

BRIEF PALAEOLOGICAL IMPACT ASSESSMENT

**PROPOSED ORLIGHT SA DEVELOPMENT OF A SOLAR PHOTOVOLTAIC
POWER PLANT NEAR AGGENEYS, NORTHERN CAPE PROVINCE
Portion 1 of Farm Aroams 57 RD**

By

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For

ORLIGHT SA (PTY) LTD

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SUMMARY

Orlight SA (Pty) Ltd (Orlight SA) proposes to construct five new Solar Photovoltaic (PV) Power Plants in the Western Cape and Northern Cape Provinces. Three proposed sites for development of the Orlight SA Solar PV Power Plants are located in the Northern Cape Province near the towns of Aggeneys, Kenhardt and Loeriesfontein. Two proposed sites are in the Western Cape Province adjacent to the towns of Vanrhynsdorp and Graafwater. Digby Wells Environmental (Digby Wells) is appointed as the independent Environmental Assessment Practitioner (EAP) to conduct the Environmental Impact Assessment (EIA) processes for the proposed projects.

This desktop palaeontological assessment pertains to the Solar PV Plant near Aggeneys in the Namakwa District Municipality, viz. on Portion 1 of the farm Aroams 57 RD (Figure 1).

The solar PV panels will be mounted on metal frames (Figure 2) which are anchored to the ground with either concrete or screw pile foundations. These footings will be either hammered into the earth or anchored in a 1.5 m deep concrete foundation.

The bedrock underlying the property is unfossiliferous and of no palaeontological interest.

The overall potential for fossils in the Quaternary sand cover is very low. Furthermore, the scale of subsurface disturbance and exposure is quite limited, comprising mainly “post holes” to support the PV panel frames.

In view of the low fossil potential it is proposed that only a basic degree of mitigation is required. It is recommended that an alert for the uncovering of fossil bone and implements be included in the Construction Phase EMP for the project. Appendix 1 outlines monitoring by construction personnel and general Fossil Find Procedures. This is a general guideline, to be adapted to circumstances.

In the event of possible fossil and/or archaeological finds, the contracted archaeologist or palaeontologist must be contacted. For possible fossil finds, the palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established.

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The author, John Pether, is an independent consultant/researcher and is a recognized authority in the field of coastal-plain and continental-shelf palaeoenvironments and is consulted by exploration and mining companies, by the Council for Geoscience, the Geological Survey of Namibia and by colleagues/students in academia pursuing coastal-plain/shelf projects.

Expertise

- Shallow marine sedimentology.
- Coastal plain and shelf stratigraphy (interpretation of open-pit exposures and on/offshore cores).
- Marine macrofossil taxonomy (molluscs, barnacles, brachiopods).
- Marine macrofossil taphonomy.
- Sedimentological and palaeontological field techniques in open-cast mines (including finding and excavation of vertebrate fossils (bones)).
- Analysis of the shelly macrofauna of modern samples e.g. for environmental surveys.

Membership of Professional Bodies

- South African Council of Natural Scientific Professions. Earth Science. Reg. No. 400094/95.
- Geological Society of South Africa.
- Palaeontological Society of Southern Africa.
- Southern African Society for Quaternary Research.
- Heritage Western Cape. Member, Permit Committee for Archaeology, Palaeontology and Meteorites.
- Accredited member, Association of Professional Heritage Practitioners, Western Cape.

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INTRODUCTION

Orlight SA (Pty) Ltd (Orlight SA) proposes to construct five new Solar Photovoltaic (PV) Power Plants in the Western Cape and Northern Cape Provinces. Orlight SA is the local company established by BSG Resources Limited (BSGR), an international natural resources company that operates in the fields of mining, energy and engineering services.

Three proposed sites for development of the Orlight SA Solar PV Power Plants are located in the Northern Cape Province near the towns of Aggeneys, Kenhardt and Loeriesfontein. Two proposed sites are in the Western Cape Province adjacent to the towns of Vanrhynsdorp and Graafwater. Digby Wells Environmental (Digby Wells) is appointed as the independent Environmental Assessment Practitioner (EAP) to conduct the Environmental Impact Assessment (EIA) processes for the proposed projects

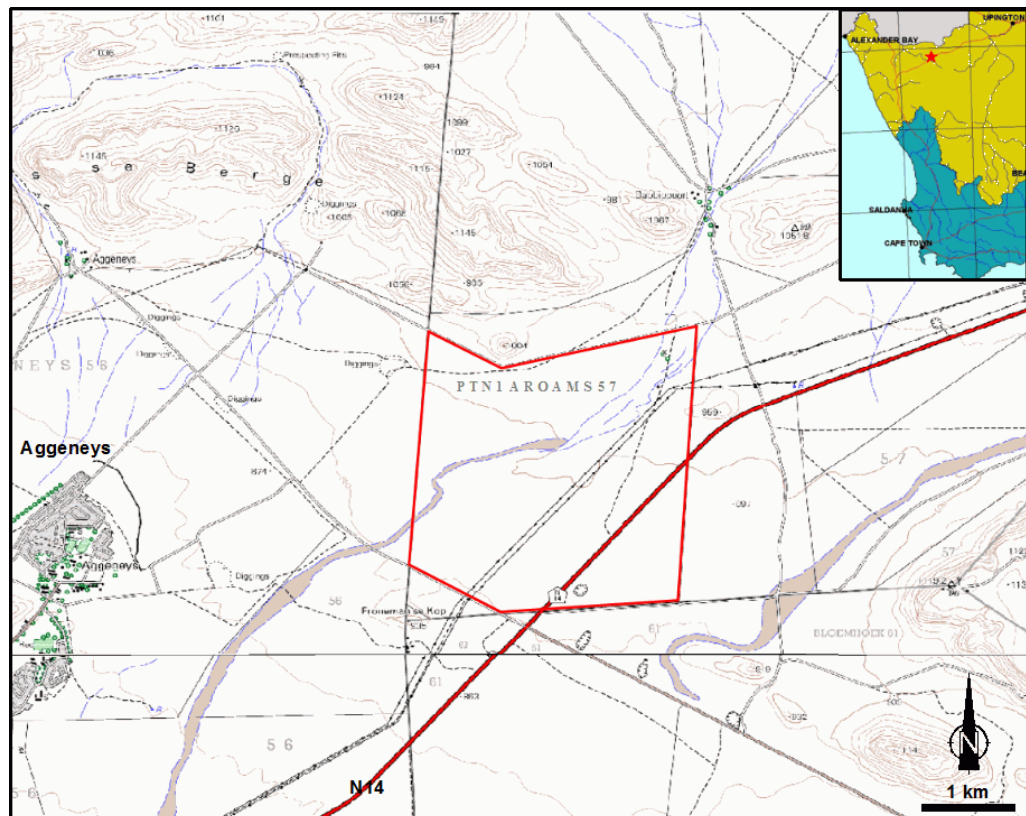


Figure 1. Location of the proposed Aggeneys Solar PV Plant. Extracts from 2918BB_2003_ED2_GEO.TIF and 2918BB_2003_ED2_GEO.TIF 1:50000 topo-cadastral maps. Chief Directorate: Surveys & Mapping.

This desktop palaeontological assessment pertains to the Solar PV Plant near Aggeneys in the Namakwa District Municipality, viz. on Portion 1 of the farm Aroams 57 RD (Figure 1). The preliminary generation capacity of the proposed Aggeneys Solar PV Power Plant is ~40 MW, but may be up to 150 MW. During the EIA Phase, studies will be undertaken to determine the optimal generation capacity that can be accommodated in the study area

based on ecological, cultural and socio-economic characteristics and other technical factors.

The power plant infrastructure will consist of a ground mounting system, solar PV panels, cabling, inverters, switchboards and transformer/s and transmission lines to connect the proposed Solar PV Power Plant to an existing Eskom transmission line. Also involved are access roads and temporary construction-related laydown areas, temporary site offices and a workshop.

The solar PV panels will be mounted into metal frames (Figure 2) which are anchored to the ground with either concrete or screw pile foundations. These footings will be either hammered into the earth or anchored in a 1.5 m deep concrete foundation.



Figure 2. Example of a Solar PV installation (supplied by Digby Wells).



Figure 3. Simulated oblique view of the project area, looking north. From Google Earth.

GEOLOGICAL SETTING

The project area is situated on a flat, sandy plain (Figure 3) between ~880 m asl. in the southwest, rising to ~915 m asl. in the northeast. To the immediate north is the eastern end of the Aggeneys se Berge, a range of hills rising sharply as inselbergs above the plain. An ephemeral drainage crosses the area.

The bedrock of the study area (Figure 4) is comprised of ancient basement rocks of the Bushmanland Terrane of the Namaqua Province (Cornell *et al.*, 2006). The Bushmanland Terrane here consists of metasediments and metavolcanics (Khurisberg Subgroup) that both overlie and are intruded by granitic gneisses (Stalhoek Complex, Achab Suite gneisses). These very old rocks (>1000 Ma) are not of palaeontological interest.

The Quaternary sand cover (pale yellow, Figure 4) is likely a combination of alluvium in the drainage lines and colluvium closer to bedrock outcrops, with a contribution of windblown, redistributed sands. Rock outcrops at several places in the project area suggests that the sand cover is not very thick.

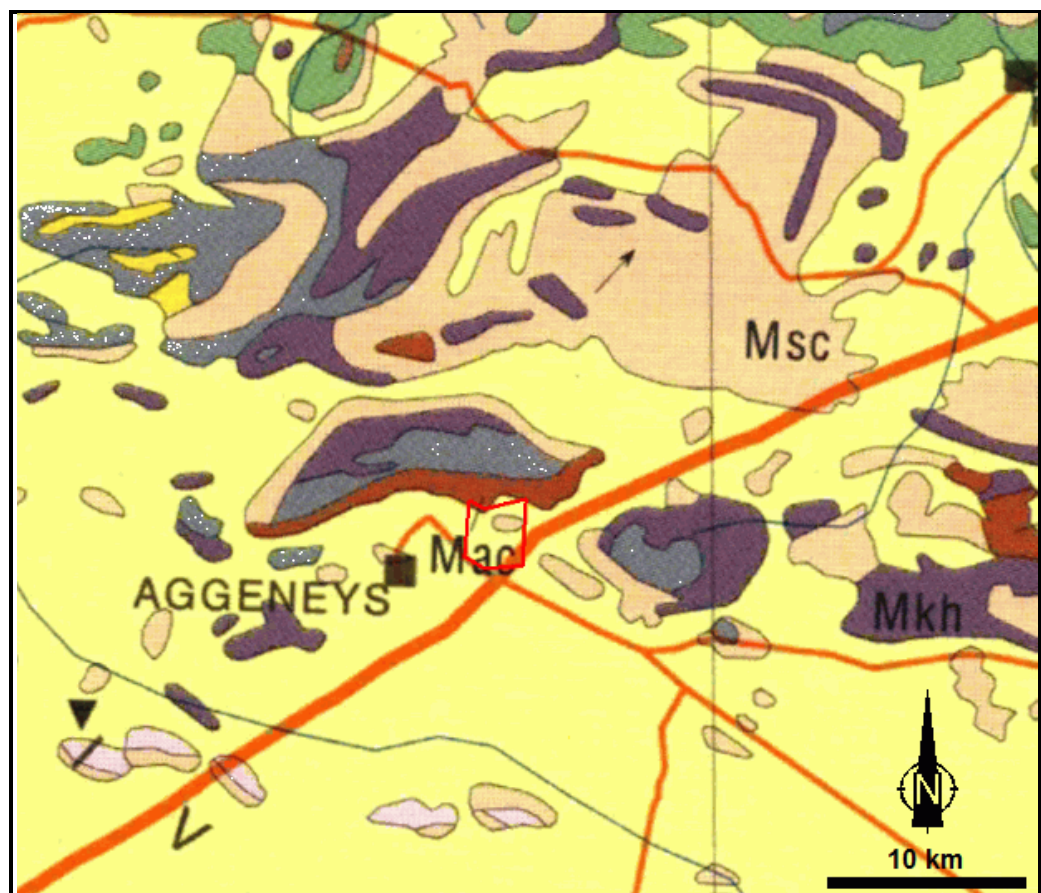


Figure 4. Geology of the study area. 1:1000000 Geological Map (CGS, 1997).

Mac – Achab Suite gneisses.

Msc – Stalhoek Complex schists and gneisses.

Mkh – Khurisberg Subgroup metasediments and volcanics.

3 ***EXPECTED PALAEOLOGY***

The bedrock underlying the property is unfossiliferous and of no palaeontological interest.

The overall potential for fossils in the Quaternary sand cover is very low. Furthermore, the scale of subsurface disturbance and exposure is quite limited, comprising mainly “post holes” to support the PV panel frames.

4 ***RECOMMENDATIONS***

In view of the low fossil potential it is proposed that only a basic degree of mitigation is required.

It is recommended that an alert for the uncovering of fossil bone and implements be included in the construction EMP for the project.

Appendices 1 and 2 outline monitoring by construction personnel and general Fossil Find Procedures. This is a general guideline, to be adapted to circumstances.

In the event of possible fossil and/or archaeological finds, the contracted archaeologist or palaeontologist must be contacted. For possible fossil finds, the palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established.

5 ***APPLICATION FOR A PALAEOLOGICAL PERMIT***

A permit from SAHRA is required to excavate fossils. The applicant should be the qualified specialist responsible for assessment, collection and reporting (palaeontologist). Should fossils be found that require rapid collecting, application for a palaeontological permit must be made to SAHRA immediately.

The application requires details of the registered owners of the sites, their permission and a site-plan map. All samples of fossils must be deposited at a SAHRA-approved institution.

6**REPORTING**

Should fossils be found a detailed report on the occurrence/s must be submitted. This report is in the public domain and copies of the report must be deposited at SAHRA. The report must fulfil the reporting standards and data requirements of SAHRA.

7**REFERENCES**

Cornell D.H. *et al.* 2006. The Namaqua-Natal Province. In: Johnson, M. R., Anhaeusser, C. R. and Thomas, R. J. (eds.), *The Geology of South Africa*. Geological Society of South Africa, Johannesburg/Council for Geoscience, Pretoria. 325-379.

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