

## **RECOMMENDED EXEMPTION FROM FURTHER PALAEOANTHROPOLOGICAL STUDIES:**

### **PROPOSED STELLA HELPMEKAR SOLAR ENERGY FACILITY, FARM HELPMEKAR 248 IN, DR RUTH SEGOMOTSI MOMPATI DISTRICT MUNICIPALITY, NORTH WEST PROVINCE**

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#### **1. OUTLINE OF PROPOSED DEVELOPMENT**

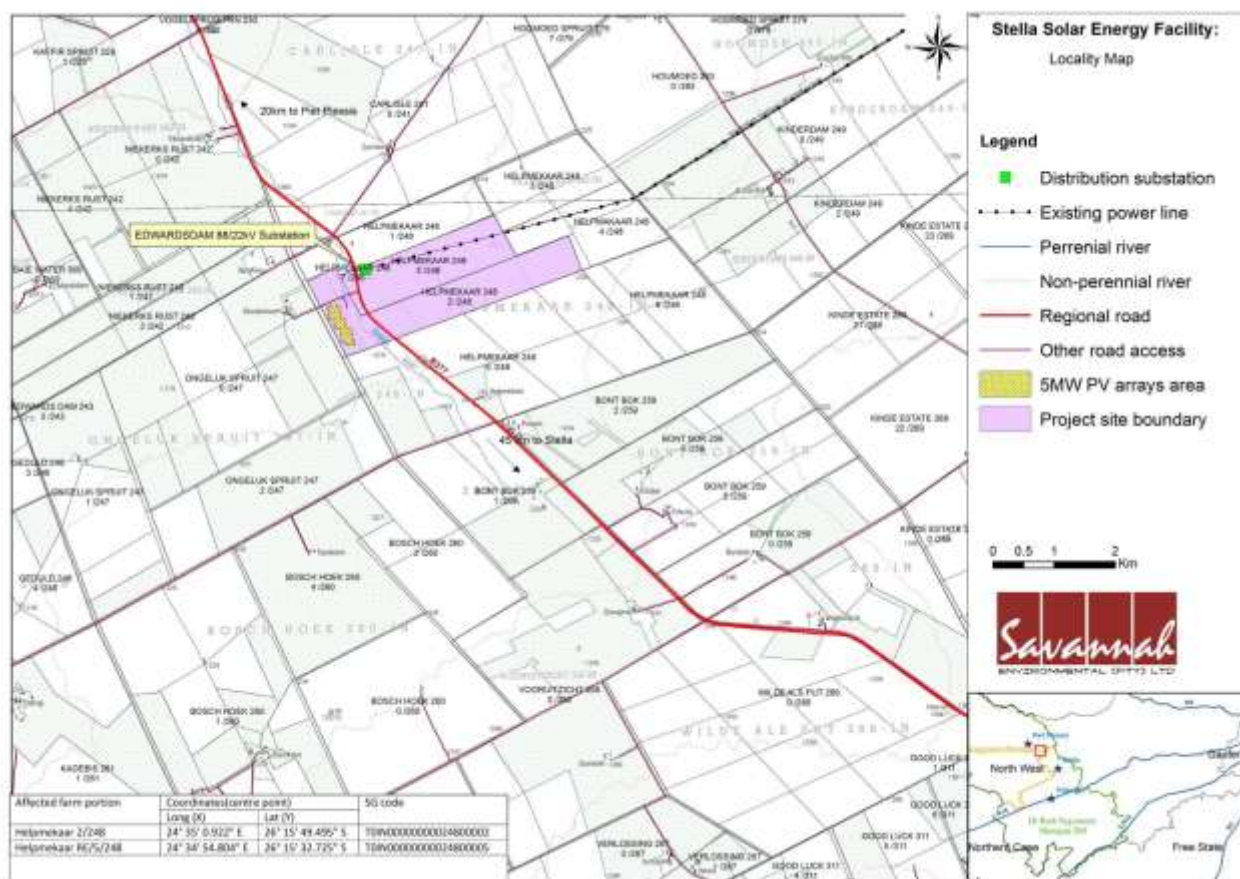
The company Bluewave Capital SA (Pty) Ltd is proposing to develop a photovoltaic solar energy facility, to be known as the Stella Helpmekaar Solar Energy Facility, at a site some 45 km northwest of the town of Stella, North West Province. The development footprint of less than 20 ha is to be located on Portion 2 of the Farm Helpmekaar 248 IN, Naledi Local Municipality within the broader Dr Ruth Segomotsi Mompoti District Municipality.

The study area is traversed by the R377 that subdivides the site into eastern and western portions. An area has been identified for the siting of the proposed PV facility to the west of the R377 and within 700 m of the Edwardsdam 88/22kV substation, into which feeds the Edwardsdam – Ferndale 88kV power line. The coordinates of the centre point of the site are: 26° 16' 08" S, 24° 34' 09" E (Fig. 1).

The main infrastructural components of the proposed PV solar energy facility include:

- PV array;
- Cabling between the project components, to be laid in trenches c. 1-2 m deep;
- Power inverters between the PV arrays ( $\pm 4.5 \text{ m}^2$ );
- Power lines to evacuate the power into the Eskom grid *via* the Edwardsdam substation;
- Internal access roads (up to 7 m wide);
- Water storage facilities / reservoirs ( $1\,000 \text{ m}^3$ );
- Office, workshop area for maintenance and storage ( $50 \text{ m}^2$ );
- Temporary infrastructure such as temporary housing and a laydown area (c. 1 ha) during construction.

This palaeontological heritage assessment comment for the proposed solar energy facility was commissioned by Heritage Contracts and Archaeological Consulting CC (HCAC) (Contact details: Mnr Jaco van der Walt. Postnet Suite No. 426, Private Bag X4, Wierda Park, 0149. E-mail: contracts.heritage@gmail.com. Tel: 012 771 3137. Fax: 086 691 6461).



**Figure 1: Map showing the location of the study site (pink polygon) for the proposed Stella Helpmekaar Solar Energy Facility, Farm Helpmekaar 248 IN, Dr Ruth Segomotsi Mompoti District Municipality, North West Province (Image kindly provided by Heritage Contracts and Archaeological Consulting CC).**

## 2. GEOLOGICAL BACKGROUND

The Stella Helpmekaar Solar Energy Facility study area is situated in very flat-lying terrain at c. 1220-1240 m amsl, either side of the R377 and c. 45 km northwest of Stella, North West Province (Fig. 1). The land is primarily agricultural. Satellite images show that there is little or no bedrock exposure on site, with the possible exceptions of occasional dams and diggings.

The geology of the study area near Stella is shown on 1: 250 000 geological map 2624 Vryburg (Council for Geoscience, Pretoria), for which a short sheet explanation has been published by Keyser and Du Plessis (1993) (Fig. 2). The study area is entirely underlain by Quaternary aeolian (wind-blown) sands of the **Gordonia Formation** (Kalahari Group) that in turn mantle Precambrian granitic basement rocks (Mosita Granite, Archaean) (Qg/Rmo, pale yellow areas in Fig. 2).

The geology of the Late Cretaceous to Recent Kalahari Group is reviewed by Thomas (1981), Dingle *et al.* (1983), Thomas & Shaw 1991, Haddon (2000) and Partridge *et al.* (2006). According to Keyser and Du Plessis (1993) the red and yellow fine-grained Gordonia sands in the Vryburg sheet area no longer retain their original dune topography. The sands are considered to range in age from the Late Pliocene / Early Pleistocene to Recent, dated in part from enclosed Middle to Later Stone Age stone tools (Dingle *et al.*, 1983, p. 291). Note that the recent extension of the Pliocene - Pleistocene boundary from 1.8 Ma back to 2.588 Ma would place the Gordonia Formation almost entirely within the Pleistocene Epoch.

### 3. PALAEOLOGICAL HERITAGE

The fossil record of the Kalahari Group is generally sparse and low in diversity (Almond & Pether 2008). The **Gordonia Formation** dune sands were mainly active during cold, drier intervals of the Pleistocene Epoch that were inimical to most forms of life, apart from hardy, desert-adapted species. Porous dune sands are not generally conducive to fossil preservation. However, mummification of soft tissues may play a role here and migrating lime-rich groundwaters derived from the underlying rocks may lead to the rapid calcification of organic structures such as animal burrows and root casts. Occasional terrestrial fossil remains that might be expected within this unit include calcified rhizoliths (root casts) and termitaria (e.g. *Hodotermes*, the harvester termite), ostrich egg shells (*Struthio*) and shells of land snails (e.g. *Trigonephrus*) (Almond 2008, Almond & Pether 2008). Other fossil groups such as freshwater bivalves and gastropods (e.g. *Corbula*, *Unio*) and snails, ostracods (seed shrimps), charophytes (stonewort algae), diatoms (microscopic algae within siliceous shells) and stromatolites (laminated microbial limestones) are associated with local watercourses and pans. Microfossils such as diatoms may be blown by wind into nearby dune sands (Du Toit 1954, Dingle *et al.*, 1983). These Kalahari fossils (or subfossils) can be expected to occur sporadically but widely, and the overall palaeontological sensitivity of the Gordonia Formation is therefore considered to be low.

The Stella Helpmekeer Solar Energy Facility study area near Stella, North West Province, is generally of LOW palaeontological sensitivity.

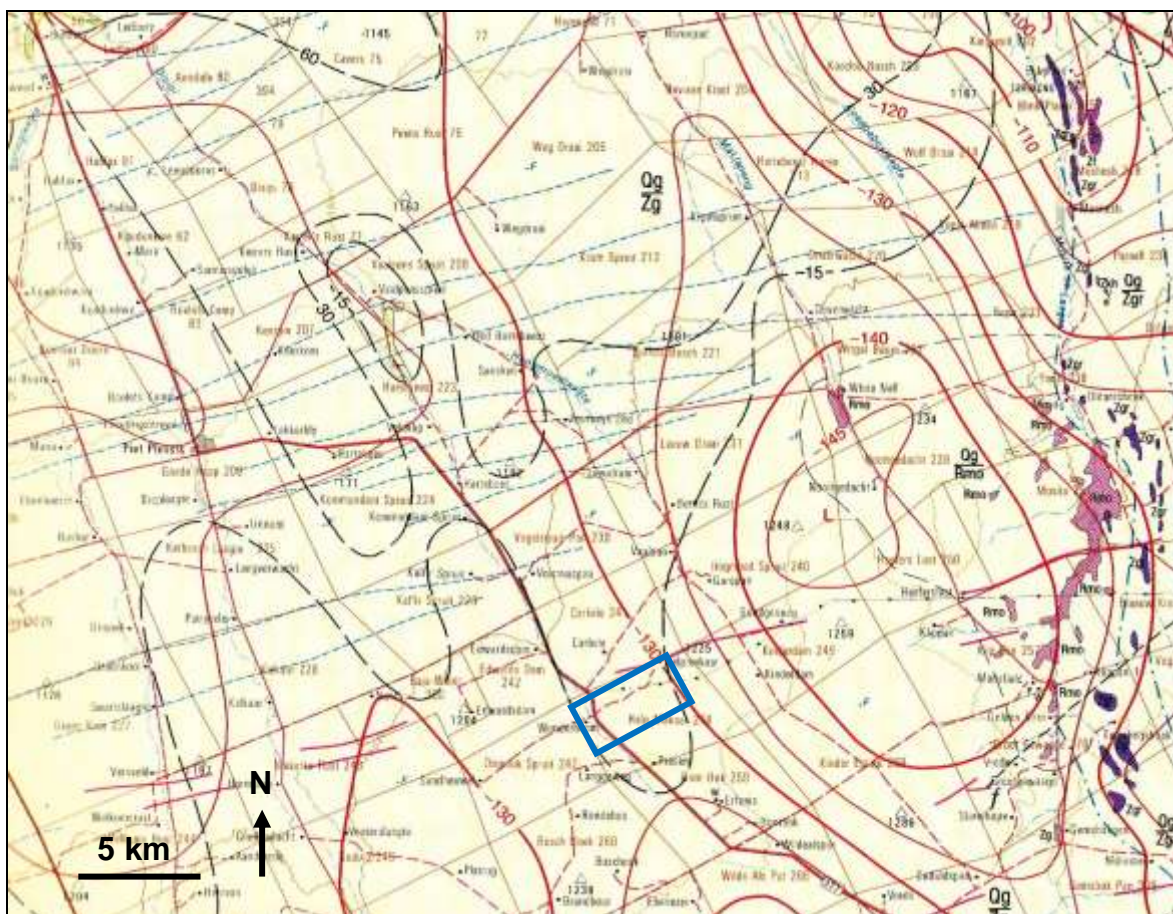
### 4. CONCLUSIONS & RECOMMENDATIONS

The study area of the proposed Stella Helpmekeer Solar Energy Facility near Stella, North West Province, is entirely underlain by unfossiliferous to sparsely fossiliferous aeolian sands of the Gordonia Formation (Kalahari Group) of probable Pleistocene age. The underlying Precambrian granite bedrocks are unfossiliferous.

The impact significance of the solar project development on local fossil heritage resources is considered to be LOW.

**It is therefore recommended that, pending the discovery of substantial new fossil remains during construction, exemption from further specialist palaeontological studies is granted for the proposed Stella Helpmekeer Solar Energy Facility.**

Any substantial fossil remains (e.g. plant remains, vertebrate bones, teeth) encountered during excavation should be reported to SAHRA (Contact details: Ms. Colette Scheermeyer, South African Heritage Resources Agency, 111 Harrington Street. P.O. Box 4637, Cape Town 8000. Tel: 021 462 4502. Email: cscheermeyer@sahra.org.za. Fax: +27 (0)21 462 4509. Web:www.sahra.org.za) for possible mitigation by a professional palaeontologist at the developers expense.



**Fig. 2. Extract from 1: 250 000 geology map 2624 Vryburg (Council for Geoscience, Pretoria) showing the approximate location of the study area for the proposed Stella Helpmekaar Solar Energy Facility near Stella, North West Province (blue rectangle). The study area is underlain by aeolian sands of the Gordonia Formation (Kalahari Group) overlying Archaean Mosita Granite bedrocks (Qg/Rmo, pale yellow areas)**

## 5. KEY REFERENCES

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## **6. 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 for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHP (Association of Professional Heritage 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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