

## PALAEONTOLOGICAL HERITAGE COMMENT:

### **Access Road Basic Assessment and Transmission Line Part 2 Amendment for the Sun Central Cluster 1 between De Aar & Hanover, Pixley Ka Seme District Municipality, Northern Cape Province**

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#### **EXECUTIVE SUMMARY**

Several previous combined desktop and field-based studies within the broader Soventix solar facility project area between De Aar and Hanover, including the Sun Central Cluster 1 project area, indicate that this region is generally of LOW palaeosensitivity, despite being underlain by Permian continental sediments of the Lower Beaufort Group (Almond 2017, 2021, 2022). This includes the small, combined footprints of the proposed additional infrastructure covered by the current Basic Assessment and Part 2 Amendment processes (access road, LILO grid connection, concrete batching plant, water pipeline etc.), portions of which are underlain by low-sensitivity Late Cenzoic alluvium. The construction phase of the proposed additional infrastructure is very unlikely to cause significant negative impacts on local palaeontological heritage resources. **There are therefore no objections on palaeontological heritage grounds to authorise the proposed additional infrastructure.**

If any substantial fossil remains (e.g. vertebrate bones, teeth) are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol outlined in Appendix 1 to this report should be fully implemented. These recommendations should be included within the EMPs for the Sun Central Cluster 1 solar PV facility and associated infrastructure developments.

#### **1. PROJECT OUTLINE**

Ecoleges Environmental Consultants (No. 3 Generaal Street, Machadodorp (eNtokozweni), 1170) was appointed by SolarAfrica Energy (Pty) Ltd (SAE) to apply for an Environmental Authorisation (through a Basic Assessment process) to rebuild and build an **access road** to Eskom specifications from the N10 to the Switching Station (Dx) and Main Transmission Substation (MTS) on the authorised Sun Central Cluster 1 Solar PV Facility (formerly known as Phase 1 Soventix Solar PV facility), situated between Hanover and De Aar in the Pixley ka Seme District, Northern Cape (DEA Reference: 14/12/16/3/3/2/998 as amended). Concurrently, a Part 2 Amendment application is being submitted for an **additional transmission line** (Loop-In, Loop-Out or LILO) from the MTS to Eskom's 400 kV Line 1, a **concrete batching plant** (situated within the Cluster 1 development footprint) and **additional water abstraction from boreholes BH13 &/or BH14** (situated outside the Cluster 1 development footprint). The Amendment application will also cover **floodlights** and a **telecommunications tower** added to the Dx and MTS footprints. An **underground pipeline** will be laid from adjacent boreholes BH13/BH14 and Solar Borehole BH5 across an ephemeral drainage line and artificial wetland, respectively to separate water storage tanks on the Cluster 1 footprint. The proposed footprints of the access road and additional infrastructure are indicated with reference to the Sun Central Cluster 1 project area on a satellite map in Figure 2.

## 2. PALAEOLOGICAL HERITAGE CONTEXT

The majority of the 'broader' project area, including Sun Central Cluster 1, has been assessed in several previous combined desktop and field-based palaeontological heritage impact assessment reports by Almond (2017, 2021, 2022). The entire project area, including the footprints of additional associated infrastructure listed above and mapped in Figure 2, is underlain at depth by potentially fossiliferous continental sediments of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) of Middle Permian age (Figure 1). A skull fragment *plus* indeterminate postcranial remains of a titanosuchid dinocephalian have been recorded close to, but outside, the Sun Central Cluster 1 project area and have already been collected for curation by the Evolutionary Studies Institute, Wits University (Almond 2017). Small, reworked blocks of petrified wood and low diversity trace fossil assemblages of low scientific interest are recorded from older alluvial deposits and bedrocks in the area and do not require mitigation (*ibid.*).

The palaeosensitivity of the 'broader' project area has been provisionally rated as Very High by the DFFE Screening Tool. However, based on four successive palaeontological site visits to the same area this sensitivity rating has been *contested* by Almond (2017, 2021, 2022). No High Sensitivity fossil sites have been recorded within any of the initial Soventix Phase 1 (presently Sun Central Cluster 1), Soventix Phase 2 and Phase 3 solar project areas (including all associated infrastructure such as grid connections, substations, access roads *etc*) while the only known sensitive fossil site has already been mitigated. The low overall palaeosensitivity here is probably largely due to rarity of well-preserved fossil remains within the bedrocks concerned, the generally very poor levels of bedrock exposure (especially in flat-lying regions), extensive baking of the sedimentary bedrocks by dolerite intrusions in the region as well as the generally low sensitivity of the superficial deposits in the region.

## 3. CONCLUSIONS

Several previous field-based studies within the 'broader' project area, including the Sun Central Cluster 1 project area, indicate that this region is generally of LOW palaeosensitivity. This includes the small combined footprints of the proposed additional infrastructure covered by the current Basic Assessment and Part 2 Amendment processes (access road, concrete batching plant, LILO grid connection, water pipeline *etc*). It is concluded that the construction phase of the proposed additional infrastructure is very unlikely to cause significant negative impacts on local palaeontological heritage resources. **There are therefore no objections on palaeontological heritage grounds to authorise the proposed additional infrastructure.**

If any substantial fossil remains (*e.g.*, vertebrate bones, teeth) are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol outlined in Appendix 1 to this report should be fully implemented. These recommendations should be included within the EMPs for the Sun Central Cluster 1 solar PV facility and associated infrastructure developments.

## 4. REFERENCES

ALMOND, J.E. 2017. Proposed Soventix Solar PV Project on various farms near Hanover, Emthanjeni Municipality, Pixley ka Seme District, Northern Cape. Palaeontological heritage report: combined desktop & field-based assessment, 43 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. 2021. Proposed Soventix Solar PV project on various farms near Hanover, Emthanjeni Municipality, Pixley Ka Seme District, Northern Cape. Palaeontological heritage report: combined desktop & field-based assessment, 54 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. 2022. Proposed development of a 400 MW Solar Photovoltaic facility on the Remainder of Farm Goede Hoop 26C and Portion 3 of Farm Goede Hoop 26C, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa. Site sensitivity verification report, 24 pp. Natura Viva cc, Cape Town.

## 5. JOHN ALMOND SHORT CV

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 the University of Tübingen in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa and Madagascar. 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 numerous palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape, Limpopo, Northwest Province, Mpumalanga, Gauteng, KwaZulu-Natal and the Free State under the aegis of his Cape Town-based company *Natura Viva* cc. He has served as a 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 development 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.



**Dr John E. Almond**  
**Palaeontologist**  
***Natura Viva* cc**

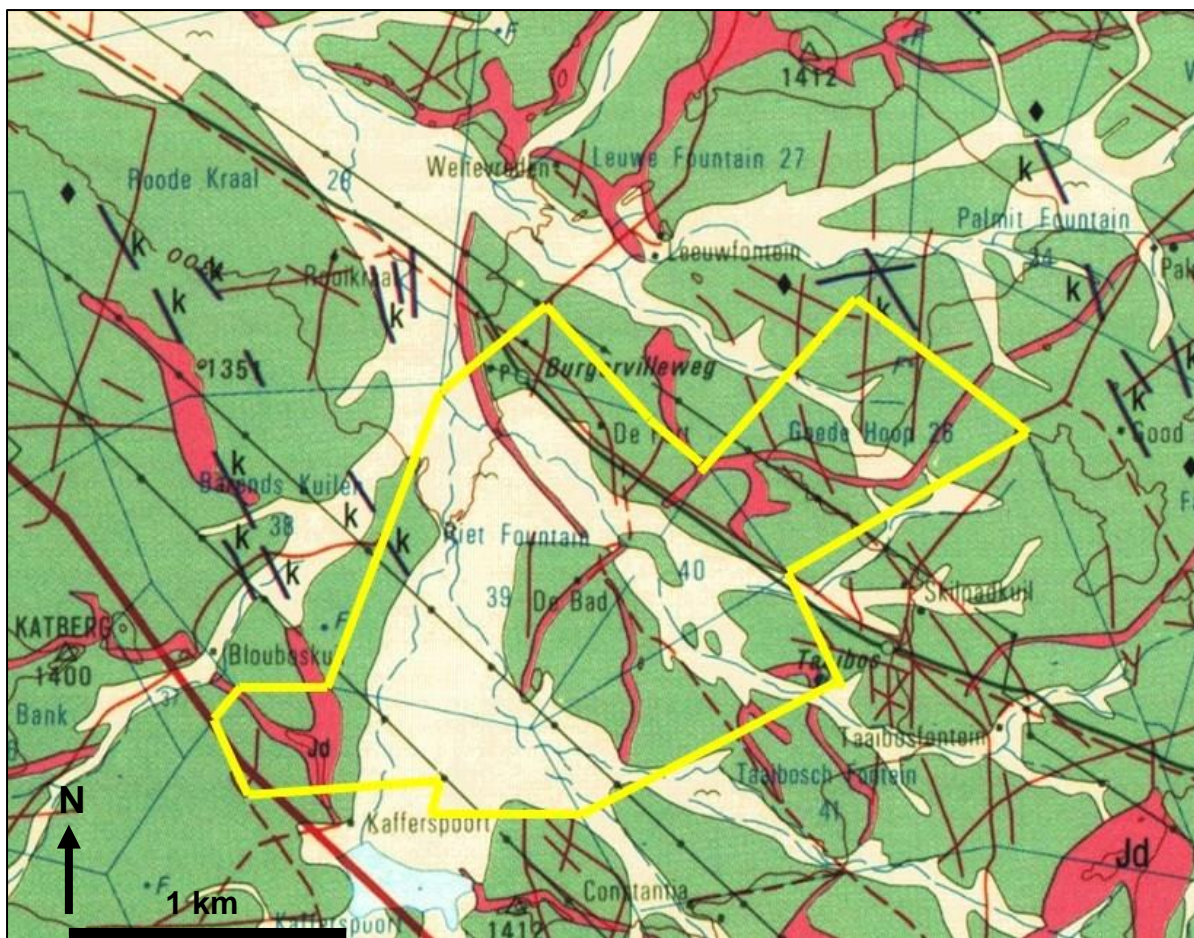


Figure 1: Geological map of the wider Soentix solar PV plant project area between De Aar and Hanover, Northern Cape (yellow polygon) (Map abstracted from 1: 250 000 geology sheet 3024 Colesberg, Council for Geoscience, Pretoria). The majority of the terrain within the yellow polygon has been previously palaeontologically surveyed by Almond (2017, 2021, 2022). The following main rock units are mapped within the project area: green (Pa) = Adelaide Subgroup (Lower Beaufort Group – probably Middle Permian Abrahamskraal Formation); pink (Jd) = intrusive dykes and sills of the Early Jurassic Karoo Dolerite Suite; pale yellow = Pleistocene to Recent alluvial deposits; small black diamond symbols = kimberlite pipes; black lines – kimberlite dykes (k). Unmapped Late Caenozoic superficial sediments include doleritic and sandstone colluvium, eluvial surface gravels and soils (including possible relict aeolian sands of the Gordonia Formation, Kalahari Group).



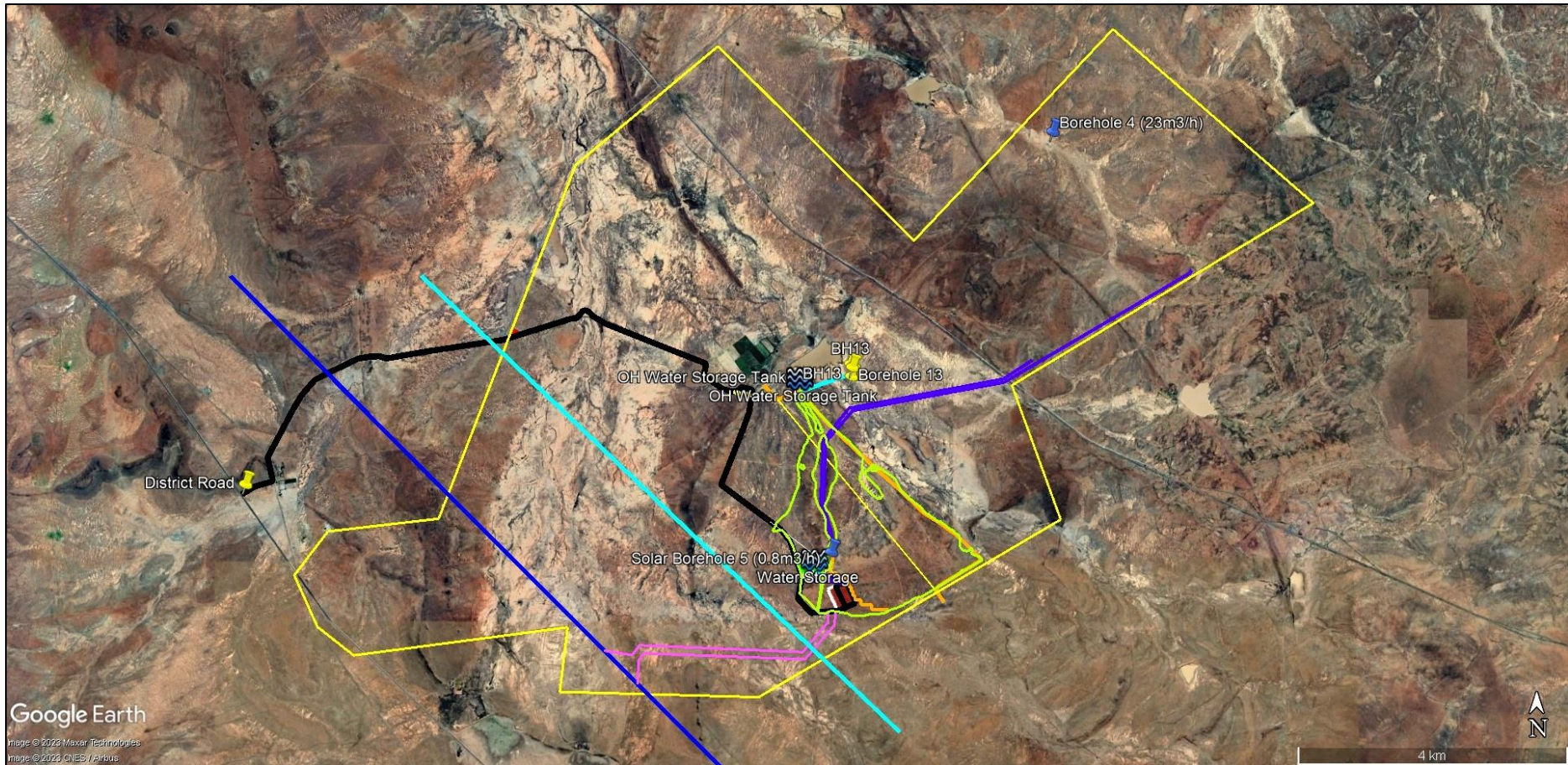


Figure 2: Google Earth© satellite map showing the outline of the Soventix PV Solar Facility project area near Hanover (yellow polygon), the solar field (light green outline) for the authorised Sun Central Cluster 1 footprint (previously called Soventix Phase 1) as well as the footprints of additional infrastructure covered by the current Basic Assessment and Part 2 Amendment applications, viz: access road to the MTS from the N10 (black line), boreholes and associated underground pipeline (short pale blue line), MTS (small red rectangle) and its LILO grid connection (pink lines) to Eskom's 400 kV Line 1 (dark blue line). The precise location of the concrete batching plant is undecided but will remain within the Cluster 1 footprint.

APPENDIX 1: SUN CENTRAL CLUSTER 1 AND ASSOCIATED INFRASTRUCTURE ON VARIOUS FARMS NEAR HANOVER	
<b>Province &amp; region:</b>	Northern Cape: Pixley Ka Seme District
<b>Responsible Heritage Resources Agency</b>	SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za).
<b>Rock unit(s)</b>	Middle Permian Adelaide Subgroup (Lower Beaufort Group, Karoo Supergroup), Late Caenozoic alluvium, pan sediments, surface gravels, soils
<b>Potential fossils</b>	Rare vertebrate bones and teeth, petrified wood and other plant material, trace fossils within Beaufort Group sediments. Fossil mammal bones, teeth, horn cores, freshwater molluscs, plant material in Late Caenozoic alluvium and pan deposits. Blocks of reworked silicified wood within surface gravels and older alluvium.
<b>ECO protocol</b>	1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately ( <i>N.B.</i> safety first!), safeguard site with security tape / fence / sand bags if necessary.
	2. Record key data while fossil remains are still <i>in situ</i> : <ul style="list-style-type: none"> <li>• Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo</li> <li>• Context – describe position of fossils within stratigraphy (rock layering), depth below surface</li> <li>• Photograph fossil(s) <i>in situ</i> with scale, from different angles, including images showing context (e.g. rock layering)</li> </ul>
	3. If feasible to leave fossils <i>in situ</i> : <ul style="list-style-type: none"> <li>• Alert Heritage Resources Agency and project palaeontologist (if any who will advise on any necessary mitigation</li> <li>• Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume</li> </ul>
	3. If <i>not</i> feasible to leave fossils <i>in situ</i> (emergency procedure only): <ul style="list-style-type: none"> <li>• <i>Carefully</i> remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. entire block of fossiliferous rock)</li> <li>• Photograph fossils against a plain, level background, with scale</li> <li>• Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags</li> <li>• Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist</li> <li>• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation</li> </ul>
	4. If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.
5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency	
<b>Specialist palaeontologist</b>	Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (e.g. museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Agency. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards.