

**PALAEONTOLOGICAL LETTER OF EXEMPTION FOR THE SIRIUS SOLAR PV
PROJECT TWO PART 2 AMENDMENT, NORTHERN CAPE PROVINCE**

Prepared for:

Savannah Environmental (Pty) Ltd

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2157

6 September 2020

Prepared by

BANZAI ENVIRONMENTAL (PTY) LTD

Declaration of Independence

I, Elize Butler, declare that –

General declaration:

- I act as the independent palaeontological specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting palaeontological impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected a palaeontological specialist in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

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Banzai Environmental (Pty) Ltd

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SIGNATURE:

A handwritten signature in black ink that reads "Elize Butler." The signature is written in a cursive style with a period at the end.

EXECUTIVE SUMMARY

Banzai Environmental was commissioned by Savannah Environmental (Pty) Ltd to write a Palaeontological Letter of Exemption for the proposed Sirius Solar PV Project Two RF (Pty) Ltd Project comprising of the construction and operation of a Battery Energy Storage System (BESS) of up to 4.5GWh, as well as an increase of the contracted capacity of the authorised Sirius Solar PV Project Two by 75MW within the authorised footprint, on a site located 21km south-west of Upington in the Northern Cape Province.

Two Basic Assessment (BA) processes for the Sirius Solar PV Project Three and Four facilities near Upington, Northern Cape Province were undertaken in 2019. The Palaeontological Impact Assessments found that the sites were underlain by unfossiliferous metamorphic basement rocks (granite-gneisses etc.; with a zero palaeontological significance) and mantled by superficial sediments of low palaeontological sensitivity. As the current project falls in the same development footprint as these projects the geology would be the same as that of the previous studies.

The proposed development footprint comprising of the construction and operation of a Battery Energy Storage System (BESS) of up to 4.5GWh, as well as an increase of the contracted capacity of the authorised Sirius Solar PV Project Two by 75MW within the authorised footprint is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.

If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the EC in charge of these developments. These discoveries ought to be protected (if possible, *in situ*) and the EC must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that correct mitigation (recording and collection) can be carry out by a paleontologist.

This is a recommended exemption from further Palaeontological studies as the proposed site has been assessed in a previous Palaeontological Impact Assessments.

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1 INTRODUCTION

Sirius Solar PV Project Two RF (Pty) Ltd is proposing the construction and operation of a Battery Energy Storage System (BESS) of up to 4.5GWh, as well as an increase of the contracted capacity of the authorised Sirius Solar PV Project Two by 75MW within the authorised footprint, on a site located 21km south-west of Upington in the Northern Cape Province. The project is located within the Upington Renewable Energy Development Zone (REDZ), within the Kai !Garib Local Municipality and the ZF Mgcawu District Municipality in the Northern Cape Province. The proposed increase in the contracted capacity of the solar PV facility by 75MW is due to improvements in technology of solar PV panels since the original authorisation of the project, as well as to ensure adequate supply of electricity. The general purpose and utilisation of a Battery Energy Storage System (BESS) is to save and store excess electrical output as it is generated, allowing for a timed release when the capacity is required. BESS systems therefore provide flexibility in the efficient operation of the electric grid through decoupling of the energy supply and demand.

The development area for the battery energy storage area is ~ 18ha and is proposed within the area assessed and approved for the solar PV facility. The extent of the development footprint of the battery energy storage will be up to 6.5ha and will be located within the development area. The development footprint as well as the development area identified for the construction and operation of the BESS is located adjacent to the authorised on-site facility substation of the solar PV facility. The following infrastructure is associated with the BESS:

- » Lithium-ion, Lithium Iron Phosphate, Sodium Sulphur, or Vanadium Redox batteries in a container with a footprint of 6.5ha and a maximum height of up to 2.8m; and
- » Multi-core, 33kV underground cables to connect the battery energy storage to the authorised on-site facility substation of Sirius Solar PV Project Two.

It is the Developer's intention to bid the solar PV facility and the battery energy storage under the Risk Mitigation Independent Power Producer (IPP) Procurement Programme of the Department of Mineral Resources and Energy. Ultimately, the development of the solar PV facility as well as the battery energy storage is intended to be part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resources Plan (IRP).

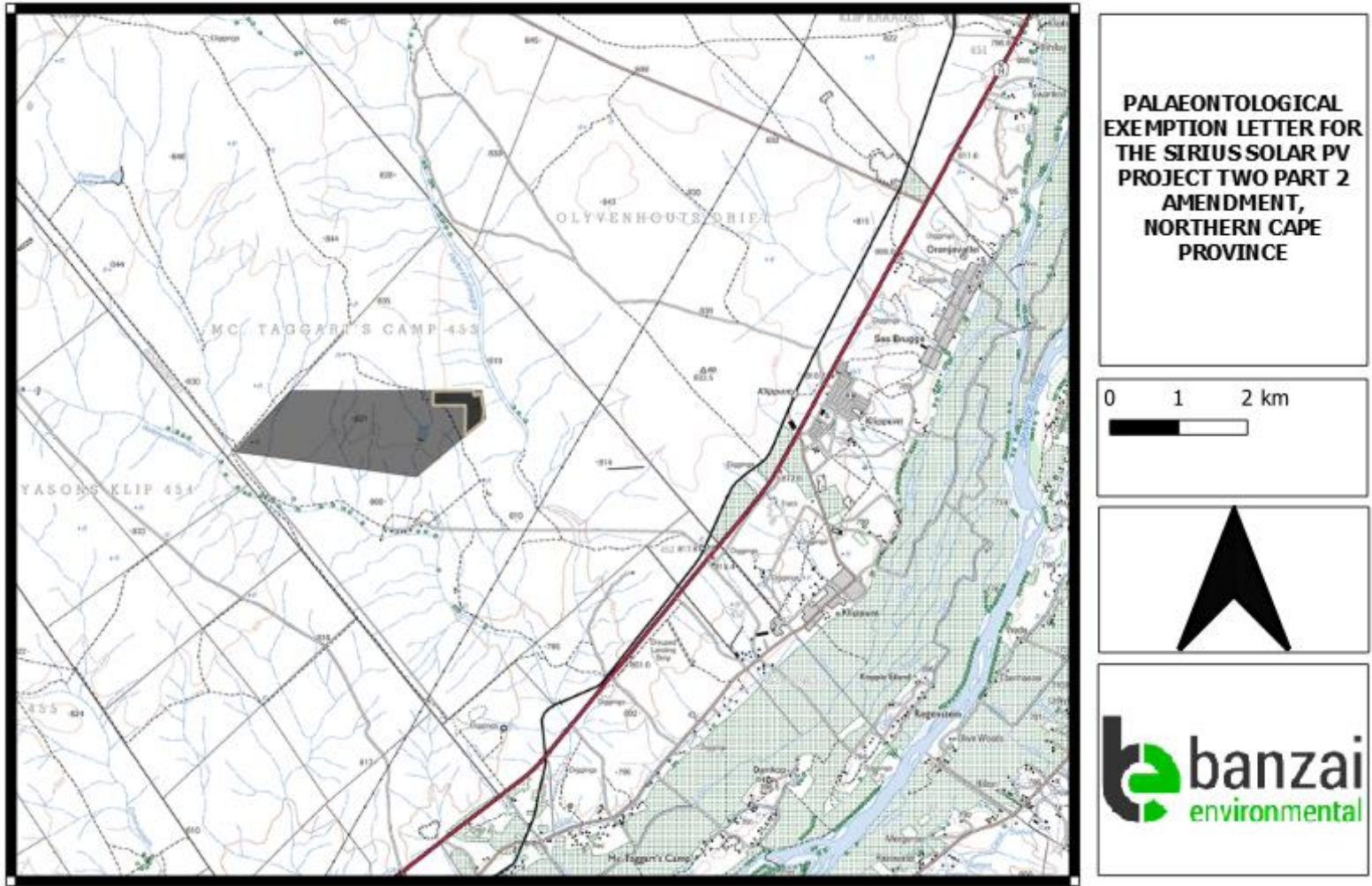


Figure 1: Layout of Sirius Solar PV Project Two near Upington in the Northern Cape. The Battery Energy Storage area is indicated in black while the footprint of the solar PV facility is represented by the grey colour.

2 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

The author (Elize Butler) has an MSc in Palaeontology from the University of the Free State, Bloemfontein, South Africa. She has been working in Palaeontology for more than twenty-five years. She has extensive experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the Karoo Basin. She has been conducting Palaeontological Impact Assessments since 2014.

3 LEGISLATION

3.1 NATIONAL HERITAGE RESOURCES ACT (25 OF 1999)

Cultural Heritage in South Africa includes all heritage resources and is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include **“all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens”**.

Palaeontological heritage is unique and non-renewable and is protected by the NHRA. Palaeontological resources may not be unearthed, moved, broken or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

This Palaeontological Desktop Assessment adheres to the conditions of the Act. According to **Section 38 (1)**, an HIA is required to assess any potential impacts to palaeontological heritage within the development footprint where:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- the construction of a bridge or similar structure exceeding 50 m in length;
- any development or other activity which will change the character of a site—
- (exceeding 5 000 m² in extent; or
- involving three or more existing erven or subdivisions thereof; or
- involving three or more erven or divisions thereof which have been consolidated within the past five years; or
- the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
- the re-zoning of a site exceeding 10 000 m² in extent;
- or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

4 GEOLOGICAL AND PALAEOLOGICAL HISTORY

The authorised footprint of Sirius Solar PV Project Two as well as the development area for the BESS near Upington, Northern Cape Province is depicted on the 1: 250 000 2820 Upington Geological Map (Council of Geosciences) and underlain by unfossiliferous metamorphic basement rocks namely Bethesda Formation of the Areachap Group, Dayson Klip Gneiss; and is mantled by superficial sediments of low palaeontological sensitivity namely the Kalahari Group (Table 1; Figure 2).

Table 1: Geology and Palaeontology of the development footprint

	Lithology	Palaeontological Sensitivity	Fossil Heritage
Bethesda FM	Biotite-rich and pelitic gneisses, muscovite-biotite schist, subordinate amphibolite and calc-silicate rocks	ZERO	Unfossiliferous
Dayson Klip Gneiss	Brown-weathering porphyroblastic to megacrystic gneiss (intrusive)	ZERO	Unfossiliferous
Kalahari Group	Superficial deposits comprising gravels, clays, sandstone, silcrete, calcrete and aeolian sand	LOW	Late Cenozoic calcrete may comprise of bones, horn horns as well as mammalian teeth. Tortoise remains, trace fossils, Amphibian and crocodile remains

The metamorphic basement rocks have a zero palaeontological sensitivity and is therefore unfossiliferous and not discussed further in this report.

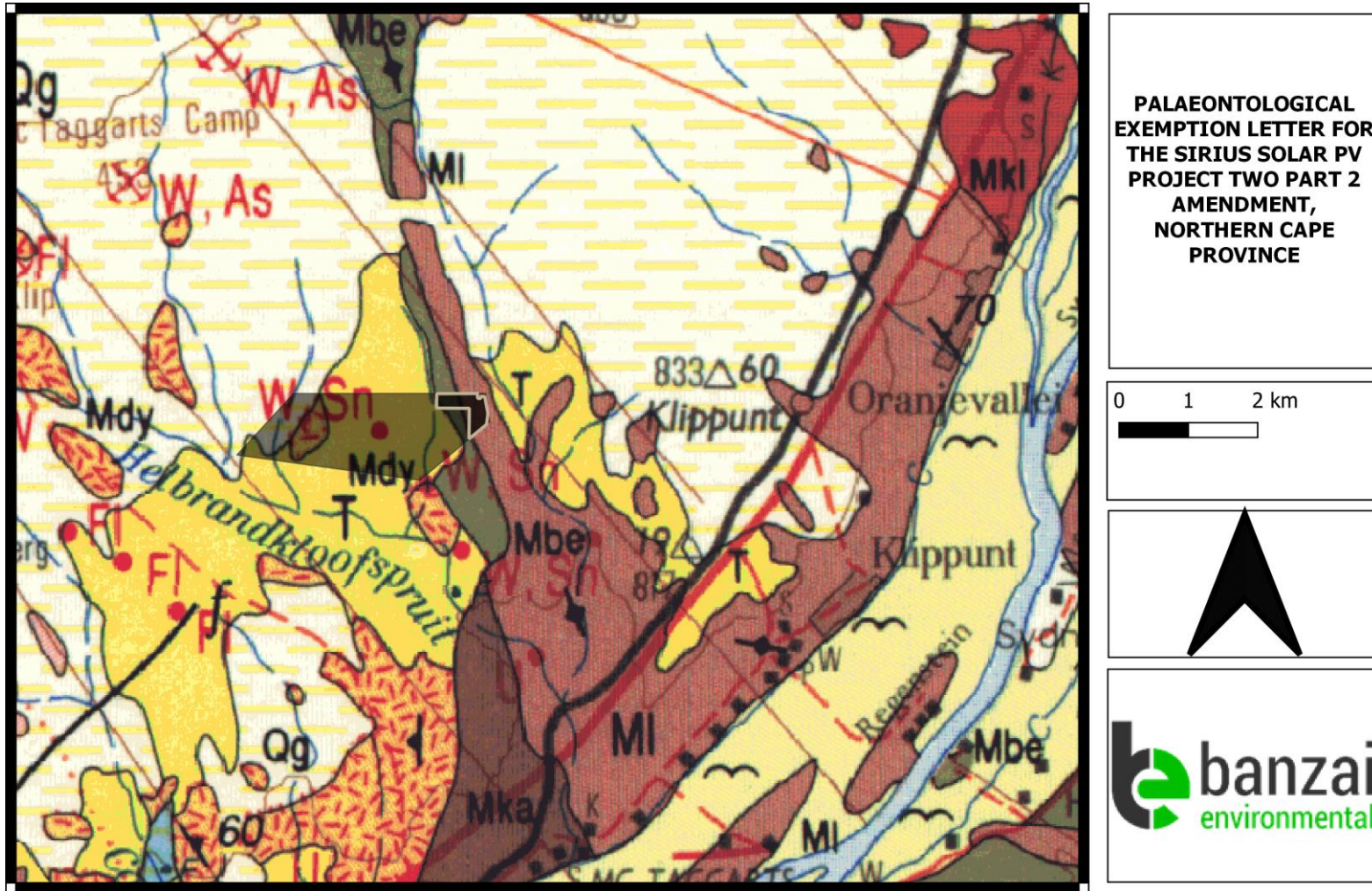


Figure 2: The surface geology of the authorised footprint of Sirius Solar PV Project Two (including the development area of the BESS) near Upington, Northern Cape Province is underlain by unfossiliferous metamorphic basement rocks namely Bethesda Formation of the Areachap Group (Mbe), Dayson Klip gneiss (Mdy); and Tertiary Sediments (T). These sediments are mantled by superficial sediments of low palaeontological sensitivity of the Kalahari Group (Qg). Map was drawn by QGIS Desktop 2.18.18.

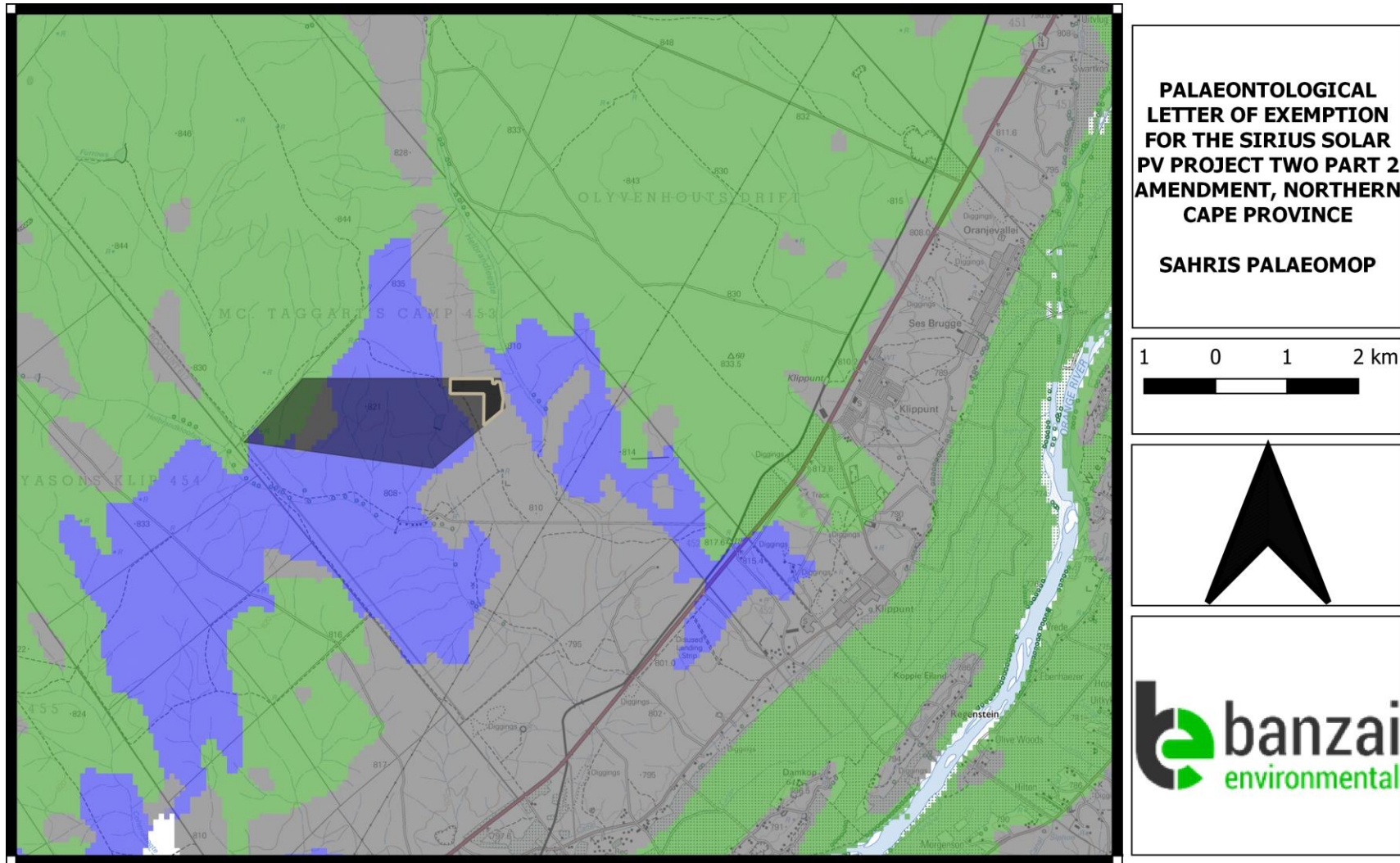


Figure 3: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the locality of the proposed development. Map was drawn by QGIS Desktop 2.18.18.

Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study; a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

According to the SAHRIS Palaeosensitivity map (Figure 3: **Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the locality of the proposed development. Map was drawn by QGIS Desktop 2.18.18.**

3) there is a Low to zero chance of finding fossils in this area.

Kalahari Group

The Cenozoic Kalahari Group is the most widespread body of terrestrial sediments in southern Africa. The Cenozoic sands and calcretes of the Kalahari Group range in thickness from a few metres to more than 180m (Partridge et al., 2006). The youngest formation of the Kalahari group is the Gordonia Formation which is generally termed Kalahari sand and comprises of red aeolian sands that covers most of the Kalahari Group sediments. The pan sediments of the area originated from the Gordonia Formation and contains white to brown fine-grained silts, sands and clays. Some of the pans consist of clayey material mixed with evaporates that shows seasonal effects of shallow saline groundwaters. Quaternary alluvium, aeolian sands, surface limestone, silcrete, and terrace gravels are also included in the Kalahari Group (Kent 1980)

Partridge *et al.*, (2006) describes numerous types of superficial deposits of Late Cenozoic (Miocene to Pliocene to Recent) age throughout the Karoo Basin. Sands and gravel in the development footprint has a possible fluvial origin.

The fossil assemblages of the Kalahari are generally very low in diversity and occur over a wide range and thus the palaeontological diversity of this Group is low (SAHRIS website). These fossils represent terrestrial plants and animals with a close resemblance to living forms. Fossil assemblages include bivalves, diatoms, gastropod shells, ostracods and trace fossils. The palaeontology of the Quaternary superficial deposits has been relatively neglected in the past. Late Cenozoic calcrete may comprise of bones, horn cores as well as mammalian teeth. Tortoise remains have also been uncovered as well as trace fossils which includes termite and insect burrows and mammalian trackways. Amphibian and crocodile remains have been uncovered where the depositional settings in the past were wetter.

Almond & Pether 2008, allocated a low significance to the Kalahari Group because fossil assemblages are generally rare and low in diversity and occur over a wide-ranging geographic area. In the past palaeontologists did not focus on Cenozoic superficial deposits although they sometimes comprise of significant fossil biotas. However, Groenewald and Groenewald (2014) allocated a high palaeontological sensitivity to the Cenozoic aged terrestrial organisms which is important indicators of palaeoenvironmental conditions.

Table 2 indicates possible fossils finds in the Kalahari Group of the development footprint. However, it must be noted that during the site visit no fossiliferous outcrop were identified.

Table 2: Possible fossils present in the Kalahari Group. Table modified from Palaeotechnical Report (Almond and Pether 2009).

Subgroup/ sequence	Group	Formation	Fossil Heritage	Comment
Tertiary- Quaternary	Kalahari		Terrestrial organisms	Trace fossils, ostracods, bivalves, gastropod shells, diatoms, bones horn corns, mammalian teeth, Tortoise shells

5 GEOGRAPHICAL LOCATION OF THE SITE

The authorised development footprint of Sirius Solar PV Project Two (including the development area of the BESS) is situated on the property, the Remaining Extent of the Farm Tungsten Lodge 638, south-west of Upington, in the Northern Cape Province. The site is accessible from a turn off the N14.

6 FINDINGS AND RECOMMENDATIONS

Banzai Environmental was commissioned by Savannah Environmental (Pty) Ltd to write a Palaeontological Exemption Letter as a result of the amendments proposed to the authorised Sirius Solar PV Project Two, comprising of the construction and operation of a Battery Energy Storage System (BESS) of up to 4.5GWh, as well as an increase of the contracted capacity of the authorised Sirius Solar PV Project Two by 75MW within the authorised footprint, on a site located 21km south-west of Upington in the Northern Cape Province

The authorised development footprint of Sirius Solar PV Project Two (including the development area of the BESS) near Upington is underlain by unfossiliferous metamorphic basement rocks (granite-gneisses etc.; with a zero palaeontological significance) or mantled by Quaternary superficial sediments of low palaeontological sensitivity.

Two Basic Assessment (BA) processes for the Sirius Solar PV Project Three and Four facilities near Upington, Northern Cape Province were undertaken in 2019 (Butler, 2019a; Butler 2019b). The Palaeontological Impact Assessments conducted by the author found that the sites were underlain by unfossiliferous metamorphic basement rocks (granite-gneisses with a zero palaeontological significance) and mantled by superficial sediments of low palaeontological sensitivity. As the current project falls in the same footprint as these projects the geology would be the same as that of the previous studies and NO additional impacts will influence the proposed development.

If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the EC in charge of these developments. These discoveries ought to be protected (if possible, *in situ*) and the EC must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that correct mitigation (recording and collection) can be carry out by a paleontologist.

It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

This is a recommended exemption from further Palaeontological studies as the proposed site has been assessed in a previous Palaeontological Impact Assessments.

7 CHANCE FINDS PROTOCOL

A following procedure will only be followed if fossils are uncovered during excavation.

7.1 LEGISLATION

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act 25 of 1999) (NHRA)**. According to Section 3 of the Act, all Heritage resources include “**all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**”.

Palaeontological heritage is unique and non-renewable and is protected by the NHRA and are the property of the State. It is thus the responsibility of the State to manage and conserve fossils on behalf of the citizens of South Africa. Palaeontological resources may not be excavated, broken, moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

7.2 BACKGROUND

A fossil is the naturally preserved remains (or traces) of plants or animals embedded in rock. These plants and animals lived in the geologic past millions of years ago. Fossils are extremely rare and irreplaceable. By studying fossils, it is possible to determine the environmental conditions that existed in a specific geographical area millions of years ago.

7.3 INTRODUCTION

This informational document is intended for workmen and foremen on construction sites. It describes the actions to be taken when mining or construction activities accidentally uncovers fossil material.

It is the responsibility of the Environmental Site Officer (ESO) or site manager of the project to train the workmen and foremen in the procedure to follow when a fossil is accidentally uncovered. In the absence of the ESO, a member of the staff must be appointed to be responsible for the proper implementation of the chance find protocol as not to compromise the conservation of fossil material.

7.4 CHANCE FIND PROCEDURE

- If a chance find is made the person responsible for the find must immediately **stop working** and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds

must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.

- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

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