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**A REPORT ON A PHASE 1 ARCHAEOLOGICAL & HERITAGE IMPACT ASSESSMENT
RELATED TO THE DEVELOPMENT OF A 400 MW SOLAR PHOTOVOLTAIC (PV) FACILITY AND
ASSOCIATED (PHASE 3) ON THE REMAINDER OF FARM GOEDE HOOP 26C, PORTION 3 OF
FARM GOEDE HOOP 26C AND OTHER PROPERTIES, BETWEEN DE AAR & HANOVER,
EMTHANJENI LOCAL MUNICIPALITY, PIXLEY KA SEME DISTRICT MUNICIPALITY,
NORTHERN CAPE PROVINCE, SOUTH AFRICA**

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REPORT: **APAC022/49**

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SUMMARY

APelser Archaeological Consulting cc was appointed by Ecoleges Environmental Consultants, on behalf of Soventix South Africa (Pty) Ltd, to undertake an Archaeological and Cultural Heritage Impact assessment related to the development of a 400 MW Solar Photovoltaic (PV) facility and associated infrastructure (Phase 3) on the Remainder of Farm Goede Hoop 26C, Portion 3 of Farm Goede Hoop 26C and other properties, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa. Previous archaeological and heritage assessments for the Goedehoop Solar PV Project (Phases 1 & 2) recorded a fairly large number of cultural heritage (archaeological & historical) resources of varying extent and significance in the larger area (**See Reports APAC017/11 & APAC021/10**). These included scatters of open-air surface Stone Age sites, rock engravings, later agro-pastoralist stone-walled sites, as well as historical Anglo-Boer War (1899-1902) sites.

Background research indicated that there are some cultural heritage (archaeological & historical) sites and features in the larger geographical area within which the study area fall, with a number recorded and identified during earlier (2017 & 2021) assessments on other farms and farm portions. The 2022 assessment identified and recorded more archaeological and historical sites, features and material in the proposed Phase 3 development areas. This report discusses the results of both the background research and physical assessment and provides recommendations on the way forward at the end.

From a Cultural Heritage Point of View it is recommended that the proposed development be allowed to continue, taking into consideration the recommendations put forward at the end of the report.

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1. INTRODUCTION

APelser Archaeological Consulting cc was appointed by Ecoleges Environmental Consultants, on behalf of Soventix South Africa (Pty) Ltd, to undertake an Archaeological and Cultural Heritage Impact assessment related to the development of a 400 MW Solar Photovoltaic (PV) facility and associated infrastructure (Phase 3) on the Remainder of Farm Goede Hoop 26C, Portion 3 of Farm Goede Hoop 26C and other properties, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa. Previous archaeological and heritage assessments for the Goedehoop Solar PV Project (Phases 1 & 2) recorded a fairly large number of cultural heritage (archaeological & historical) resources of varying extent and significance in the larger area (**See Reports APAC017/11 & APAC021/10**). These included scatters of open-air surface Stone Age sites, rock engravings, later agro-pastoralist stone-walled sites, as well as historical Anglo-Boer War (1899-1902) sites.

Background research indicated that there are some cultural heritage (archaeological & historical) sites and features in the larger geographical area within which the study area fall, with a number recorded and identified during earlier (2017 & 2021) assessments on other farms and farm portions. The 2022 assessment identified and recorded more archaeological and historical sites, features and material in the proposed Phase 3 development areas.

The client indicated the location and boundaries of the areas that had to be assessed and the work was confined to this.

2. TERMS OF REFERENCE

The Terms of Reference for the study was to:

1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the portion of land that will be impacted upon by the proposed development;
2. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
3. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
4. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;
5. Review applicable legislative requirements;

3. LEGISLATIVE REQUIREMENTS

Aspects concerning the conservation of cultural resources are dealt with mainly in two Acts. These are the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998).

3.1. The National Heritage Resources Act

According to the Act the following is protected as cultural heritage resources:

- a. Archaeological artifacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

The National Estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Sites of Archaeological and palaeontological importance
- g. Graves and burial grounds
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g. archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.)

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources. An HIA must be done under the following circumstances:

- a. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length
- b. The construction of a bridge or similar structure exceeding 50m in length
- c. Any development or other activity that will change the character of a site and exceed 5 000m² or involve three or more existing erven or subdivisions thereof

- d. Re-zoning of a site exceeding 10 000 m²
- e. Any other category provided for in the regulations of SAHRA or a provincial heritage authority

Structures

Section 34 (1) of the Act states that no person may demolish any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

Alter means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or the decoration or any other means.

Archaeology, palaeontology and meteorites

Section 35(4) of the Act deals with archaeology, palaeontology and meteorites. The Act states that no person may, without a permit issued by the responsible heritage resources authority (national or provincial)

- a. destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- b. destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
- c. trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
- d. bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.
- e. alter or demolish any structure or part of a structure which is older than 60 years as protected.

The above mentioned may only be disturbed or moved by an archaeologist, after receiving a permit from the South African Heritage Resources Agency (SAHRA). In order to demolish such a site or structure, a destruction permit from SAHRA will also be needed.

Human remains

Graves and burial grounds are divided into the following:

- a. ancestral graves
- b. royal graves and graves of traditional leaders
- c. graves of victims of conflict

- d. graves designated by the Minister
- e. historical graves and cemeteries
- f. human remains

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant Heritage Resources Authority:

- a. destroy, damage, alter, exhume or remove from its original position of otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- b. destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- c. bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Human remains that are less than 60 years old are subject to provisions of the Human Tissue Act (Act 65 of 1983) and to local regulations. Exhumation of graves must conform to the standards set out in the **Ordinance on Excavations (Ordinance no. 12 of 1980)** (replacing the old Transvaal Ordinance no. 7 of 1925).

Permission must also be gained from the descendants (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated to) before exhumation can take place.

Human remains can only be handled by a registered undertaker or an institution declared under the **Human Tissues Act (Act 65 of 1983 as amended)**.

3.2. The National Environmental Management Act

This Act states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made.

Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

4. METHODOLOGY

4.1. Survey of literature

A survey of available literature was undertaken in order to place the development area in an archaeological and historical context. The sources utilized in this regard are indicated in the bibliography.

4.2. Field survey

The field assessment section of the study is conducted according to generally accepted HIA practices and aimed at locating all possible objects, sites and features of heritage significance in the area of the proposed development. The location/position of all sites, features and objects is determined by means of a Global Positioning System (GPS) where possible, while detail photographs are also taken where needed.

4.3. Oral histories

People from local communities are sometimes interviewed in order to obtain information relating to the surveyed area. It needs to be stated that this is not applicable under all circumstances. When applicable, the information is included in the text and referred to in the bibliography.

4.4. Documentation

All sites, objects, features and structures identified are documented according to a general set of minimum standards. Co-ordinates of individual localities are determined by means of the Global Positioning System (GPS). The information is added to the description in order to facilitate the identification of each locality.

5. DESCRIPTION OF THE AREA

The study and proposed development area is located on the Remainder of Farm Goede Hoop 26C, Portion 3 of Farm Goede Hoop 26C and other properties. It is situated between De Aar & Hanover in the Emthanjeni Local Municipality of the Pixley Ka Seme District Municipality in the Northern Cape Province of South Africa.

The Upper Nama Karoo (Nku3) vegetation of the region is limited by the low annual rainfall (ca. 190 - 200 mm/a) and is dominated by flat plain areas and hills with rocky outcrops. The geology is mostly Dwyka/Ecca shales overlaid with shallow sandy soils that drain well. In general the topography of the study area is flat and open, with some rocky ridges/outcrops and low hills surrounding present. Tree cover is scarce, but fairly dense ground cover (grass/shrubs/bushes) in some sections did hamper visibility on the ground during the assessment. The focus of the field assessment was therefore on large open patches of soil and erosion dongas, as well as the rocky ridges and outcrops.

It is important to note here that just before and during the June 2022 assessment the area experienced unseasonal high rainfall, resulting in large sections of the study area being waterlogged and impassable. The water cover in these sections also limited visibility and the identification of possible archaeological sites, features and material in these locations.

In general the area has not been disturbed by modern developments, except for a railway line, existing 132kV Eskom Powerline corridors that cuts through the areas and have had some impact, with the largest other type of impact being agricultural activities (sheep/cattle; grazing and limited crop growing and ploughing). Farmsteads and related infrastructure are also present, but these will not be directly impacted by the proposed development actions.

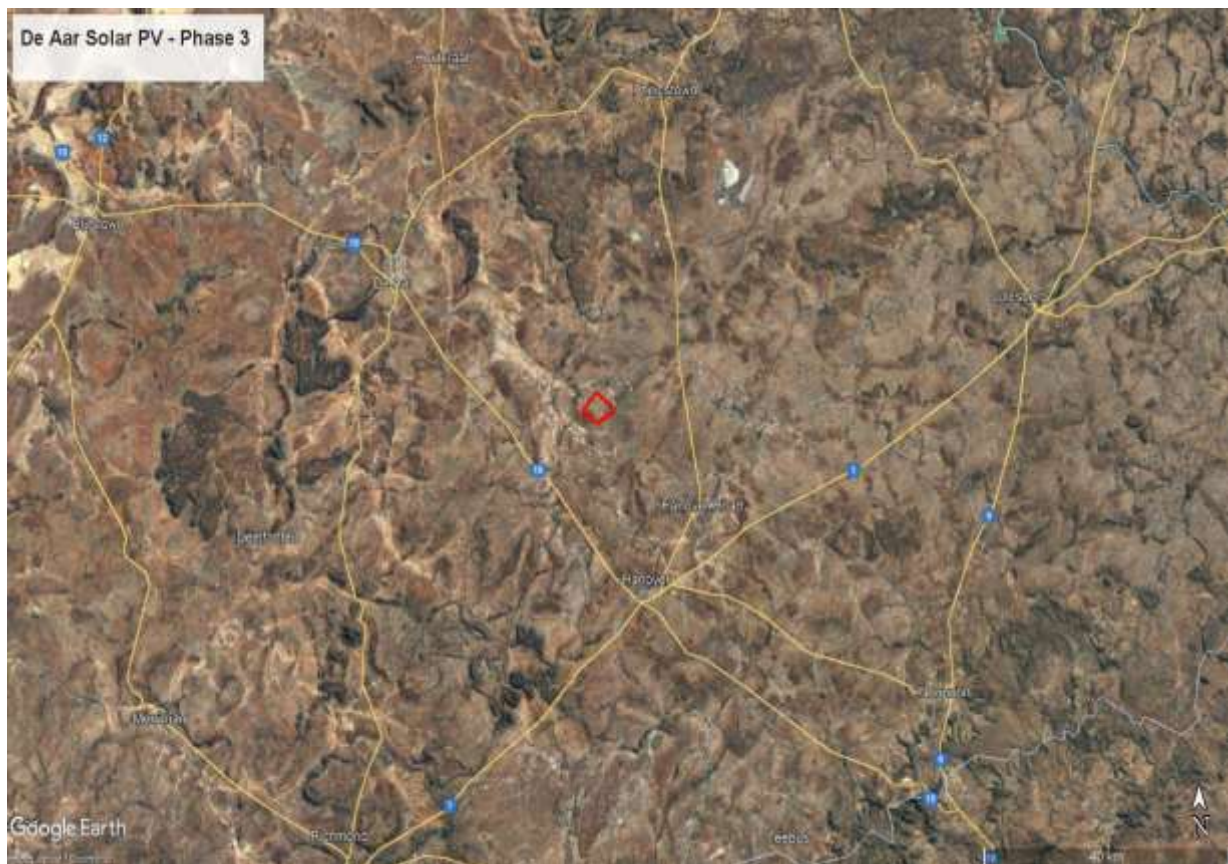


Figure 1: General location of the study & proposed development area footprint (Google Earth 2022).



Figure 2: Closer view of study and proposed development area footprint (Google Earth 2022). The rock-walled sheep kraal and rock cairns on the image were identified by the client during earlier field visits.

6. DISCUSSION

A number of Heritage Impact Assessments have been undertaken in the larger geographical area. No Grade I or II sites (National or Provincial Heritage Sites) have been identified in close proximity to the proposed development area as yet.

The possible impact of the proposed development on paleontological resources is gauged by using the fossil sensitivity maps available on the SAHRIS and the nature of the proposed development.

Karoo Sedimentary Rocks

The Beaufort Group contains fossils of diverse terrestrial and freshwater tetrapods of *Tapinocephalus* and *Lystrosaurus* genere (amphibians, true reptiles, synapsids – especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways) and sparse vascular plants (*Glossopteris* Flora, including petrified wood) that dates to the Late Permian – Early Triassic Periods (c. 266 – 250 Ma). The area of the proposed development where this geological signature occurs is regarded as highly sensitive with regards to palaeontological heritage (Palaeo Field Services cc 2014: 5).

Karoo Dolerites

No fossil heritage has been recorded in these intrusive dolerites (dykes, sills) and associated diatremes. The dolerite dykes and sills within the area of the proposed development are not palaeontologically significant. Notice must however be taken of the presence of these features as Stone Age quarry sites are usually found at the foot of dolerite hills where hornfels outcrops occur. Dolerite is also associated with engraving sites. One such site has been recorded at the Commonage in Hanover Town (Palaeo Field Services 2014: 5).

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools. In South Africa the Stone Age can be divided basically into three periods. It is however important to note that dates are relative and only provide a broad framework for interpretation. A basic sequence for the South African Stone Age (Lombard et.al 2012) is as follows:

Earlier Stone Age (ESA) up to 2 million – more than 200 000 years ago

Middle Stone Age (MSA) less than 300 000 – 20 000 years ago

Later Stone Age (LSA) 40 000 years ago – 2000 years ago

The Stone Age is well represented in the area by the archaeological remains associated with Stone Age hunter gatherers and herders and includes cave shelters and surface sites. These occurrences cover represent the Early, Middle and Later Stone Ages. Erosion gullies and river/streambeds and dolerite outcrops are usually associated with stone tool assemblages (Palaeo Field Services 2014: 6).

For prehistory, Sampson's (1972, 1974) survey of the Seacow drainage near Hanover (part of his Orange River Scheme) is the most important archaeological project in the Karoo environment of the Northern Cape. His team recorded sites and quarries, ranging from the Earlier, Middle and Later Stone Ages, to proto-historic pastoralist camps and Historic farmyards. Among other things, the research noted a correlation between age and the patina on hornfels (also called lydianite and indurated shale): dark brown to yellow = Earlier Stone Age; red = Middle Stone Age; grey to grey brown = Lockshoek; light brown/tan = Interior Wilton; and black = Smithfield (the last three belonging to the Later Stone Age). This culture-history sequence forms a basis for identifying stone tool industries and historic occupations over the entire district. There have been several investigations in the De Aar district itself because of the ammunition disposal plant to the west and various solar panel projects (e.g. Kaplan 2010; Kruger 2012; Morris 2011). Generally, archaeologists have found scatters of stone tools dating to the Middle and Later Stone Ages. In addition, the ammunition area yielded an Earlier Stone Age scatter, and a few rock art sites are on record for the district (Morris 1988; Rudner and Rudner 1968). These reports show that the De Aar district has a rich archaeological heritage (Huffman 2013: 3).

Surface scatters of stone tools (mostly Early and Middle Stone Age) were recorded during various earlier Heritage Impact Assessments: - The farm Plooyfontein 93 (Palaeo Field Services 2014: 6; 24) in the Hanover District.

- Erf 3094 on the old De Aar 180 farm (Huffman 2013: 5-6)
- A variable density of stone artifacts, mostly of Pleistocene age, was noted over most of the area examined during the Archaeological Specialist Input on the site of the proposed Taaibosch Photovoltaic Plant between De Aar and Hanover (David Morris 2011). Rock art sites have also been recorded (Morris 1988, Rudner & Rudner 1968). Included are the engraving sites at the Hanover Town Commonage and at the farm Groenfontein, Hanover District. (Palaeo Field Services 2014).

A number of Stone Age sites were identified and recorded during the 2017 & 2021 assessments for the Soventix Solar PV Project (for the Phases 1 & 2 Solar PV Developments), with further sites also identified and recorded during the recent June 2022 Phase 3 assessment.

The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artifacts. In South Africa it can be divided in two separate phases (Bergh 1999: 96-98), namely:

Early Iron Age (EIA) 200 – 1000 A.D
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

Early Iron Age (EIA) 250 – 900 A.D.
Middle Iron Age (MIA) 900 – 1300 A.D.
Late Iron Age (LIA) 1300 – 1840 A.D.

The Iron Age is not represented in the general area of the development. No sites were found during the assessment as well, although one of the sites recorded during the February 2021 assessments could represent a proto-historic pastoralist structure similar to those described by Sampson.

The historical age started with the first recorded oral histories in the area. It includes the moving into the area of people that were able to read and write, but more recently also refers to the last five hundred years of South African history. Farms and other historical settlements in the area date back to the 1840's, while the area also have evidence associated with the South African (Anglo Boer) War. Signs of historical occupation is common in the general area and includes abandoned sheep kraals and homestead ruins. Old railway infrastructure (housing, old railway lines and foundations) was also recorded (at nearby Burgervilleweg (Becker 2012).

The proximity of the railway means that material traces may exist alongside that relate to its construction, maintenance and use, and its protection by way of blockhouses, as a major transport route for British forces further inland during the Anglo-Boer War. The Google Earth image of the area clearly shows different generations of railway alignment within the

study area. Jean Beater's heritage report describes Anglo-Boer War redoubts (components of a blockhouse line) on the north side of the older railway (Beater 2011).

A number of historical sites, features and artifacts related to the above was identified and recorded during the 2017 assessment in the larger area, while a few was identified and recorded in the Phase 3 study area during the June 2022 assessment.

Results of the June 2022 field assessment

The objectives of the assessment were to cover the areas where the proposed development activities will take place to determine if there are any possible cultural heritage (archaeological and/or historical) sites, feature or material located here and if these would be negatively impacted by the development. Should any be found, and be deemed of archaeological & historical significance, then suitable measures to mitigate these impacts were to be provided in the report.

The cumulative impacts were not investigated as they are not particularly applicable to the Cultural Heritage sites, given the fairly localized context.

A total of 31 sites and features were identified during the June 2022 field assessment. Most of these were open-air surface scatters of Stone Age material (Sites 1; 3-15; 17-18; 26-28 & 30-31). Sites 2, 16, Sites 19-24 & Site 29 date to more recent historical times.

It needs to be mentioned here again that due to the inaccessibility of large sections as a result of these being waterlogged that there might be many more similar sites in the larger development area. It is however envisaged that most of these will be similar in nature to those already identified and recorded (mostly open-air surface scatters of Stone Age material).

Furthermore, the heritage sites identified and recorded in the larger area or the Solar PV Phases 1 and 2 Developments are not included in this report as they were dealt with in detail in the 2017 & 2021 HIA Reports.

June 2022 Sites Discussion

A total of 31 sites were identified during the 2022 assessment in the study and development area. They included a fairly larger number of open-air Stone Age surface sites (with varying degrees of density), a recent stone kraal and some stone cairns that are most likely associated with an old road.

Even though only 31 sites were identified during the June 2022 fieldwork, there could potentially be many more located in the area. Fairly dense ground cover (grass, shrubs/bushes) hampered visibility in some sections during the survey, while the waterlogged situation on the ground also limited access and visibility. The focus was therefore on more open patches of ground, erosion dongas and dry rocky outcrops and ridges. Sites 26-31 are located outside of the proposed development footprint.

Sites 1; 3-15; 17-18; 26-28 & 30-31: Stone Age open-air surface scatters

These sites were all open-air surface scatters with differing densities of material (cores, waste-flakes, more formal tools such as blades, scrapers and broken points) on them. These artifact and sites most likely date to between the MSA and LSA and is similar to those found in other areas during the 2017 & 2021 assessments and in other studies by archaeologists in the larger geographical area.

Most of the sites contain a fairly low density of material on them, with a few only consisting of a relatively high density of material scattered on them. The low density sites are deemed of Low Cultural Heritage Significance, with those with a higher density of material on them all given a Medium Significance.

Although the Stone Age sites and finds situated in the proposed development footprint are open-air surface locations and therefore not located in a primary & stratified context such as those in rock shelters and caves, it is believed that they could contribute to our knowledge of the Stone Age of the specific and larger geographical area. As is the case with the 2017 and 2021 Heritage Assessments, if the sites can't be avoided by the development activities that will be mostly drilling holes to insert the poles that support the solar modules, and two-track dirt roads and need to be destroyed as a result then the following mitigation measures are recommended prior to development commencing:

1. Detailed mapping of the sites to determine their extents, and
2. Surface collection of material to obtain a representative sample of Stone Age material and types to determine the age of the material and sites

These mitigations need to be undertaken by a heritage specialist/archaeologist registered with ASAPA. For the surface sampling an Archaeological Mitigation Permit will have to be applied for and issued by SAHRA. A permit will only be issued by SAHRA once Environmental Authorization for the development have been given, Final Comments from SAHRA on the Phase 1 HIA has been provided and an accredited Archaeologist has been appointed to undertake the work. Landowner's permission to undertake the required mitigation work also needs to be provided.

GPS Location of Sites: S30 49 49.00 E24 22 49.20 **(1)**; S30 49 54.09 E24 22 46.70 **(3)**; S30 49 49.90 E24 22 42.90 **(4)**; S30 49 48.90 E24 22 41.20 **(5)**; S30 49 47.50 E24 22 33.30 **(6)**; S30 49 43.40 E24 22 24.70 **(7)**; S30 49 38.30 E24 22 13.80 **(8)**; S30 49 37.00 E24 22 13.80 **(9)**; S30 49 36.50 E24 22 02.00 **(10)**; S30 49 35.10 E24 21 53.40 **(11)**; S30 49 35.00 E24 21 39.90 **(12)**; S30 49 33.80 E24 21 37.60 **(13)**; S30 49 34.60 E24 21 33.90 **(14)**; S30 49 43.60 E24 21 04.70 **(15)**; S30 49 48.00 E24 20 49.10 **(17)**; S30 49 55.40 E24 20 39.20 **(18)**; S30 50 23.30 E24 20 12.90 **(26)**; S30 50 24.60 E24 20 16.60 **(27)**; S30 50 24.40 E24 20 18.10 **(28)**; S30 50 24.10 E24 20 11.40 **(30)** & S30 50 23.50 E24 20 08.80 **(31)**.

Cultural Significance: Low (1; 2; 4; 6-14; 17; 26; 27; 30 & 31); Medium (3; 5; 15; 18; 28)

Heritage Significance: Grade III: Other heritage resources of local importance and therefore worthy of conservation

Field Ratings: General protection C (IV C): Phase 1 is seen as sufficient recording and it may be demolished (sites of Low Significance)

General protection B (IV B): site should be recorded before destruction (sites of Medium significance)

Impact of the development on the archaeological sites: All the sites fall within the proposed development footprint and will be impacted negatively to varying degrees. The impacts will be Negative and this impact needs to be mitigated

Mitigation: Detailed mapping of the sites to determine their extents, and the Surface collection of material to obtain a representative sample of Stone Age material and types to determine the age of the material and sites. For Stone Age sites 26-28 & 30-31 no mitigation is required as they fall outside of the development footprint and will not be negatively impacted.

Site 16 – Stone Kraal

This is a recent stone built kraal used as livestock enclosure (sheep). Although the exact age is not known, it is likely less than 60 years of age. It is not deemed of any historical/cultural heritage significance and the documentation done during the Phase 1 assessment is seen as sufficient and no mitigation is required.

Sites 2, 19-24 & Site 29 – Stone Cairns

A number of similar stone cairns were identified by Eco Leges in the study area during earlier site visits and indicated to the Heritage Specialist prior to his site assessments. During the June 2022 assessment a number of these stone cairns were identified in the study area, with Sites 19-24 and 29 represented by these features. It was found that many of these occur in pairs, with the pairs around 10m apart and the next set of pairs approximately 40m from each other in a line. On aerial images (Google Earth) of the area a dark line (confirmed as a dolerite dyke) is visible where these cairns are situated. The zones associated with the contact between the dolerite dyke and host rock are often targeted for groundwater development (drilling boreholes) specifically in the Karoo basin. Although it is possible that these cairns are marking potential drill sites, it is unlikely as the recorded cairns are located on top of the dyke, found in pairs opposite each other, with the pairs lining up with other pairs in nearly exact distances from each other. It is therefore seen as more likely being markers for an old road.

One of the stone cairns (Site 2) recorded is in another section of the study area and is possibly the remnant of an old farm boundary fence.

Although the age, origin and function of this possible old road is not known, it could date to the late 19th/early 20th century, with some cultural material dating to this period found in

association (Martini Henry cartridge). This was likely an old wagon road linking farmsteads with each other, as well as these with Hanover and other towns. From this point of view this road and related features (cairns) are relatively significant from a Cultural Heritage point of view and at least should in part be preserved. Stone cairns can be demolished in sections where they cannot be avoided by development actions. The exact age and historical origin should also be researched. The following is recommended:

1. Desktop Research on the age, origin and function of the road
2. Detailed mapping and photographic recording of the section of the road located in the development footprint
3. Preserving a section of the possible road located within the development footprint and the erection of Information Signage on the history of the road

A Heritage Specialist needs to be appointed to undertake the recommended work.

GPS Location of Sites: S30 49 51.20 E24 22 47.80 (**2**); S30 49 35.93 E24 20 53.40 (**16**); S30 50 01.90 E24 20 24.90 (**19**); S30 50 02.40 E24 20 25.40 (**20**); S30 50 03.40 E24 20 26.10 (**21**); S30 50 04.00 E24 20 26.10 (**22**); S30 50 03.80 E24 20 26.50 (**23**); S30 50 06.00 E24 20 27.30 (**24**); S30 50 09.30 E24 20 29.60 (**25**); S30 50 25.40 E24 20 17.40 (**29**).

Stone Cairns (Eco Leges): **S30 50 44.56 E24 21 04.46**

Cultural Significance: Low (Site 2 Stone Cairn & Site 16 Stone Kraal); Medium to High (Stone Cairns/Old wagon road)

Heritage Significance: Grade III: Other heritage resources of local importance and therefore worthy of conservation (Stone Age sites and Old Wagon Road)

Field Ratings: General protection A (IV A): Sites should be mitigated before destruction (High/Medium significance)

Impact of the development on the archaeological sites: The sites fall within the proposed development footprint and will be impacted negatively to varying degrees. The impacts will be Negative and this impact needs to be mitigated

Mitigation: Desktop Research on the age, origin and function of the road; Detailed mapping and photographic recording of the section of the road located in the development footprint & Preserving a section of the possible road located within the development footprint and the erection of Information Signage on the history of the road. For Site 29 no mitigation is required as it falls outside of the development footprint and will not be negatively impacted.



Figure 3: General view of a section of the study & development area.



Figure 4: Another general view.



Figure 5: Note the general flat and open nature of the area, but also the relatively dense vegetation cover on the ground.



Figure 6: A view showing the relatively dense grass cover characterizing the area.



Figure 7: Open patches/erosion areas exist and these were focused on during the assessment.



Figure 8: The waterlogged nature of large sections of the area during the assessment is evident here.



Figure 9: Another view of the waterlogged situation at the time of the assessment.



Figure 10: Most of the roads were impassable and the survey was conducted on foot in areas that could be accessed.



Figure 11: Another general view of a part of the study area.



Figure 12: Another section of the study and development area.



Figure 13: General view of the study & development area.



Figure 14: A view of a section of the area down an existing Eskom Powerline.



Figure 15: Low density scatter of MSA/LSA stone tools at Site 1.



Figure 16: Some of the stone tools at Site 3. This site has a relative high density of Stone Age material.



Figure 17: Some of the stone tools at Site 5. These artifacts were located in an erosion gully.



Figure 18: A view of the location of Site 5.



Figure 19: Some of the MSA/LSA stone tools from Site 7.



Figure 20: The general location of Site 10. Although only a low density scatter of material was found here, there are many similar open patches around this section.



Figure 21: Site 15 contained a relative high density of MSA/LSA stone tool, of which these are some examples.



Figure 22: A view of Site 15.



Figure 23: A view of Site 18.



Figure 24: A view of Site 16 stone kraal (livestock enclosure).



Figure 25: One of the stone cairns that formed part of the old wagon road/track (Sites 19-25).



Figure 26: A large stone cairn (Site 25) next to the old wagon road/track.



Figure 27: Late 19th/early 20th century Martini Henry cartridge next to the old wagon road/track.



Figure 28: Stone tools at Site 26. The material is located next to on Eskom servitude road.



Figure 29: Site 28 contained a relatively high density of MSA/LSA material.



Figure 31: Stone Age material at Site 27.



Figure 32: The distribution of sites found during the June 2022 field assessment in the proposed Soventix Solar Phase 3 Development Area (Google Earth 2022).



Figure 33: This image clearly shows the dolerite dyke (dark line) and possible old wagon road alignment with the stone cairns (Sites 19-25) on and next to it (Google Earth 2022).

From a Cultural Heritage point of view it can be said that the proposed development of a 400 MW Solar Photovoltaic (PV) facility and associated infrastructure (Phase 3) on the Remainder of Farm Goede Hoop 26C, Portion 3 of Farm Goede Hoop 26C and other properties, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa should be allowed to continue once the recommended mitigation measures related to the archaeological & historical sites and features have been implemented.

It should be noted that although all efforts are made to cover a total area during any assessment and therefore to identify all possible sites or features of cultural (archaeological and/or historical) heritage origin and significance, that there is always the possibility of something being missed. This will include low stone-packed or unmarked graves. This aspect should be kept in mind when development work commences and if any sites (including graves) are identified then an expert should be called in to investigate and recommend on the best way forward.

7. CONCLUSIONS AND RECOMMENDATIONS

APelser Archaeological Consulting cc was appointed by Ecoleges Environmental Consultants, on behalf of Soventix South Africa (Pty) Ltd, to undertake an Archaeological and Cultural Heritage Impact assessment related to the development of a 400 MW Solar Photovoltaic (PV) facility and associated infrastructure (Phase 3) on the Remainder of Farm Goede Hoop 26C, Portion 3 of Farm Goede Hoop 26C and other properties, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa. Previous archaeological and heritage assessments for the Goedehoop Solar PV Project (Phases 1 & 2) recorded a fairly large number of cultural heritage resources of varying extent and significance in the larger area. These included scatters of open-air surface Stone Age sites, rock engravings, later agro-pastoralist stone-walled sites, as well as historical Anglo-Boer War (1899-1902) sites.

Background research indicated that there are some cultural heritage (archaeological & historical) sites and features in the larger geographical area within which the study area fall, with a number recorded and identified during earlier (2017 & 2021) assessments on other farms and farm portions. The 2022 assessment identified and recorded more archaeological and historical sites, features and material in the proposed Phase 3 development areas.

A total of 31 sites and features were identified during the June 2022 field assessment. Most of these were open-air surface scatters of Stone Age material while some date to more recent historical times. Although the Stone Age sites and finds situated in the proposed development footprint are open-air surface locations and therefore not located in a primary & stratified context such as those in rock shelters and caves, it is believed that they could contribute to our knowledge of the Stone Age of the specific and larger geographical area.

The following mitigation measures are recommended prior to development commencing:

1. Detailed mapping of the sites to determine their extents, and

2. Surface collection of material to obtain a representative sample of Stone Age material and types to determine the age of the material and sites

The June 2022 assessment also identified a number of stone cairns in the study area, with Sites 19-24 and 29 represented by these features. Many of these occur in pairs, with the pairs around 10m apart and the next set of pairs approximately 40m from each other in a line. It was concluded that these features are likely markers for an old road. The age and origin of this possible old road is not known, but it possibly dates to between the late 19th and early 20th centuries, with some cultural material dating to this period found in association. This was likely an old wagon road linking farmsteads with each other, as well as these with Hanover and other towns. From this point of view this road and related features are fairly significant and should at least in part be preserved.

The following is recommended:

1. Desktop Research on the age, origin and function of the road
2. Detailed mapping and photographic recording of the section of the road located in the development footprint
3. Preserving a section of the possible road located within the development footprint and the erection of Information Signage on the history of the road

It needs to be mentioned once again that due to the inaccessibility of large sections as a result of these being waterlogged that there might be many more similar sites in the larger development area. It is however envisaged that most of these will be similar in nature to those already identified and recorded (mostly open-air surface scatters of Stone Age material).

Although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed as a result of grass cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.

Finally, from a Cultural Heritage point of view, it can be said that the proposed development of a 400 MW Solar Photovoltaic (PV) facility & associated infrastructure (Phase 3) on the Remainder of Farm Goede Hoop 26C, Portion 3 of Farm Goede Hoop 26C and other properties, between De Aar & Hanover in the Northern Cape Province, should be allowed to continue once the recommended mitigation measures related to the archaeological & historical sites and features have been implemented.

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APPENDIX A: DEFINITION OF TERMS:

Site: A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artifacts, found on a single location.

Structure: A permanent building found in isolation or which forms a site in conjunction with other structures.

Feature: A coincidental find of movable cultural objects.

Object: Artifact (cultural object).

(Also see Knudson 1978: 20).

APPENDIX B: DEFINITION/ STATEMENT OF HERITAGE SIGNIFICANCE

Historic value: Important in the community or pattern of history or has an association with the life or work of a person, group or organization of importance in history.

Aesthetic value: Important in exhibiting particular aesthetic characteristics valued by a community or cultural group.

Scientific value: Potential to yield information that will contribute to an understanding of natural or cultural history or is important in demonstrating a high degree of creative or technical achievement of a particular period

Social value: Have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.

Rarity: Does it possess uncommon, rare or endangered aspects of natural or cultural heritage.

Representivity: Important in demonstrating the principal characteristics of a particular class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province region or locality.

APPENDIX C: SIGNIFICANCE AND FIELD RATING:

Cultural significance:

- Low: A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings.
- Medium: Any site, structure or feature being regarded less important due to a number of factors, such as date and frequency. Also any important object found out of context.
- High: Any site, structure or feature regarded as important because of its age or uniqueness. Graves are always categorized as of a high importance. Also any important object found within a specific context.

Heritage significance:

- Grade I: Heritage resources with exceptional qualities to the extent that they are of national significance
- Grade II: Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate
- Grade III: Other heritage resources of local importance and therefore worthy of conservation

Field ratings:

- i. National Grade I significance: should be managed as part of the national estate
- ii. Provincial Grade II significance: should be managed as part of the provincial estate
- iii. Local Grade IIIA: should be included in the heritage register and not be mitigated (high significance)
- iv. Local Grade IIIB: should be included in the heritage register and may be mitigated (high/medium significance)
- v. General protection A (IV A): site should be mitigated before destruction (high/medium significance)
- vi. General protection B (IV B): site should be recorded before destruction (medium significance)
- vii. General protection C (IV C): phase 1 is seen as sufficient recording and it may be demolished (low significance)

APPENDIX D: PROTECTION OF HERITAGE RESOURCES:

Formal protection:

National heritage sites and Provincial heritage sites – Grade I and II

Protected areas - An area surrounding a heritage site

Provisional protection – For a maximum period of two years

Heritage registers – Listing Grades II and III

Heritage areas – Areas with more than one heritage site included

Heritage objects – e.g. Archaeological, palaeontological, meteorites, geological specimens, visual art, military, numismatic, books, etc.

General protection:

Objects protected by the laws of foreign states

Structures – Older than 60 years

Archaeology, palaeontology and meteorites

Burial grounds and graves

Public monuments and memorials

APPENDIX E: HERITAGE IMPACT ASSESSMENT PHASES

1. Pre-assessment or Scoping Phase – Establishment of the scope of the project and terms of reference.
2. Baseline Assessment – Establishment of a broad framework of the potential heritage of an area.
3. Phase I Impact Assessment – Identifying sites, assess their significance, make comments on the impact of the development and makes recommendations for mitigation or conservation.
4. Letter of recommendation for exemption – If there is no likelihood that any sites will be impacted.
5. Phase II Mitigation or Rescue – Planning for the protection of significant sites or sampling through excavation or collection (after receiving a permit) of sites that may be lost.
6. Phase III Management Plan – For rare cases where sites are so important that development cannot be allowed.