PALAEONTOLOGICAL IMPACT ASSESSMENT OF THE PROPOSED OLIEN SOLAR PROJECT ON FARM 300, BARKLY WEST, NORTHERN CAPE PROVINCE

Prepared for:

Cape Environmental Assessment Practitioners (Pty) Ltd

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EXECUTIVE SUMMARY

A solar development is proposed by AE-AMD Renewable Energy (Pty) Ltd on Portion 4 of Farm 300, Barkly West in the Northern Cape Province. Due to the National Heritage Resources Act, a palaeontological impact assessment is required to detect the presence of fossil material at the proposed development. The development will affect superficial Quaternary landslide deposits only, which are generally not particularly fossiliferous. Fossils in Quaternary deposits are found only in gulleys and river beds, and due to the absence of such features in the proposed development area, the impact on the palaeontology at this site is negligible. Thus, subject to approval from the relevant authorities, the establishment of the proposed solar farm should proceed.

CONTENTS

1. INTRODUCTION

A 150 MW PV plant is proposed on 450 ha on Portion 4 of Farm 300, Barkly West in the Northern Cape Province. This development will involve excavating and will thus modify the existing topography. As palaeontological material is unique and non-renewable, it is protected by the National Heritage Resources Act (Act No. 25 of 1999, section 35). A Palaeontological Impact Assessment of the proposed development is thus necessary to ensure that palaeontological material is either removed, or is not present.

1.1 Objective

To conduct a desktop study on Portion 4 of Farm 300, Barkly West (Siyanga District Municipality, Kgatelopele Local Municipality, Northern Cape Province) to determine the impact on potential palaeontological material at this site.

2. BACKGROUND TO THE GEOLOGICAL AND PALAEONTOLOGICAL HISTORY

Farm 300, Barkly West, Northern Cape

Portion 4 of Farm 300 is an area of low relief (Figures 1 and 2). The geology of Farm 300 contains superficial deposits, which are Late Cenozoic (Quaternary [2.6 million years old] to Recent) in age (Walker and Geiss, 2009). Those on Farm 300 comprise Quaternary landslide deposits (Figure 3), which contain taxa from the Florisian Mammal Age. Most species of this time have modern counterparts, but there are some extinct animals such as the giant long-horned buffalo *Pelorovis* and the giant hartebeest, *Megalotragus*. The Florisian Mammal fauna includes mostly mammals such as lagomorphs, rodents, carnivores, perissodactyls, numerous artiodactyls and bovids. Amphibians, reptiles and birds are rarely found in Florisian deposits (Brink, 1987). Although the flatter areas containing these deposits generally contain few fossils, numerous quaternary fossils have been found in river gulleys.

3. NAME AND GEOGRAPHICAL LOCATION OF THE SITE

Olien Solar Farm: Portion 4 of Farm 300, Barkly West, Siyanda District Municipality, Kgatelopele Local Municipality, Northern Cape (28° 20′ 10.07″ S, 23° 37′ 50.51″ E), 14.86 km East of Lime Acres, 17.34 km South-South-East of Danielskuil and 120 km North-West of Kimberley.

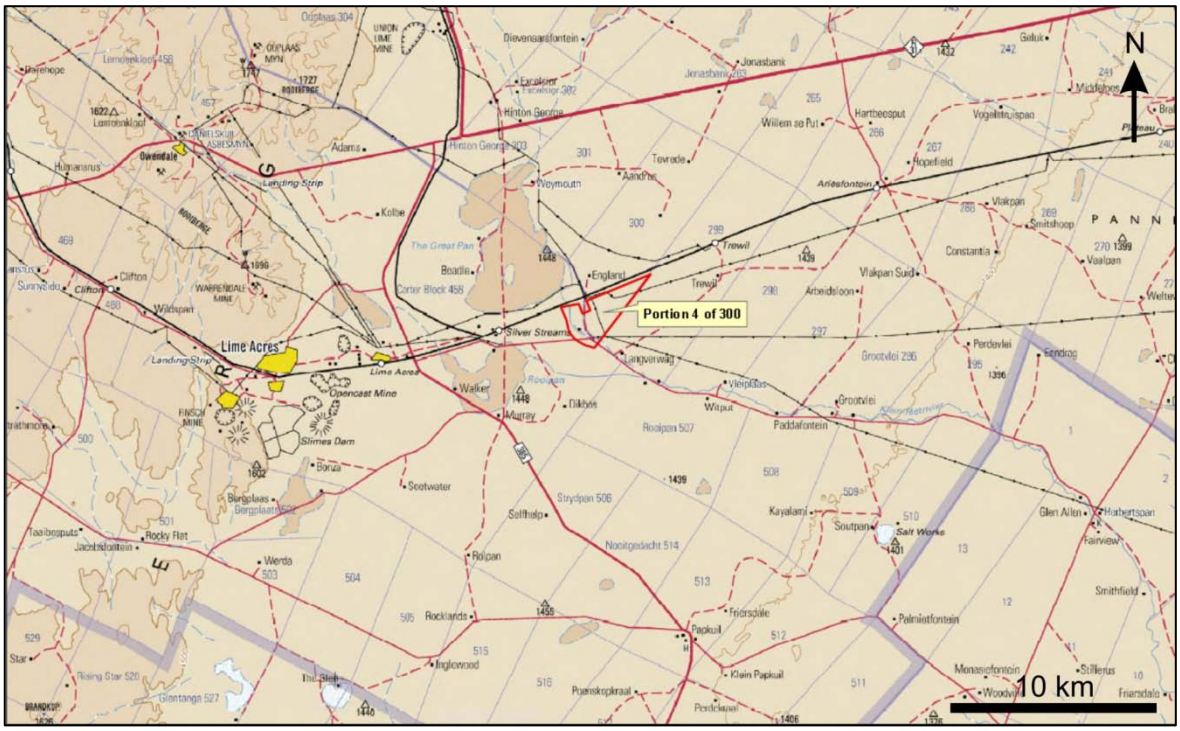

Figure 1. Topographical map of the proposed Olien Solar Farm on Portion 4 of Farm 300, Northern Cape (1: 50 000 map of Silver Streams 2823BC, Data source: Council for Geoscience, Pretoria).

Figure 2. Google Earth satellite image of Olien Solar Farm (white section bordered in yellow) on Portion 4 of Farm 300, Northern Cape Province, showing the low relief and disturbed nature of the environment.

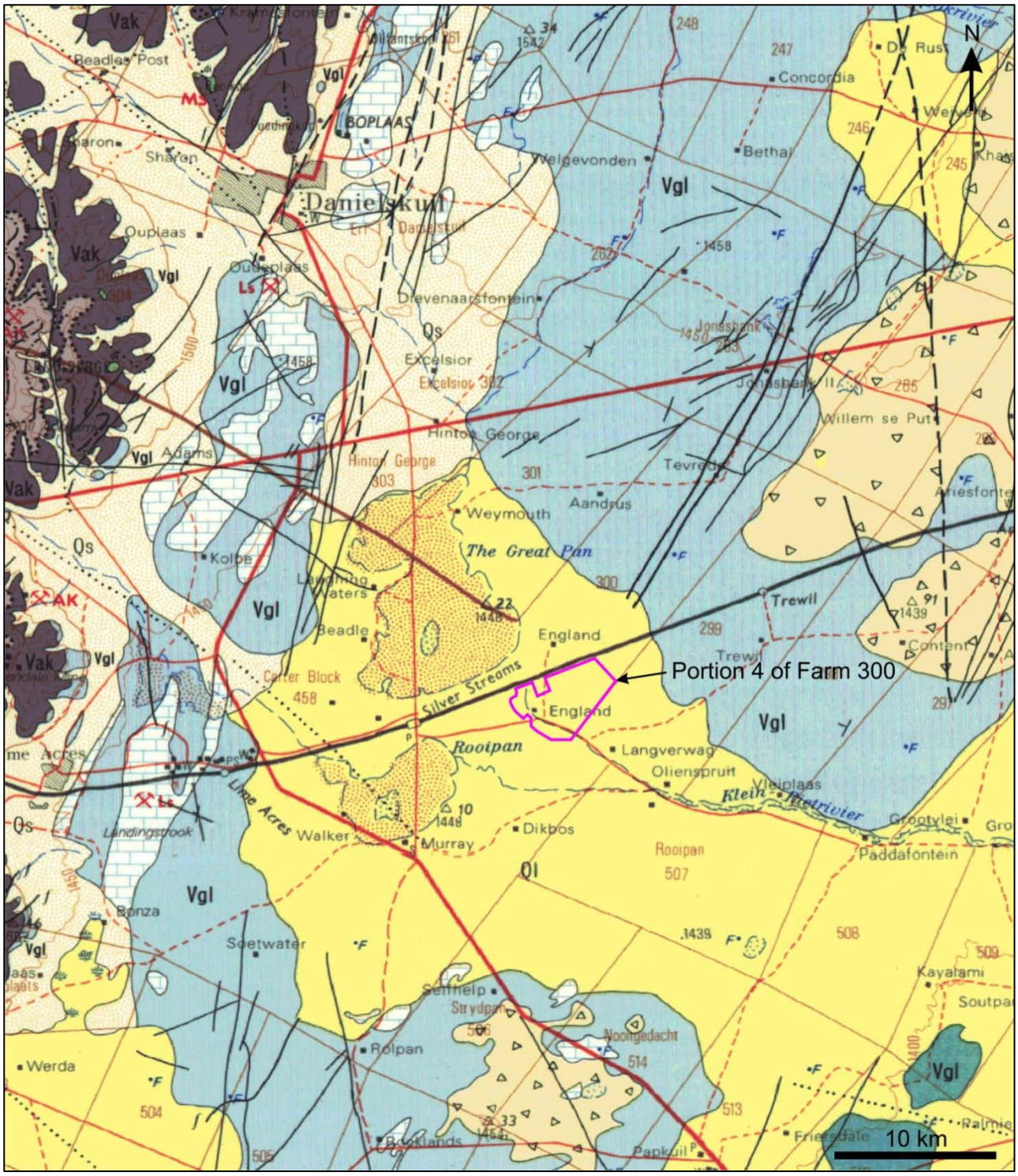

Figure 3. Geological map (1: 250 000, Posmasburg 2822), showing the geology of Portion 4 of Farm 300 (bordered in pink). Ql (pale yellow), Quaternary landslide deposits; Qs (speckled brown), Quaternary aeolian sand; Vgl (blue), Vaalian Ghaap Plateau Formation (non-fossiliferous) (Data Source: Council for Geoscience, Pretoria).

4. METHODS

A desktop study was conducted to assess the potential risk to palaeontological material (fossils, trace fossils) in the proposed areas of development. The author's experience, aerial photos (using Google, 2012), topographical and geological maps were used to assess the proposed area of development.

4.1 Assumptions and Limitations

The accuracy of desktop Palaeontological Impact Assessments may be limited by old fossil databases that have not been kept up-to-date or are not computerized and/or do not include pertinent locality or geological information, and the accuracy of geological maps where information may be based solely on aerial photographs and small areas of significant geology have been overlooked. Much of South Africa has not been studied palaeontologically due to there being so few palaeontologists in the field. As with most desktop studies, this PIA infers the presence of fossil heritage in the development area based on the presence of such heritage in the same rock units elsewhere.

5. FINDINGS AND RECOMMENDATIONS

Olien Solar Farm will affect areas on Portion 4 of Farm 300 that contain Quaternary landslide deposits. The low-lying relief, disturbed nature of the area and absence of potentially fossiliferous gulleys strongly suggest that fossils are absent from this farm. Considering the rarity of fossil-bearing sediments and lack of appropriate exposure (i.e. steep-sided gulleys) at the proposed site, the impact on palaeontological material on Portion 4 of Farm 300 is negligible (rated Low or negative).

Thus, pending the discovery of significant new fossil material at these sites, no further specialist studies are considered to be necessary.

It is recommended that:
The ECO responsible for the development must remain aware that all sedimentary deposits have the potential to contain fossils and he/she should thus monitor all substantial excavations into sedimentary bedrock for fossil remains;
In the case of any significant fossils (e.g. vertebrate teeth, bones, burrows, petrified wood) being found during construction, they must be safeguarded and the relevant heritage management authority (SAHRA) be informed so that a professional palaeontologist may be consulted in order to facilitate the necessary rescue operations.

5 REFERENCES

Brink, J. S. 1987. The archaeozoology of Florisbad, Orange Free State. Memoirs van die Nasionale Museum Bloemfontein 24: 1-151.

Walker, J. D. and J. W. Geissman. 2009. Geologic Time Scale. Geological Society of America.

QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Dr Jennifer Botha-Brink has an Honours Degree in Zoology and a PhD in Palaeontology from the University of Cape Town, South Africa. She has conducted extensive field work in South Africa for the past 14 years and currently holds the position of Head of the Karoo Palaeontology Department at the National Museum in Bloemfontein. Her current research interests comprise Permo-Triassic vertebrate palaeobiology, with a special focus on the end-Permian mass extinction. She is also trained in the specialized field of palaeohistology (the study of fossil bone microstructure). Dr Botha-Brink has published more than 30 scientific articles in both national and internationally accredited journals, has written several popular articles on palaeontology and is currently lecturing Zoology students in Vertebrate Evolution at the University of the Free State. Dr Botha-Brink began conducting palaeontological impact assessments for developments in 2011. She is currently the President of the Palaeontological Society of Southern Africa (PSSA) and is registered with the South African Heritage Resources Agency.

Declaration of Independence

I, Dr Jennifer Botha-Brink, 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 my objectivity in this work.

Sincerely,

Dr Jennifer Botha-Brink

Palaeontologist