

PALAEONTOLOGICAL SCREENING REPORT

PROPOSED OSBORNE PHOTOVOLTAIC FACILITY

***Hopetown, Northern Cape Province of South Africa
Farm: Wicklow 218 in the Thembelihle Local Municipality
within the Pixley ka Seme District Municipality***

Developer: SCATEC SOLAR SA (PTY) LTD



Consultant:

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EXECUTIVE SUMMARY

The development of a Photovoltaic (PV) Facility near Hopetown in the Northern Cape is an initiative of Scatec Solar SA (Pty) Ltd. Sustainable Development Projects cc (SPD), as part of the Heritage Impact Assessment, commissioned this Palaeontological Assessment. The purpose of this Palaeontological Screening is to identify potential palaeontological heritage on the site of the proposed development, to assess the impact the development may have on this resource and to make recommendations as to how this impact might be mitigated.

The proposed development site is on the farm Wicklow 218, located on the western side of the R385 road approximately 10 km north of Hopetown in the Northern Cape. The proposed photovoltaic centre is anticipated to produce up to 300 MW of electricity that will be fed into the Eskom power grid through the local Osborne sub-station. The installation's footprint is approximately 130 ha.

A basic assessment of the topography and geology of the area was made by using appropriate geological (1:250 000) maps in conjunction with Google Earth. A review of the literature on the underlying geological formation(s) and the fossils that have been associated with these geological strata was undertaken where after the palaeological significance was assessed.

The study area is underlain by Late Cretaceous Quaternary Calcrete deposits. Towards the south-west of the development footprint the lower lying areas of the Orange River consist of the Radian Allanridge and Bothaville Formation of the Venterdorp Supergroup.

There is a low possibility that fossils could be encountered during excavations within the development footprint. Therefore, fossils within the development site could be characterised as rare but with a low significant (See Table below). The exposure and subsequent reporting of fossils for removal will have a beneficial palaeontological impact.

Geological Unit	Rock Type and Age	Fossil Heritage	Palaeontological Sensitivity
Quaternary Calcrete	Fluvial gravels, sands, lacustrine and pan mudrocks, evaporites, aeolian sands, pedocretes (especially calcrete) LATE CRETACEOUS TO RECENT	Palynomorphs, root casts (rhizomorphs) and burrows (e.g. termitaria), rare vertebrate remains (mammals, fish, ostrich egg shell etc), diatom-rich limestones, freshwater stromatolites, freshwater and terrestrial shells (gastropods, bivalves), ostracods, charophytes.	Low sensitivity

It is recommended that an application for exemption from further palaeontological studies be made to SAHRA.

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1. INTRODUCTION

The development of a Photovoltaic (PV) Facility near Hopetown in the Northern Cape is an initiative of Scatec Solar SA (Pty) Ltd. Sustainable Development Projects cc (SPD), as part of the Heritage Impact Assessment, commissioned this Palaeontological Assessment. The purpose of this Palaeontological Screening is to identify potential palaeontological heritage on the site of the proposed development, to assess the impact the development may have on this resource and to make recommendations as to how this impact might be mitigated.

1.1. Legal Requirements

This report forms part of the Environmental Impact Assessment for the Osborne Photovoltaic (PV) Facility and complies with the requirements for the South African National Heritage Resource Act No 25 of 1999. In accordance with Section 38 (Heritage Resources Management), a Heritage Impact Assessment (HIA) is required to assess any potential impacts to palaeontological heritage within the development footprint.

Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act, and which therefore fall under its protection, include:

- geological sites of scientific or cultural importance;
- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; and
- objects with the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.

2. PROPOSED DEVELOPMENT DESCRIPTION

Scatec SA (Pty) Ltd, an international renewable energy generator that develops, finances, builds, operates and maintains commercial alternative energy generation facilities, plans to develop a photovoltaic electricity generation facility on the farm Wicklow 218, located on the western side of the R385 road approximately 10 km north of Hopetown in the Northern Cape (Figure 2.1). The proposed photovoltaic centre is anticipated to produce up to 300 MW of electricity that will be fed into the Eskom power grid through the local Osborne sub-station. The installation's footprint is approximately 130 ha.

An individual PV module is made of layers of amorphous silicone, which acts as a semi-conductor. When light shines on the cell it creates an electric field across the layers, causing electricity to flow. Higher light intensity will increase the flow of electricity. This charge is discharged via the module's transparent conductive front layer and metallic rear layer. The direct current generated within the module is fed into the electrical grid via an inverter. The PV modules are 5.7m² (2.6 x 2.2m) in size, and comprise four panels. Each module is mounted on a metal supporting structure, no more than 1m off the ground, and has a potential output of 380W. There are a number of options regarding the structures and their anchoring to the ground. Typically this is done by means of a small concrete plinth at the base of the pole supporting the structure

A typical photovoltaic facility consist of modules that is organised into groups of 1 MW (approximately 1.5 ha), with each group connected to a "group station" (a cabin of approximately 2.5 x 4 m containing transformers and inverters). Each "group station" is then connected with a "main station" of approximately the same size, which is connected to an Eskom substation via an underground power line.

It is also proposed that the PV Park be fenced for security reasons. A small control cabin will be built at the entrance to the park.



Figure 2.1 Location of the Proposed Osborne Photovoltaic Facility

3. AIMS AND METHODS

After discussions with SPD a request for a Palaeontological Screening Report (PSR) was received. Following the “SAHRA APM Guidelines: Minimum Standards for the Archaeological & Palaeontological Components of Impact Assessment Reports” the aims of the PSR are:

- to investigate available resources (geological maps, scientific literature, previous impact assessment reports, institutional fossil collections, satellite images or aerial photos , etc) to inform an assessment of fossil heritage and/or exposure of potentially fossiliferous rocks within the study area;
- to conclude whether a further field assessment is warranted or not; and
- where further studies are required; this screening report would normally be an integral part of a field assessment of relevant palaeontological resources.

A basic assessment of the topography and geology of the area was made by using appropriate geological (1:250 000) maps in conjunction with Google Earth. The only limitation on this methodology is the scale of mapping, which restricts comparison of the geology to the 1:250 000 scale. This restriction only applies in areas where major changes in the geological character of the area occur over very short distances or on the geological transformation zones.

A review of the literature on the geological formations exposed at surface in the development site and the fossils that have been associated with these geological strata was undertaken.

Pending the outcome of the screening process recommendations were made for further field investigation(s) or exemption for further Palaeontological Studies.

4. GEOLOGY OF THE AREA

The study area is underlain by Late Cretaceous Quaternary Calcrete deposits. Towards the south-west the lower lying areas of the Orange River consist of the Randian Allanridge and Bothaville Formation of the Venterdorp Supergroup as illustrated in Figure 4.1.

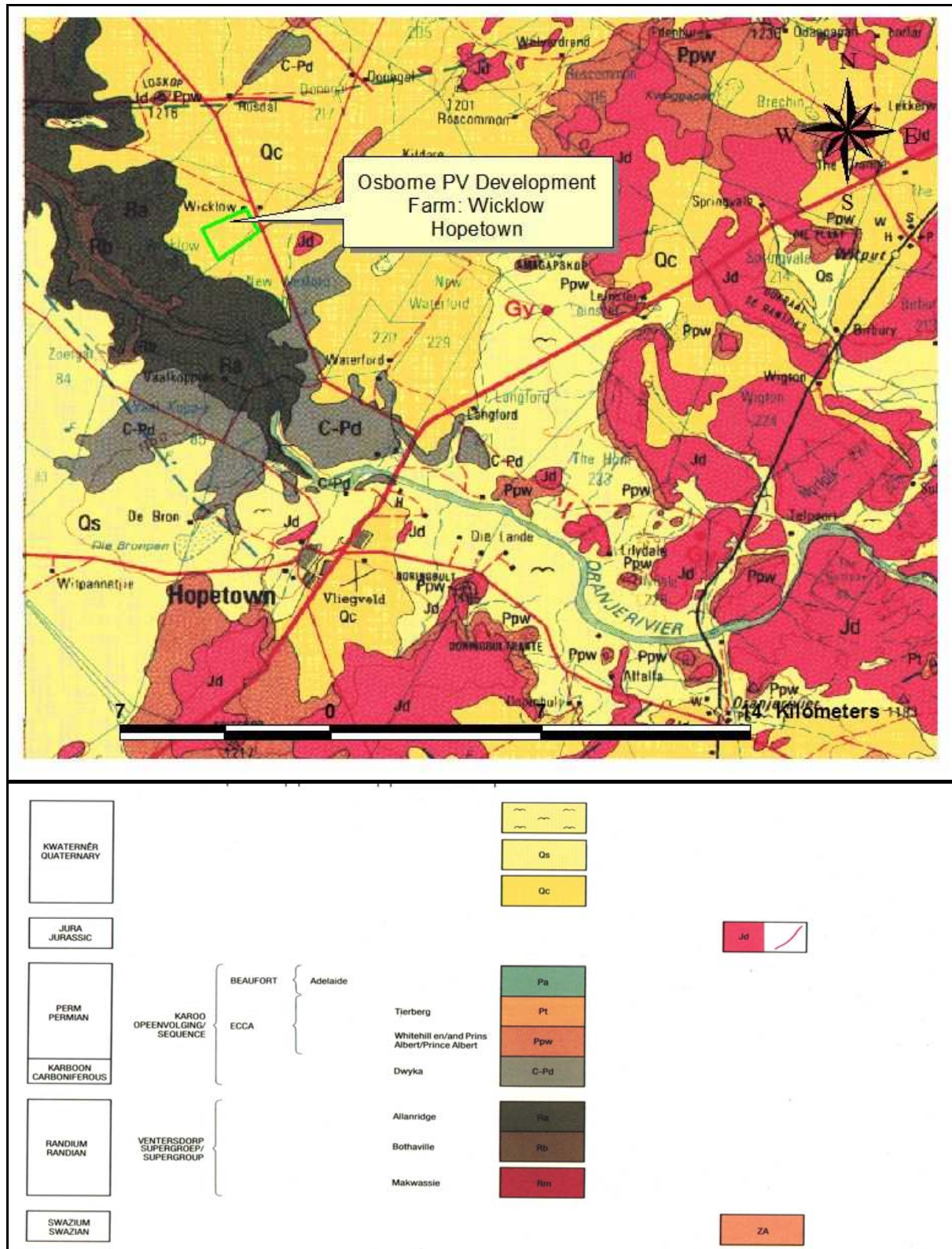


Figure 4.1 The Geology (Geo Map 2924 - Koffiefontein) of the Proposed Development

The Quaternary deposits were mainly formed through fluvial gravels, aeolian sands, lacustrine and pan mudrocks.

5. PALAEOLOGY OF THE AREA

The palaeontology of the Quaternary is poorly studied, but fossil material collected was mainly associated with ancient pans, lakes and river systems (Almond & Pether, 2009).

The excavations for the foundations of the PV supporting structures as well as the roads and other infrastructure may provide an opportunity to inspect fresh, unweathered calcrete rock in the study area.

6. PALAEOLOGICAL SIGNIFICANCE

The predicted palaeontological impact of the development is based on the initial mapping assessment and literature reviews. The expected palaeontological significance is summarised in Table 6.1.

Table 6.1 Palaeontological Significance of Geological Units on Site (Almond & Pether, 2009)

Geological Unit	Rock Type and Age	Fossil Heritage	Palaeontological Sensitivity
Quaternary Calcrete	Fluvial gravels, sands, lacustrine and pan mudrocks, evaporites, aeolian sands, pedocretes (especially calcrete) LATE CRETACEOUS TO RECENT	Palynomorphs, root casts (rhizomorphs) and burrows (e.g. termitaria), rare vertebrate remains (mammals, fish, ostrich egg shell etc), diatom-rich limestones, freshwater stromatolites, freshwater and terrestrial shells (gastropods, bivalves), ostracods, charophytes.	Low sensitivity

There is a low possibility that fossils could be encountered during excavations within the development footprint. Therefore, fossils within the development site could be characterised as rare but with a low significant.

7. CONCLUSION

The development site for the Osborne Photovoltaic Facility is underlain by the by Late Cretaceous Quaternary Calcrete deposits. There is a low potential for fossil material to be uncovered during excavations and has therefore a low palaeontological sensitivity rating.

It is recommended that an application for exemption from further palaeontological studies be made to SAHRA.

8. REFERENCES

Almond J and Pether J, 2009. Palaeontological Heritage of the Northern Cape. SAHRA Palaeontological Report. Capetown.

Johnson MR, Anhaeusser CR and Thomas RJ (Eds), 2006. The Geology of South Africa. GSSA, Council for Geoscience. Pretoria.