2; Council for Geoscience, Pretoria) (Moen 2007). The underlying bedrocks are ancient Precambrian granite-gneisses such as the **Augrabies** and **Riemvasmaak Gneisses** of the **Namaqua-Natal Province** that are some 1.5 billion years old and entirely unfossiliferous (Cornell *et al.* 2006, Almond & Pether 2008).

The study area lies well away from the deeply-incised valley of the River Orange, so ancient (Tertiary - Quaternary) alluvial gravels of the Orange River system – which are known to be highly fossiliferous elsewhere (*e.g.* Partridge *et al.* 2006) are unlikely to be present here.

Superficial (drift) sediments away from the main drainage courses largely comprise surface gravels (mainly sheetwash and deflation deposits, scree breccias derived from local elevated exposures of bedrock), reddish aeolian and locally derived sands and 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 drift sediments and probably of a similar, geological youthful age. Although fossil remains are occasionally encountered in these terrestrial units – for example calcretised root casts, termitaria, ostrich egg shells, land snail shells (Almond 2008, Almond & Pether 2008 and refs. therein) - they

are sparsely distributed and occur over a very wide area, so the footprint of this project on palaeontological heritage preserved within these non-alluvial drift units would be very slight.

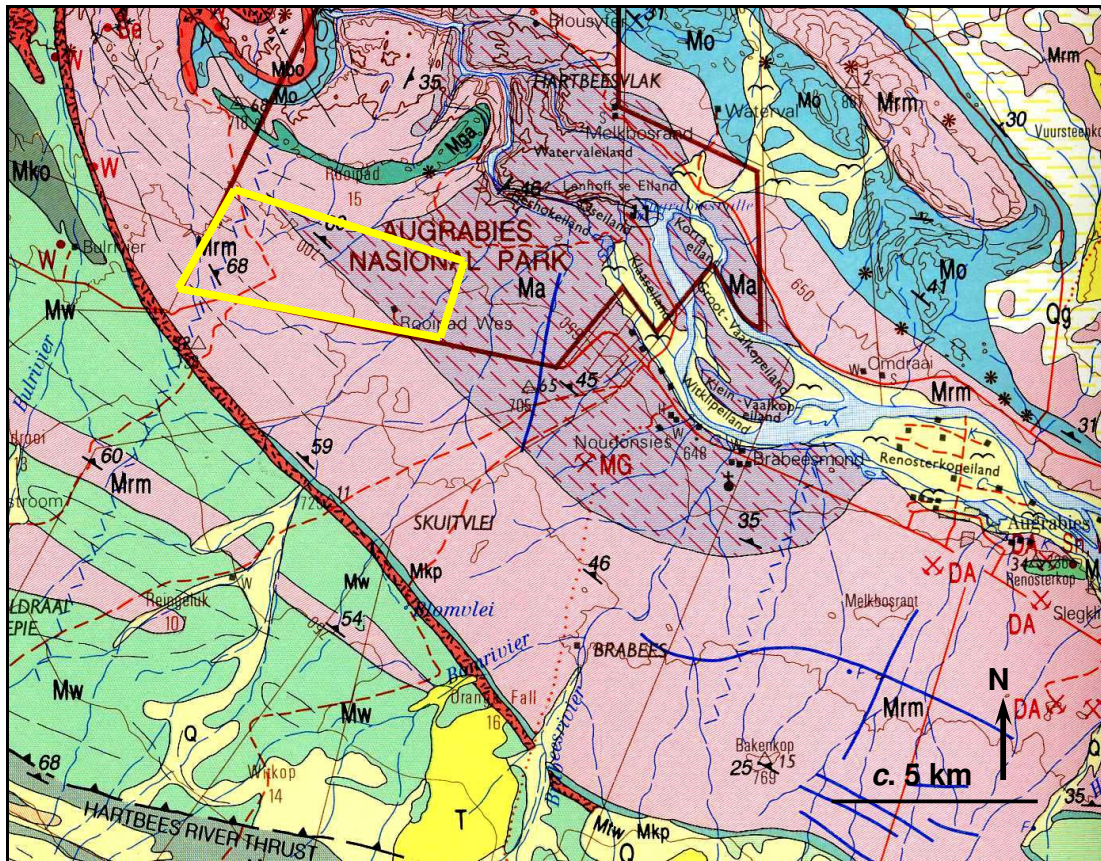


Fig. 2. Extract from 1: 250 000 sheet 2820 Upington (Council for Geoscience, Pretoria) showing the geology of the Augrabies study area (yellow rectangle) south of the Orange River and c. 37 km NW of Kakamas, Northern Cape. Bedrock units Ma (purple, Augrabies Gneiss) and Mrm (pink, Riemvasmaak Gneiss) beneath the study area are unfossiliferous Precambrian (Proterozoic) basement rocks of the Namaqua-Natal Metamorphic Province.

### 3. Conclusions & recommendations

In view of the low palaeontological sensitivity of both the ancient Precambrian bedrocks as well as the geologically recent superficial sediments along the Orange River in the Kakamas – Augrabies region, the proposed photovoltaic solar plant is not considered to pose a significant threat to palaeontological heritage. Neither of the alternative development options is preferred on palaeontological heritage grounds.

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

All South African fossil heritage is protected by the National Heritage Resources Act, 1999. 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.

#### 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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#### 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 under the aegis of his Cape Town-based company *Natura Viva* cc. He is 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, Limpopo, Gauteng and Free State 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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