RECOMMENDED EXEMPTION FROM FURTHER PALAEONTOLOGICAL STUDIES:

PROPOSED WOLMARANSSTAD MUNICIPALITY SOLAR ENERGY FACILITY, FARM WOLMARANSSTAD AND TOWNLANDS 184, DR KENNETH KAUNDA 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 of 75 MW generation capacity, to be known as the Wolmaransstad Municipality Solar Energy Facility, on the north-western outskirts of the town of Wolmaranasstad, North West Province. The development footprint of *c*. 450 ha is to be located on the Remainder of Portion 2 of the Farm Wolmaransstad and Townlands 184, Maquassi Hills Local Municipality and broader Dr Kenneth Kaunda District Municipality.

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

- PV panel array (fixed or tracking technology);
- Cabling between the project components, to be lain in trenches *c*. 1-2 m deep;
- Power inverters between the PV arrays (± 4.5 m^2);
- Power lines to evacuate the power into the Eskom grid *via* the Goat DS 132/88kV substation;
- Internal access roads (up to 7 m wide);
- Water storage facility / reservoir (1 000 m^3);
- Office, workshop area for maintenance and storage (50 m^2);
- Temporary infrastructure such as temporary housing during construction, construction laydown areas.

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).

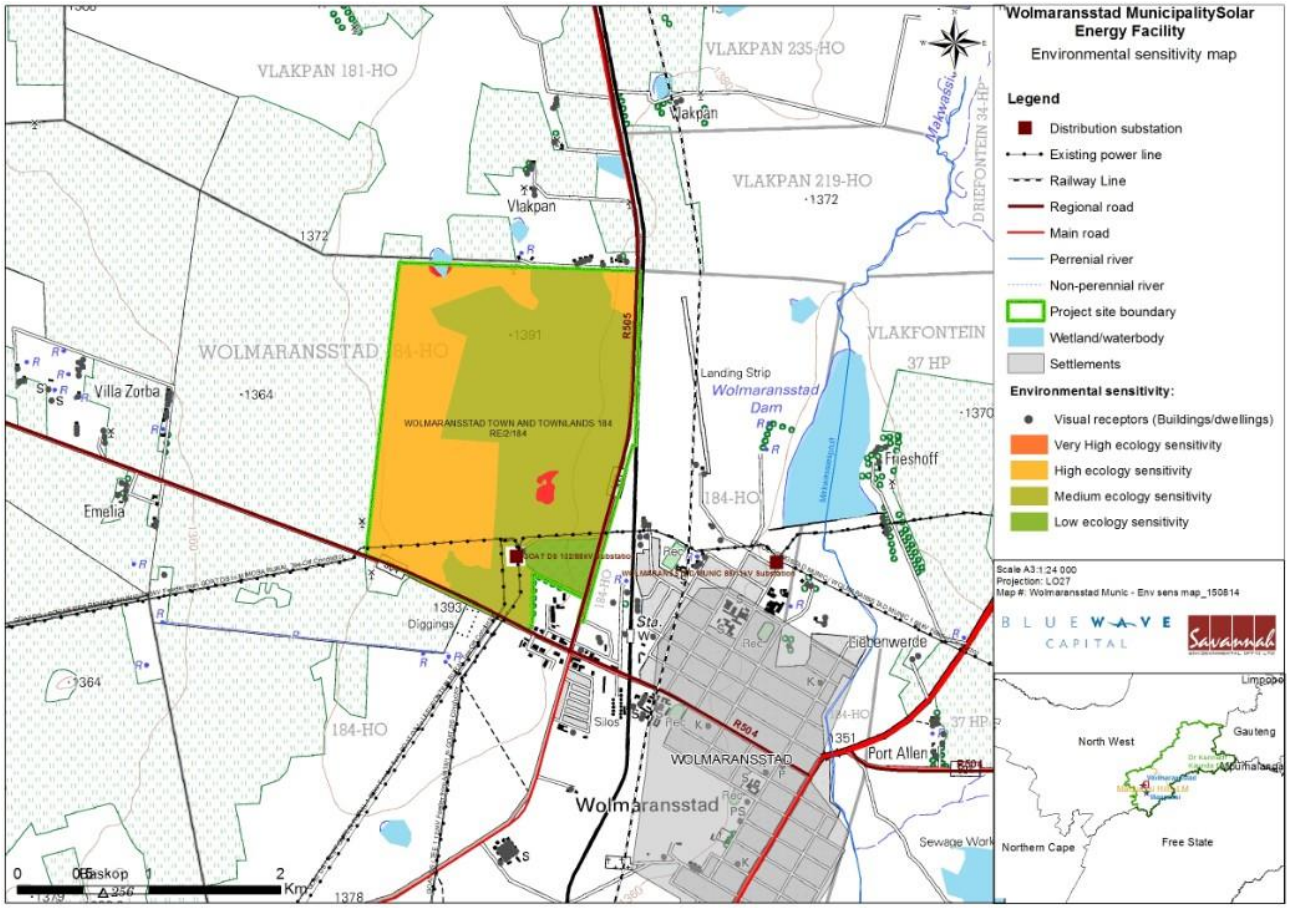

Figure 1: Map showing the location of the study site (green polygon) for the proposed 75MW Wolmaransstad Municipality Solar Energy Facility, Farms Wolmaransstad and Townlands 184 on the north-western outskirts of Wolmaransstad , Dr Kenneth Kaunda District Municipality, North West Province (Image kindly provided by Heritage Contracts and Archaeological Consulting CC).

2. GEOLOGICAL BACKGROUND

The Wolmaransstad Municipality Solar Energy Facility study area is situated in flat-lying terrain at *c*. 1380-1400 m amsl on the north-western outskirts of Wolmaransstad, west of the R505 to Ottosdal and north of the R504 to Schweizer-Reineke (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 Wolmaransstad is shown on 1: 250 000 geological map 2724 Christiana (Council for Geoscience, Pretoria), for which a short sheet explanation has been published by Schutte (1994) (Fig. 2). The study area is entirely underlain by various subunits of the predominantly volcanic Ventersdorp Supergroup of Archaean (early Precambrian) age.

The **Ventersdorp Supergroup** represents a major episode of igneous extrusion (LIP = Large Igneous Province) that is associated with fracturing of the Kaapvaal Craton some 2.7 Ga (billion years) ago. The basal lava pile termed the **Klipriviersberg Group** - mainly basaltic lavas welling up in fissure eruptions, totalling up to two kilometres thick and 100 000 km^2 in extent - accumulated over a comparatively short period of some six million years (McCarthy & Rubidge 2005). The overlying **Platberg Group** comprises a range of felsic to mafic volcanic rocks, including lavas and pyroclastics, such as the porphyritic felsites and pyroclastic flows of the **Makwassie Formation** (Schutte 1994, Van der Westhuizen *et al.* 2006). These igneous

rocks are associated with rift-related sediments, including colluvial, alluvial fan and lacustrine deposits, and are overlain by fluvial polymict conglomerates and quartzites of the Bothaville Formation. The **Rietgat Formation** at the top of the Platberg Group consists of intercalated volcanic rocks (basic to intermediate lavas, pyroclastics), shales and greywackes as well as chemical sediments (cherts, stromatolitic calcarenites) (Bleeker 1990, Van der Westhuizen *et al.* 2006).

3. PALAEONTOLOGICAL HERITAGE

The fossil record within the very ancient (Archaean / early Precambrian), predominantly volcanic Ventersdorp Supergroup succession is very limited but nevertheless of considerable palaeontological interest. Domical stromatolites (microbial mounds) are recorded from shallow water lacustrine calcarenites within the volcano-sedimentary succession of the **Rietgat Formation** at the top of the Platberg Group (Bleeker 1990, Schopf 2006, Van der Westhuizen *et al.* 2006). The overlying predominantly siliciclastic Bothaville Formation contains conical stromatolites (Schopf 2006). Potentially fossiliferous carbonate sediments are not reported in association with the Klipriviersberg Group and Makwassie Formation of the Ventersdorp Supergroup, however.

Although the Rietgat Formation is known for important Archaean stromatolite occurences, the Rietgat rocks represented in the Wolmaransstad study area are volcanic in origin (See V symbols in Fig. 2), as is the case with the other Ventersdorp Supergroup rocks here, and are therefore not fossiliferous. Late Caenozoic superficial deposits overlying the Precambrian bedrocks, such as downwasted gravels and soils, are generally unfossiliferous or, at most, sparsely fossiliferous (*e.g.* possible rare mammalian teeth and bones). The Wolmaransstad Municipality Solar Energy Facility study area near Wolmaranssrad is generally of LOW palaeontological sensitivity.

4. CONCLUSIONS & RECOMMENDATIONS

The study area of the proposed 75 MW Wolmaransstad Municipality Solar Energy Facility near Wolmaransstad, North West Province, is entirely underlain by unfossiliferous volcanic rocks of the Ventersdorp Group of early Precambrian age. These bedrocks are unlikely to be significantly impacted by the solar energy development since they are probably mantled by a blanket of superficial sediments (weathered regolith, soils) of very low palaeontological sensitivity.

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 Wolmaransstad Municipality Solar Energy Facility.

Any substantial fossil remains (*e.g.* stromatolites, fossil shells, petrified wood or 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.

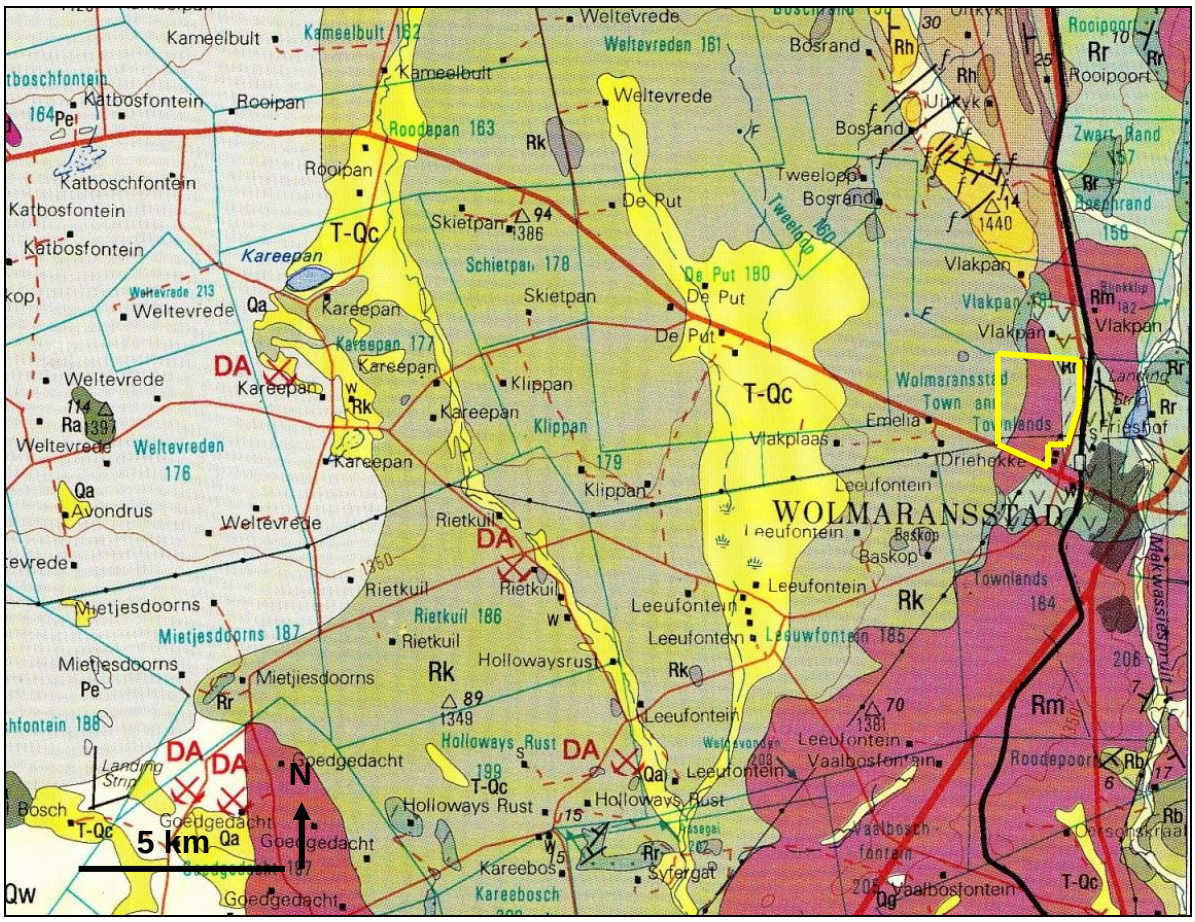

Fig. 2. Extract from 1: 250 000 geology map 2724 Christiana (Council for Geoscience, Pretoria) showing the location of the study area for the proposed Wolmaransstad Municipality Solar Energy Facility near Wolmaransstad, North West Province (yellow polygon). The study area is underlain by various subunits of the Precambrian (Archaean) Ventersdorp Supergroup including: Klipriviersberg Group (Rk, grey-green), Makwassie Formation (Rm, red) and Rietgat Formation (Rr, grey with V symbols = volcanic rocks).

5. KEY REFERENCES

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MCCARTHY, T. & RUBIDGE, B. 2005. The story of Earth and life: a southern African perspective on a 4.6-billion-year journey. 334pp. Struik, Cape Town.

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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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