ENNEX DEVELOPMENTS: PROPOSED ESTABLISHMENT OF A SOLAR ENERGY FACILITY NEAR DE AAR, NORTHERN CAPE PROVINCE

Phase 1 Archaeological Impact Assessment Report

March 2012

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Compiled by N. Kruger

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ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF DEMARCATED SURFACE AREAS ON THE OF THE FARM VETLAAGTE 4, DE AAR, NORTHERN CAPE PROVINCE

March 2012

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NOTATIONS AND TERMS

Absolute dating:
Absolute dating provides specific dates or range of dates expressed in years.

Archaeology:
The study of the human past through its material remains.

Archaeological record:
The archaeological record minimally includes all the material remains documented by archaeologists. More comprehensive definitions also include the record of culture history and everything written about the past by archaeologists.

Artefact:
Entities whose characteristics result or partially result from human activity. The shape and other characteristics of the artifact are not altered by removal of the surroundings in which they are discovered. In the southern African context examples of artefacts include potsherds, iron objects, stone tools, beads and hut remains.

Assemblage:
A group of artefacts recurring together at a particular time and place, and representing the sum of human activities.

^{14}C or radiocarbon dating:
The ^{14}C method determines the absolute age of organic material by studying the radioactivity of carbon. It is reliable for objects not older 70 000 years by means of isotopic enrichment. The method becomes increasingly inaccurate for samples younger than ±250 years.

Ceramic Facies:
In terms of the cultural representation of ceramics, a facies is denoted by a specific branch of a larger ceramic tradition. A number of ceramic facies thus constitute a ceramic tradition.

Ceramic Tradition:
In terms of the cultural representation of ceramics, a series of ceramic units constitutes as ceramic tradition.

Context:
An artefact's context usually consists of its immediate *matrix*, its *provenience* and its *association* with other artefacts. When found in *primary context*, the original artefact or structure was undisturbed by natural or human factors until excavation and if in *secondary context,* disturbance or displacement by later ecological action or human activities occurred.

Culture:
A contested term, "culture" could minimally be defined as the learned and shared things that people have, do and think.

Cultural Heritage Resource:
The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural landscape:
A cultural landscape refers to a distinctive geographic area with cultural significance.

Cultural Resource Management (CRM):
A system of measures for safeguarding the archaeological heritage of a given area, generally applied within the framework of legislation designed to safeguard the past.

Ecofact:
Non artifactual material remains that has cultural relevance which provides information about past human activities. Examples would include remains or evidence of domesticated animals or plant species.

Excavation:
The principal method of data acquisition in archaeology, involving the systematic uncovering of archaeological remains through the removal of the deposits of soil and the other material covering and accompanying it.

Feature:
Non-portable artifacts, in other words artifacts that cannot be removed from their surroundings without destroying or altering their original form. Hearths, roads, and storage pits are examples of archaeological features

GIS:
Geographic Information Systems are computer software that allows layering of various types of data to produce complex maps; useful for predicting site location and for representing the analysis of collected data within sites and across regions.

Historical archaeology:
Primarily that aspect of archaeology which is complementary to history based on the study of written sources. In the South African context it concerns the recovery and interpretation of relics left in the ground in the course of Europe's discovery of South Africa, as well as the movements of the indigenous groups during, and after the "Great Scattering" of Bantu-speaking groups – known as the *mfecane* or *difaqane*.

Iron Age:
Also known as "Farmer Period", the "Iron Age" is an archaeological term used to define a period associated with domesticated livestock and grains, metal working and ceramic manufacture.

Lithic:
Stone tools or waste from stone tool manufacturing found in on archaeological sites.

Matrix:
The material in which an artefact is situated (sediments such as sand, ashy soil, mud, water, etcetera). The matrix may be of natural origin or human-made.

Megalith:
A large stone, often found in association with others and forming an alignment or monument, such as large stone statues.

Midden:
Refuse that accumulates in a concentrated heap.

Microlith:
A small stone tool, typically knapped of flint or chert, usually about three centimetres long or less.

Monolith:
A geological feature such as a large rock, consisting of a single massive stone or rock, or a single piece of rock placed as, or within, a monument or site.

Oral Histories:
The historical narratives, stories and traditions passed from generation to generation by word of mouth.

Pre-Phase 1 CRM Assessment:
An initial pre-assessment (scoping) phase, where the specialist establishes the scope of the project and terms of reference for the developer.

Phase 1 CRM Assessment:
An Impact Assessment which identifies archaeological and heritage sites, assesses their significance and comments on the impact of a

given development on the sites. Recommendations for site mitigation or conservation are also made during this phase.

Phase 2 CRM Study:

In-depth studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required. Mitigation / Rescue involves planning the protection of significant sites or sampling through excavation or collection (in terms of a permit) at sites that may be lost as a result of a given development.

Phase 3 CRM Measure:

A Heritage Site Management Plan (for heritage conservation), is required in rare cases where the site is so important that development will not be allowed and sometimes developers are encouraged to enhance the value of the sites retained on their properties with appropriate interpretive material or displays.

Prehistoric archaeology:

That aspect of archaeology which concerns itself with the development of humans and their culture before the invention of writing. In South Africa, prehistoric archaeology comprises the study of the Early Stone Age, the Middle Stone Age and the greater part of the Later Stone Age and the Iron Age.

Probabilistic Sampling:

A sampling strategy that is not biased by any person's judgment or opinion. Also known as statistical sampling, it includes systematic, random and stratified sampling strategies.

Provenience

Provenience is the three-dimensional (horizontal and vertical) position in which artefacts are found. Fundamental to ascertaining the provenience of an artefact is *association,* the co-occurrence of an artefact with other archaeological remains; and *superposition,* the principle whereby artefacts in lower levels of a matrix were deposited before the artefacts found in the layers above them, and are therefore older.

Random Sampling:

A probabilistic sampling strategy whereby randomly selected sample blocks in an area are surveyed. These are fixed by drawing coordinates of the sample blocks from a table of random numbers.

Relative dating:

The process whereby the relative antiquity of sites and objects are determined by putting them in sequential order but not assigning specific dates.

Remote Sensing:

The small or large-scale acquisition of information of an object or phenomenon, by the use of either recording or real-time sensing device(s) that is not in physical or intimate contact with the object (such as by way of aircraft, spacecraft or satellite). Here, ground-based geophysical methods such as Ground Penetrating Radar and Magnetometry are often used for archaeological imaging.

Rock Art Research:

Rock art can be "decoded" in order to inform about cultural attributes of prehistoric societies, such as dress-code, hunting and food gathering, social behaviour, religious practice, gender issues and political issues.

Sensitive:

Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains.

Site (Archaeological):

A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity. These include surface sites, caves and rock shelters, larger open-air sites, sealed sites (deposits) and river deposits. Common functions of archaeological sites include living or habitation sites, kill sites, ceremonial sites, burial sites, trading, quarry, and art sites,

Slag:

The material residue of smelting processes from metalworking.

Stone Age:
An archaeological term used to define a period of stone tool use and manufacture.

Stratigraphy:
This principle examines and describes the observable layers of sediments and the arrangement of strata in deposits

Stratified Sampling:
A probabilistic sampling strategy whereby a study area is divided into appropriate zones – often based on the probable location of archaeological areas, after which each zone is sampled at random.

Systematic Sampling:
A probabilistic sampling strategy whereby a grid of sample blocks is set up over the survey area and each of these blocks is equally spaced and searched.

Tradition:
Artefact types, assemblages of tools, architectural styles, economic practices or art styles that last longer than a phase and even a horizon are describe by the term *tradition*. A common example of this is the early Iron Age tradition of Southern Africa that originated ± 200 AD and came to an end at about 900 AD.

Tuyère:
A ceramic blow-tube used in the process of iron smelting / reduction.

LIST OF ABBREVIATIONS

Abbreviation	Description
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
K2/Map	K2/Mapungubwe Period
LFP	Later Farmer Period (also Later Iron Age)
LIA	Later Iron Age (also Later Farmer Period)
LSA	Later Stone Age
MIA	Middle Iron Age (also Early later Farmer Period)
MRA	Mining Rights Application
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)

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1 EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study of surface portions of the farm Vetlaagte 4, subject to an Environmental Impact Assessment (EIA) for Ennex Developments in the Northern Cape Province. The study was requested for the proposed construction of a Solar Energy Facility east of the town of De Aar. The report includes background information on the area's archaeology, its representation in southern Africa, and the history of the larger area under investigation, survey methodology and results as well as heritage legislation and conservation policies. A copy of the report will be supplied to the South African Heritage Resources Agency (SAHRA) and recommendations contained in this document will be reviewed in order to consider the conservation priority of sites located in the area.

A number of academic archaeological and historical studies, as well as Heritage Impact Assessments have been conducted in the De Aar area. These studies all infer a rich and diverse archaeological landscape. Similarly, a number of areas of high archaeological and heritage potential were located during the AIA survey which focused on a total surface area of approximately 1500ha.

Palaeontology:

A Palaeontological assessment by Dr John Almond (Natura Viva cc) concluded that the solar power developments do not pose a significant cumulative impact on local fossil heritage as no vertebrate fossils were observed within the Lower Beaufort Group rocks that are very poorly exposed in the southern portion of the study area. However, cognisance should be taken of various trace fossils, silicified woods and rare vertebrate remains of the Middle Permian *Pristerognathus* Assemblage Zone occurring from these successions elsewhere in the De Aar area (Almond 2010b).

Stone Age:

The abundance of locally available raw material implies a prominent Stone Age presence and specifically Middle Stone Age (MSA) artefacts consisting of cores, blades and scrapers occur widely in the area. Three rich MSA scatters occur along the eastern periphery of the study area along a minor drainage line which extends from the south to the north to become a tributary of the Brak River, north of the property. Vetlaagte's MSA representations are of particular interest due to the high density of the scatters and a specialist analysis of lithics from the site will provide an understanding of the development and spread of the MSA in the Northern Cape and Karoo areas. It is therefore recommended that a qualified, ASAPA accredited Stone Age specialist conduct a Phase 2 specialist study on MSA occurrences at Vetlaagte, in view of the medium to high significance rating for these scatters. This study should minimally include a surface sampling and consequent analysis of the stone artefacts along the drainage line on the east border of the property, in order to elucidate the understanding of the development and spread of the MSA in the area. In addition, a careful watching brief monitoring process is recommended for any developments at the site. Should any subsurface paleontological / archaeological material be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately.

Another low density scatter of MSA lithics with single blades and scrapers was identified along the north western border of the property and the study area. The site is of low significance and it is recommended that site monitoring be done if any construction takes place in the vicinity of this site.

Historical/ Colonial Period & Graves:

Historical period remnants, in the form of the old Vetlaagte homestead and a dilapidated dam wall constructed in the drainage line east of the farmstead, occur in the general landscape. The farmstead, consisting out of a restored farm house, outbuildings, midden and labourers quarters is situated in an area excluded from the Solar Energy Facility development. A small family graveyard, associated with the farmstead at Vetlaagte, also occurs in the exclusion zone. The cemetery contains a single grave of a former farm owner who passed away in the 1933. Even though the Vetlaagte farmstead and graveyard occurs in an area excluded from the proposed development, these sites are of heritage conservation priority and it is recommended that a 100m conservation buffer zone be maintained around these features during all phases of development and operation of the Solar Energy Facility. As the dam wall situated in drainage line east of the farmstead has been largely destroyed, the site is of low significance and it is recommended that site monitoring be done if any construction takes place in the vicinity of this site.

It is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites in the area. Here, care should be taken around dolomite koppies in the larger landscape, as rock art is known to occur on these outcrops. Water sources such as drainage lines and pans should also be regarded as potentially sensitive in terms of possible Stone Age deposits. The possible existence of Historical Period resources deriving from the Ango-Boer War or the area's Colonial farming history should also be considered. Finally, the distribution of potentially fossiliferous sedimentary rocks of Palaeozoic and younger Quaternary age should be observed in order to avoid destruction of palaeontological remains.

Generally, a careful watching brief monitoring process is recommended for all stages of the project, specifically around heritage sensitive areas i.e. MSA scatters and historical period structures and features. Should any subsurface paleontological, archaeological or historical material be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately

This report details the methodology, limitations and recommendations relevant to these heritage areas, as well as areas of proposed development. It should be noted that mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

2 BACKGROUND

2.1 Scope and Motivation

AGES was appointed by Ennex Developments for an Archaeological Impact Assessment (AIA) study of surface portions of the farm Vetlaagte 4, subject to the development of a Solar Energy Facility (see Figure 2-1). The rationale of the AIA study was to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance; to consider the impact of the proposed project on such heritage resources, and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

2.2 Project Direction

AGES's expertise ensures that all projects be conducted to the highest international ethical and professional standards. As archaeological specialist for AGES, Mr Neels Kruger acted as field director for the project; responsible for the assimilation of all information, the compilation of the final AIA report and recommendations in terms of heritage resources on the demarcated project areas. Mr Kruger is an accredited archaeologist and Culture Resources Management (CRM) practitioner with the Association of South African Professional Archaeologists (ASAPA), a member of the Society for Africanist Archaeologists (SAFA) and the Pan African Archaeological Association (PAA) as well as a Master's Degree candidate in archaeology at the University of Pretoria.

2.3 Project Description

The proposed activity includes the establishment of a Solar Energy Facility. Typically, such facilities would include associated infrastructure such as:

- Photovoltaic components consisting out of numerous arrays of photovoltaic panels and inverters.
- Power lines to connect to the existing ESKOM Hydra Substation.
- On-site substations to facilitate the connection between the facility and power lines.
- Temporary waste storage facilities.
- Internal and external access roads.
- Maintenance buildings, lay down areas, and a site office.

2.4 Terms of Reference

Environmental Impact Assessments (EIAs) should, in all cases, include the assessment of Heritage Resources. The heritage component of the EIA is provided for in the **National Environmental Management Act, (Act 107 of 1998)** and endorsed by section 38 of the **National Heritage Resources Act (NHRA - Act 25 of 1999)**. In addition, the NHRA protects all structures and features older than 60 years (see Section 34), archaeological sites and material (see Section 35) and graves as well as burial sites (see Section 36). The objective of this legislation is to enable and to facilitate developers to employ measures to limit the potentially negative effects that the development could have on heritage resources. Based hereon, this project functioned according to the following **terms of reference:**

- *Provide a detailed description of all archaeological artefacts, structures (including graves) and settlements, if any.*
- *Estimate the level of significance/importance of the archaeological remains within the area.*

- *Assess any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities.*
- *Propose possible mitigation measures provided that such action is necessitated by the development.*
- *Liaise and consult with the South African Heritage Resources Agency (SAHRA).*

2.5 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

2.5.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

- *National Heritage Resources Act No 25 of 1999, section 35*

According to the National Heritage Resources Act of 1999 a historical site is "any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years." This clause is commonly known as the "60-years clause". Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. "Tell" refers to the evidence of human existence which is no longer above ground level, such as building foundations and buried remains of settlements (including artefacts).

The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa including archaeological and palaeontological objects, meteorites and rare geological specimens
- visual art objects
- military objects
- numismatic objects
- objects of cultural and historical significance
- objects to which oral traditions are attached and which are associated with living heritage
- objects of scientific or technological interest
- any other prescribed category

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority-

(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 which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."

And:

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

(a) destroy, damage, alter, exhume or remove from its original position or 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, 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;

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."

- *Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925*

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

2.5.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'Generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs

and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites. The National Heritage Resources Act (Act No. 25 of 1999, section 38) provides guidelines for Cultural Resources Management and prospective developments:

"38. *(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as:*

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50 m in length;

(c) any development or other activity which will change the character of a site:

(i) exceeding 5 000 m^2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."

And:

"The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and

(g) plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64)."

Consequently, section 35 of the Act requires Heritage Impact Assessments (HIA's) or Archaeological Impact Assessments (AIAs) to be done for such developments in order for all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic or technological value or significance to be protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects.

3 REGIONAL CONTEXT

3.1 Area Location

The study area is located approximately 10km east of the town of De Aar on surface portions of the farm Vetlaagte Portion 4, generally at **S30°40'11.14" E24°05'45.47"**. De Aar is situated in the Northern Cape Province, approximately 220km south-east of the Northern Cape town of Kimberley.

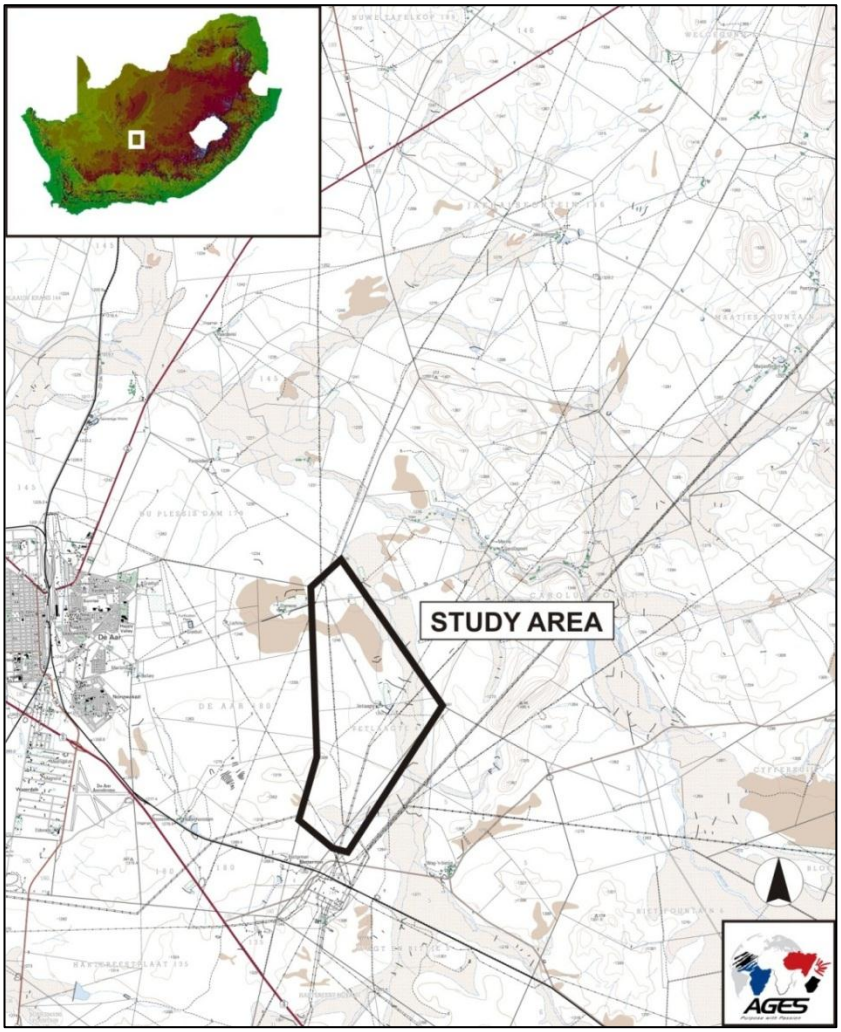

Figure 3-1: 1:50 00 Map representation of the ENNEX Solar Energy Facility project location on the farm Vetlaagte 4 (3024CA).

3.2 Area Description: Receiving Environment

The environment around De Aar is characterised by flat undulating Karoo vegetation comprised out of relatively sparse scrub and grasses, with dolerite hills in the surrounding landscape. Large portions of the land is currently devoted to livestock farming but a number of solar energy facilities are to be constructed on farms around De Aar. Shallow soils covers a combination of calcrete, shale and dolerite substrates, and large sections in the landscape are exposed to sheet erosion, specifically along low lying areas and drainage lines. Dolerite and sandstone is present, while exotic rocks occur in the gravel of the Orange River bed and terraces. These provided suitable material for stone tool production during the Earlier, Middle and Later Stone Ages.

Figure 3-2: Panorama image of general surroundings in the study area, looking east towards the Vetlaagte farmstead.

3.3 Site Description

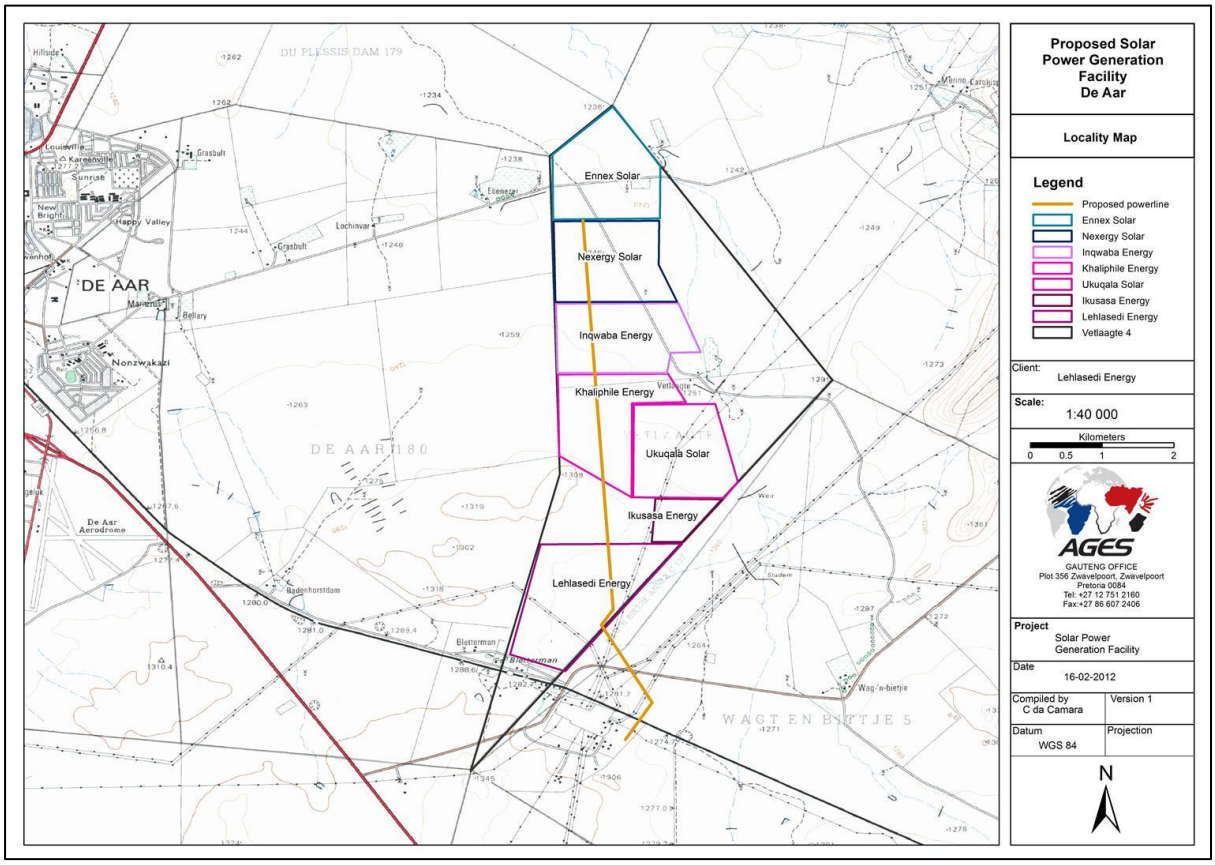

Figure 3-3: Proposed portions on the farm Verlaagte, subject to the ENNEX Solar Energy Facility project.

The study area subject to the Ennex Solar Energy Facility project is situated to the east of De Aar on the farm Vetlaagte 4. The site is characterised by a large grass and scrub covered plain, delimited by a minor drainage line to the east and a series of dolerite outcrops to the west. The landscape is generally covered in natural vegetation but surface disturbances occur in the study area, primary as a result of natural agents such as erosion.

The Solar Energy Facility will cover 13 portions of Vetlaagte. These portions do not include the Vetlaagte homestead or the dolerite outcrops on the western periphery of the property (See Figure 3-3).

4 METHOD OF ENQUIRY

4.1 Sources of Information

4.1.1 Desktop Study

A desktop study was prepared in order to contextualize the proposed project within a larger historical milieu. The study focused on relevant previous studies, archaeological and archival sources, aerial photographs, historical maps and local histories, all pertaining to the De Aar area and the larger landscape of this section of the Northern Cape Province. Several previous Archaeological Research or Heritage Impact Assessment Reports (e.g. Morris 2006, 2007; Richardson 2001; Sampson 1985; Van Jaarsveld 2006; Van Schalkwyk 2011) were consulted for the desktop study.

4.1.2 Aerial Representations and Survey

Aerial photography is often employed to locate and study archaeological sites, particularly where larger scale area surveys are performed. This method was applied to aid the pedestrian survey of Vetlaagte and surroundings, where contour lines of elevations, depressions, variation in vegetation, soil marks and landmarks were examined (see Figure 4-1).

Figure 4-1: Aerial representation of Vetlaagte, indicating areas identified as possible archaeological sites / disturbances prior to site survey.

Specific attention was given to shadow sites (shadows of walls or earthworks which are visible early or late in the day), crop mark sites (crop mark sites are visible because disturbances beneath crops cause variations in their

height, vigour and type) and soil marks (e.g. differently coloured or textured soil (soil marks) might indicate ploughed-out burial mounds). Attention was also given to moisture differences, as prolonged dampening of soil as a result of precipitation frequently occurs over walls or embankments. By superimposing high frequency aerial photographs with images generated with Google Earth, potential sensitive areas were subsequently identified. These areas served as referenced points from where further pedestrian surveys were carried out.

4.1.3 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. An archaeological survey of areas to be impacted by the Solar Energy Facility project was done by means of a systematic pedestrian and vehicular survey in accordance with standard archaeological practise by which heritage resources are observed and documented. In order to sample surface areas systematically and to ensure a high probability of site recording, a transect grid system at a frequency of between 50m and 100m was digitally superimposed on maps of the infrastructure development areas. This system was then applied as guide for the survey. Moving along the transect grid with a Garmin E-trex Legend GPS, objects and structures of archaeological / heritage value were recorded and photographed with a Canon 450D Digital camera.

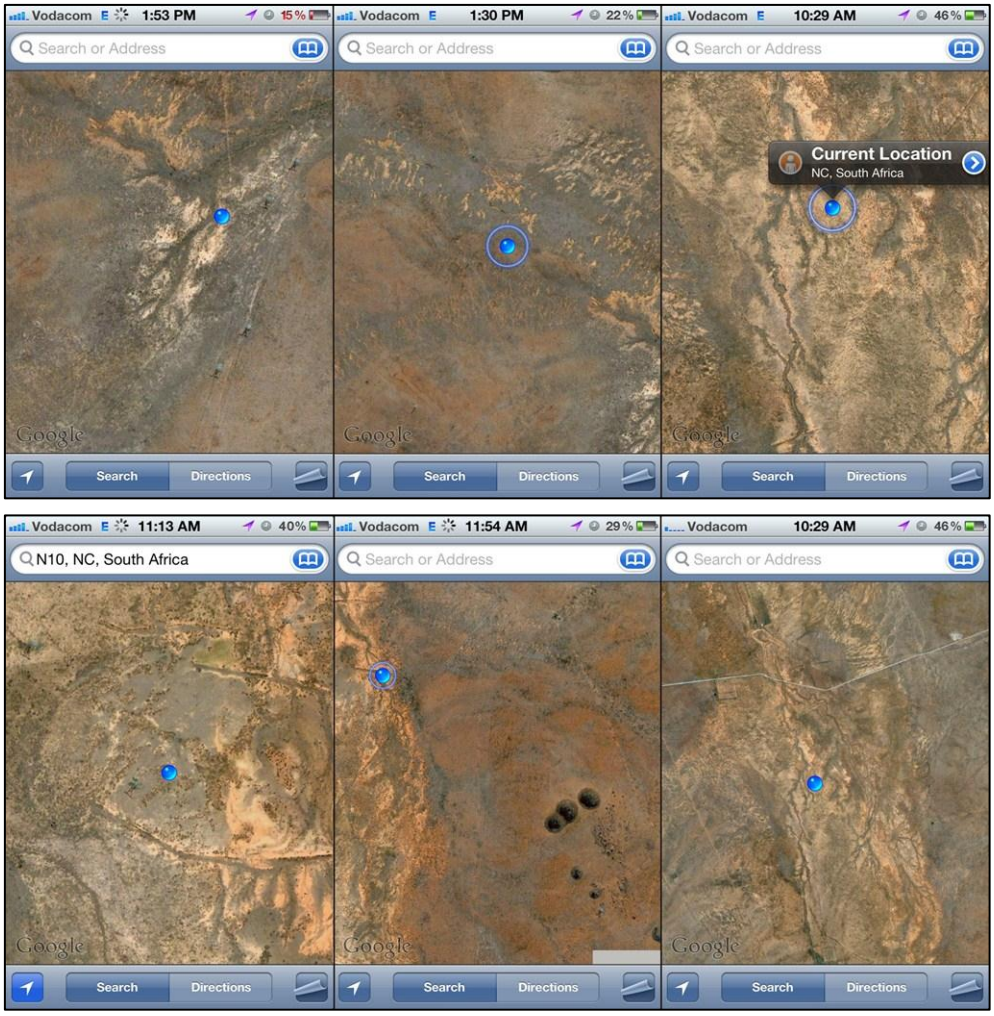

Figure 4-2: Captured screen contents of real time mobile aerial orientation representations employed during the field survey, current location indicated by blue marker.

The pedestrian and vehicular survey also focused around potentially sensitive areas identified during the aerial survey (see Figure 4-1) as well as areas of higher site catchment probability – for example around water sources such as pans and drainage lines. Real time aerial orientation, by means of a mobile Google Earth application was also employed to investigate possible disturbed areas during the survey (see Figure 4-2). As most archaeological material occur in single or multiple stratified layers beneath the soil surface, special attention was given to disturbances, both man-made such as roads and clearings, as well as those made by natural agents such as burrowing animals and erosion.

4.1.4 General Public Liaison

Consultation with the landowner and the on-site farm manager provided information on the general history of the area and the location and frequency of archaeological and historical sites on Vetlaagte. In addition, they also provided brief commentaries on the recent history of Vetlaagte.

4.2 Limitations

4.2.1 Access

Access control is applied to the property and small farm roads provide access to most areas relevant to this assessment. In addition, main and secondary roads provided access to areas surrounding Vetlaagte and to De Aar. No access constraints or restrictions were encountered during the field survey.

4.2.2 Visibility

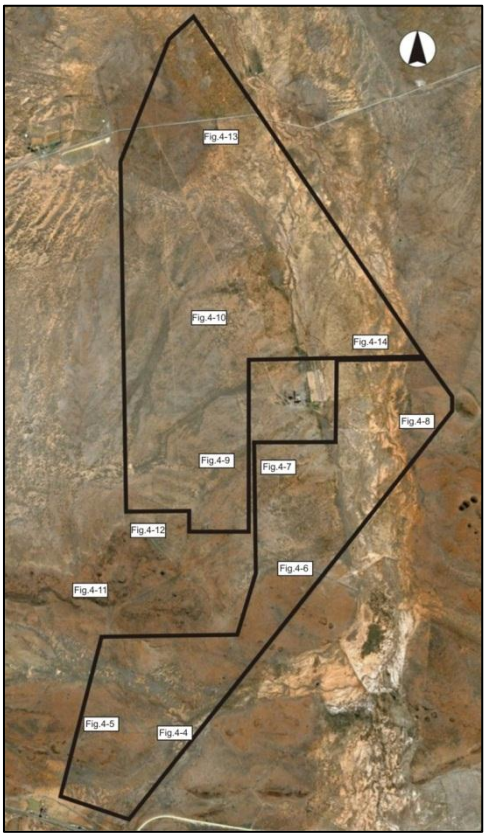

Figure 4-3: Aerial photograph indicating locations from where site photographs (Figures 4-4 to 4-14) were captured.

The surrounding vegetation in the De Aar area is mostly comprised out of mixed and sparsely scattered Karoo scrub and grasses with the occurrence of semi-arid succulents in places. The general visibility at the time of the AIA survey (January 2012) was moderate to high as a result of scant vegetation cover and surface disturbances in some areas (see Figures 4-4 to 4-14). However, grass cover restricted surface visibility in some areas. In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits.

Figure 4-4: Minor drainage line on the southern portion of Vetlaagte, looking east.

Figure 4-5: Minor drainage line on the south-western portion of Vetlaagte, looking east.

Figure 4-6: Eroded minor drainage line to the south-east of Vetlaagte, looking north-east.

Figure 4-7: View of the general surroundings south of the Vetlaagte farmstead, looking east.

Figure 4-8: Eroded drainage line east of the Vetlaagte farmstead, looking south.

Figure 4-9: View of general surroundings west of the Vetlaagte farmstead, looking east.

Figure 4-10: View grassy plains on the north-western portion of Vetlaagte, looking east.

Figure 4-11: View of Dolerite outcrops on the western periphery of Vetlaagte, looking south towards the ESKOM Hydra Substation.

Figure 4-12: View of the general surroundings at Vetlaagte, looking east towards the Vetlaagte farmstead in the distance.

Figure 4-13: View of grassy plains next to the drainage line in the northern portion of Vetlaagte, looking south.

Figure 4-14: Eroded drainage line north of the Vetlaagte farmstead, looking south.

4.2.3 Limitations and Constraints

Generally, time restrictions in terms of the site survey proved to be a constraint due to the vast surface extent of the larger project area. Therefore, pedestrian and vehicular site surveys focused around areas tentatively identified as sensitive and of high heritage probability (i.e. along drainage lines and pans and those noted during the aerial survey). Even though it might be assumed that survey findings are representative of the heritage landscape of Vetlaagte, it should be stated that the possibility exists that individual sites could be missed due to the localised nature of some heritage remains as well as the possible presence of sub-surface archaeology.

Thus, maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should be stated that the heritage resources identified during the study do not necessarily represent *all* the heritage resources present on the property. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

5 RESULTS: ARCHAEOLOGICAL SURVEY

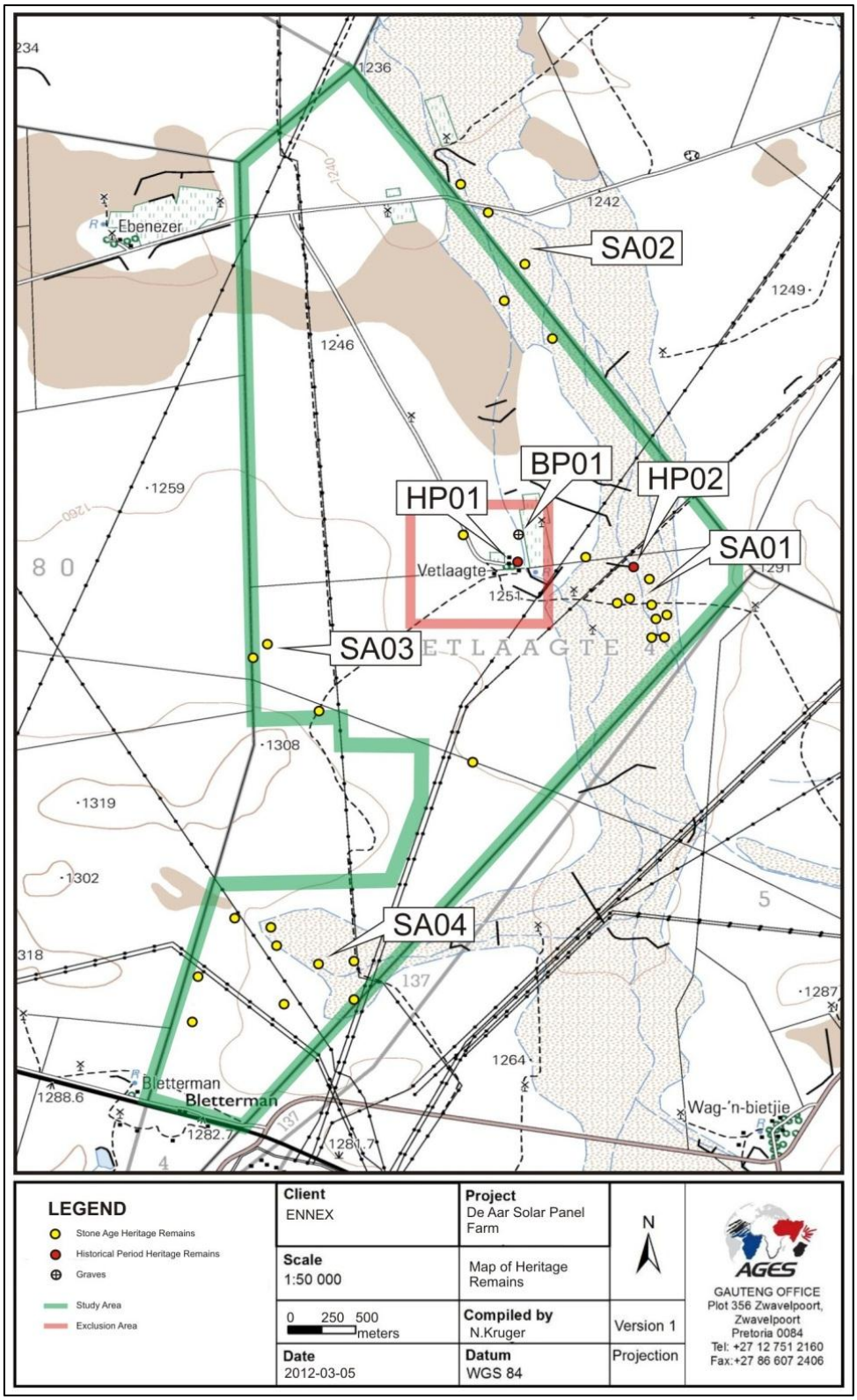

Figure 5-1: Map indicating the locations of archaeological and historical sites discussed in the text.

5.1 The Stone Age

Middle Stone Age and Later Stone Age scatters and quarries occur frequently around hills and on plains between dolerite hills and outcrops in the De Aar area. This presence of Stone Age people in the landscape can probably be attributed to the abundance of locally available raw material for the manufacture of stone tools.

- **Site SA01: S30°40'14.76" E24° 06'38.22" (MSA Scatter)**
- **Site SA02: S30°39'00.54" E24° 06'00.42" (MSA Scatter)**
- **Site SA04: S30°41'59.09" E24° 05'30.97" (MSA Scatter)**

The archaeological surveys of Vetlaagte generally concentrated around the 13 Portions directly associated with the proposed locations of the Solar Farm layout. During the survey, widespread Middle Stone Age (MSA) material, including characteristic formal MSA stone tools such as points, blades and scrapers (see Figures 5-6 - 5-10) were documented in the survey area along a north-south oriented drainage on the eastern periphery of the property. The lithic remains occur in three large scatters and, almost without exception, in low lying areas along non-perennial drainage lines and wetland areas where precipitation and groundwater have exposed the stone tools, originally deposited on a decomposed calcrete rock layer approximately 30cm sub surface.

Preliminary examinations of some of the lithics indicated that a number of flakes displayed facetted platforms, characteristic of the MSA. Here, prepared cores show evidence of the use of the Levallois technique, where surfaces on the core are shaped in order to generate a specific formal tool when flaked from the core. Use wear and marks are clearly visible on formal tools. Artefacts are generally made from locally available fine-grained materials.

Figure 5-2: Site SA01: MSA artefact and debris scatters in drainage line at Vetlaagte.

Figure 5-3: Site SA02: MSA artefact and debris scatters in drainage line at Vetlaagte.

Figure 5-4: Site SA04: MSA artefact and debris scatters in drainage line at Vetlaagte.

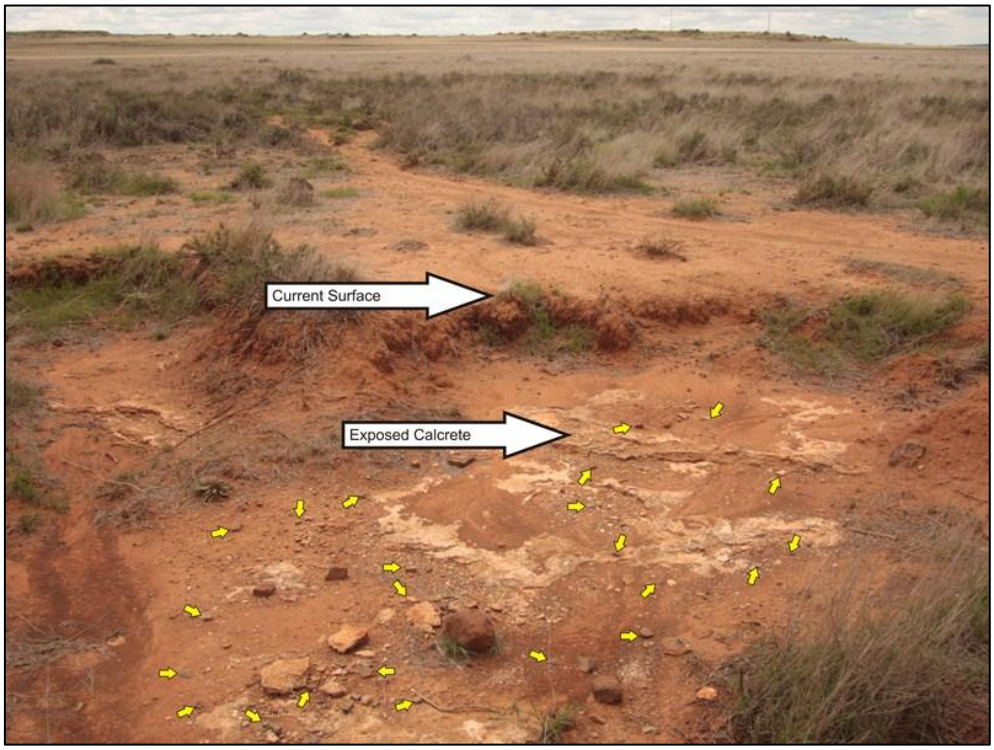

Figure 5-5 Around Site SA04, indicating the current surface, and eroded Calcrete where lithics has been exposed as a result of erosion (yellow arrows).

Figure 5-6: Formal MSA stone tools from Vetlaagte: point (left), blade (centre) round scraper (right).

Figure 5-7: MSA stone cores, flakes and debris from Vetlaagte.

Figure 5-8: Weathered formal MSA stone point from Vetlaagte.

Figure 5-9: Weathered formal MSA stone blades from Vetlaagte.

Figure 5-10: Formal MSA stone scrapers from Vetlaagte.

In addition, a low density scatter of MSA debris was identified along the north western border of the property and the study area.

- **Site SA03: S30°40'37.94" E24° 05'27.13" (MSA Scatter)**

At the site, single blades and scrapers occur along with flakes and debris (see Figure 5-11).

Figure 5-11: MSA stone scrapers from Site SA03 on Vetlaagte.

5.2 The Iron Age (Farmer Period)

No Iron Age (Farmer Period) occurrences were observed in the survey area.

5.3 Historical / Colonial Period and recent times

Historical period remains, specifically the old Vetlaagte homestead with restored farm house, outbuildings, midden and labourers quarters, as well as a dilapidated dam wall constructed in the drainage line east of the farmstead are present on the property.

- **Site HP01: S30°40'18.62" E24°06'09.08" (Vetlaagte Farmstead)**
- **Site HP02: S30°40'19.19" E24°06'37.97" (Dilapidated Dam Wall)**

The date of construction of the farm house is denoted by a year count ("1930") on the front gable of the structure. The entire farmstead is situated in an area excluded from the solar farm development. The small dam wall channel east of the farmstead, situated inside areas to be developed, was constructed out of cement and stone but has largely been destroyed. The structure is therefore of little heritage value.

Figure 5-12: Site HP01: The Vetlaagte farmstead.

Figure 5-13: Site HO02: Dilapidated Historical Period dam wall channel.

5.4 Graves

A small family graveyard, associated with the farmstead at Vetlaagte, also occurs in the exclusion zone about 100m north of the farm house.

- **Site BP01: S30°40'11.00" E24° 06'11.62" (Du Plessis Grave)**

The cemetery contains a single grave of a former farm owner who passed away in the 1933. The inscription on the grave reads:

Hier is begrawe my Eggenoot en ons Vader
Johannes Lodewikus du Plessis
Geb. 29 Nov. 1895
Oorl. 19 Maart 1933

Figure 5-14: Site BP01: Grave of J.L du Plessis, north of the Vetlaagte farmstead.

5.5 Other: Palaeontology[1]

The Ecca and Beaufort Group sediments in the De Aar area generally have a moderate to high palaeontological sensitivity. However, the potentially fossiliferous sediments of the Karoo Supergroup that underlie the study area are almost entirely mantled in a thick layer of superficial deposits of probable Pleistocene to Recent age. They include various soils, gravels and – at least in some areas - a well-developed calcrete hardpan. The upper Ecca Group bedrocks in the De Aar area contain locally abundant fossil wood (of palaeontological interest for dating and palaeoenvironmental studies) as well as low diversity trace fossil assemblages typical of the Waterford Formation, rather than the Tierberg Formation as mapped. No vertebrate fossils were observed within the Lower Beaufort Group rocks that are very poorly exposed in the southern portion of the study area. However, various trace fossils, silicified woods and rare vertebrate remains (therapsids, parareptiles) of the Middle Permian *Pristerognathus* Assemblage Zone have recently been recorded elsewhere from these successions in the De Aar area (Almond 2010b). Jurassic dolerite sill and dyke rocks here are entirely unfossiliferous (igneous intrusions), as are rare kimberlite pipes of Cretaceous age.

The diverse superficial deposits in the study region are of low palaeontological sensitivity as a whole.

[1] Refer to Almond, J. E. 2012. Palaeontological Specialist Study - combined desktop and field-based assessments: Proposed solar power generation facilities on the remaining extent of the farm Vetlaagte No. 4, De Aar, Northern Cape Province. Cape Town: Natura Viva cc

Calcretized rhizoliths (root casts) and possible invertebrate burrows of probable Quaternary age were observed during recent field studies in the De Aar region (Almond 2010a). Good examples of silicified Ecca fossil woods are recorded from gravels directly overlying Ecca bedrock as well as reworked into surface gravels in the present study area. Fossil wood material probably occurs widely in similar settings throughout the Ecca Group outcrop area, albeit often buried beneath superficial deposits

Fossils exposed at the surface or underground may be damaged, disturbed or sealed-in during the construction phase of the proposed solar energy facilities on Vetlaagte near De Aar. However these developments are all inferred to be of low significance in terms of palaeontological heritage resource conservation because:

- The potentially fossiliferous Karoo Supergroup rocks within the development footprints (solar panel arrays, transmission lines, roads and other infrastructure) are generally buried beneath a mantle of fossil-poor superficial sediments (soils, gravels, calcretes);

- The Karoo Supergroup rocks are often extensively disrupted by near-surface secondary calcrete formation. Baking by dolerite intrusion has often further compromised their original fossil heritage;

- The solar energy facilities each have a small footprint while extensive, deep bedrock excavations are not envisaged for this sort of alternative energy development.

6 ARCHAE0-HISTORICAL CONTEXT

6.1 The archaeology of Southern Africa

Archaeology in southern Africa is typically divided into two main fields of study, the **Stone Age** and the **Iron Age** or **Farmer Period**. The following table gives a concise outline of the chronological sequence of periods in Southern African history:

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: *Australopithecines* *Homo habilis* *Homo erectus*	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First *Homo sapiens* species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	*Homo sapiens sapiens* including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period 300 – 900 AD	Holocene	First Bantu-speaking groups	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Middle Iron Age (Mapungubwe / K2) / early Later Farmer Period 900 – 1350 AD	Holocene	Bantu-speaking groups, ancestors of present-day groups	Typically distinct ceramics, bead ware and iron / gold / copper objects, trade goods and grinding stones.
Late Iron Age / Later Farmer Period	Holocene	Various Bantu-speaking groups including Venda,	Distinct ceramics, grinding stones, iron objects, trade objects, remains of iron smelting activities

1400 AD -1850 AD		Thonga, Sotho-Tswana and Zulu	including iron smelting furnace, iron slag and residue as well as iron ore.
Historical / Colonial Period ±1850 AD – present	Holocene	Various Bantu-speaking groups as well as European farmers, settlers and explorers	Remains of historical structures e.g. homestead, missionary schools etc. as well as, glass, porcelain, metal and ceramics.

6.1.1 The Stone Ages

- **The Earlier Stone Age (ESA)**

Earlier Stone Age deposits typically occur on the flood-plains of perennial rivers and may date to between 2 million and 250 000 years ago. These ESA open sites sometimes contain stone tool scatters and manufacturing debris ranging from pebble tool choppers to core tools such as handaxes and cleavers. These stone tools were made by the earliest hominins. These groups seldom actively hunted and relied heavily on the opportunistic scavenging of meat from carnivore fill sites.

- **The Middle Stone Age (MSA)**

The majority of Middle Stone Age (MSA) sites occur on flood plains and sometimes in caves and rock shelters. Sites usually consist of large concentrations of knapped stone flakes such as scrapers, points and blades and associated manufacturing debris. Tools may have been hafted but organic materials, such as those used in hafting, seldom remain preserved in the archaeological record. Limited drive-hunting activities are also associated with the MSA.

- **The Later Stone Age (LSA)**

Sites dating to the Later Stone Age (LSA) are better preserved in rock shelters, although open sites with scatters of mainly stone tools can occur. Well-protected deposits in shelters allow for stable conditions that result in the preservation of organic materials such as wood, bone, hearths, ostrich eggshell beads and even bedding material. By using San (Bushman) ethnographic data a better understanding of this period is possible. South African rock art is also associated with the LSA.

6.1.2 The Iron Age (Farmer Period)

- **Early Iron Age (Early Farming Communities)**

The Early Iron Age (also Early Farmer Period) marks the movement of Bantu speaking farming communities into South Africa at around 200 A.D. These groups were agro-pastoralists that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Artefact evidence from Early Farmer Period sites is mostly found in the form of ceramic assemblages and the origins and archaeological identities of this period are largely based upon ceramic typologies and sequences, where diagnostic pottery assemblages can be used to infer group identities and to trace movements across the landscape. Early Farmer Period ceramic traditions are classified by some scholars into different “streams” or trends in pot types and decoration that, over time emerged in southern Africa. These “streams” are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). More specifically, in the northern regions of South Africa at least three settlement phases have been distinguished for prehistoric Bantu-speaking agropastoralists. The first phase of the Early Iron Age, known as Happy Rest (named after the site where the ceramics were first identified), is representative of the Western Stream of migrations, and dates to AD 400 - AD 600. The second phase of Diamant is dated to AD 600 - AD 900 and was first recognized at the eponymous site of Diamant in the western Waterberg. The third phase, characterised by herringbone-decorated pottery of the Eiland tradition, is regarded as the final expression of the Early Iron Age (EIA) and occurs over large parts of the North West Province, Northern Province, Gauteng and

Mpumalanga. This phase has been dated to about AD 900 - AD 1200. Early Farmer Period ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. The Early Iron Age continued up to the end of the first millennium AD.

- **Middle Iron Age / K2 Mapungubwe Period (early Later Farming Communities)**

The onset of the middle Iron Age dates back to ±900 AD, a period more commonly known as the Mapungubwe / K2 phase. These names refer to the well known archaeological sites that are today the pinnacle of South Africa's Iron Age heritage. The inhabitants of K2 and Mapungubwe, situated on the banks of the Limpopo, were agriculturalists and pastoralists and were engaged in extensive trade activities with local and foreign traders. Although the identity of this Bantu-speaking group remains a point of contestation, the Mapungubwe people were the first state-organized society southern Africa has known. A considerable amount of golden objects, ivory, beads (glass and gold), trade goods and clay figurines as well as large amounts of potsherds were found at these sites and also appear in sites dating back to this phase of the Iron Age. Ceramics of this tradition take the form of beakers with upright sides and decorations around the base (K2) and shallow-shouldered bowls with decorations as well as globular pots with long necks. (Mapungubwe). The site of Mapungubwe was deserted at around 1250 AD and this also marks the relative conclusion of this phase of the Iron Age.

- **Later Iron Age (Later Farming Communities)**

The late Iron Age of southern Africa marks the grouping of Bantu speaking groups into different cultural units. It also signals one of the most influential events of the second millennium AD in southern Africa, the difaqane. The difaqane (also known as "the scattering") brought about a dramatic and sudden ending to centuries of stable society in southern Africa. Reasons for this change was essentially the first penetration of the southern African interior by Portuguese traders, military conquests by various Bantu speaking groups primarily the ambitious Zulu King Shaka and the beginning of industrial developments in South Africa. Different cultural groups were scattered over large areas of the interior. These groups conveyed with them their customs that in the archaeological record manifest in ceramics, beads and other artefacts. This means that distinct pottery typologies can be found in the different late Iron Age groups of South Africa.

6.1.3 Historical and Colonial Times and Recent History:

The Historical period in southern Africa encompass the course of Europe's discovery of South Africa and the spreading of European settlements along the East Coast and subsequently into the interior. In addition, the formation stages of this period are marked by the large scale movements of various Bantu-speaking groups in the interior of South Africa, which profoundly influenced the course of European settlement. Finally, the final retreat of the San and Khoekhoen groups into their present-day living areas also occurred in the Historical period in southern Africa.

6.2 The Northern Cape and De Aar: Specific Themes

6.2.1 The Stone Ages in the Northern Cape

Figure 6-1: Engravings on Dorerite outcrop east of De Aar towards Richmond.

The Northern Cape landscape is exceptionally rich in Stone Age and rock art sites even though the area has probably been relatively marginal in terms of human settlement for most of its history. A few major archaeological and historical studies have been conducted in the Northern Cape. Most notable are projects undertaken by Garth Sampson and his colleagues in the Seekoei Valley. In addition, archaeologists from the McGregor Museum have focused attention on the Upper Karoo and the northern periphery of the Karoo as well as some survey work in the Victoria West-De Aar region (Morris, 1994; Morris, 2000b). These studies all infer a rich Stone Age archaeological landscape representative of the Earlier, Middle and Later Stone Ages of southern Africa.

6.2.2 The historical period and the Anglo-Boer War

The De Aar Railway Junction played a strategic role during the Anglo-Boer War in the beginning of the 20th century. The town first became involved in the war during November 1899 when the Boers moved southward from the areas of their strong hold the Orange Free State and the Transvaal. On the 1st of November 1899 a small detachment of Boers from the Orange Free State seized control over the railway bridge over the Orange River at Norvalspont. Up until that point, Boers forces deliberately neglected to occupy some of the principal railway junctions in the Colony, notably: De Aar, Naauwpoort and Stormberg. When hostility between the British and the Boers across the Orange River commenced, the British had small garrisons at Stormberg Junction, Albert Road, Aliwal North, Norvalspont, Colesberg, Arundel and Naauwpoort (Meintjes, 1969). However, they had no garrison in De Aar which was one of the key strategic supply and distribution junctions. The garrisons along some of the railway lines and stations were strategic as the lines formed an integral part of the British offensive. When advancing south, the Boers selected Stormberg Junction above De Aar as a target junction of annexation, because of its link-up with East London. It was also an important strategic point through the eastern Cape to Bloemfontein and Kimberley

De Aar did, however, play a role during the war times as a stop and transfer junction with the transportation of British brigades and Naval Police from Cape Town to the central interior and for the transportation and transfer of supplies. The De Aar junction further acted as a major stockpile for stores to be sent forward to the British forces.

6.2.3 The town of De Aar

The town of De Aar was established in 1881 on the farm "De Aar", means "the artery" - referring to its underground water supply. Because of its central location, the government selected the location for a junction on the first railway line from Cape Town to Kimberley in 1881. In 1899 two brothers who ran a trading store and hotel at the junction, Isaac and Wulf Friedlander, purchased the farm of De Aar. The junction was of very strategic importance for the English during the Second Boer War. Following the Anglo Boer War, the Friedlander brothers surveyed the land for the establishment of a town. The municipality was created a year later and the towns first mayor, Dr Harry Baker, was elected in 1907. Despite the spring that gave De Aar its name the town had insufficient water until 1936 when the municipality decided to purchase the village, Burgerville situated 34km away. De Aar is the second-most important railway junction in the country, with 110km of railway lines including 29 rail-tracks. Major production activities of the area include wool production and livestock farming.

6.2.4 Vetlaagte History

In addition to Anglo-Boer War remnants and historical legacies of the town of De Aar, European farms such as Vetlaagte also presents a later regional social development in the Karoo area where European expansion brought about dramatic changes in social and cultural land tenure on the Northern Cape frontier. According to official historical title deeds, the farm Vetlaagte was first proclaimed in 1876. The deed was later transferred in 1926 and amended in 1937 and 1957. The Du Plessis family owned the farm in first half of the 20th century, and the current farm house was built in 1930. The then owner of the farm, Johannes du Plessis passed away shortly after in 1933 and was buried on the farm.

Figure 6-2: Chronometric detail on the Vetlaagte farmhouse and on the grave of J.L du Plessis.

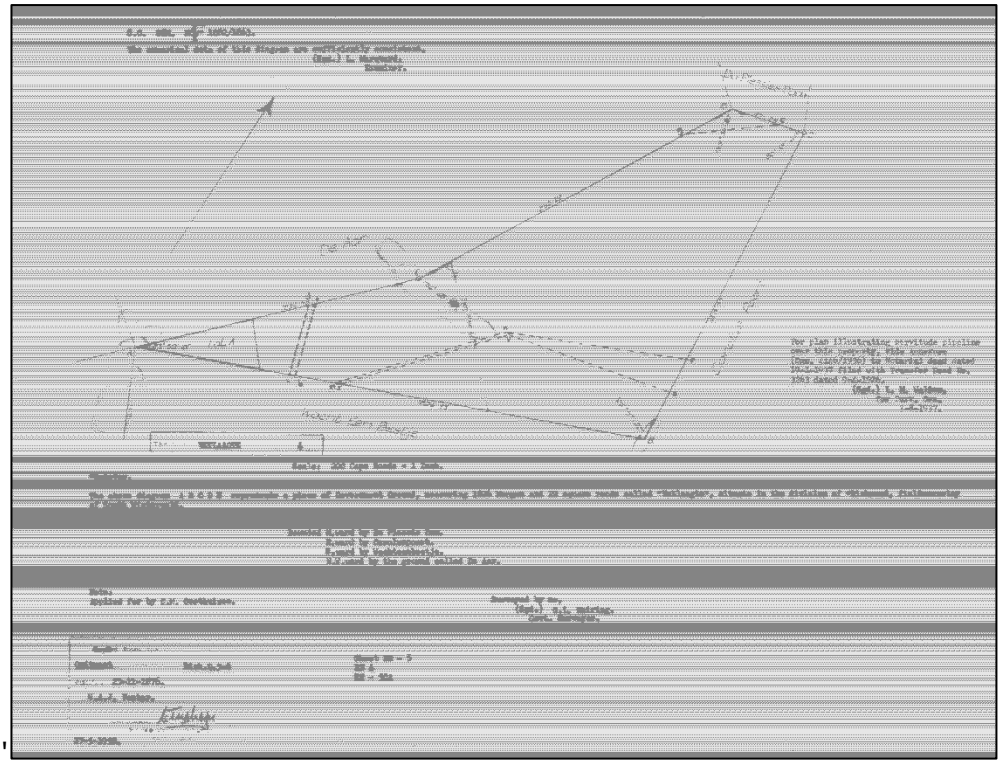

Figure 6-3: Historical title deed for the farm Vetlaagte c.1876.

7 STATEMENT OF SIGNIFICANCE

7.1 Heritage resources management and conservation

Archaeological sites, as previously defined in the National Heritage Resources Act (Act 25 of 1999) are places in the landscape where people have lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and *non-renewable.* Many such sites are unfortunately lost on a daily basis through development for housing, roads and infrastructure and once archaeological sites are damaged, they cannot be re-created as site integrity and authenticity is permanently lost. Archaeological sites have the potential to contribute to our understanding of the history of the region and of our country and continent. By preserving links with our past, we may not be able to revive lost cultural traditions, but it enables us to appreciate the role they have played in the history of our country.

7.2 Categories of significance

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research

questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

- *Aesthetic value:*

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses and also the aesthetic values commonly assessed in the analysis of landscapes and townscape.

- *Historic value:*

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually a place has historical value because of some kind of influence by an event, person, phase or activity.

- *Scientific value:*

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

- *Social value:*

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group.

With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally ranked into the following categories.

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required 2b. Controlled sampling (shovel test pits, augering), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism
High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinterment [including 2a, 2b & 3]

Furthermore, the significance of archaeological sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

A fundamental aspect in assessing the significance and protection status of a heritage resource is often whether or not the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data / information, which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed. These are generally sites graded as of low or medium significance.

7.3 Evaluation of Results

Previous studies conducted in the larger De Aar and Northern Cape area, coupled with finds noted in this report suggest a rich and diverse archaeological landscape and cognisance should be taken of archaeological material that might be present in surface and sub-surface deposits. The following significance rating applies to material of heritage potential, located in the Ennex Solar Energy facility project area:

Palaeontologocal Landscape: Given the low overall palaeontological sensitivity of the region around De Aar, and the widespread occurrence elsewhere in the Great Karoo of the fossils so far recorded there, the seven small PV solar power developments proposed here do not pose a significant cumulative impact on local fossil heritage.

Stone Age remains: The presence of formal stone tools and large deposits of stone debris display characteristic Middle Stone Age technological advances and the density of artefacts might imply that the area functioned as a MSA factory site. The MSA representations at Vetlaagte are therefore of particular scientific interest and an analysis of lithics from the site by a Stone Age specialist will provide an understanding of the development and spread of the MSA in the larger landscape and in the Northern Cape.

Historical period structures and grave: Even though the Vetlaagte farmstead and graveyard occurs in an area excluded from the proposed development, these sites are of heritage conservation priority and it is recommended that a 100m conservation buffer zone be maintained around these features during all phases of development and operation of the solar farm project. As the dam wall situated in drainage line east of the farmstead has been largely destroyed, the site is of low significance and it is recommended that site monitoring be done if any construction takes place in the vicinity of this site. Due cognisance should be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites in the area.

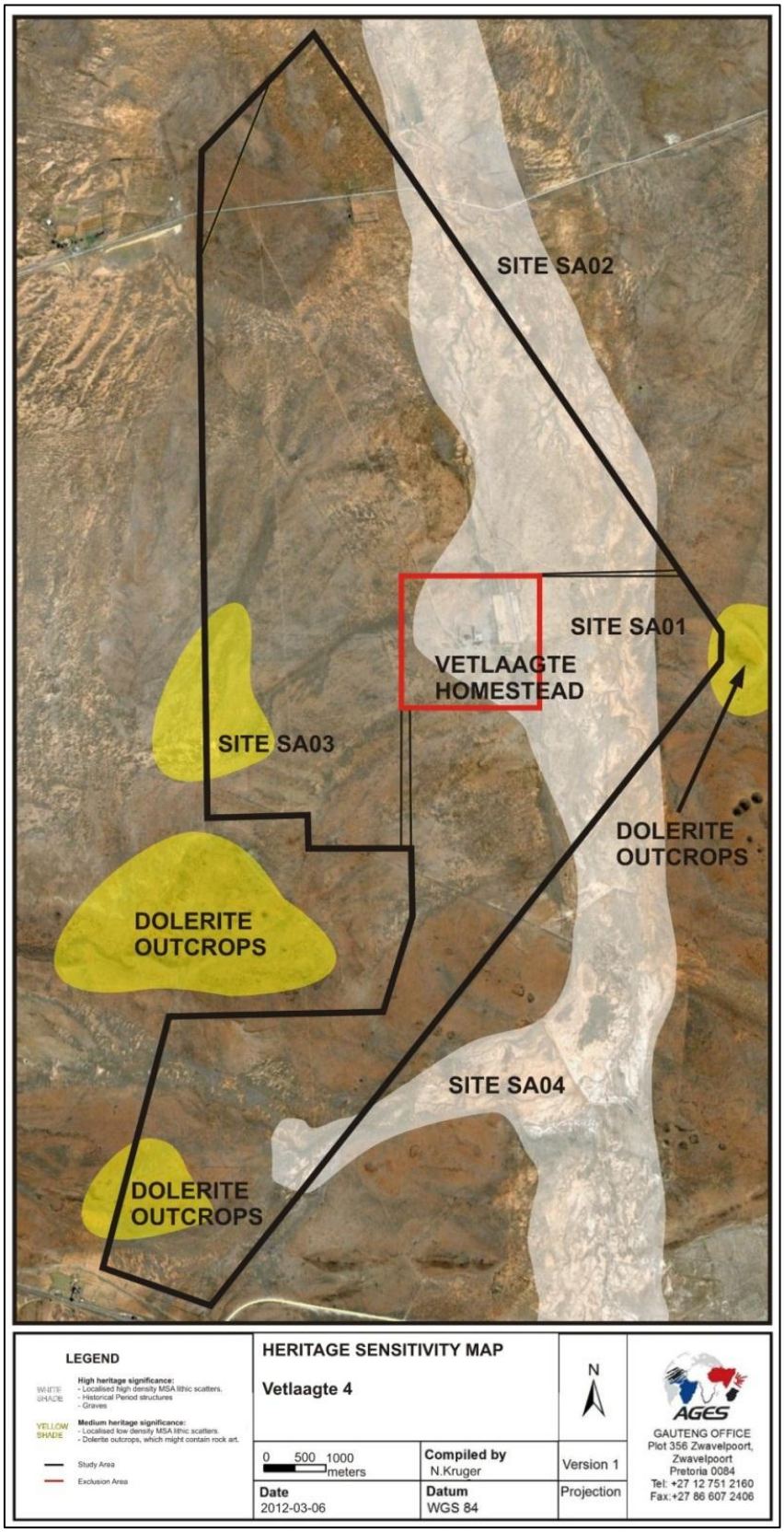

Figure 7-1: Heritage Sensitivity Map: Vetlaagte Portion 4

7.4 Potential Impacts

- *Nature*

Generally, the value and significance of archaeological and other heritage sites might be impacted by any activity that would result immediately or in the future in the destruction damage, excavation, alteration, removal or collection from its original position, any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). Here, the most apparent impact would be land surface disturbance associated with infrastructure construction. Thus, the destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. However, in the long run, the proximity of operations in any given area could result in secondary indirect impacts resulting from the movement of people or vehicles in the immediate or surrounding vicinity.

- *Magnitude and extent*

It should be noted that the magnitude and extent of potential impacts resulting from the Vetlaagte solar energy facility could be regarded as largely destructive, as large sections of the landscape and its surface will be modified where solar fields will be erected.

Considering the nature, magnitude and extent of impacts on heritage resources at Vetlaagte, the following potentially sensitive receptors in the landscape should be considered:

- The distribution of potentially fossiliferous sedimentary rocks of Palaeozoic and younger Quaternary age should be observed in order to avoid destruction of palaeontological remains
- Rock engravings are known to exist on dolomite koppies in the larger landscape around De Aar. Such outcrops occur in the landscape surrounding the 13 portions to be developed at Vetlaagte but no engravings were found on the koppies. However, the dolerite koppies and outcrops on Vetlaagte should be regarded as potentially sensitive in terms of rock engravings.
- Water sources such as drainage lines and pans would often have attracted human activity in the past. This fact is reflected by higher densities of stone artifacts spread across the minor drainage line on the eastern periphery of Vetlaagte. As most of the Stone Age material seems to originate from below present sand surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits.
- De Aar played a pivotal role in the Anglo-Boer war because of its strategic railway connection to the interior of South Africa. Remains of Anglo-Boer War blockhouse and war remnants have been found along the railway line into De Aar as well as in the general landscape. In addition, other Colonial / Historical period material culture such as farm infrastructure and graves occur in the area the larger landscape should be regarded as potentially sensitive in terms of such Colonial / Historical period heritage resources.

7.5 Site Significance Ratings

7.5.1 Sites SA01, SA02, SA04

1. SITE DESCRIPTION : Higher density Middle Stone Age Sites

1.1 General Site Description

MSA lithic scatters	

1.2 Site features / artefacts / Other

Site Location			
Province / Dsitrict	**Northern Cape Province**	Map Number	**3024CA**
Farm Name	**Vetlaagte Portion 4**	Co-ordinates	**S30°40'14.76" E24° 06'38.22" S30°39'00.54" E24° 06'00.42" S30°41'59.09" E24° 05'30.97"**

Site Type			
Surface sites	**X**	Caves and rock shelters	
Larger open-air sites	**X**	Sealed sites (deposits	
River deposits		Other	

Site Function			
Living / habitation		Kill	
Ceremonial		Burial	
Trading / Barter		Art	
Quarry / Mining / Smelting		Other	**X – debris / scatter site**

Site Placement							
Valley floor		Hill top		Vlei/swamp		River Mouth	
Dam		River Bank	**X**	Slope		Plains	**X**
Other / Comments							

Vegetation							
Riverine forest		Bushveld		Savannah		Mountain forest	
Thornveld		Grassland	**X**	Cultivated	**X**	Other	

Age Classification							
Stone Age	**X**	Early Iron Age		Middle Iron Age		Later Iron Age	
Historical		Other					

Material Culture							
Midden		House Remains		Stone Walling		Stone Structures	
Granary		Grinding Stone (L)		Grinding Stone (U)		Granary Stand	
Metal		Ceramics (Pottery)		Ceramics (Porcelain)		Stone (non-lithic)	
Metal slag		Tuyere		Fauna		Bead (Glass)	
Bead (OES / Shell)		Glass		Lithics	**X**	Smelting Residues	
Other:				Other:			

1.3 Site Condition
The site integrity has been somewhat compromised by the mixing of artefacts caused by riverbank erosion.

2. SITE EVALUATION			
2.1 HERITAGE VALUE (NHRA, Section 2 [3])	**High**	**Medium**	**Low**
It has importance to the community or pattern of South Africa's history or pre-colonial history.		X	
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.		X	
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.		X	
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.		X	
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			X
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.		X	
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).			X
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.		X	
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			X
It has significance relating to the history of slavery in South Africa.			X
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.		X	

FIELD REGISTER RATING	
National/Grade 1 [should be registered, retained]	
Provincial/Grade 2 [should be registered, retained]	
Local/Grade 3A [should be registered, mitigation not advised]	
Local/Grade 3B [High significance; mitigation, partly retained]	
Generally Protected A [High/Medium significance, mitigation]	X
Generally protected B [Medium significance, to be recorded]	
Generally Protected C [Low significance, no further action]	

C. SPHERE OF SIGNIFICANCE	High	Medium	Low
International			
National			
Provincial			
Local		X	
Specific community			

E. GENERAL STATEMENT OF SITE SIGNIFICANCE	
Low	
Medium	X
High	

F. RATING OF POTENTIAL IMPACT OF DEVELOPMENT	
None	
Peripheral	X
Destruction	
Uncertain	

G. RECOMMENDED MITIGATION

If further impact is envisaged:

- **Documentation of sites, surface sampling.**
- **Further desktop study to more accurately ascertain context of sites.**
- **Relevant Permitting from Heritage Resources Authority.**

H. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS

- **National Heritage Resources Act (Act no. 25 of 1999)**

7.5.2 Site SA03

1. SITE DESCRIPTION : Lower density Middle Stone Age Site

1.1 General Site Description

MSA lithic scatters	

1.2 Site features / artefacts / Other

Site Location			
Province / Dsitrict	**Northern Cape Province**	Map Number	**3024CA**
Farm Name	**Vetlaagte Portion 4**	Co-ordinates	**S30°40'37.94"** **E24° 05'27.13"**

Site Type			
Surface sites	**X**	Caves and rock shelters	
Larger open-air sites	**X**	Sealed sites (deposits	
River deposits		Other	

Site Function			
Living / habitation		Kill	
Ceremonial		Burial	
Trading / Barter		Art	
Quarry / Mining / Smelting		Other	**X – debris / scatter site**

Site Placement							
Valley floor		Hill top		Vlei/swamp		River Mouth	
Dam		River Bank	**X**	Slope		Plains	**X**
Other / Comments							

Vegetation							
Riverine forest		Bushveld		Savannah		Mountain forest	
Thornveld		Grassland	**X**	Cultivated	**X**	Other	

Age Classification							
Stone Age	**X**	Early Iron Age		Middle Iron Age		Later Iron Age	
Historical		Other					

Material Culture							
Midden		House Remains		Stone Walling		Stone Structures	

Granary		Grinding Stone (L)		Grinding Stone (U)		Granary Stand	
Metal		Ceramics (Pottery)		Ceramics (Porcelain)		Stone (non-lithic)	
Metal slag		Tuyere		Fauna		Bead (Glass)	
Bead (OES / Shell)		Glass		Lithics	X	Smelting Residues	
Other:				Other:			

1.3 Site Condition

The site integrity has been compromised by the mixing of artefacts caused by riverbank erosion.

2. SITE EVALUATION

2.1 HERITAGE VALUE (NHRA, Section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.		X	
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.			X
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.			X
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.		X	
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			X
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.		X	
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).		X	
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.			X
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			X
It has significance relating to the history of slavery in South Africa.			X
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.		X	

FIELD REGISTER RATING	
National/Grade 1 [should be registered, retained]	
Provincial/Grade 2 [should be registered, retained]	
Local/Grade 3A [should be registered, mitigation not advised]	
Local/Grade 3B [High significance; mitigation, partly retained]	
Generally Protected A [High/Medium significance, mitigation]	
Generally protected B [Medium significance, to be recorded]	X
Generally Protected C [Low significance, no further action]	

C. SPHERE OF SIGNIFICANCE	High	Medium	Low
International			
National			
Provincial			
Local			X
Specific community			

E. GENERAL STATEMENT OF SITE SIGNIFICANCE	
Low	X
Medium	
High	

F. RATING OF POTENTIAL IMPACT OF DEVELOPMENT	
None	
Peripheral	
Destruction	X
Uncertain	

G. RECOMMENDED MITIGATION

If further impact is envisaged:

- **Recording of site.**
- **Destruction permit from Heritage Resources Authority.**

H. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS

- **National Heritage Resources Act (Act no. 25 of 1999)**

7.5.3 Site HP01*

* Note that this site is situated outside the area demarcated foe development. However, should the site (or the recommended 100m conservation buffer around it) be affected or impacted by the proposed development in any way, the following significance ratings and recommended actions apply.

1. SITE DESCRIPTION : Vetlaagte Farmstead

1.1 General Site Description

Restored Historical Period farmstead and midden.

1.2 Site features / artefacts / Other

Site Location				
Province / Dsitrict	**Northern Cape Province**	Map Number	**3024CA**	
Farm Name	**Vetlaagte Portion 4**	Co-ordinates	**S30°40'18.62"**	**E24°06'09.08"**

Site Type			
Surface sites	X	Caves and rock shelters	
Larger open-air sites		Sealed sites (deposits)	
River deposits		Other	

Site Function			
Living / habitation	X	Kill	
Ceremonial		Burial	
Trading / Barter		Art	
Quarry / Mining / Smelting		Other	

Site Placement							
Valley floor		Hill top		Vlei/swamp		River Mouth	
Dam		River Bank		Slope		Plains	X

Other / Comments							
Vegetation							
Riverine forest		Bushveld		Savannah		Mountain forest	
Thornveld		Grassland	X	Cultivated	X	Other	
Age Classification							
Stone Age		Early Iron Age		Middle Iron Age		Later Iron Age	
Historical	X	Other					
Material Culture							
Midden	X	House Remains	X	Stone Walling		Stone Structures	X
Granary		Grinding Stone (L)		Grinding Stone (U)		Granary Stand	
Metal	X	Ceramics (Pottery)		Ceramics (Porcelain)	X	Stone (non-lithic)	X
Metal slag		Tuyere		Fauna	X	Bead (Glass)	
Bead (OES / Shell)		Glass	X	Lithics		Smelting Residues	
Other: X				Other:			

1.3 Site Condition

Site preservation is excellent as the farmstead has recently been restored. The midden remains partially intact.

2. SITE EVALUATION

2.1 HERITAGE VALUE (NHRA, Section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.		X	
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.		X	
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.		X	
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.		X	
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.		X	
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.			X
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons.		X	
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.		X	
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			X
It has significance relating to the history of slavery in South Africa.			X
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.		X	

FIELD REGISTER RATING	
National/Grade 1 [should be registered, retained]	
Provincial/Grade 2 [should be registered, retained]	
Local/Grade 3A [should be registered, mitigation not advised]	
Local/Grade 3B [High significance; mitigation, partly retained]	
Generally Protected A [High/Medium significance, mitigation]	X
Generally protected B [Medium significance, to be recorded]	
Generally Protected C [Low significance, no further action]	

C. SPHERE OF SIGNIFICANCE	High	Medium	Low

International			
National			
Provincial			
Local		X	
Specific community			

E. GENERAL STATEMENT OF SITE SIGNIFICANCE

Low	
Medium	X
High	

F. RATING OF POTENTIAL IMPACT OF DEVELOPMENT

None	X
Peripheral	
Destruction	
Uncertain	

G. RECOMMENDED MITIGATION

If further impact is envisaged:

- **Survey and mapping**
- **Limited Phase 2 investigation**
- **Permit from SAHRA for destruction**

H. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS

- **National Heritage Resources Act (Act no. 25 of 1999)**

7.5.4 Site HP02

1. SITE DESCRIPTION : Vetlaagte dam structure

1.1 General Site Description

Dilapidated historical stone dam wall and channel.

1.2 Site features / artefacts / Other

Site Location

Province / Dsitrict	**Northern Cape Province**	Map Number	**3024CA**	
Farm Name	**Vetlaagte Portion 4**	Co-ordinates	**S30°40'19.19"**	**E24°06'37.97"**

Site Type

Surface sites	X	Caves and rock shelters	
Larger open-air sites		Sealed sites (deposits	
River deposits		Other	

Site Function

Living / habitation		Kill	
Ceremonial		Burial	
Trading / Barter		Art	
Quarry / Mining / Smelting		Other	X

Site Placement							
Valley floor		Hill top		Vlei/swamp		River Mouth	
Dam	X	River Bank	X	Slope		Plains	
Other / Comments							

Vegetation							
Riverine forest		Bushveld		Savannah		Mountain forest	
Thornveld		Grassland	X	Cultivated	X	Other	

Age Classification							
Stone Age		Early Iron Age		Middle Iron Age		Later Iron Age	
Historical	X	Other					

Material Culture							
Midden		House Remains		Stone Walling		Stone Structures	X
Granary		Grinding Stone (L)		Grinding Stone (U)		Granary Stand	
Metal		Ceramics (Pottery)		Ceramics (Porcelain)		Stone (non-lithic)	X
Metal slag		Tuyere		Fauna		Bead (Glass)	
Bead (OES / Shell)		Glass		Lithics		Smelting Residues	
Other: **X - Cement**				Other:			

1.3 Site Condition

Site preservation is poor as large sections of the wall and channel have collapsed.

2. SITE EVALUATION

2.1 HERITAGE VALUE (NHRA, Section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.		X	
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.			X
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.			X
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.			X
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			X
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.		X	
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons.			X
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.			X
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			X
It has significance relating to the history of slavery in South Africa.			X
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.		X	

FIELD REGISTER RATING	
National/Grade 1 [should be registered, retained]	

Provincial/Grade 2 [should be registered, retained]	
Local/Grade 3A [should be registered, mitigation not advised]	
Local/Grade 3B [High significance; mitigation, partly retained]	
Generally Protected A [High/Medium significance, mitigation]	
Generally protected B [Medium significance, to be recorded]	
Generally Protected C [Low significance, no further action]	X

C. SPHERE OF SIGNIFICANCE	High	Medium	Low
International			
National			
Provincial			
Local			X
Specific community			

E. GENERAL STATEMENT OF SITE SIGNIFICANCE	
Low	
Medium	X
High	

F. RATING OF POTENTIAL IMPACT OF DEVELOPMENT	
None	
Peripheral	
Destruction	X
Uncertain	

G. RECOMMENDED MITIGATION

If further impact is envisaged:

- **Recording of site.**
- **Destruction permit from Heritage Resources Authority.**

H. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS

- **National Heritage Resources Act (Act no. 25 of 1999)**

7.5.5 Site BP01*

* Note that this site is situated outside the area demarcated foe development. However, should the site (or the recommended 100m conservation buffer around it) be affected or impacted by the proposed development in any way, the following significance ratings and recommended actions apply.

1. SITE DESCRIPTION : Grave of J.H du Plessis

1.1 General Site Description

Grave of J.H du Plessis, former owner of Vetlaagte.

1.2 Site features / artefacts / Other

Site Location							
Province / Dsitrict	**Northern Cape Province**			Map Number	**3024CA**		
Farm Name	**Vetlaagte Portion 4**			Co-ordinates	**S30°40'11.00"**	**E24° 06'11.62"**	
Site Type							
Surface sites	**X**			Caves and rock shelters			
Larger open-air sites				Sealed sites (deposits			
River deposits				Other			
Site Function							
Living / habitation				Kill			
Ceremonial				Burial	**X**		
Trading / Barter				Art			
Quarry / Mining / Smelting				Other			
Site Placement							
Valley floor		Hill top		Vlei/swamp		River Mouth	
Dam		River Bank		Slope		Plains	**X**
Other / Comments							
Vegetation							
Riverine forest		Bushveld		Savannah		Mountain forest	
Thornveld		Grassland	**X**	Cultivated	**X**	Other	
Age Classification							
Stone Age		Early Iron Age		Middle Iron Age		Later Iron Age	
Historical	**X**	Other	**X - recent**				
Material Culture							
Midden		House Remains		Stone Walling		Stone Structures	
Granary		Grinding Stone (L)		Grinding Stone (U)		Granary Stand	
Metal		Ceramics (Potter)		Ceramics (Porcelain)		Stone (non-lithic)	
Metal slag		Tuyere		Fauna		Bead (Glass)	
Bead (OES / Shell)		Glass		Lithics		Smelting Residues	
Other: **X – grave dressing**				Other: **X – funeral goods**			

1.3 Site Condition

Site preservation is good as the burials are of recent age.

2. SITE EVALUATION

2.1 HERITAGE VALUE (NHRA, Section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.	**X**		
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.		**X**	
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.		**X**	
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.		**X**	
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.	**X**		
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.		**X**	
It has marked or special association with a particular community or cultural group for social, cultural or	**X**		

spiritual reasons.			
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.		X	
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			X
It has significance relating to the history of slavery in South Africa.			X
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.			X

FIELD REGISTER RATING	
National/Grade 1 [should be registered, retained]	
Provincial/Grade 2 [should be registered, retained]	
Local/Grade 3A [should be registered, mitigation not advised]	X
Local/Grade 3B [High significance; mitigation, partly retained]	
Generally Protected A [High/Medium significance, mitigation]	
Generally protected B [Medium significance, to be recorded]	
Generally Protected C [Low significance, no further action]	

C. SPHERE OF SIGNIFICANCE	High	Medium	Low
International			
National			
Provincial	X		
Local	X		
Specific community			

E. GENERAL STATEMENT OF SITE SIGNIFICANCE	
Low	
Medium	
High	X

F. RATING OF POTENTIAL IMPACT OF DEVELOPMENT	
None	
Peripheral	
Destruction	X
Uncertain	

G. RECOMMENDED MITIGATION

If further impact is envisaged:

- Social consultation
- Exhumation and reburial

H. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS

- Human Tissue Act (Act 65 of 1983 as amended).
- Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925)
- Ordinance on Excavations (Ordinance no. 12 of 1980)
- Local and regional provisions, laws and by-laws
- National Heritage Resources Act (Act no. 25 of 1999)
- Permit from SAHRA for removal

8 RECOMMENDATIONS

At Vetlaagte 4, high densities of Middle Stone Age material occur widely on the property around low laying drainage lines and wetlands. These artefacts display MSA technological characteristics and it might possibly represent the debris from the manufacture of artefacts, which suggests that the area might have functioned as a factory site during the MSA. Therefore, the following recommendations are made based on general observations at the site:

- Due cognisance should be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites in the area. Here, care should be taken around dolomite koppies in the larger landscape, as rock art is known to occur on these outcrops. Water sources such as drainage lines and pans should also be regarded as potentially sensitive in terms of possible Stone Age deposits. The possible existence of Historical Period resources deriving from the Ango-Boer War or the area's Colonial farming history should also be considered.
- **Site SA03**, a low density Middle Stone Age surface occurrence on the north-western boundary of Vetlaagte, is of low scientific value and no significant impact on these resources is foreseen. Therefore no further actions are recommended
- **Sites SA01**, **SA02** and **SA04** comprise high density Middle Stone Age scatters. Principally, it is recommended that areas containing these high densities of MSA material be excluded from the Solar Energy Facility development. However, were these MSA scatters to be directly impacted by development activities, it is recommended that the sites be recorded and that the larger cultural and social context of the sites is established by means of a Phase 2 Specialist Study. This study should minimally include a surface sampling and consequent analysis of the stone artefacts by a qualified Stone Age specialist, in order to elucidate the understanding of the development and spread of the MSA in the area. The Specialist should obtain the necessary permits from SAHRA for the in-situ analysis, possible collection and photography of the artefacts during the study.
- Even though the Vetlaagte farmstead (**Site HP01**) and graveyard (**Site BP01**) occurs in an area excluded from the proposed development, these sites are of heritage conservation priority and it is recommended that a 100m conservation buffer zone be maintained around these features during all phases of development and operation of the solar farm project. As the dam wall situated in drainage line east of the farmstead (**Site HP02**) has been largely destroyed, the site is of low significance and it is recommended that site monitoring be done if any construction takes place in the vicinity of this site.
- In view of the overall low significance of the proposed development on palaeontological heritage resources, it is concluded that no further palaeontological heritage studies or specialist mitigation are required for these PV projects, pending the exposure of any substantial fossil remains (*e.g.* vertebrate bones and teeth, large blocks of petrified wood) during the construction phase. The ECO responsible for these developments should be alerted to the possibility of fossil remains being found on the surface or exposed by fresh excavations during construction. Should substantial fossil remains be discovered during construction, these should be safeguarded (preferably *in situ*) and the ECO should alert SAHRA so that appropriate mitigation (*e.g.* recording, sampling or collection) can be taken by a professional palaeontologist. The specialist involved would require a collection permit from SAHRA. Fossil material must be curated in an approved repository (*e.g.* museum or university collection) and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.
- A careful watching brief monitoring process by the project's ECO is recommended for all stages of mining or infrastructure development. Should any subsurface palaeontological / archaeological /

historical material be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately
- It should be noted that mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

9 GENERAL COMMENTS AND CONDITIONS

This Phase 1 AIA report serves to confirm the extent and significance of archaeological material at Vetlaagte 4 where Solar Energy Facility is planned. In addition to heritage resources occurring at Vetlaagte, the larger De Aar and Northern Cape Area encompass a rich and diverse archaeological landscape and cognisance should be taken of heritage resources in the area, and archaeological material that might be present in surface and sub-surface deposits. Such heritage sites might include:

- Stone Age sites located near the foot of hills, in rock shelters and along water courses.
- Sites with either rock engravings or rock paintings. Dolerite koppies in the region are known to have rock engravings.
- Stock enclosures constructed of stone.
- Houses, middles and other structures older than 60 years
- Farming infrastructure such as wind mills, outhouses and cattle pens.
- Anglo-Boer War remnants such as blockhouses, enclosures and battle fields.
- Graves and cemeteries, both formal and informal.

If, during construction, any possible archaeological material culture are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include:

- Formal Earlier Stone Age stone tools such as handaxes, choppers and cleavers.
- Formal Middle Stone Age stone tools such as points, blades and scrapers.
- Formal Later Stone Age stone tools such a microlithic blades, points and scrapers.
- Lithic residues and debris such as stone cores and flakes.
- Decorated and undecorated potsherds.
- Iron objects.
- Beads made from ostrich eggshell and glass.
- Ash middens and cattle dung deposits and accumulations.
- Animal bones and faunal remains.
- Human remains/graves.
- Stone walling or any sub-surface structures.
- Historical glass, tin or ceramics.
- Fossils.

If such site were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by SAHRA, the National Resources Act and the CRM section of ASAPA will be required. Please note that this report is a Phase 1 archaeological heritage impact assessment/investigation only and does not include or exempt other required heritage impact assessments.

It must be emphasised that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, represent the area's complete archaeological legacy. Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately **(*cf.* NHRA (Act No. 25 of 1999)**, Section 36 (6)).

It must also be clear that Archaeological Specialist Reports (AIA's) will be assessed by the relevant heritage resources authority. The final decision rests with the heritage resources authority, which should give a permit or a formal letter of permission for the destruction of any cultural sites.

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