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**AGES LIMPOPO: PROPOSED PHOTOVOLTAIC POWER PLANT  
DEVELOPMENT ON THE REMAINDER OF THE FARM  
KROMRIVIERFONTEIN 360 LT, AND THE REMAINDER OF THE  
FARM WORCESTER 200 LT, LIMPOPO PROVINCE**

**Archaeological Impact Assessment**



**EOH**

Prepared for: **AGES LIMPOPO**

Prepared by: **Exigo Sustainability**

## **ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF AREAS DEMARCTED FOR PROPOSED PHOTOVOLTAIC POWER PLANT (BOLUBEDU SOLAR PARK) ON THE REMAINDER OF THE FARM KROMRIVIERFONTEIN 360 LT, AND THE REMAINDER OF THE FARM WORCESTER 200 LT, LIMPOPO PROVINCE**

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**DECLARATION**

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I, Nelius Le Roux Kruger, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Bolubedu Solar Park Project in an objective manner, even if this results in views and findings that are not favourable to the client;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have the required expertise in conducting the specialist report and I will comply with legislation, including the relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980), the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment (SAHRA, AMAFA and the CRM section of ASAPA), regulations and any guidelines that have relevance to the proposed activity;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this declaration are true and correct.



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Signature of specialist

**Company:** Exigo Sustainability

**Date:** 16 July 2016



## EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study on the remainder of the Farm Kromrivierfontein 360 LT and the remainder of the Farm Worcester 200 LT, subject to an Environmental Impact Assessment (EIA) process for the proposed Bolubedu Solar Park Project west of Mooketsi in the Greater Letaba Local Municipality, Mopani District Municipality, Limpopo Province. The proposed project includes the construction of a PV power plant covering a footprint of up to **340ha**. 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.

The history and archaeology of the larger Mooketsi area is relatively well known and the landscape around the Bolubedu Site is primarily well known for the occurrence of Iron Age farmer and Historical Period occurrences. The proposed Bolubedu Solar Park Project area is situated in environments that have, in places been altered where informal farming crop fields, roads and other infrastructure have been established. However, certain parts of the project area remain pristine and a number of heritage occurrences and features were noted in the project infrastructure footprint area.

- An isolated occurrence of single MSA lithics (**EXIGO-BSP-SA01**) occurring within the proposed Bolubedu Solar Park footprint is of low heritage significance due to the small numbers of formal and diagnostic tools, and general loss of context of the lithics. No farther action is required in terms of mitigation of the site and occurrences.
- Two occurrences of undecorated Iron Age farmer period ceramics (**EXIGO-BSP-IA01, EXIGO-BSP-IA02**) as well as a number of recent period stone structures (**EXIGO-BSP-FT01, EXIGO-BSP-FT02**) occur within the proposed Bolubedu Solar Park footprint. The occurrences are of low heritage significance due to the absence of diagnostic pottery and general loss of site context, as well as due to the probable recent age of the stone structures. However, the possibility exists that previously undetected heritage remains are present in subsurface deposits and it is recommended that the area be carefully monitored by an informed ECO.
- Probable Iron Age Farmer Period stone wall structures and specifically grain bin stands (**EXIGO-BSP-IA03**), a surface and probable subsurface occurrence of decorated and undecorated Iron Age farmer period ceramics (**EXIGO-BSP-IA04**), the remains of a probable Iron Age / early Historical Period occupation site (**EXIGO-BSP-IA05**) as well as a further occurrence of grain bin stands (**EXIGO-BSP-IA06, EXIGO-BSP-IA07**) are all of medium significance. The sites occur within the proposed Bolubedu Solar Park footprint. It is primarily recommended that the proposed footprint be adjusted to avoid these resources. However, should impact on the sites prove inevitable, the occurrences should be adequately documented by means of Phase 2 Specialist Studies. Such studies should minimally include the mapping, documentation and possible sampling of the sites in order to conserve the historical fabric of the heritage resources. The necessary excavation and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the sites should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- Two informal cemeteries (**EXIGO-BSP-BP01, EXIGO-BSP-BP02**) of high significance are situated within the proposed Bolubedu Solar Park footprint. Since human burials are generally of high heritage significance at all levels for their spiritual, social and cultural values, it is primarily recommended that

any applicable infrastructure components in the vicinity of the cemeteries be designed in such a way as to avoid impact on the heritage resources at all times. In addition, a conservation buffer zone of at least 50m around the cemeteries, as well as the fencing off of the graveyard is recommended. However, should impact on any of the graves in the cemeteries or the proposed 50m buffer zone prove inevitable, full grave relocations are recommended for these burial grounds. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.

- Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately
- 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. It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the Study Area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the Solar Park.

**Bolubedu Solar Park Project - Documented Site Locations:**

Site Code	Short Description	Coordinate S E	Mitigation Action
EXIGO-BSP-SA01	Isolated MSA Occurrence.	S23.49017° E30.36485°	No further heritage action required.
EXIGO-BSP-IA01	LIA undecorated potsherd scatter.	S23.49591° E30.36728°	No further heritage action required, general site monitoring.
EXIGO-BSP-IA02	LIA undecorated potsherd scatter.	S23.49488° E30.36879°	
EXIGO-BSP-IA03	LIA stone wall occupation site.	S23.49226° E30.36811°	Site monitoring, avoidance. Phase 2 Study, excavation and destruction permitting if impacted on.
EXIGO-BSP-IA04	LIA decorated and undecorated potsherd scatter, possible subsurface deposits.	S23.49137° E30.37117°	
EXIGO-BSP-IA05	Probable Iron Age / early Historical Period occupation site.	S23.48978° E30.37299°	
EXIGO-BSP-IA06	Cluster of LIA grain bin stands.	S23.48724° E30.37692°	
EXIGO-BSP-IA07	Cluster of LIA grain bin stands.	S23.49872° E30.36050°	
EXIGO-BSP-FT01	Probable recent period elongated stone structures (erosion control).	S23.49444° E30.36837°	No further heritage action required, general site monitoring.
EXIGO-BSP-FT02	Probable recent period stone heaps and low stone walling (agriculture related).	S23.49744° E30.36108°	
EXIGO-BSP-BP01	Informal cemetery containing at least 2 graves.	S23.48724° E30.37692°	Site monitoring, avoidance, site management. Grave relocation subject to authorisations and permitting if impacted on.
EXIGO-BSP-BP02	Informal cemetery containing at least 3 graves.	S23.49246° E30.37263°	

***Sensitive and significance heritage resources occur inside areas proposed for the Bolubedu Solar Park development and the mitigation and management of some of these resources are required for the duration of the development. In the opinion of the author of this Archaeological Impact Assessment Report, the proposed Bolubedu Solar Park Project on the Farm Kromrivierfontein 360 LT and the Remainder of the Farm Worcester 200 LT may proceed from a culture resources management perspective, provided that mitigation measures are implemented.***

A Palaeontological Impact Assessment should be considered where bedrock is to be impacted on and, should fossil remains such as fossil fish, reptiles or vitrified wood be exposed during construction, these objects should be carefully safeguarded and the relevant heritage resources authority (SAHRA) should be notified immediately so that the appropriate action can be taken by a professional palaeontologist. 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. Here, care should be taken around rock faces and outcrops in the larger landscape, as rock art is known to occur on these outcrops. Water sources such as salt pans, drainage lines and rivers should also be regarded as potentially sensitive in terms of possible Stone Age deposits. The possible existence of Historical Period resources deriving from the area's more recent history should also be considered. Ultimately, it is essential that the archaeological and cultural heritage of the Northern Cape Province be respected.

It is essential that cognisance be taken of the larger archaeological landscape of the Limpopo Province and the Mooketsi region in order to avoid the destruction of previously undetected heritage sites. Should any previously undetected heritage resources be exposed or uncovered during construction phases of the proposed project, these should immediately be reported to SAHRA. Since the intrinsic heritage and social value of graves and cemeteries are highly significant, these resources require special management measures. Should human remains be discovered at any stage, these should be reported to the Heritage Specialist and relevant authorities (SAHRA) and development activities should be suspended until the site has been inspected by the Specialist. The Specialist will advise on further management actions and possible relocation of human remains in accordance with the Human Tissue Act (Act 65 of 1983 as amended), the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the National Heritage Resources Act (Act no. 25 of 1999) and any local and regional provisions, laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.

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 recommendations and possible 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).

## NOTATIONS AND TERMS/TERMINOLOGY

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**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 artefact 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.

**<sup>14</sup>C or radiocarbon dating:**

The <sup>14</sup>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 artefactual 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 artefacts, in other words artefacts 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*.

**Impact:** A description of the effect of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

**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 on archaeological sites.

**Management / Management Actions:**

Actions – including planning and design changes - that enhance benefits associated with a proposed development, or that avoid, mitigate, restore, rehabilitate or compensate for the negative impacts.

**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.

**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.

**Scoping Assessment:**

The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an impact assessment. The main purpose is to focus the impact assessment on a manageable number of important questions on which decision making is expected to focus and to ensure that only key issues and reasonable alternatives are examined. The outcome of the scoping process is a Scoping Report that includes issues raised during the scoping process, appropriate responses and, where required, terms of reference for specialist involvement.

**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.

**Trigger:** A particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an *issue* and/or potentially significant *impact* associated with that proposed development that may require specialist input. Legal requirements of existing and future legislation may also trigger the need for specialist involvement.

**Tuyère:**

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

**LIST OF ABBREVIATIONS**

<b>Abbreviation</b>	<b>Description</b>
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
CRM	Culture Resources Management
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
ICOMOS	International Council on Monuments and Sites
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 Right Area
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
PHRA	Provincial Heritage Resources Authorities
SAFA	Society for Africanist Archaeologists
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)



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## 1 BACKGROUND

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### 1.1 Scope and Motivation

Exigo Sustainability was commissioned by AGES Limpopo for an Archaeological Impact Assessment (AIA) study on the remainder of the Farm Kromrivierfontein 360 LT and the remainder of the Farm Worcester 200 LT, subject to an Environmental Impact Assessment (EIA) process for the proposed Bolubedu Solar Park Project in the Greater Letaba Local Municipality, Mopani District Municipality, Limpopo Province. The rationale of this AIA is to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance in previously unstudied areas; 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.

### 1.2 Project Direction

Exigo Sustainability's expertise ensures that all projects be conducted to the highest international ethical and professional standards. As archaeological specialist for Exigo Sustainability, Mr Neels Kruger acted as field director for the project; responsible for the assimilation of all information, the compilation of the final consolidated 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.

### 1.3 Project Brief

The proposed project will consist of construction, operation and maintenance of a Photovoltaic (PV) Power Plant with associated infrastructure and structures having a generation capacity up to **75 MW**. The footprint of the solar park will be up to **340ha**. The Bolubedu Solar Park will deliver the electrical energy to the Eskom Bolubedu Substation. Access to the Bolubedu Solar Park will be from the tar road between the villages of Lebaka and Ga-Femane to the south of the R81.

The Photovoltaic (PV) Power Plant together with their connection infrastructure will require the installation of the following equipment:

- Photovoltaic modules (monocrystalline, polycrystalline or thin-film solar modules)
- Mounting systems (fixed or single-axis horizontal trackers) for the PV arrays and related foundations
- Medium voltage stations, hosting DC/AC inverters and LV/MV power transformers.
- Workshop & warehouses
- One small on-site high-voltage substation with high-voltage power transformers, stepping up the voltage to the voltage of the Eskom's grid (132 kV) and a 132 kV busbar with metering and protection devices and a control building, to be located within the PV plant development area
- Access road and internal roads
- Fencing of the site and alarm and video-surveillance system
- Water access point and water extraction on-site borehole(s) point, water supply pipelines, water treatment facilities
  - sewage system (*Ballam Waterslot* or *Lilliput* system).

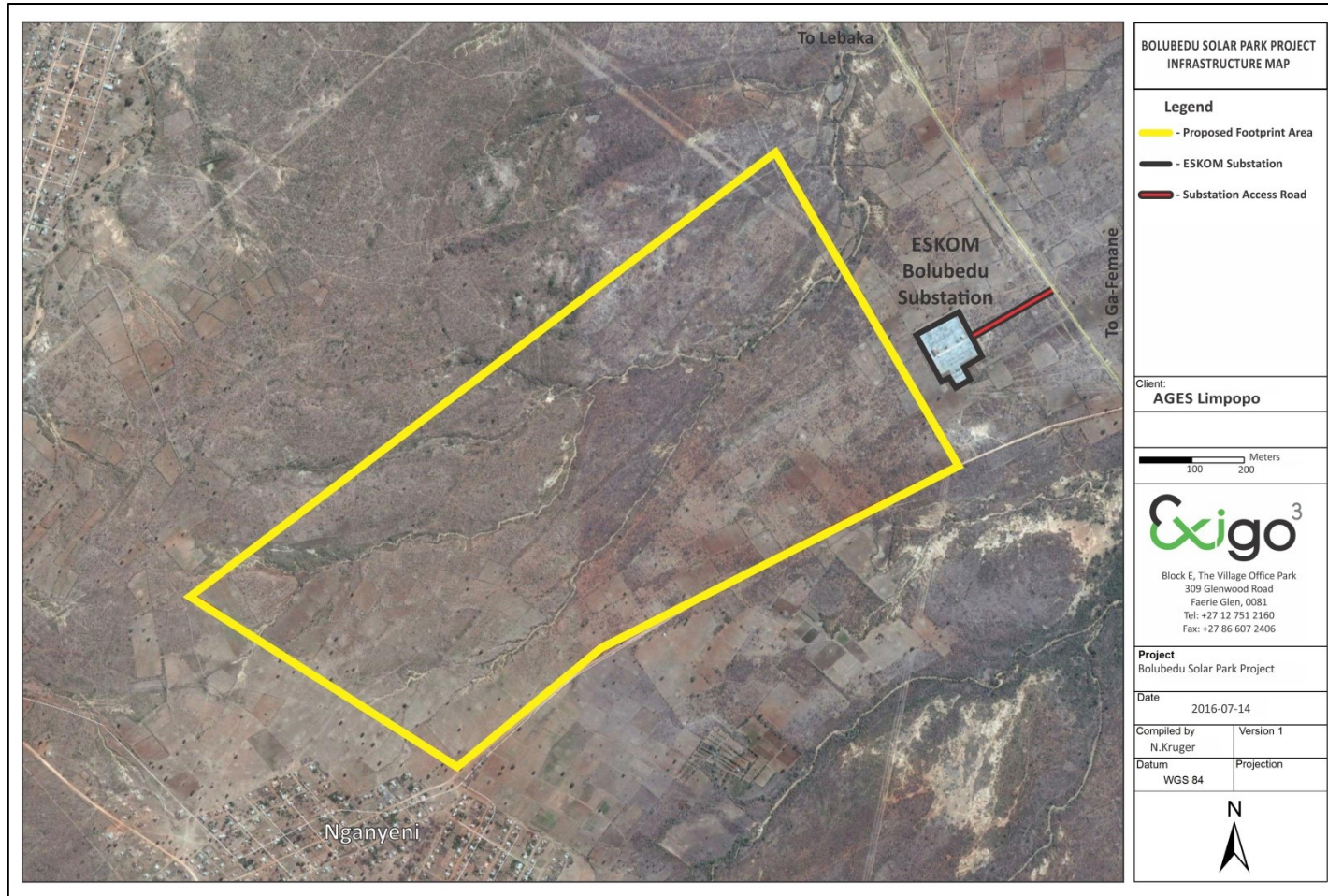


Figure 1-1: Map representation of the general locality of the Bolubedu Solar Park project.



#### 1.4 Terms of Reference

Heritage specialist input into the Environmental Impact Assessment (EIA) process is essential to ensure that through the management of change, developments still conserve our heritage resources. Heritage specialist input in EIA processes can play a positive role in the development process by enriching an understanding of the past and its contribution to the present. It is also a legal requirement for certain development categories which may have an impact on heritage resources (Refer to Section 2.5.2).

Thus, EIAs should always include an 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)** and the **KwaZulu-Natal Heritage Act (KZNHRA - Act of 2008)**. In addition, the NHRA and the KZNHRA protects all structures and features older than 60 years, archaeological sites and material and graves as well as burial sites. The objective of this legislation is to ensure that developers implement 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** for heritage specialist input:

- *Provide detailed updated description of all additional archaeological artefacts, structures (including graves) and settlements which may be affected, if any.*
- *Assess the nature and degree of significance of such resources within the area.*
- *Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance.*
- *Assess any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities.*
- *Propose possible heritage management measures provided that such action is necessitated by the development.*
- *Obtain a comment from the EC-PHRA.*

#### 1.5 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.

##### 1.5.1 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.

###### a. 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)."*

#### **b. 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.

#### **1.5.2 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 50m in length;*
- (c) *any development or other activity which will change the character of a site:*
  - (i) *exceeding 5 000 m<sup>2</sup> 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<sup>2</sup> 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 (HIAs) 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. Heritage resources management and conservation**

### **1.6 Assessing the Significance of Heritage Resources**

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.

#### - 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.

It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of heritage resources; i.e. formally protected and generally protected sites:

**Formally protected sites:**

- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the provincial HRA (EC-PHRA).
- Grade 3 or local heritage sites.

**Generally protected sites:**

- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 70 years.
- Structures older than 60 years.

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 six 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.**

## 2 REGIONAL CONTEXT

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### 2.1 Area Location

The study area is located on the remainder of the Farm Kromrivierfontein 360 LT and the remainder of the Farm Worcester 200 LT in Greater Letaba local Municipality, Mopani District Municipality generally at **S23.489373° E 30.357793° "**. The study area appears on 1:50 000 Map Sheet 2330AC. The proposed project is situated south of the R81 Mooketsi – Giyani road, with the footprint planned to the west of the Eskom Bolubedu substation. The region lies approximately 30km north-east of Mooketsi and 40km south-west of Giyani in the Limpopo Province (see Figure 2-1).

### 2.2 Area Description: Receiving Environment

The development site lies within the Savanna biome which is the largest biome in Southern Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants (trees and shrubs). The most recent classification of the area by Mucina & Rutherford is the Granite Lowveld Bushveld vegetation type, although most of the proposed development sites have been completely modified and represent degraded bushveld or old fields. Soils associated with the site are mostly deep red-yellow apedal sandy to sandyloam on the plains, while black, alluvial soils are associated with the drainage channels.

### 2.3 Site Description

The project area is situated on portions of the farms Kromrivierfontein 360 LT and Worcester 200 LT with the Eskom Bolubedu substation occurring directly east of the site. The surroundings are characterised by slightly undulating to flat plains with two major drainage channels bisecting the area. The current land-use on the project site is cattle grazing and small-scale subsistence farming. Neighbouring farms are being used for crop cultivation, livestock grazing and small-scale subsistence farming. Large portions of the site to the south have been transformed by current and historical agriculture activities. A number of small villages such as Maphalle, Ditshoseng, Nganyeni and Mohlabaneng border the project site. The chosen site is suitable for the installation of a photovoltaic (PV) power plant. It is appropriate morphologically (flat terrain) and regarding the favourable radiation conditions. The available radiation allows a high rate of electric energy production, as a combination of latitude-longitude and climatic conditions.



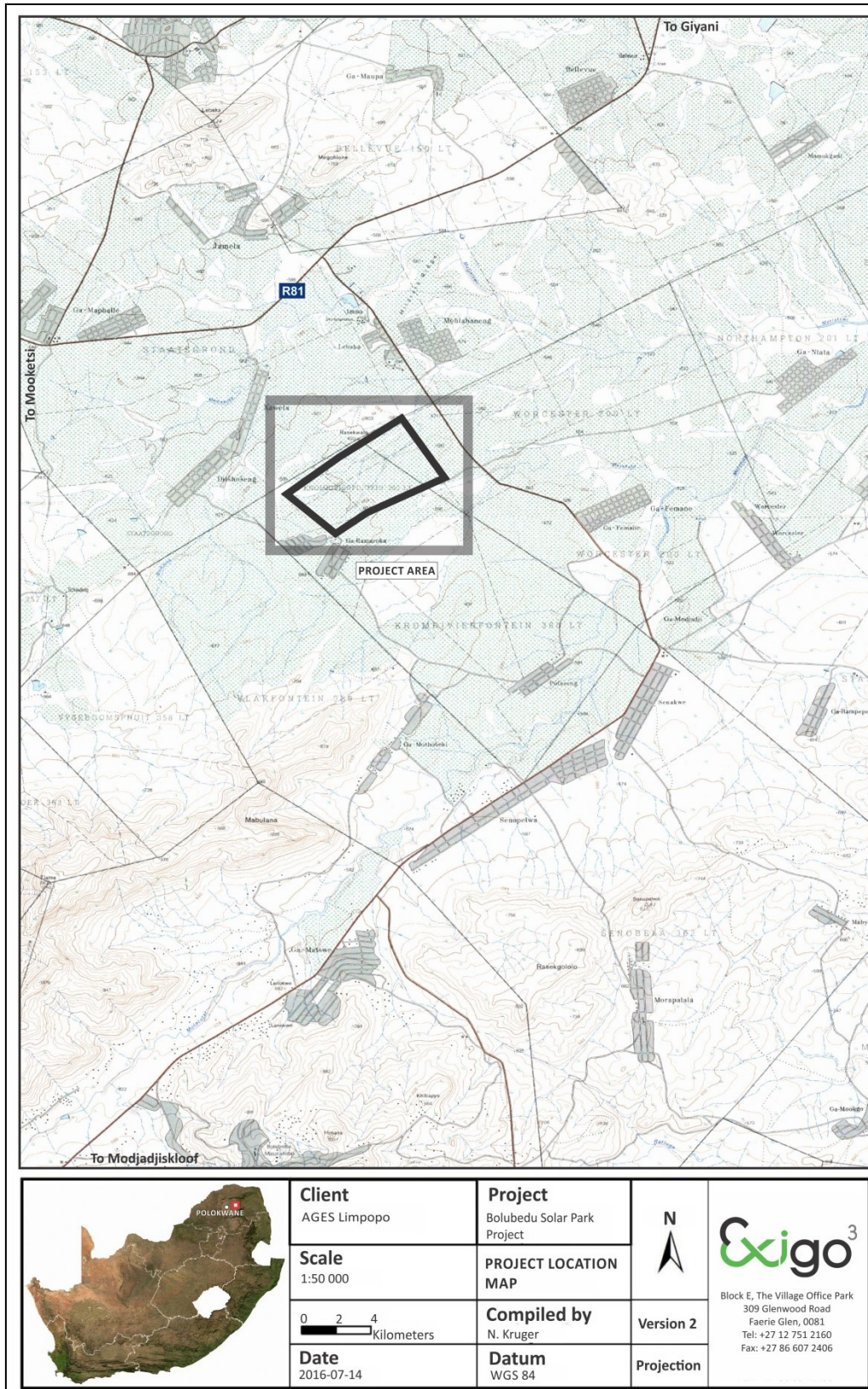


Figure 2-1: 1:50 00 Map representation of the location of the Bolubedu Solar Park Project Area (sheet 2330AC).





Figure 2-2: Aerial representation of the regional setting for the Bolubedu Solar Park project footprint.

### 3 METHOD OF ENQUIRY

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#### 3.1 Sources of Information

Data from detailed desktop, aerial and field studies were employed in order to sample surface areas systematically and to ensure a high probability of heritage site recording.

##### 3.1.1 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 Mooketsi area and the larger landscape of this section of the Northern Cape Province.

##### 3.1.2 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 assist the foot and automotive site surveys where depressions, variation in vegetation, soil marks and landmarks were examined. 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, geo-referenced and transferred to a handheld GPS device. These areas served as referenced points from where further vehicular and pedestrian surveys were carried out. From the aerial survey it is evident that some surface areas subject to the Bolubedu Solar Park Project have been subjected to historical and more recent disturbances and impacts as a result of natural agents as well as cattle grazing (see Figure 2-2).

##### 3.1.3 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. An archaeological survey of the footprint area proposed for the Bolubedu Solar Park was conducted in October 2015 and July 2016. The process encompassed a systematic field survey in accordance with standard archaeological practice by which heritage resources are observed and documented. In order to sample surface areas systematically and to ensure a high probability of site recording, the Solar Park footprint was systematically surveyed on foot by means of a transect survey (see GPS Track log in Figure 3-1). GPS reference points identified during the aerial survey were also visited and random spot checks were made (see detail in previous section). Using a Garmin E-trex Legend GPS objects and structures of archaeological / heritage value were recorded and photographed with a Canon 450D Digital camera. Real time aerial orientation, by means of a mobile Google Earth application was also employed to investigate possible disturbed areas during the survey.

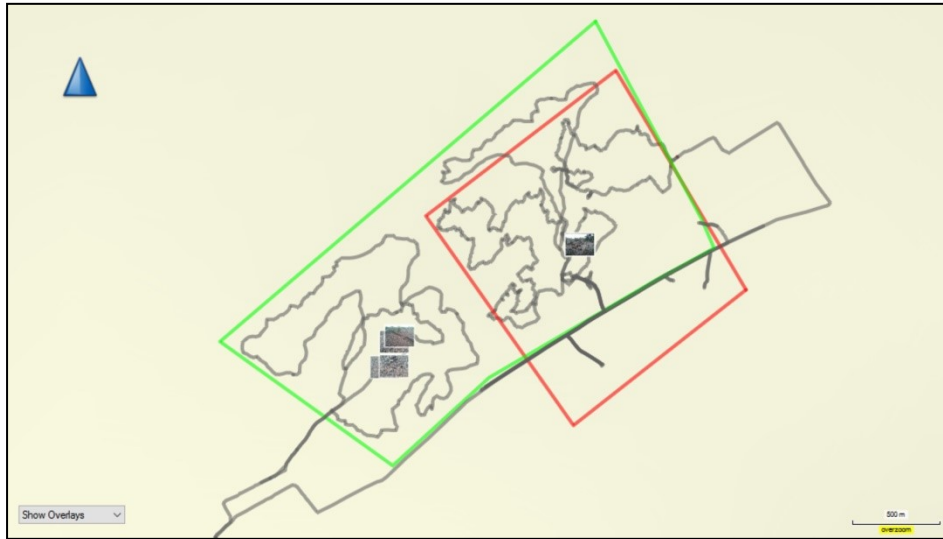


Figure 3-1: Garmin GPS Track log for the site survey of the initial Bolubedu Solar Park footprint (red) and the final footprint for development (green). Limitations

**3.1.4 Access**

The project site for the Bolubedu Solar Park is accessed via a regional road connecting to the R81 Mooketsi – Giyani road. Access control is not applied to the farm portions relevant to this assessment and no restrictions were encountered during the site visit.

**3.1.5 Visibility**

The surrounding vegetation in the study area is mostly comprised out of mixed grasslands and scattered trees as well as pioneering species in disturbed and transformed areas. As such, the general visibility at the time of the AIA survey (October 2015 and July 2016) was moderate due to surface vegetation and obstruction (see Figures 3-2 to 3-15). In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits.





Figure 3-2: View of general surroundings along the eastern periphery of the study area, looking east.



Figure 3-3: View of general surroundings along the eastern periphery of the study area.





Figure 3-4: View of a large drainage line in a northern section of the study area.



Figure 3-5: View of heavily disturbed vegetation in disused crop fields.



Figure 3-6: View of more dense vegetation in the study area towards the north-west.



Figure 3-7: View of exposed rock in a drainage line in the study area.





Figure 3-8: Large erosion gullies towards the north-west of the study area.



Figure 3-9: Sparse vegetation in a central portion of the study area.





Figure 3-10: View of erosion gullies along power lines forming the eastern boundary of the study area.



Figure 3-11: View of a small dam in the study area.



Figure 3-12: Cultivated crop fields in a southern portion of the study area.



Figure 3-13: A footpath in a disturbed area in a western portion of the study area.





Figure 3-14: Disused crop fields along the south-west of the study area.



Figure 3-15: Cleared areas along the north-west of the study area.

### 3.1.6 Limitations and Constraints

The pedestrian site survey for the Bolubedu Solar Project AIA primarily focused around areas tentatively identified as sensitive and of high heritage probability (i.e. those noted during the aerial survey) as well as areas of high human settlement catchment. The following constraints were encountered:

- **Survey Time and Extent:** Survey time proved to be a constraint due to the relatively large surface extent of the footprint area. Therefore, pedestrian site surveys focused around areas tentatively identified as sensitive (i.e. along drainage lines and those noted during the aerial survey) during aerial surveys.
- **Visibility:** Visibility proved to be a constrain in areas with denser surface cover, as well as portions where vegetation is more pristine.

Thus, even though it might be assumed that survey findings are representative of the heritage landscape of the project area for the Bolubedu Solar Park, 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. Therefore, 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 in the project area. 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.

### 3.2 Impact Assessment

For consistency among specialists, impact assessment ratings by Exigo Specialist are generally done using the Plomp<sup>1</sup> impact assessment matrix scale supplied by Exigo. According to this matrix scale, each heritage receptor in the study area is given an impact assessment. A cumulative assessment for the proposed project is also included.

## 4 ARCHAEO-HISTORICAL CONTEXT

### 4.1 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 provides a concise outline of the chronological sequence of periods, events, cultural groups and material expressions in Southern African pre-history and history.

Table 1 Chronological Periods across southern Africa

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: <i>Australopithecines</i> <i>Homo habilis</i> <i>Homo erectus</i>	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First <i>Homo sapiens</i> species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age	Pleistocene /	<i>Homo sapiens sapiens</i>	Typically small to minute stone tools such as

<sup>1</sup> Plomp, H.,2004



20 000 BC – present	Holocene	including San people	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 1400 AD -1850 AD	Holocene	Various Bantu-speaking groups including Venda, Thonga, Sotho-Tswana and Zulu	Distinct ceramics, grinding stones, iron objects, trade objects, remains of iron smelting activities 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. homesteads, missionary schools etc. as well as, glass, porcelain, metal and ceramics.

**4.1.1 The Stone Ages**

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

The Earlier Stone Age from between 1.5 million and 250 000 years ago refers to the earliest that *Homo sapiens sapiens* predecessors began making stone tools. The earliest stone tool industry was referred to as the Olduvai Industry originating from stone artefacts recorded at Olduvai Gorge, Tanzania. The Acheulian Industry, the predominant southern African Early Stone Age Industry, replaced the Olduvai Industry approximately 1.5 million years ago, is attested to in diverse environments and over wide geographical areas. The hallmark of the Acheulian Industry is its large cutting tools (LCTs or bifaces), primarily handaxes and cleavers. Bifaces emerged in East Africa more than 1.5 million years ago but have been reported from a wide range of areas, from South Africa to northern Europe and from India to the Iberian coast. Earlier Stone Age deposits typically occur on the flood-plains of perennial rivers. 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 groups seldom actively hunted and relied heavily on the opportunistic scavenging of meat from carnivore kill sites. The most well-known Early Stone Age site in southern Africa is Amanzi Springs, situated about 10km north-east of Uitenhage, near Port Elizabeth (Deacon 1970). In a series of spring deposits a large number of stone tools were found in situ to a depth of 3-4m. Wood and seed material preserved remarkably very well within the spring deposits, and possibly date to between 800 000 to 250 000 years old.

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

The Middle Stone Age (MSA) spans a period from 250 000-30 000 years ago and focuses on the emergence of modern humans through the change in technology, behaviour, physical appearance, art and symbolism. Various stone artefact industries occur during this time period, although less is known about the time prior to 120 000 years ago, extensive systemic archaeological research is being conducted on sites across southern Africa dating within the last 120 000 years (Thompson & Marean 2008). The large handaxes and cleavers were replaced by smaller stone artefacts called the MSA flake and blade industries. Surface scatters of these flake and blade industries occur widespread across southern Africa although rarely with any associated botanical and faunal remains. It is also common for these stone artefacts to be found between the surface and approximately 50-80cm below ground. Fossil bone may in rare cases be associated with MSA occurrences (Gess 1969). These stone artefacts, like the Earlier Stone Age handaxes are usually observed in secondary context with no other associated archaeological material. The MSA is

distinguished from the ESA by the smaller-sized and distinctly different stone artefacts and chaîne opératoire (method) used in manufacture, the introduction of other types of artefacts and evidence of symbolic behaviour. The prepared core technique was used for the manufacture of the stone artefacts which display a characteristic faceted striking platform and includes mainly unifacial and bifacial flake blades and points. The Howiesons Poort Industry (80 000-55 000 years ago) is distinguished from the other MSA stone artefacts: the size of tools are generally smaller, the range of raw materials include finer-grained rocks such as silcrete, chalcedony, chert and hornfels, and include segments, backed blades and trapezoids in the stone toolkit which were sometimes hafted (set or glued) onto handles. In addition to stone artefacts, bone was worked into points, possibly hafted, and used as tools for hunting (Deacon & Deacon 1999). Other types of artefacts that have been encountered in archaeological excavations include tick shell beads, the rim pieces of ostrich eggshell (OES) water flasks, ochre-stained pieces of ostrich eggshell and engraved and scratched ochre pieces, as well as the collection of materials for purely aesthetic reasons. The majority of 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 associated with the MSA.

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

The Later Stone Age (LSA) spans the period from about 20 000 years ago until the colonial era, although some communities continue making stone tools today. The period between 30 000 and 20 000 years ago is referred to as the transition from the MSA to LSA; although there is a lack of crucial sites and evidence that represent this change. By the time of the Later Stone Age the genus *Homo*, in southern Africa, had developed into *Homo sapiens sapiens*, and in Europe, had already replaced *Homo neanderthalensis*. The LSA is marked by a series of technological innovations, new tools and artefacts, the development of economic, political and social systems, and core symbolic beliefs and rituals. The stone toolkits changed over time according to time-specific needs and raw material availability, from smaller microlithic Robberg, Wilton Industries and in between, the larger Albany/Oakhurst and the Kameelindustries. Bored stones used as part of digging sticks, grooved stones for sharpening and grinding and stone tools fixed to handles with mastic also become more common. Fishing equipment such as hooks, gorges and sinkers also appear within archaeological excavations. Polished bone tools such as eyed needles, awls, linkshafts and arrowheads also become a more common occurrence. Most importantly bows and arrows revolutionized the hunting economy. It was only within the last 2000 years that earthenware pottery was introduced, before then tortoiseshell bowls were used for cooking and ostrich eggshell (OES) flasks were used for storing water. Decorative items like ostrich eggshell and marine/fresh water shell beads and pendants were made. Hunting and gathering made up the economic way of life of these communities; therefore, they are normally referred to as hunter-gatherers. Hunter-gatherers hunted both small and large game and gathered edible plant foods from the veld. For those that lived at or close the coast, marine shellfish and seals and other edible marine resources were available for the gathering. The political system was mainly egalitarian, and socially, hunter-gatherers lived in bands of up to twenty people during the scarce resource availability dispersal seasons and aggregated according to kinship relations during the abundant resource availability seasons. Symbolic beliefs and rituals are evidenced by the deliberate burial of the dead and in the rock art paintings and engravings scattered across the southern African landscape. Sites dating to the 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.

#### 4.1.2 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  $\pm 900$  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.

#### - Bantu Speaking Groups in the South African interior

*It should be noted that terms such as "Nguni", "Sotho", "Venda" and others refer to broad and comprehensive language groups that demonstrated similarities in their origins and language. It does not imply that these Nguni / Sotho groups were homogeneous and static; they rather moved through the landscape and influenced each other in continuous processes marked by cultural fluidity.*

Ethnographers generally divide major Bantu-speaking groups of southern Africa into two broad linguistic groups, the Nguni and the Sotho with smaller subdivisions under these two main groups. Nguni groups were found in the eastern parts of the interior of South Africa and can be divided into the northern Nguni and the southern Nguni. The various Zulu and Swazi groups were generally associated with the northern Nguni whereas the southern Nguni comprised the Xhosa, Mpondo, Thembu and Mpondomise groups. The same geographically based divisions exist among Sotho groups where, under the western Sotho (or Tswana), groups such as the Rolong, Hurutshe, Kwena, Fokeng and Kgatla are found. The northern Sotho included the Pedi and amalgamation of smaller groups united to become the southern Sotho group or the Basutho. Other smaller language groups such as the Venda, Lemba and Tshonga Shangana transpired outside these major entities but as time progressed they were, however to lesser or greater extent influenced and absorbed by neighbouring groups.

#### 4.1.3 Pastoralism and the last 2000 years

Until 2000 years ago, hunter-gatherer communities traded, exchanged goods, encountered and interacted with other hunter-gatherer communities. From about 2000 years ago the social dynamics of the southern African landscape started changing with the immigration of two 'other' groups of people, different in physique, political, economic and social systems, beliefs and rituals. One of these groups, the Khoekhoe pastoralists or herders entered southern Africa with domestic animals, namely fat-tailed sheep and goats, travelling through the south towards the coast. They also introduced thin-walled pottery common in the interior and along the coastal regions of southern Africa. Their economic systems were directed by the accumulation of wealth in domestic stock numbers and their political make-up was more hierarchical than that of the hunter-gatherers.

#### 4.1.4 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.

#### 4.2 The Mooketsi Area: Specific Themes.

A number of academic archaeological and historical studies have been conducted in this section of the Limpopo Province and these studies all infer a rich and diverse archaeological landscape, representative of most phases of human and cultural development in southern Africa.

#### 4.2.1 The Earlier and Middle Stone Ages

The cultural historical landscape of Limpopo spans million years with evidence of hominin occupation, Stone Age traditions, Iron Age farmers and historical events. Makapansgat, a deep limestone cave near Mokopane has yielded remains of *Australopithecus africanus* that dates to more than 3 million years BP and also *Homo erectus*, dating to approximately 1 million years BP. However, Earlier Stone Age (ESA) material is scarce on the Waterberg plateau. The Middle Stone Age (MSA) is abundantly represented in the Waterberg

area and archaeological excavations at sites such as the Olieboomspoot Shelter in the north-western part of the Waterberg have yielded rich MSA deposits which display a large degree of specialisation and skill in stone working (Van der Ryst 1996). These groups occupied open camps which were situated in the proximity of water sources such as pans, lakes or rivers. There is a noticeable gap in the area between MSA assemblages and material from the Later Stone Age (LSA), suggesting that the region may not have seen dense human occupation for a long period of time. However, Later Stone Age groups, including the San hunter gatherers and Khoi herders frequented the area in the last few millennia, and numerous LSA sites have been discovered and excavated. Similarly, LSA evidence such as stone implements, ceramics and a wealth of rock paintings and markings are scattered over the plateau.

#### **4.2.2 The Iron Age / Farmer Period**

The beginnings of the Iron Age (Farmer Period) in southern Africa are associated with the arrival of a new Bantu speaking population group at around the third century AD. These newcomers introduced a new way of life into areas that were occupied by Later Stone Age hunter-gatherers and Khoekhoe herders. Distinctive features of the Iron Age are a settled village life, food production (agriculture and animal husbandry), metallurgy (the mining, smelting and working of iron, copper and gold) and the manufacture of pottery. According to the most recent archaeological cultural distribution sequences by Huffman (2007), this area falls within the distribution area of various cultural groupings originating out of both the Urewe Tradition (eastern stream of migration) and the Kalundu Tradition (western stream of migration). The facies that may be present are: Urewe Tradition: Kwale branch – Silver Leaves facies AD 280 – 450 (Early Iron Age) Mzonjani facies AD 450 – 750 (Early Iron Age) Garonga facies AD 750 – 900 (Early Iron Age) Moloko branch – Icon facies AD 1300 - 1500 (Late Iron Age) Kalundu Tradition: – Kgopolwe facies AD 1030 – 1350 (Middle Iron Age) Tavatshena facies AD 1450 – 1600 (Late Iron Age) Letaba facies AD 1600 – 1840 (Late Iron Age).

#### **4.2.3 Later History: Colonial Period**

The population of the larger surrounding areas of Giyani are made up of predominantly Tsonga-speakers. The first Tsonga groups appear to have settled in southern Mozambique around 1544 as agricultural communities. In the 19<sup>th</sup> century three groups existed among the Tsonga people; a southern group (including the Maputa, Tembe and Mpfumo), a central group (including the Khosa, Nkuna Mavunda and Maluleke) and a northern group (including the Hlengwe and Tswa). At around 1820 various Nguni groups forcefully moved into the area of the Tsonga groups in Mozambique. The first Nguni group to strike the Tsonga settlements was that of Zwangendaba (from the Jele clan) and they were followed by Nxaba and his people. The final Nguni group to harass the Tsonga was the Shangana under the command of Soshangana (Manukuza). Then the Shangana moved into the fertile valleys of the Limpopo valley but after hit expeditions by the Zulu king Shaka in 1825, Soshangana moved his people north to the Zambezi River. Soshangana integrated various local groups including Shona's, into the Shangana group. He established the Gaza kingdom (named after his great grandfather) stretching from the Zambezi River to Delagoa Bay. A pox-epidemic forced the Shangana to move southwards back into the Limpopo Valley. Various Tsonga groups moved over the Lebombo Mountains in fear of the return of Soshangana and they settled in the north of the area later known as Gazankulu. Soshangana's death in 1858 initiated a period of chaos and the disintegration of the Gaza kingdom. He was, contrary to his final wishes, succeeded by his son Mawewe whose reign was soon violently tested by his brother, Muzila (the late Soshangana's choice for a successor). This dispute over succession between the two brothers caused more Tsonga people to move from Mozambique into South Africa. Mawewe died in 1872 and he was succeeded by Hanyana who fled to the former Gaza area after a run-in with the Transvaal authorities. After Mawewe's death a time of peace and stability prevailed and many Tsonga groups moved back to their former settlement areas.

In the Apartheid era, this area formed part of Gazankulu, a bantustan in South Africa. The Apartheid government intended this to be a semi-independent homeland for the Shangaan Tsonga people. It was located in both the Northern Transvaal, now Limpopo province and Eastern Transvaal, now Mpumalanga province. It was given self-rule in 1969, with its capital at Giyani. Most of the farms in the Mooketsi area were proclaimed around the beginning of the 20<sup>th</sup> century.

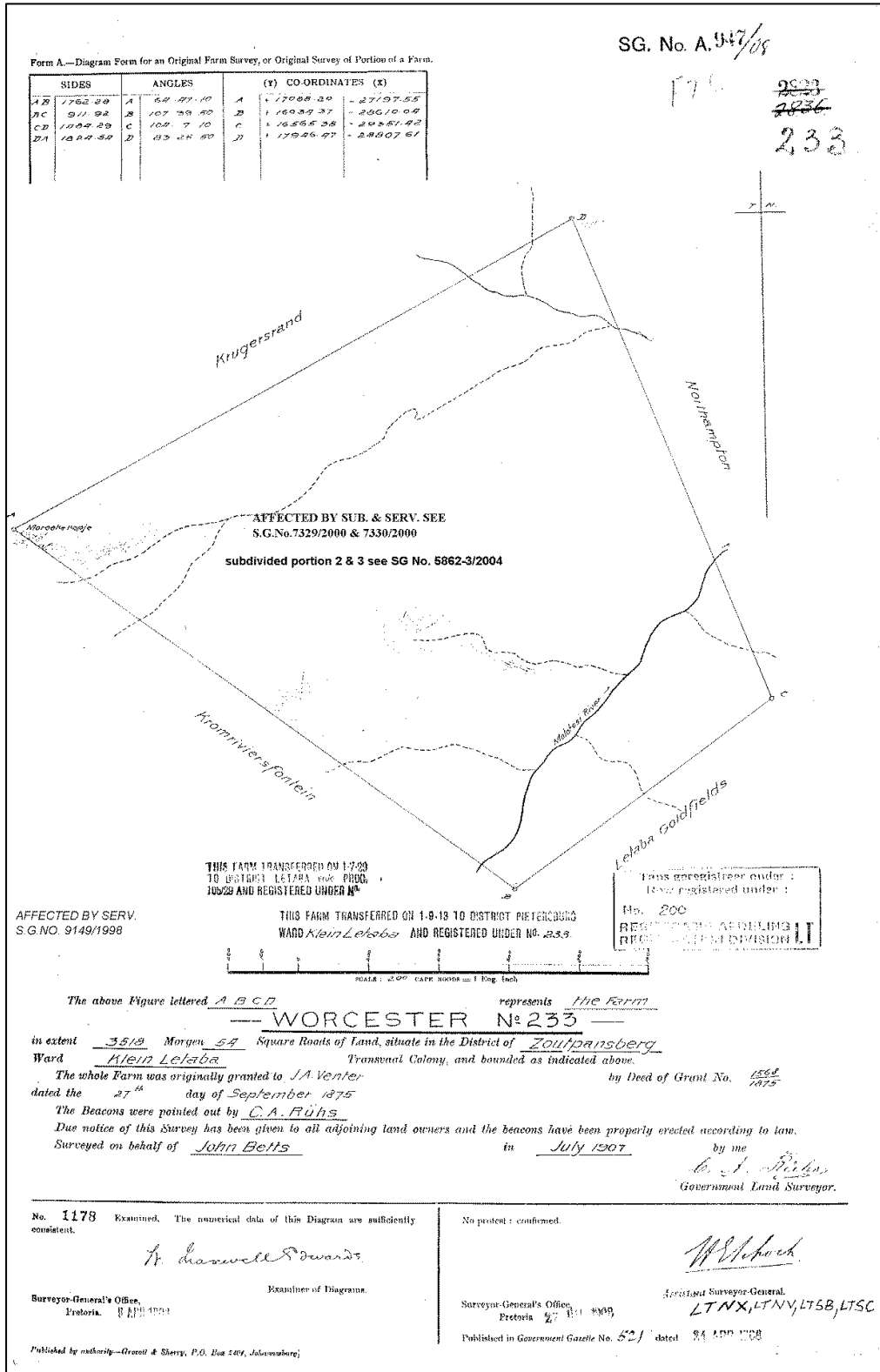


Figure 4-1: The original title deed for the farm Worcester c.1907.



#### 4.2.4 Burial Sites / Human Remains

Human remains and burials are commonly found close to archaeological sites; they may be found in "lost" graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Human remains are usually observed when they are exposed through erosion. In some instances packed stones or rocks may indicate the presence of informal pre-colonial burials. If any human bones are found during the course of construction work then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial they would need to be exhumed under a permit from either SAHRA (for pre-colonial burials as well as burials later than about AD 1500).

### 5 RESULTS: ARCHAEOLOGICAL SURVEY

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The history and archaeology of the larger Mooketsi area is relatively well known and the landscape around the Bolubedu Site is primarily well known for the occurrence of Iron Age farmer and Historical Period occurrences. The proposed Bolubedu Solar Park Project area is situated in environments that have, in places been altered where informal farming crop fields, roads and other infrastructure have been established. However, certain parts of the project area remain pristine and a number of heritage occurrences and features were noted in the project infrastructure footprint areas. These occurrences were uniquely coded **EXIGO-BSP-SAxx** (Exigo Bolubedu Solar Park Stone Age xx), **EXIGO-BSP-IAxx** (Exigo Bolubedu Solar Park Iron Age xx) and **EXIGO-BSP-FTxx** (Exigo Bolubedu Solar Park Feature xx).

#### 5.1 The Stone Age

Stone Age material generally occurs along drainage lines and exposed surfaces in the landscape. The 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. During the site survey a single Stone Age occurrence was documented.

- **EXIGO-BSP-SA01 S23.49017° E30.36485°**

A small number of Middle Stone Age (MSA) flakes were identified in the project area. The occurrences were documented and their locations plotted with a hand held GPS unit. The lithics occur along a large dongha where natural elements such as precipitation and groundwater have exposed the stone tools. The individual artefacts show a predominant MSA signature where utilised flakes and side scrapers indicate faceted platforms, characteristic of the MSA. The raw material used in the production of the lithics is mostly hornfels. It is not possible to assign an age estimate without an in-depth analysis of a more representative sample. No evidence of any factory or workshop site, or the result of any human settlement was identified. The stone implements documented in this area comprise isolated occurrences that are spread thinly and unevenly over the surrounding landscape. Generally, the occurrences are lacking in context as no organic remains such as bone, pottery or ostrich eggshell was found. As a result of the small numbers of formal and diagnostic tools, and general loss of context of the lithics, these archaeological remains in the Study Area have been rated as having low heritage significance. The occurrences are located within the Bolubedu Solar Park footprint and impact could be anticipated.



Figure 5-1: A MSA side scraper from Site EXIGO-BSP-SA01.

## 5.2 The Iron Age Farmer Period

A number of Iron Age (Farmer period) sites occur in the larger Giyani area and Iron Age farmer period occurrences and sites occur in the proposed Bolubedu Solar Park project footprint area.

- EXIGO-BSP-IA01 S23.49591° E30.36728°
- EXIGO-BSP-IA02 S23.49488° E30.36879°

A number of undecorated potsherds were noted at two adjacent locales towards the west of the study area. The ceramics occur near erosion gullies where natural elements such as precipitation and groundwater have exposed the artefacts. Since no diagnostic pottery were found it is not possible to assign an age estimate or cultural context of the potsherds. However, later Iron Age farmer pottery of the Letaba ceramic tradition were noted elsewhere on the site (see **Site Exigo-BSP-IA04** below) and these occurrences may be related. These two ceramic scatters comprise isolated surface occurrences with no indication of subsurface deposits and as such, the occurrences are lacking in context. As a result of the general absence of diagnostic artefacts and the small numbers of ceramics, as well as the general loss of site context, these archaeological remains in the Study Area have been rated as having low heritage significance. The sites are located within the Bolubedu Solar Park footprint and impact could be anticipated.





Figure 5-2: General surroundings at Site EXIGO-BSP-IA01.



Figure 5-3: Undecorated potsherds from Site EXIGO-BSP-IA01.





Figure 5-4: Undecorated potsherds from Site EXIGO-BSP-IA02.

- **EXIGO-BSP-IA03 S23.49226° E30.36811°**

A number of crude stone wall structures, and specifically circular grain bin stands were documented on a small ridge along the western periphery of the study area. The structures probably represent a single occupation Later Iron Age Farmer Period living site. The structures are poorly preserved and associated Iron Age farmer Period material culture on the surface is largely absent from the site. However, the site might be significant in terms of its regional representation in the Iron Age farmer period landscape of the area and it is rated as of medium significance. The site is located within the Bolubedu Solar Park footprint and impact could be anticipated.





Figure 5-5: Crude stone walls and stone structures at Site EXIGO-BSP-IA03.



Figure 5-6: A small stone structure, possibly a grain bin stand at Site EXIGO-BSP-IA03.





Figure 5-7: Collapsed stone walling at Site EXIGO-BSP-IA03.

- **EXIGO-BSP-IA04 S23.49137° E30.37117°**

A number of undecorated and decorated potsherds were noted at, and around a large ant hill in a central portion of the study area. Much of the ceramics have been extracted from ashy subsurface deposits in the ant hill by animal burrowing activities but surface shards were also noted. Diagnostic decorated potsherds of the Letaba Ceramic tradition indicate a probable Later Iron Age Venda / Tshonga speaker presence during the last 200years. It is highly likely that further associated material culture is present in subsurface deposits at the site. The site is rated as of medium significance due to the presence of diagnostic artefacts as well as the potentially rich material cultural assemblages at the site. It is ultimately important in terms of its regional representation in the Iron Age farmer period landscape of the area. The site is located within the Bolubedu Solar Park footprint and impact could be anticipated.





Figure 5-8: An ant hill containing ceramic sherds at Site EXIGO-BSP-IA04.



Figure 5-9: Decorated and undecorated potsherds from Site EXIGO-BSP-IA04.





Figure 5-10: Detail on decorated potsherds from Site EXIGO-BSP-IA04.

- **EXIGO-BSP-IA05 S23.48978° E30.37299°**

The remains of a probable Iron Age / early Historical Period occupation site occur towards the east of the study area. The site, measuring approximately 200m x 100m displays a surface scatter of Iron Age and Historical period artefacts such as undecorated ceramics, upper and lower grind stones and single glass fragments. In addition, a number small stone wall enclosures and stone structures, grain bin stands and stone platforms occur at the site. Even though no diagnostic artefacts were noted at the site, stone walling and the presence of maize grind stones suggest that it might be related to later Iron Age farmer pottery of the Letaba ceramic tradition noted elsewhere on the site (see **Site Exigo-BSP-IA04**). This would imply that the site was occupied by occupied by Later Iron Age Venda / Tsonga speakers during the last 200years. Glass found at the site also suggests a Historical Period occupation event at the site. The site is rated as of high significance in terms of its regional representation in the Iron Age farmer period landscape of the area and it bears high archaeological research potential. The site is located within the Bolubedu Solar Park footprint and impact could be anticipated.



Figure 5-11: A small stone platform supporting an upper grind stone at Site EXIGO-BSP-IA05.



Figure 5-12: Glass fragment and scattered stones at Site EXIGO-BSP-IA05.





Figure 5-13: Rough stone walling and terracing at Site EXIGO-BSP-IA05.



Figure 5-14: Rough stone walling at Site EXIGO-BSP-IA05.



- **EXIGO-BSP-IA06 S23.48724° E30.37692°**

A small number of circular grain bin stands were documented along the eastern periphery of the study area. It is highly likely that the structures are related to the Iron Age / Historical period occupation site to its west (Site EXIGO-BSP-IA05). The structures are poorly preserved and associated Iron Age farmer Period material culture is largely absent from the site. However, the site might be significance in terms of its relationship to other significant sites in the study area and as such, its regional representation in the Iron Age farmer period landscape of the area. The occurrence is rated as of medium significance. The site is located within the Bolubedu Solar Park footprint and impact could be anticipated.



Figure 5-15: A grain bin stand at Site EXIGO-BSP-IA06.

- **EXIGO-BSP-IA07 S23.49872° E30.36050°**

Another cluster of circular grain bin stands were documented towards the western sector of the study area in a disused crop field. It is highly likely that the structures are related to the Iron Age / Historical period occupation sites elsewhere in the area and the features point to prehistoric agriculture activities in these fields. Unfortunately, the structures are poorly preserved and associated Iron Age farmer Period material culture is absent from the site. However, the site might be significance in terms of its relationship to other significant sites in the study area and as such, its regional representation in the Iron Age farmer period landscape of the area. The occurrence is rated as of medium significance. The site is located within the Bolubedu Solar Park footprint and impact could be anticipated.





Figure 5-16: A grain bin stand at Site EXIGO-BSP-IA07.



Figure 5-17: A small grain bin stand at Site EXIGO-BSP-IA07.





Figure 5-18: A collapsed grain bin stand at Site EXIGO-BSP-IA07.

**5.3 Historical / Colonial Period and recent times**

No Historical / Colonial Period occurrences were observed in the survey area. No Historical / Colonial Period occurrences were observed in any of the survey areas. In terms of the built environment, the area has no significance, as there are no old buildings, structures, or features, old equipment, public memorial or monuments in the footprint areas.

**5.4 Graves**

At least two burial sites were identified in the project area. In the rural areas of the Limpopo Province graves and cemeteries often occur within settlements or around homesteads but they are also randomly scattered around archaeological and historical settlements. The probability of additional and informal human burials encountered during development should be thus high. Should any unmarked human burials/remains be found during the course of construction, work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA). Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met.

**- EXIGO-BSP-BP01 S23.48724° E30.37692°**

An informal cemetery was recorded in a central portion of the study area. The site consists of at least two graves. The first grave is fenced in an iron enclosure and it is dressed with a marble headstone noting the following inscription:

*In loving memory of  
 Sarila Jim Mikhatsane  
 \*1910-07-09  
 †1950-06-07  
 Robala Ka Khgotso  
 "Mokwena Psalm 8"*



The second grave, situated under a tree next to the first burial, is demarcated by a rough stone rectangular structure. No headstone or grave dressing is present. The burials, which are of high heritage significance, are located within the Bolubedu Solar Park footprint and impact could be anticipated.



Figure 5-19: A grave dressed with marble at Site EXIGO-BSP-BP01.



Figure 5-20: A human burial demarcated by a square stone structure at suite EXIGO-BSP-BP01.



- **EXIGO-BSP-BP02 S23.49246° E30.37263°**

Another informal cemetery occurs approximately 120m south-east of the first in a central portion of the study area. The site consists of at least three graves. The first grave, located under a small Mopane tree, is dressed with a marble headstone with a brick foundation. The following inscription appears on the tombstone:

*Makhate James*  
*\*1902-03-04*  
*†1960-10-19*  
*Noko*

At least two additional graves occur directly west of the first grave at the site. These burials are demarcated by rough stone rectangular structures. No headstones or grave dressings are present on these burials and preservation thereof is poor as it appears that stones from the grave dressings are scattered over the site. The burials, which are of high heritage significance, are located within the Bolubedu Solar Park footprint and impact could be anticipated.



Figure 5-21: A grave dressed with a marble headstone at Site EXIGO-BSP-BP02.



Figure 5-22: Scattered stones indicate the presence of 2 burials at suite EXIGO-BSP-BP02.

## 5.5 Other Features

One feature of more recent age was identified in the study area.

### - EXIGO-BSP-FT01 S23.49444° E30.36837°

A number of surface feature consisting out roughly constructed elongated stone structures occur along smaller drainage lines to the west of the study area. A clear temporal context and function for the structures are not known but they occur along cattle paths within donghas and one might assume that they have been constructed to control erosion. As such, the features are most probably not older than 60 years and of recent age. The features, which are of low heritage significance due to their probable recent age, are located within the Bolubedu Solar Park footprint and impact could be anticipated.





Figure 5-23: An elongated stone structure at Site EXIGO-BSP-FT01.



Figure 5-24: An elongated stone structure along a cattle track at Site EXIGO-BSP-FT01.

- EXIGO-BSP-FT02 S23.49744° E30.36108°

A number of surface feature consisting out rough stone heaps and cairns, and long sections of low stone walling in straight lines occur along the edges of disused crop fields in a western sector of the study area. In some instances dried thorn bushes were placed on top and within low stone walling where these



structures acted as support for informal fences around fields. A clear temporal context and function for the structures, which occur abundantly in the surrounding landscape, are not known but their location along the previously cultivated fields imply that they are the result of the clearing of fields for agricultural purposes and the construction of informal fences around fields. As such, the features most probably date to more recent times and they are not historically significant. The features, which are of low heritage significance due to their probable recent age are located within the Bolubedu Solar Park footprint and impact could be anticipated.



Figure 5-25: An elongated stone wall foundation at Site EXIGO-BSP-FT02.



Figure 5-26: Stone heaps and cairns at Site EXIGO-BSP-FT02.



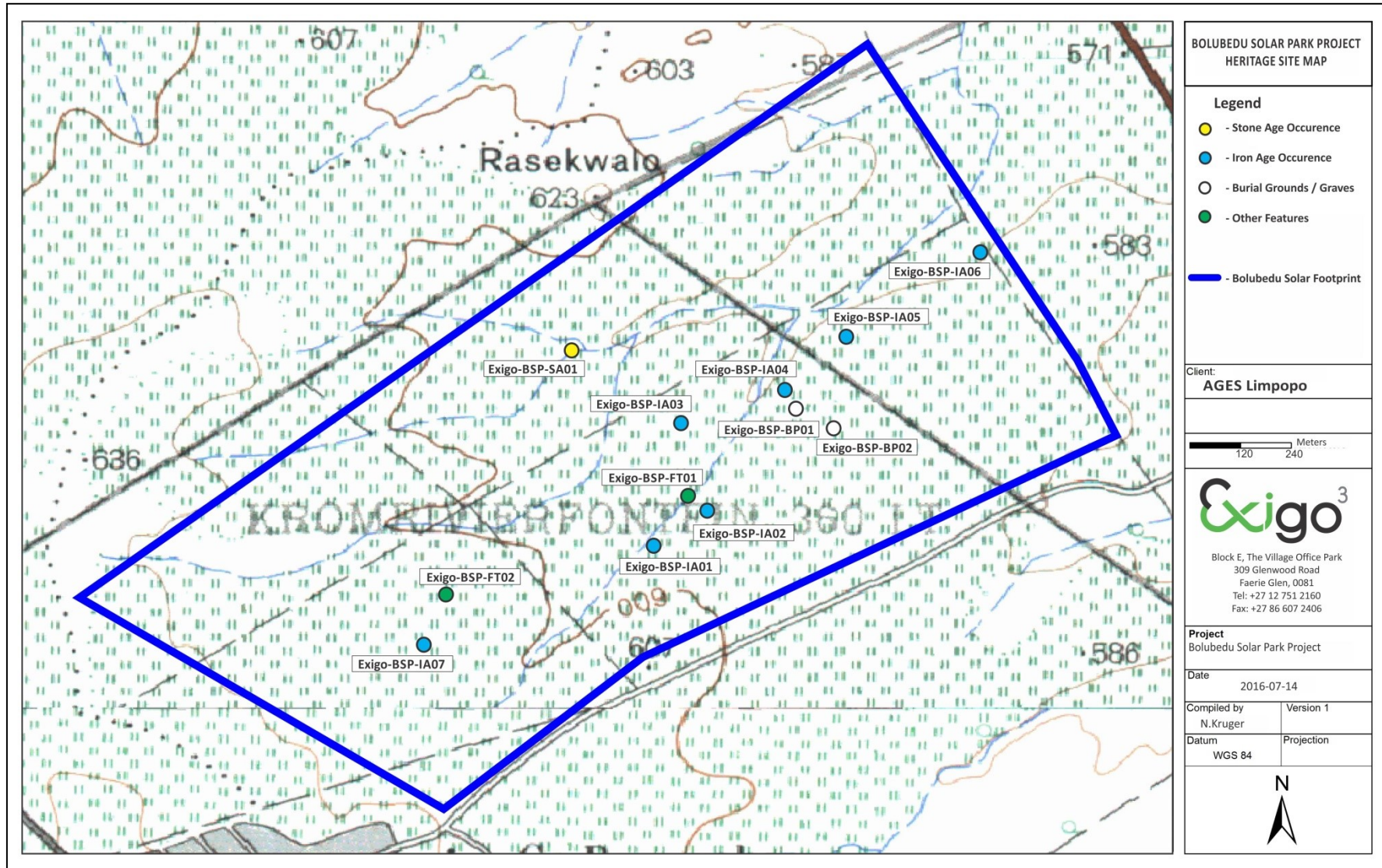


Figure 5-27: Map indicating the location of heritage sites discussed in the text.

**6 RESULTS: STATEMENT OF SIGNIFICANCE AND IMPACT RATING**

**6.1 Potential Impacts and Significance Ratings<sup>2</sup>**

The following section provides a background to the identification and assessment of possible impacts and alternatives, as well as a range of risk situations and scenarios commonly associated with heritage resources management. A guideline for the rating of impacts and recommendation of management actions for areas of heritage potential within the study area is supplied in Section 10.2 of the Addendum.

**6.1.1 General assessment of impacts on resources**

Generally, the value and significance of archaeological and other heritage sites might be impacted on 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)). 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. The EIA process therefore specifies impact assessment criteria which can be utilised from the perspective of a heritage specialist study which elucidates the overall extent of impacts.

**6.1.2 Direct impact rating**

**Direct or primary effects** on heritage resources occur at the same time and in the same space as the activity, e.g. loss of historical fabric through demolition work. **Indirect effects or secondary effects** on heritage resources occur later in time or at a different place from the causal activity, or as a result of a complex pathway, e.g. restriction of access to a heritage resource resulting in the gradual erosion of its significance, which is dependent on ritual patterns of access (refer to Section 10.3 in the Addendum for an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected).

Significant heritage receptors were found in the project area and potential impacts to heritage resources is foreseen.

The following table summarizes impacts to the **low** significance Stone Age occurrence (**EXIGO-BSP-SA01**) located within the footprint of the proposed Bolubedu Solar Park Project.

<b>NATURE OF IMPACT:</b> Impact could involve displacement or destruction of Stone Age material in the study area.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>EXTENT</b>	Local	Local
<b>DURATION</b>	Permanent	Permanent
<b>MAGNITUDE</b>	Minor	Minor
<b>PROBABILITY</b>	Definite	Very improbable
<b>SIGNIFICANCE</b>	Low	Low
<b>STATUS</b>	Negative	Neutral
<b>REVERSIBILITY</b>	Non-reversible	Non-reversible

<sup>2</sup> Based on: Winter, S. & Baumann, N. 2005. *Guideline for involving heritage specialists in EIA processes: Edition 1.*

<b>IRREPLACEABLE LOSS OF RESOURCES?</b>	Yes	No
<b>CAN IMPACTS BE MITIGATED?</b>	Yes	
<b>MITIGATION:</b> Site monitoring by ECO.		
<b>CUMULATIVE IMPACTS:</b> No cumulative impact is anticipated.		
<b>RESIDUAL IMPACTS:</b> n/a		

The following table summarizes impacts to the **low** significance Iron Age Occurrences and more recent stone features (**EXIGO-BSP-IA01, EXIGO-BSP-IA02, EXIGO-BSP-FT01, EXIGO-BSP-FT02**) located within the footprint of the proposed Bolubedu Solar Park Project.

<b>NATURE OF IMPACT:</b> Impact could involve displacement or destruction of artefacts and heritage resources in the project area.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>EXTENT</b>	Local	Local
<b>DURATION</b>	Permanent	Permanent
<b>MAGINITUDE</b>	Minor	Minor
<b>PROBABILITY</b>	Definite	Very improbable
<b>SIGNIFICANCE</b>	Low	Low
<b>STATUS</b>	Negative	Neutral
<b>REVERSIBILITY</b>	Non-reversible	Non-reversible
<b>IRREPLACEABLE LOSS OF RESOURCES?</b>	Yes	No
<b>CAN IMPACTS BE MITIGATED?</b>	Yes	
<b>MITIGATION:</b> Site monitoring by ECO.		
<b>CUMULATIVE IMPACTS:</b> No cumulative impact is anticipated.		
<b>RESIDUAL IMPACTS:</b> n/a		

The following table summarizes impacts to the **medium** significance Iron Age occurrences (**EXIGO-BSP-IA03, EXIGO-BSP-IA04, EXIGO-BSP-IA05, EXIGO-BSP-IA06, EXIGO-BSP-IA07**) located within the footprint of the proposed Bolubedu Solar Park Project.

<b>NATURE OF IMPACT:</b> Impact could involve displacement or destruction of significant heritage resources in the proposed project area.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>EXTENT</b>	Local	Local
<b>DURATION</b>	Permanent	Permanent
<b>MAGINITUDE</b>	Major	Minor
<b>PROBABILITY</b>	Definite	Very improbable

<b>SIGNIFICANCE</b>	Medium	Low
<b>STATUS</b>	Negative	Neutral
<b>REVERSIBILITY</b>	Non-reversible	Non-reversible
<b>IRREPLACEABLE LOSS OF RESOURCES?</b>	Yes	No
<b>CAN IMPACTS BE MITIGATED?</b>	Yes	
<b>MITIGATION:</b> Avoidance, Site monitoring by ECO, documentation of site, destruction permit when required.		
<b>CUMULATIVE IMPACTS:</b> No cumulative impact is anticipated.		
<b>RESIDUAL IMPACTS:</b> n/a		

The following table summarizes impacts to the **high** significance burial site (**EXIGO-BSP-BP01, EXIGO-BSP-BP02**) located within the footprint of the proposed Bolubedu Solar Park Project.

<b>NATURE OF IMPACT:</b> Impact could involve disturbance or destruction of burials in the project area.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>EXTENT</b>	Local	Local
<b>DURATION</b>	Permanent	Permanent
<b>MAGINITUDE</b>	Major	Minor
<b>PROBABILITY</b>	Definite	Very improbable
<b>SIGNIFICANCE</b>	High	Low
<b>STATUS</b>	Negative	Neutral
<b>REVERSIBILITY</b>	Non-reversible	Non-reversible
<b>IRREPLACEABLE LOSS OF RESOURCES?</b>	Yes	No
<b>CAN IMPACTS BE MITIGATED?</b>	Yes	
<b>MITIGATION:</b> Avoidance, site monitoring by ECO, grave relocation.		
<b>CUMULATIVE IMPACTS:</b> No cumulative impact is anticipated.		
<b>RESIDUAL IMPACTS:</b> n/a		

**6.1.3 Discussion: Evaluation of Results and Impacts**

Previous studies conducted in the larger Mooketsi area suggest a rich and diverse archaeological landscape and cognisance should nonetheless be taken of archaeological material that might be present in surface and sub-surface deposits along drainage lines and at water pans.

An isolated occurrence of single MSA lithics (**EXIGO-BSP-SA01**) occurring within the proposed Bolubedu Solar Park footprint is of low heritage significance due to the small numbers of formal and diagnostic tools, and general loss of context of the lithics. The potential impact on the resource is considered to be LOW but



this impact rating can be limited to a NEGLIBLE impact by the implementation of mitigation measures (site monitoring) for the sites, if / when required.

Two occurrences of undecorated Iron Age farmer period ceramics (**EXIGO-BSP-IA01, EXIGO-BSP-IA02**) as well as a number of stone structures, stone heaps and low stone walling of recent origin (**EXIGO-BSP-FT01, EXIGO-BSP-FT02**) occur within the proposed Bolubedu Solar Park footprint. The occurrences are of low heritage significance due to the absence of diagnostic pottery and general loss of site context, as well as due to the relatively recent age of the stone structures. The potential impact on the resources is expected to be LOW, provided that no previously undetected heritage remains of significance be exposed during construction and development phases. This impact rating can be limited to a NEGLIBLE impact by the implementation of mitigation measures (site monitoring) for the sites, if / when required.

Probable Iron Age Farmer Period stone wall structures and specifically grain bin stands (**EXIGO-BSP-IA03**), a surface and probable subsurface occurrence of decorated and undecorated Iron Age farmer period ceramics (**EXIGO-BSP-IA04**), the remains of a probable Iron Age / early Historical Period occupation site (**EXIGO-BSP-IA05**) as well as a further occurrence of grain bin stands (**EXIGO-BSP-IA06, EXIGO-BSP-IA07**) are all of medium significance. The sites occur within the proposed Bolubedu Solar Park footprint. As such, the potential impact is expected to be MEDIUM but this rating can be lessened to a LOW impact by the implementation of mitigation measures (avoidance, monitoring, site documentation, destruction permitting).

Two informal cemeteries (**EXIGO-BSP-BP01, EXIGO-BSP-BP02**) of high significance is situated within the proposed Bolubedu Solar Park footprint. This potential impact on the sites is expected to be HIGH but the threshold of the potential impact can be limited to a NEGLIBLE impact by the implementation of mitigation measures (avoidance, site management, monitoring, grave relocation) for the sites, if / when required.

***Sensitive and significance heritage resources occur inside areas proposed for the Bolubedu Solar Park development and the mitigation and management of some of these resources are required for the duration of the development. In the opinion of the author of this Archaeological Impact Assessment Report, the proposed Bolubedu Solar Park Project on the Farm Kromrivierfontein 360 LT and the Remainder of the Farm Worcester 200 LT may proceed from a culture resources management perspective, provided that mitigation measures are implemented.***

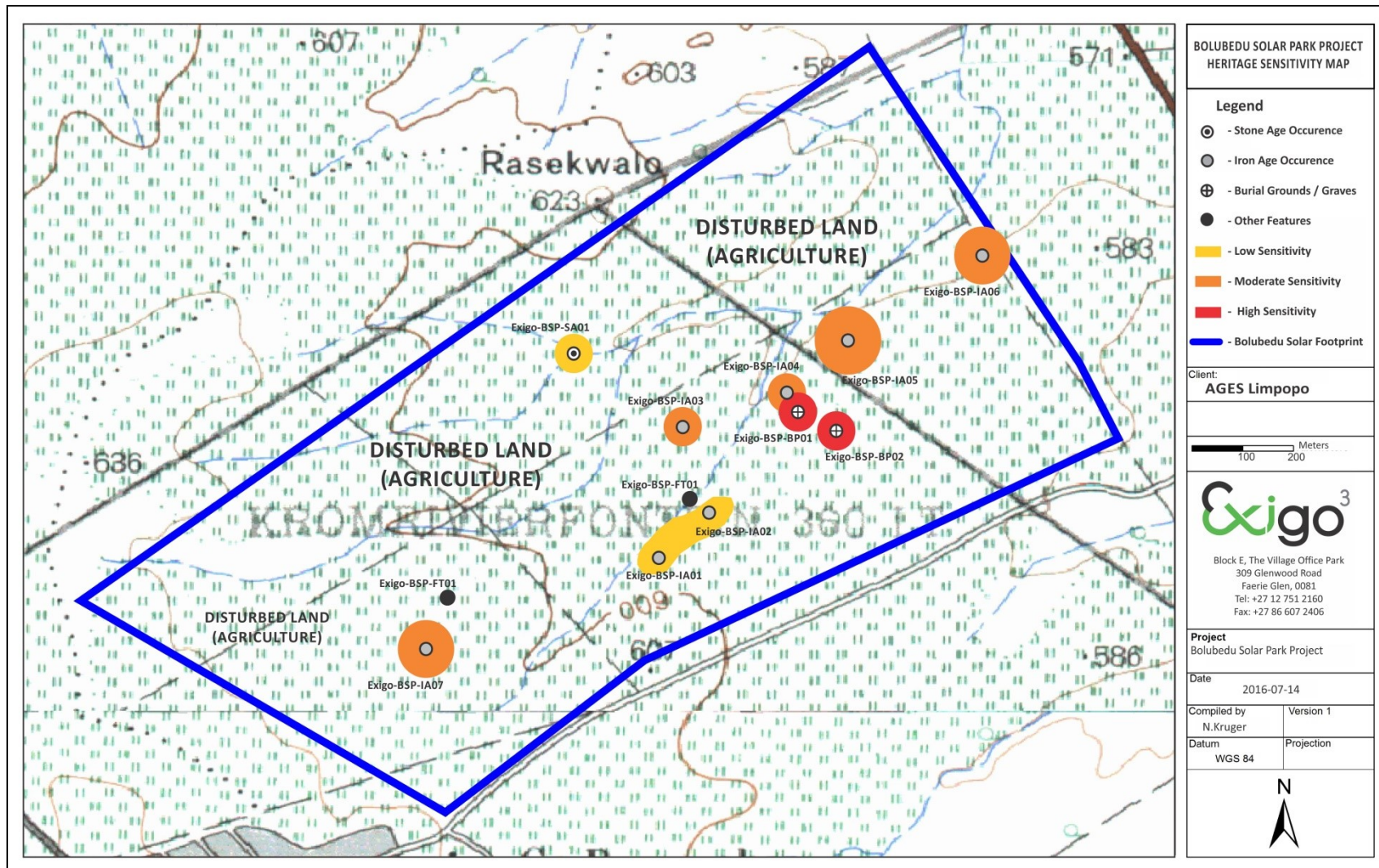


Figure 6-1: Sensitivity map for heritage resources in the Bolubedu Solar Park footprint area.

**6.2 Management actions**

Recommendations for relevant heritage resources management actions are vital to the conservation of heritage resources. A general guideline for recommended management actions is included in Section 10.4 of the Addendum. The following management measures would be required during implementation of the proposed Bolubedu Solar Park Project.

**OBJECTIVE:** prevent unnecessary disturbance and/or destruction of previously undetected heritage receptors.

**No further action in terms of mitigation is required for the low significance isolated occurrence of single MSA lithics (EXIGO-BSP-SA01) occurring within the proposed Bolubedu Solar Park footprint.**

**For two occurrences of undecorated Iron Age farmer period ceramics (EXIGO-BSP-IA01, EXIGO-BSP-IA02) as well as a number of recent period stone structures (EXIGO-BSP-FT01, EXIGO-BSP-FT02) within the proposed Bolubedu Solar Park footprint the following are required in terms of heritage management and mitigation:**

<b>PROJECT COMPONENT/S</b>	All phases of construction and operation.		
<b>POTENTIAL IMPACT</b>	Damage/destruction of sites.		
<b>ACTIVITY RISK/SOURCE</b>	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
<b>MITIGATION: TARGET/OBJECTIVE</b>	To locate previously undetected heritage remains / graves as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
<b>MITIGATION: ACTION/CONTROL</b>	<b>RESPONSIBILITY</b>	<b>TIMEFRAME</b>	
<b>Fixed Mitigation Procedure (required)</b>			
<b>Site Monitoring:</b> Regular examination of trenches and excavations.	ECO	Monitor as frequently as practically possible.	
<b>PERFORMANCE INDICATOR</b>	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
<b>MONITORING</b>	Successful location of sites by person/s monitoring.		

**For probable Iron Age Farmer Period stone wall structures and specifically grain bin stands (EXIGO-BSP-IA03), a surface and probable subsurface occurrence of decorated and undecorated Iron Age farmer period ceramics (EXIGO-BSP-IA04), the remains of a probable Iron Age / early Historical Period occupation site (EXIGO-BSP-IA05) as well as a further occurrence of grain bin stands (EXIGO-BSP-IA06, EXIGO-BSP-IA07) are all of medium significance the following are required in terms of heritage management and mitigation:**

<b>PROJECT COMPONENT/S</b>	All phases of construction and operation.		
<b>POTENTIAL IMPACT</b>	Damage/destruction of sites.		
<b>ACTIVITY RISK/SOURCE</b>	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
<b>MITIGATION: TARGET/OBJECTIVE</b>	To locate previously undetected heritage remains / graves as soon as possible after disturbance so as to maximize the chances of successful		



	rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		RESPONSIBILITY	TIMEFRAME
Fixed Mitigation Procedure (required)			
<b>Site Monitoring:</b> Regular examination of trenches and excavations.		ECO, HERITAGE ASSESSMENT PRACTITIONER	Monitor as frequently as practically possible.
Preferred Mitigation Procedure			
<b>Avoidance:</b> Implement a heritage conservation buffer of at least 50m around the heritage resource, redesign the proposed footprint to avoid the heritage resource and the proposed conservation buffer.		DEVELOPER	All phases of construction and operation.
Alternative Mitigation Procedure (if preferred mitigation procedure is not feasible)			
Documentation of sites if features are to be impacted on by development (mapping, desktop study Phase 2 site sampling). Permitting if and when required.		HERITAGE ASSESSMENT PRACTITIONER	Prior to the commencement of construction and earth-moving.
<b>PERFORMANCE INDICATOR</b>	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
<b>MONITORING</b>	Successful location of sites by person/s monitoring.		

**For informal cemeteries (EXIGO-BSP-BP01, EXIGO-BSP-BP02) of high significance is situated within the proposed Bolubedu Solar Park footprint the following are required in terms of heritage management and mitigation:**

<b>PROJECT COMPONENT/S</b>	All phases of construction and operation.		
<b>POTENTIAL IMPACT</b>	Damage/disturbance to subsurface burials and surface burial features.		
<b>ACTIVITY RISK/SOURCE</b>	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
<b>MITIGATION: TARGET/OBJECTIVE</b>	To locate human burials as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		RESPONSIBILITY	TIMEFRAME
Preferred Mitigation Procedure			
<b>Avoidance:</b> Implement a heritage conservation buffer of at least 100m around the heritage resource; if necessary redesign development footprint to avoid the heritage resource and the proposed conservation buffer. Fence cemetery and apply access control.		DEVELOPER	Prior to the commencement of construction and earth-moving, during all phases of development.
Alternative Mitigation Procedure (if preferred mitigation procedure is not feasible)			
<b>Grave Relocation:</b> Relocation of burials and documentation of site, full social consultation with affected parties, possible conservation management and protection measures. Subject to authorisations and relevant permitting from heritage authorities and affected parties.		QUALIFIED HERITAGE SPECIALIST	Prior to the commencement of construction and earth-moving.
Fixed Mitigation Procedure (required)			

<b>Site Monitoring:</b> Regular examination of trenches and excavations.	ECO	Monitor as frequently as practically possible.
<b>PERFORMANCE INDICATOR</b>	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.	
<b>MONITORING</b>	Successful location of sites by person/s monitoring.	

## 7 RECOMMENDATIONS

The larger landscape around Mooketsi is rich in pre-historical and historical remnants and this rings true for the study area and surrounds. The following recommendations are made based on general observations in the proposed Bolubedu Solar Park Project development areas:

- A Palaeontological Impact Assessment is recommended where bedrock is to be impacted and, should fossil remains such as fossil fish, reptiles or petrified wood be exposed during construction, these objects should carefully safeguarded and the relevant heritage resources authority (SAHRA) should be notified immediately so that the appropriate action can be taken by a professional palaeontologist.
- An isolated occurrence of single MSA lithics (**EXIGO-BSP-SA01**) occurring within the proposed Bolubedu Solar Park footprint is of low heritage significance due to the small numbers of formal and diagnostic tools, and general loss of context of the lithics. No farther action is required in terms of mitigation of the site and occurrences.
- Two occurrences of undecorated Iron Age farmer period ceramics (**EXIGO-BSP-IA01, EXIGO-BSP-IA02**) as well as a number of recent period stone structures (**EXIGO-BSP-FT01, EXIGO-BSP-FT02**) occur within the proposed Bolubedu Solar Park footprint. The occurrences are of low heritage significance due to the absence of diagnostic pottery and general loss of site context, as well as due to the probable recent age of the stone structures. However, the possibility exists that previously undetected heritage remains are present in subsurface deposits and it is recommended that the area be carefully monitored by an informed ECO.
- Probable Iron Age Farmer Period stone wall structures and specifically grain bin stands (**EXIGO-BSP-IA03**), a surface and probable subsurface occurrence of decorated and undecorated Iron Age farmer period ceramics (**EXIGO-BSP-IA04**), the remains of a probable Iron Age / early Historical Period occupation site (**EXIGO-BSP-IA05**) as well as a further occurrence of grain bin stands (**EXIGO-BSP-IA06, EXIGO-BSP-IA07**) are all of medium significance. The sites occur within the proposed Bolubedu Solar Park footprint. It is primarily recommended that the proposed footprint be adjusted to avoid these resources. However, should impact on the sites prove inevitable, the occurrences should be adequately documented by means of Phase 2 Specialist Studies. Such studies should minimally include the mapping, documentation and possible sampling of the sites in order to conserve the historical fabric of the heritage resources. The necessary excavation and destruction permits should be obtained from the relevant Heritage Resources Authorities prior to site sampling and destruction. Generally, the sites should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains.
- Two informal cemeteries (**EXIGO-BSP-BP01, EXIGO-BSP-BP02**) of high significance are situated within the proposed Bolubedu Solar Park footprint. Since human burials are generally of high heritage significance at all levels for their spiritual, social and cultural values, it is primarily recommended that any applicable infrastructure components in the vicinity of the cemeteries be designed in such a way as to avoid impact on the heritage resources at all times. In addition, a conservation buffer zone of at least 50m around the cemeteries, as well as the fencing off of the

graveyard is recommended. However, should impact on any of the graves in the cemeteries or the proposed 50m buffer zone prove inevitable, full grave relocations are recommended for these burial grounds. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.

- Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately
- 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. It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the Study Area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the Solar Park.

In addition to these site-specific recommendations, careful cognisance should be taken of the following:

- As Palaeontological remains occur where bedrock has been exposed, all geological features should be regarded as sensitive.
- Water sources such as drainage lines, fountains and pans would often have attracted human activity in the past. As Stone Age material the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits.

## **8 GENERAL COMMENTS AND CONDITIONS**

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This AIA report serves to confirm the extent and significance of the heritage landscape of the proposed Bolubedu Solar Park Project Development area. The larger heritage horizon encompasses rich and diverse archaeological landscapes and cognisance should be taken of heritage resources and archaeological material that might be present in surface and sub-surface deposits. If, during construction, any possible archaeological material culture discoveries 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.
- Formal MSA stone tools.
- Formal LSA stone tools.
- Potsherds
- Iron objects.
- Beads made from ostrich eggshell and glass.
- Ash middens and cattle dung deposits and accumulations.
- 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 AMAFA, SAHRA, the National Resources Act and the CRM section of ASAPA will be required.

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 will be assessed by the relevant heritage resources authority (SAHRA).

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**10 ADDENDUM 1: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE**

**10.1 Site Significance Matrix**

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by its aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these. The following matrix is used for assessing the significance of each identified site/feature.

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.			
It possesses unique, uncommon, rare or endangered aspects of South Africa’s natural or cultural heritage.			
It has potential to yield information that will contribute to an understanding of South Africa’s natural and cultural heritage.			
It is of importance in demonstrating the principle characteristics of a particular class of South Africa’s natural or cultural places or objects.			
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.			
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).			
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.			
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			
It has significance relating to the history of slavery in South Africa.			
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.			
2.2 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]			
2.3 Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Local			
Specific community			

**10.2 Impact Assessment Criteria**

The following table provides a guideline for the rating of impacts and recommendation of management actions for sites of heritage potential.

**Significance of the heritage resource**

This is a statement of the nature and degree of significance of the heritage resource being affected by the activity. From a heritage management perspective it is useful to distinguish between whether the significance is embedded in the physical fabric or in associations with events or persons or in the experience of a place; i.e. its visual and non-visual qualities. This statement is a primary informant to the nature and degree of significance of an impact and thus needs to be thoroughly considered. Consideration needs to be given to the significance of a heritage resource at different scales (i.e. sitespecific, local, regional, national or international) and the relationship between the heritage resource, its setting and its associations.

**Nature of the impact**

This is an assessment of the nature of the impact of the activity on a heritage resource, with some indication of its positive and/or negative effect/s. It is strongly informed by the statement of resource significance. In other words, the nature of the impact may be historical, aesthetic, social, scientific, linguistic or architectural, intrinsic, associational or contextual (visual or non-visual). In many cases, the nature of the impact will include more than one value.

**Extent**

Here it should be indicated whether the impact will be experienced:

- On a site scale, i.e. extend only as far as the activity;
- Within the immediate context of a heritage resource;
- On a local scale, e.g. town or suburb
- On a metropolitan or regional scale; or
- On a national/international scale.

**Duration**

Here it should be indicated whether the lifespan of the impact will be:

- Short term, (needs to be defined in context)
- Medium term, (needs to be defined in context)
- Long term where the impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention; or
- Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Of relevance to the duration of an impact are the following considerations:

- Reversibility of the impact; and
- Renewability of the heritage resource.

**Intensity**

Here it should be established whether the impact should be indicated as:

- Low, where the impact affects the resource in such a way that its heritage value is not affected;
- Medium, where the affected resource is altered but its heritage value continues to exist albeit in a modified way; and
- High, where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed.

**Probability**

This should describe the likelihood of the impact actually occurring indicated as:

- Improbable, where the possibility of the impact to materialize is very low either because of design or historic experience;
- Probable, where there is a distinct possibility that the impact will occur;
- Highly probable, where it is most likely that the impact will occur; or
- Definite, where the impact will definitely occur regardless of any mitigation measures

**Confidence**

This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.

- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation and socio-political context is fluid.
- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

**Impact Significance**

The significance of impacts can be determined through a synthesis of the aspects produced in terms of the nature and degree of heritage significance and the nature, duration, intensity, extent, probability and confidence of impacts and can be described as:

- Low; where it would have a negligible effect on heritage and on the decision
- Medium, where it would have a moderate effect on heritage and should influence the decision.
- High, where it would have, or there would be a high risk of, a big effect on heritage. Impacts of high significance should have a major influence on the decision;
- Very high, where it would have, or there would be high risk of, an irreversible and possibly irreplaceable negative impact on heritage. Impacts of very high significance should be a central factor in decision-making.

**10.3 Direct Impact Assessment Criteria**

The following table provides an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected

HERITAGE CONTEXT	TYPE OF DEVELOPMENT			
	CATEGORY A	CATEGORY B	CATEGORY C	CATEGORY D
<b>CONTEXT 1</b> High heritage Value	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected	Very high heritage impact expected
<b>CONTEXT 2</b> Medium to high heritage value	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected
<b>CONTEXT 3</b> Medium to low heritage value	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected
<b>CONTEXT 4</b> Low to no heritage value	Little or no heritage impact expected	Little or no heritage impact expected	Minimal heritage value expected	Moderate heritage impact expected

**NOTE: A DEFAULT "LITTLE OR NO HERITAGE IMPACT EXPECTED" VALUE APPLIES WHERE A HERITAGE RESOURCE OCCURS OUTSIDE THE IMPACT ZONE OF THE DEVELOPMENT.**

HERITAGE CONTEXTS	CATEGORIES OF DEVELOPMENT
<p><b>Context 1:</b> Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources</p> <p><b>Context 2:</b> Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.</p> <p><b>Context 3:</b> Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources</p> <p><b>Context 4:</b> Of little or no intrinsic, associational or contextual heritage value due to disturbed, degraded conditions or extent of irreversible damage.</p>	<p><b>Category A: Minimal intensity development</b></p> <ul style="list-style-type: none"> <li>- No rezoning involved; within existing use rights.</li> <li>- No subdivision involved.</li> <li>- Upgrading of existing infrastructure within existing envelopes</li> <li>- Minor internal changes to existing structures</li> <li>- New building footprints limited to less than 1000m2.</li> </ul> <p><b>Category B: Low-key intensity development</b></p> <ul style="list-style-type: none"> <li>- Spot rezoning with no change to overall zoning of a site.</li> <li>- Linear development less than 100m</li> <li>- Building footprints between 1000m2-2000m2</li> <li>- Minor changes to external envelop of existing structures (less than 25%)</li> <li>- Minor changes in relation to bulk and height of immediately adjacent structures (less than 25%).</li> </ul> <p><b>Category C: Moderate intensity development</b></p> <ul style="list-style-type: none"> <li>- Rezoning of a site between 5000m2-10 000m2.</li> </ul>



	<ul style="list-style-type: none"> <li>- Linear development between 100m and 300m.</li> <li>- Building footprints between 2000m2 and 5000m2</li> <li>- Substantial changes to external envelop of existing structures (more than 50%)</li> <li>- Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 50%)</li> </ul> <p><b>Category D: High intensity development</b></p> <ul style="list-style-type: none"> <li>- Rezoning of a site in excess of 10 000m2</li> <li>- Linear development in excess of 300m.</li> <li>- Any development changing the character of a site exceeding 5000m2 or involving the subdivision of a site into three or more erven.</li> <li>- Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 100%)</li> </ul>
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### 10.4 Management and Mitigation Actions

The following table provides a guideline of relevant heritage resources management actions is vital to the conservation of heritage resources.

<p><b>No further action / Monitoring</b></p> <p>Where no heritage resources have been documented, heritage resources occur well outside the impact zone of any development or the primary context of the surroundings at a development footprint has been largely destroyed or altered, no further immediate action is required. Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage\ remains are destroyed.</p> <p><b>Avoidance</b></p> <p>This is appropriate where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. Mitigation is not acceptable or not possible. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources.</p> <p><b>Mitigation</b></p> <p>This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated to a degree of medium to low significance, e.g. the high to medium impact of a development on an archaeological site could be mitigated through sampling/excavation of the remains. Not all negative impacts can be mitigated.</p> <p><b>Compensation</b></p> <p>Compensation is generally not an appropriate heritage management action. The main function of management actions should be to conserve the resource for the benefit of future generations. Once lost it cannot be renewed. The circumstances around the potential public or heritage benefits would need to be exceptional to warrant this type of action, especially in the case of where the impact was high.</p> <p><b>Rehabilitation</b></p> <p>Rehabilitation is considered in heritage management terms as a intervention typically involving the adding of a new heritage layer to enable a new sustainable use. It is not appropriate when the process necessitates the removal of previous historical layers, i.e. restoration of a building or place to the previous state/period. It is an appropriate heritage management action in the following cases:</p> <ul style="list-style-type: none"> <li>- The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.</li> <li>- Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric.</li> <li>- Where the rehabilitation process will not result in a negative impact on the intrinsic value of the resource.</li> </ul> <p><b>Enhancement</b></p> <p>Enhancement is appropriate where the overall heritage significance and its public appreciation value are improved. It does not imply creation of a condition that might never have occurred during the evolution of a place, e.g. the tendency to sanitize the past. This management action might result from the removal of previous layers where these layers are culturally of low significance and detract from the significance of the resource. It would be appropriate in a range of heritage contexts and applicable to a range of resources. In the case of formally protected or significant resources, appropriate enhancement action should be encouraged. Care should, however, be taken to ensure that the process does not have a negative impact on the character and context of the resource. It would thus have to be carefully monitored</p>
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