



**SolarReserve SA (Pty) Ltd**

**The proposed 10mw Photovoltaic (PV) Power Plant on the Farm  
Slypklip (Farm 198) near Kimberley, Northern Cape Province**

Heritage Impact Assessment

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**Declaration of Independence**

*The report has been compiled by PGS Heritage & Grave Relocation Consultants an appointed Heritage Specialist for SiVest. The views stipulated in this report are purely objective and no other interests are displayed during the decision making processes discussed in the Heritage Impact Assessment Process*

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## EXECUTIVE SUMMARY

PGS Heritage & Grave Relocation Consultants was appointed by SiVest to undertake a Heritage Impact Assessment (HIA) that forms part of the Basic Environmental Assessment (BA) for the proposed 10mw Photovoltaic (PV) Power Plant on the Farm Slypklip (Farm 198) near Kimberley, Northern Cape Province. The proposed 10mw Photovoltaic (PV) Power Plant on the Farm Slypklip (Farm 198) near Kimberley, Northern Cape Province.

The HIA has shown that the study area has a rich history of occupation from the Stone Age with hunter gatherers to the Thlaping and Thlaro during the Iron Age period. The 1800's saw the rise of the Griqua people in the area and their loss of sovereignty after 1880 to Cape rule and the South African War at the turn of the century of 1900, all adds to the richness of the heritage landscape.

The field work that feeds into the HIA utilised the findings of the archival work to guide this work. Field work and an archaeological survey of the footprint area have indicated that no heritage resources are present on site.

*Table 1: Comparison of summarised impacts on environmental parameters*

| <b>Environmental parameter</b> | <b>Issues</b>                                 | <b>Rating prior to mitigation</b> | <b>Average</b>       | <b>Rating post mitigation</b> | <b>Average</b>      |
|--------------------------------|---|-----------------------------------|----------------------|-------------------------------|---------------------|
| Heritage                       | Destruction of sub-surface heritage resources | -68                               | High negative        | -22                           | Low negative        |
|                                |   |                                   | <b>- 68</b>          |                               | <b>-22</b>          |
|                                |   |                                   | High Negative Impact |                               | Low Negative Impact |

Further to these recommendations the general Heritage Management Guideline in Section 7 needs to be incorporated in to the EMP for the project.

The overall impact of the development on heritage resources is seen as acceptably low and can impacts can be mitigated to acceptable levels.

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## **1 INTRODUCTION**

PGS Heritage & Grave Relocation Consultants was appointed by SiVest to undertake a Heritage Impact Assessment (HIA) that forms part of the Basic Environmental Assessment (BA) for the proposed 10mw Photovoltaic (PV) Power Plant on the Farm Slypklip (Farm 198) near Kimberley, Northern Cape Province. The proposed 10mw Photovoltaic (PV) Power Plant on the Farm Slypklip (Farm 198) near Kimberley, Northern Cape Province.

### **1.1 Scope of the Study**

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area. The Heritage Impact Assessment (HIA) aims to inform the EIA in the development of a comprehensive EMP to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

### **1.2 Specialist Qualifications**

This HIA was compiled by PGS Heritage & Grave Relocation Consultants (PGS).

The staff at PGS has a combined experience of nearly 40 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Wouter Fourie, Principal Archaeologist for this project, and the two field archaeologists, Henk Steyn and Marko Hutton are registered with the Association of Southern African Professional Archaeologists (ASAPA) and has CRM accreditation within the said organisation.

### **1.3 Assumptions and Limitations**

Not subtracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily

represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the current dense vegetation cover. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist had been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development the procedures and requirements pertaining to graves and burials will apply as set out below.

#### **1.4 Legislative Context**

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

- i. National Environmental Management Act (NEMA) Act 107 of 1998
- ii. National Heritage Resources Act (NHRA) Act 25 of 1999
- iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
- iv. Development Facilitation Act (DFA) Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

- i. National Environmental Management Act (NEMA) Act 107 of 1998
  - a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
  - b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
  - c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
  - d. EMP (EMP) – Section (34)(b)
- ii. National Heritage Resources Act (NHRA) Act 25 of 1999
  - a. Protection of Heritage resources – Sections 34 to 36; and
  - b. Heritage Resources Management – Section 38
- iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
  - a. Section 39(3)
- iv. Development Facilitation Act (DFA) Act 67 of 1995

- a. The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development Facilitation Act, 1995. Section 31.

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34 (1) of the NHRA states that “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...”. The NEMA (No 107 of 1998) states that an integrated EMP should (23:2 (b)) “...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”. In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive legally compatible AIA report is compiled.

## 1.5 Terminology and Abbreviations

*Table 2: List of abbreviations*

| <b>Abbreviations</b> | <b>Description</b>                                       |
|----------------------|--|
| AIA                  | Archaeological Impact Assessment                         |
| ASAPA                | Association of South African Professional Archaeologists |
| CRM                  | Cultural Resource Management                             |
| DEA                  | Department of Environmental Affairs                      |
| DWA                  | Department of Water Affairs                              |
| EIA practitioner     | Environmental Impact Assessment Practitioner             |
| EIA                  | Environmental Impact Assessment                          |
| ESA                  | Early Stone Age  |
| GPS                  | Global Positioning System                                |
| HIA                  | Heritage Impact Assessment                               |
| I&AP                 | Interested & Affected Party                              |
| LSA                  | Late Stone Age   |
| LIA                  | Late Iron Age  |
| MSA                  | Middle Stone Age   |
| MIA                  | Middle Iron Age  |
| NEMA                 | National Environmental Management Act                    |
| NHRA                 | National Heritage Resources Act                          |



|       |  |
|-------|--|
| PHRA  | Provincial Heritage Resources Agency     |
| PSSA  | Palaeontological Society of South Africa |
| ROD   | Record of Decision                       |
| SADC  | Southern African Development Community   |
| SAHRA | South African Heritage Resources Agency  |

#### Archaeological resources

This includes:

- i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- ii. rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- iii. wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

#### Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

#### Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;

- ii. carrying out any works on or over or under a place;
- iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- iv. constructing or putting up for display signs or boards;
- v. any change to the natural or existing condition or topography of land; and
- vi. any removal or destruction of trees, or removal of vegetation or topsoil

### Early Stone Age

The archaeology of the Stone Age between 700 000 and 2500 000 years ago.

### Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

### Heritage

That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

### Heritage resources

This means any place or object of cultural significance

### Holocene

The most recent geological time period which commenced 10 000 years ago.

### Late Stone Age

The archaeology of the last 20 000 years associated with fully modern people.

### Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with iron working and farming activities such as herding and agriculture.

### Middle Stone Age

The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Refer to **Appendix B** for further discussions on heritage management and legislative frameworks

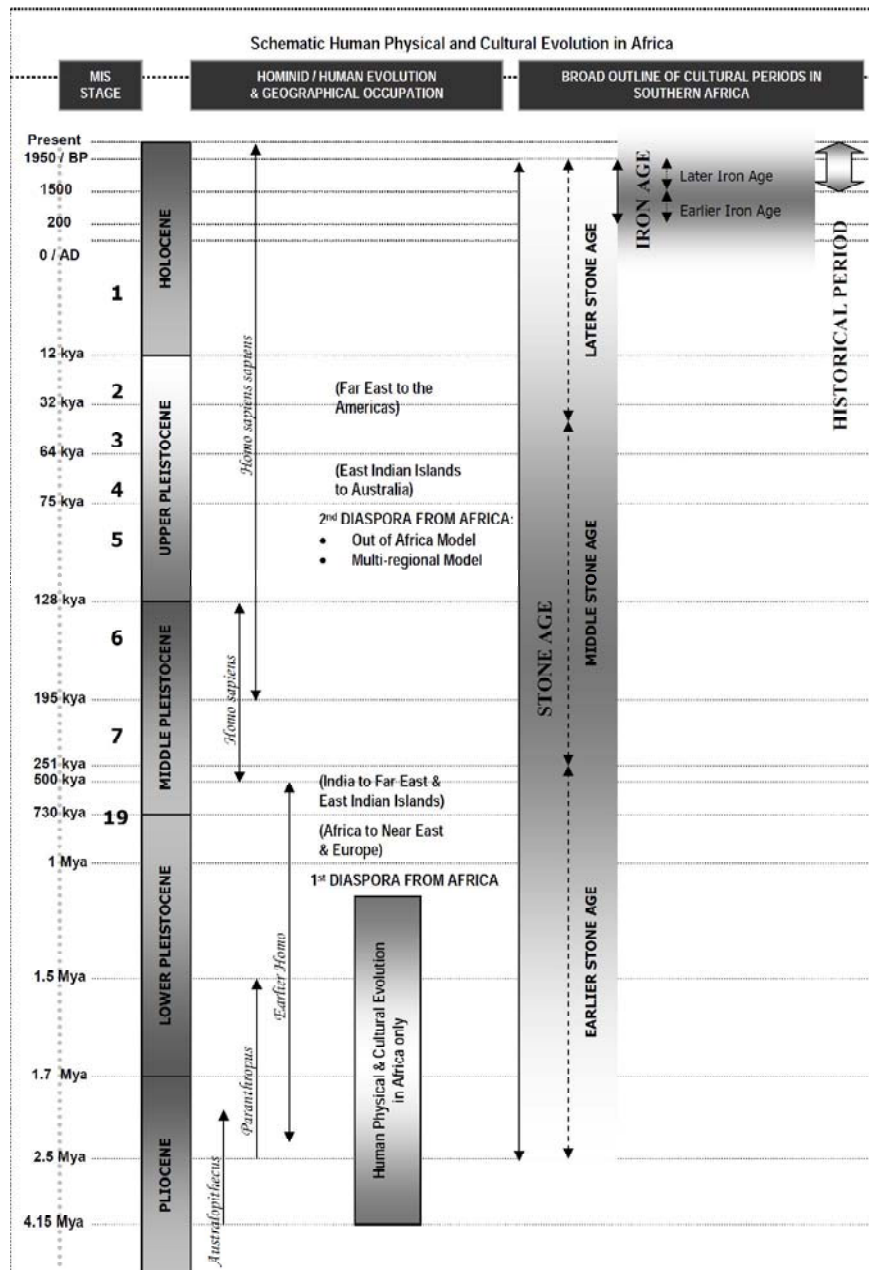


Figure 1 – Human and Cultural Time line in Africa (Morris, 2008)

## 2 TECHNICAL DETAILS OF THE PROJECT

### 2.1 Site Location and Description

|                  |  |
|------------------|--|
| Location         | (E23.37224,S28.32263),<br>The land is situated 40 kilometres north of Kimberley on the N12 towards Warrenton |
| Land             | 20 hectares  |
| Land Description | The land is greenfield veld type, zoned for agricultural use however used for grazing at present.            |

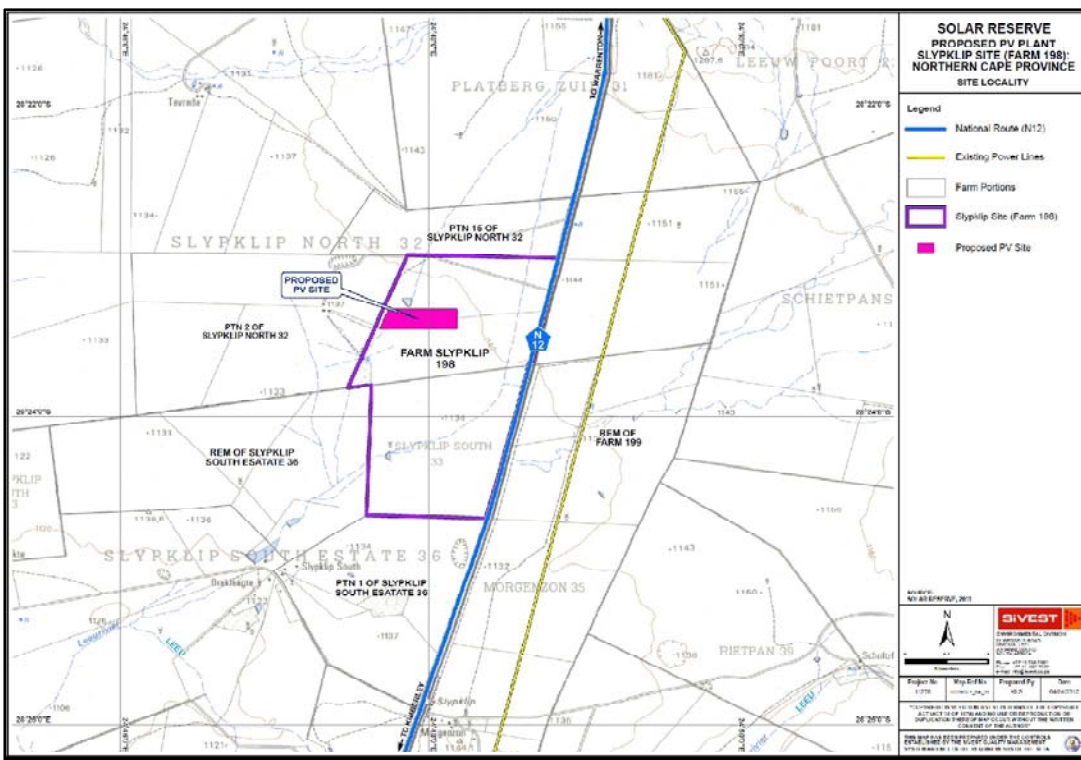


Figure 2 – Slypklip PV locality (refer to Appendix A for enlarged version)

### 2.2 Technical Project Description

SolarReserve South Africa (Pty) Ltd (hereafter referred to as SolarReserve) has appointed SiVest to undertake a Basic Assessment (BA) process for the proposed construction of a 10 MW Photovoltaic (PV) Power Plant on the Farm Slypklip (Farm 198) near Kimberley, Northern Cape Province. The objective of the project is to generate electricity to feed into Eskom's

national electricity grid by means of the construction of a 10MW solar PV Plant and associated infrastructure.

### 2.3 Project Description

The proposed project is to consist of:

- the proposed construction of a 10MW photovoltaic power plant on the Farm Slypklip (Farm 198);
- the establishment of associated infrastructure as required.

The following key components for the PV Power Plant are to be constructed:

- PV solar panels and arrays;
- PV Panel mountings;
- DC-AC current inverters and transformers; and
- Underground cabling/ overhead power lines.

The PV panels that are proposed to be used typically measure up to 6 m<sup>2</sup> in size per panel. The PV panels will be arranged in rows (arrays) and made up of approximately 100 m sections unless environmental constraints restrict this. The PV panels will be mounted on metal frames with a maximum height of approximately 3 m above the ground, supported by rammed, concrete or screw pile foundations, and they will face north in order to capture the optimum amount of sunlight.

Power lines will be required for the proposed development. However, route options are yet to be postulated. This information will become available in due course.

In terms of the associated infrastructure required for the proposed development, the following is to be constructed:

- one or more meteorological stations (to collect data on the solar resource);
- a small site office and storage facility (including security and associated facilities);
- visitor centre;
- security system- closed circuit video-surveillance system;
- site fencing;
- car park;

- temporary construction camp ( to house up to 100 people); and
- a temporary lay-down area (for the temporary storage of materials during the construction activities).

Details pertaining to the size and dimensions of the proposed associated infrastructure are yet to be finalised. This information will become available in due course.

Ultimately, the intention of SolarReserve SA (Pty) Ltd is to develop numerous small-scale commercial renewable energy projects to diversify the local energy generation, mix and reduce South Africa's dependency on non-renewable fossil fuel resources (i.e. coal). Factors such as increased economic growth and social development, rapid community development advancement among others have led to the growth in demand for electricity in Southern Africa.

By 2007, the electricity demand in South Africa had been growing at approximately 3% a year thus increasing pressure on South Africa's existing power generation capacity. As one of its strategies to meet future energy consumption requirements, the country is opting for the use of renewable energy technologies such as Photovoltaic (PV) Plants. This technology is therefore fast becoming an important energy option in South Africa. As a result, SolarReserve plan to establish a Photovoltaic (PV) plant on the remainder of farm 198 Slykclip near Windsorton, in the Northern Cape Province.

### **3 ASSESSMENT METHODOLOGY**

The section below outlines the assessment methodologies utilised in the study.

#### **3.1 Methodology for Assessing Heritage Site significance**

This Heritage Impact Assessment (HIA) report was compiled by PGS Heritage and Grave Relocation Consultants (PGS) for the proposed Humansrus Project. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002). The HIA process consisted of three steps:

- Step I – Literature Review: The background information to the field survey leans greatly on the Heritage Scoping Report completed by PGS for this site in September 2010.
- Step II – Physical Survey: A physical survey was conducted on foot through the proposed project area by qualified archaeologists (February 2011), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.
- Step III – The final step involved the recording and documentation of relevant archaeological resources, as well as the assessment of resources in terms of the heritage impact assessment criteria and report writing, as well as mapping and constructive recommendations

The significance of heritage sites was based on four main criteria:

- site integrity (i.e. primary vs. secondary context),
- amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
  - Low - <10/50m<sup>2</sup>
  - Medium - 10-50/50m<sup>2</sup>
  - High - >50/50m<sup>2</sup>
- uniqueness and
- potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;

B - Mapping of the site and controlled sampling required;

C - No-go or relocate pylon position

D - Preserve site, or extensive data collection and mapping of the site; and

E - Preserve site

Impacts on these sites by the development will be evaluated as follows

Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report.

*Table 3: Site significance classification standards as prescribed by SAHRA*

| <b>FIELD RATING</b>          | <b>GRADE</b> | <b>SIGNIFICANCE</b>        | <b>RECOMMENDED MITIGATION</b>                |
|------------------------------|--------------|----------------------------|--|
| National Significance (NS)   | Grade 1      | -                          | Conservation; National Site nomination       |
| Provincial Significance (PS) | Grade 2      | -                          | Conservation; Provincial Site nomination     |
| Local Significance (LS)      | Grade 3A     | High Significance          | Conservation; Mitigation not advised         |
| Local Significance (LS)      | Grade 3B     | High Significance          | Mitigation (Part of site should be retained) |
| Generally Protected A (GP.A) | -            | High / Medium Significance | Mitigation before destruction                |
| Generally Protected B (GP.B) | -            | Medium Significance        | Recording before destruction                 |
| Generally Protected C (GP.A) | -            | Low Significance           | Destruction                                  |

### **3.2 Methodology for Impact Assessment**

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.



### **3.1 Determination of Significance of Impacts**

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas Intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in the table below.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

### **3.2 Impact Rating System**

Impact assessment must take account of the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

#### *3.2.1 Rating System Used To Classify Impacts*

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

|  |                            |   |
|--|----------------------------|---|
| <b>NATURE</b>  |                            |   |
| Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.   |                            |   |
| <b>GEOGRAPHICAL EXTENT</b>   |                            |   |
| This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined. |                            |   |
| 1  | Site                       | The impact will only affect the site  |
| 2  | Local/district             | Will affect the local area or district  |
| 3  | Province/region            | Will affect the entire province or region   |
| 4  | International and National | Will affect the entire country  |
| <b>PROBABILITY</b>   |                            |   |
| This describes the chance of occurrence of an impact   |                            |   |
| 1  | Unlikely                   | The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence). |
| 2  | Possible                   | The impact may occur (Between a 25% to 50% chance of occurrence).                           |
| 3  | Probable                   | The impact will likely occur (Between a 50% to 75% chance of occurrence).                   |
| 4  | Definite                   | Impact will certainly occur (Greater than a 75% chance of occurrence).                      |
| <b>REVERSIBILITY</b>   |                            |   |
| This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.  |                            |   |
| 1  | Completely reversible      | The impact is reversible with implementation of minor mitigation measures                   |
| 2  | Partly reversible          | The impact is partly reversible but more intense mitigation measures are required.          |
| 3  | Barely reversible          | The impact is unlikely to be reversed even with intense mitigation measures.                |
| 4  | Irreversible               | The impact is irreversible and no mitigation measures exist.                                |

| IRREPLACEABLE LOSS OF RESOURCES   |                               |   |
|---|-------------------------------|---|
| This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.   |                               |   |
| 1   | No loss of resource.          | The impact will not result in the loss of any resources.  |
| 2   | Marginal loss of resource     | The impact will result in marginal loss of resources.   |
| 3   | Significant loss of resources | The impact will result in significant loss of resources.  |
| 4   | Complete loss of resources    | The impact is result in a complete loss of all resources.   |
| DURATION  |                               |   |
| This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity   |                               |   |
| 1   | Short term                    | The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years). |
| 2   | Medium term                   | The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).   |
| 3   | Long term                     | The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).   |
| 4   | Permanent                     | The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).  |
| CUMULATIVE EFFECT   |                               |   |
| This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question. |                               |   |
| 1   | Negligible Cumulative Impact  | The impact would result in negligible to no cumulative effects  |

|  |                          |  |
|--|--------------------------|--|
| 2  | Low Cumulative Impact    | The impact would result in insignificant cumulative effects  |
| 3  | Medium Cumulative impact | The impact would result in minor cumulative effects  |
| 4  | High Cumulative Impact   | The impact would result in significant cumulative effects  |
| INTENSITY / MAGNITUDE  |                          |  |
| Describes the severity of an impact  |                          |  |
| 1  | Low                      | Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.   |
| 2  | Medium                   | Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).  |
| 3  | High                     | Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.  |
| 4  | Very high                | Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation. |
| SIGNIFICANCE   |                          |  |
| <p>Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:</p> <p>(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.</p> <p>The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.</p> |                          |  |

| Points   | Impact Significance Rating | Description  |
|----------|----------------------------|--|
| 6 to 28  | Negative Low impact        | The anticipated impact will have negligible negative effects and will require little to no mitigation.   |
| 6 to 28  | Positive Low impact        | The anticipated impact will have minor positive effects.   |
| 29 to 50 | Negative Medium impact     | The anticipated impact will have moderate negative effects and will require moderate mitigation measures.  |
| 29 to 50 | Positive Medium impact     | The anticipated impact will have moderate positive effects.  |
| 51 to 73 | Negative High impact       | The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.                      |
| 51 to 73 | Positive High impact       | The anticipated impact will have significant positive effects.   |
| 74 to 96 | Negative Very high impact  | The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws". |
| 74 to 96 | Positive Very high impact  | The anticipated impact will have highly significant positive effects.  |

An example of a ratings table:

| <b>IMPACT TABLE FORMAT</b>               |   |
|--|---|
| Environmental Parameter                  | A brief description of the environmental aspect likely to be affected by the proposed activity e.g. Surface water   |
| Issue/Impact/Environmental Effect/Nature | A brief description of the nature of the impact that is likely to affect the environmental aspect as a result of the proposed activity e.g. alteration of aquatic biota The environmental impact that is likely to positively or negatively affect the environment as a result of the proposed activity e.g. oil spill in surface water |
| Extent                                   | A brief description of the area over which the impact will be expressed   |
| Probability                              | A brief description indicating the chances of the impact occurring  |
| Reversibility                            | A brief description of the ability of the environmental components recovery after a disturbance as a result of the proposed activity  |
| Irreplaceable loss of resources          | A brief description of the degree in which irreplaceable resources are likely to be lost  |
| Duration                                 | A brief description of the amount of time the proposed activity is likely to take to its completion   |

|                     |   |                               |
|---------------------|---|-------------------------------|
| Cumulative effect   | A brief description of whether the impact will be exacerbated as a result of the proposed activity  |                               |
| Intensity/magnitude | A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily  |                               |
| Significance Rating | A brief description of the importance of an impact which in turn dictates the level of mitigation required  |                               |
|                     | Pre-mitigation impact rating  | Post mitigation impact rating |
| Extent              | 4   | 1                             |
| Probability         | 4   | 1                             |
| Reversibility       | 4   | 1                             |
| Irreplaceable loss  | 4   | 1                             |
| Duration            | 4   | 1                             |
| Cumulative effect   | 4   | 1                             |
| Intensity/magnitude | 4   | 1                             |
| Significance rating | -96 (high negative)   | -6 (low negative)             |
| Mitigation measures | Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. Describe how the mitigation measures have reduced/enhanced the impact with relevance to the impact criteria used in analyzing the significance. These measures will be detailed in the EMP. |                               |

## 4 CURRENT STATUS QUO

### 4.1 Site Description

The property is just to the east by the N12 which connects Warrenton and Kimberley (**Figure 3**).

The site is covered by grass land with no additional natural features (**Figure 4**).



*Figure 3 – View of to the N12 towards Kimberley (Study area on the right)*



*Figure 4 – View of site towards the north west*

#### 4.1.1 Archival findings

The archival research focused on available information sourced that was used to compile a background history of the study area and surrounds. This data then informed the possible heritage resources to be expected during field surveying.

##### **Paleontological background**

The general area is comprised of Vaal River gravel river deposits which have been divided into older and younger gravels on the basis of lithological and topographical observations (Helgren 1979; de Wit et al 2000). The older levels are found at an elevation of 21 to 60 meters above the river levels and have been grouped into the Windsorton Formation (de Wit et al 2000). The younger gravels are found at a lower elevation and are grouped into the Riverton Formation and Rietputs Formation which are believed to be late Pleistocene (from about 2 million to 11 thousand years ago) to Holocene (from 11 thousand years) in age (de Wit et al 2000).

##### **Archaeological Background**

*Early Stone Age 2 million – 400 000 BP approx.*

The Early Stone Age at Windsorton is classified by an industry called the Acheulean Industry (Leader 2009). A sample of 465 stone tools from one pit in the lower coarse alluvium is consistent with early Acheulean technology (Kuman and Gibbon in press). It must be recognised that the dates assigned for the Acheulean technology at Windsorton are only a minimum age for the stone tool technology preserved in the deposits and each assemblage represents a time averaged collection. The types of tools found during the Acheulean include flakes struck from cores in various ways, and the Levallois technique.

This technique is prepared core technique whereby flakes are struck from the core in order to produce a particular flake size and type which are systematically flaked from the core. This is different from flaking the core without thinking about the shape or type of flake, just looking for a sharp edge. The Levallois technique shows much more control and foresight in the preparation of flakes. The Acheulean represents the transition between the Early and Middle Stone Age (Mitchell 2002:59) however the transition is poorly dated.



*Middle Stone Age 400 000 – 30 000 BP approx.*

At the site near Windsorton known as Rooidam there were hand axes, prepared cores and the first regional appearance of true blades.(Beumont and Vogel 2006:223) There were also scrapers and other retouched forms which are characteristic of the Fauresmith (ibid). The Fauresmith is a description of the tool composition found in the dryer internal areas in South Africa found during the Middle Stone Age (Leader 2009).

It is thought that these tools were made by hominins called *Homo ergaster* (Mitchell 2002). These hominins are a later version of a line of hominins which evolved across the years to split and form the existence of modern humans. The kind of artefacts found at Rooidam are argued to be comparable to those found at Windsorton (Beaumont et al 2006). The MSA (Middle Stone Age) at Windsorton is still predominately dominated by Acheulean technology. The core preparation which is known as the Levallois technique is attributed to the Victoria West complex (Mitchell 2002) which is mostly related to the core preparation techniques. Dates from Wonderwerk Cave found in the Northern Cape and displaying much of the same material culture as Windsorton suggests that the Fauresmith is in excess of 200,000 years old, thus placing it firmly in the MSA.

*Later Stone Age 30 000 BP approx. to recent times*

There is no direct evidence for the Later Stone Age (LSA) at the site of Windsorton. However, at the site of Rietputs about 1.5 kilometres away from the site at Windsorton there are some LSA remains. These remains are small flakes, made of chert and show very little evidence of abrasion and therefore are fresher than those of the Acheulean (Leader 2009:25). These remains are apparently the only LSA remnants in the area (Leader 2009) thus confirming the rarity of settlement in the area by LSA individuals which were likely to be the San or Bushmen as they are known..

The LSA is generally known for microlithic technologies accompanied by art and in some cases jewellery. These microlithic technologies include the small flakes as documented at Rietputs. The industry also includes bladlets (Mitchell 2002). There is a move towards finer grained rock in this period (Mitchell 2002:115) which would explain the use of chert in the tools found at Rietputs since chert is a fairly fine grained rock.

Although art, a marker of modern human cognisance which was believed to have come about during the LSA (Lewis-Williams 1983 cf Morris1988) , is not specifically documented at Windsorton, engravings occur in abundance in the dry interior of South Africa (Dowson 1992) and thus it is probable that engravings can be found in the vicinity of the site.

Archaeological work done by Morris (2006) (Figure 5 some 10 kilometres to the west of Slypklip on the Vaalriver on the farm Zoelen's Laagte has shown a graduated distribution of Stone Age finds away from the river and can be expected on the eastern bank of the river closer (8km from the study area) to the current study area.

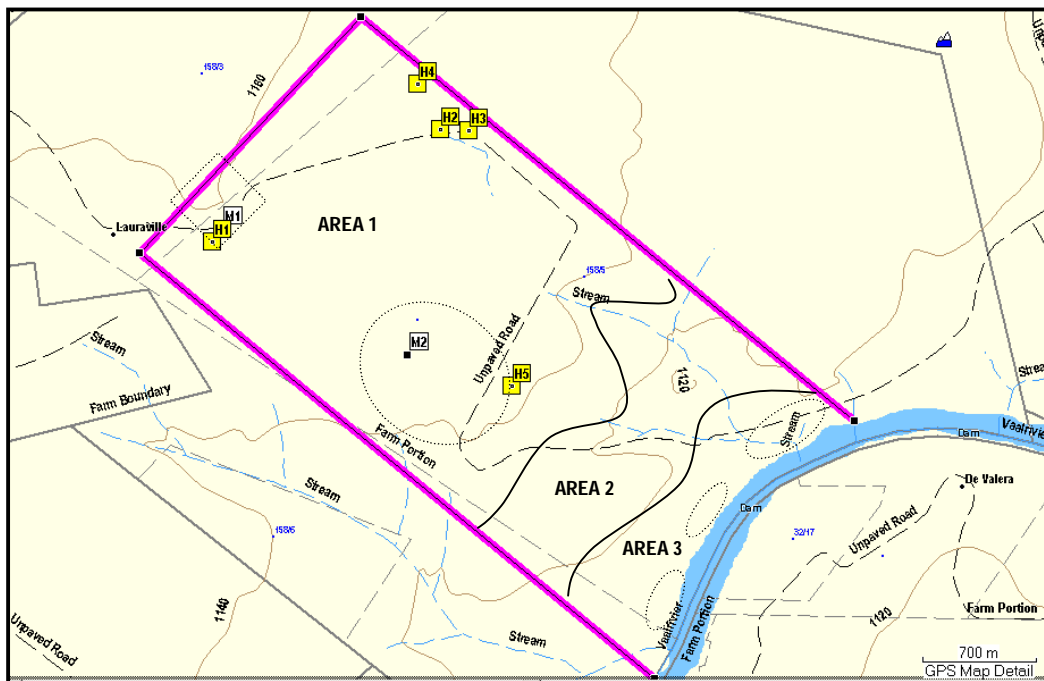


Figure 5 – Van Zoelen's Laagte study area, with demarcated areas (Morris, 2006)

Area 1: Area characterised by widely dispersed scatters of LSA remains (density  $\leq 4:1$  (artefacts:  $m^2$ ))

Area2: Area characterised by dispersed scatters of LSA remains. Larger scatters with stratigraphic depth

Area 3: Area is characterised by Later Stone Age concentrations of stone tools (ratio of  $\geq 4:1$ ) scattered virtually throughout the Area but concentrated along the Vaal river and smaller stream beds. Some MSA and ESA material such as handaxes.

### *Rock Art*

There are two major types of rock engravings that can be found – incised and pecked engravings. Incised engravings are known as ‘hairline’ or ‘fine lined’ engravings (Moriss1988). These are done with a pointed stone tool and are done on fully patinated rocks (ibid). These tend to consist of outlines only and include outlines of animals and humans (ibid). The other tradition is those that are pecked into the rock surface and are produced (...percussively with a pointed tool.) (Morris 1988). These pecks can be done in dots or dashes (with a slanted stroke). They can also be hacked.

However, the form of the engraving is defined by the graphic element that dominates the engraving (Morris 1988). There has been some interest in the spatial differential of engravings in South Africa. Those north of the Orange River are apparently quite different to those north of the river. However, in this report the engravings north of the Orange River are the main focus of this report. Those north of the Orange River are mostly pecked and scraped engravings are extremely rare (Morris 1988).

The engravings in this general area show both animals, and more interestingly, many geometric forms (Lewis-Williams and Dowson 1989). These images are thought to represent the experiences of various San medicine men and women, otherwise referred to as shamans, during trance (ibid.). These images are a visual representation of a complex set of beliefs relating to religion and the cosmos which the San peoples believed and still do believe in. In San culture and religious systems it was believed that the cosmos was inhabited by various animals and by two gods, spirits-of-the-dead, and could be accessed through the trance process (ibid.; Lewis-Williams and Blundell 1998; Blundell 2004). Shamans went into trance in order to perform one or more of three pivotal tasks – control game to ensure food for their band, capture the ‘rain’ in the form of an animal to ensure that rain fell so that game would be plentiful, and to take away illness to the spirit world that the shamans had drawn out of the bodies of various San band members, thus dispelling the illness back into the spirit world from whence it had come (Blundell 2004).

During the process of performing these three tasks it was necessary for shamans to go into trance to ‘see’ the illness and in order to access the spirit world (Lewis – Williams and Dowson 1989). Through the process of going into trance various bodily sensations were felt and visions were seen. These included the seeing of entoptics such as zigzags, u-shapes and dots, the

feelings of 'attenuation' i.e. the feeling of growing taller, the sensation of flying or going underwater and all of this was often accompanied by great pain in the stomach and bleeding from the nose (ibid.).

These sensations are often depicted in rock art, both painted and engraved, and these images can be seen in the engravings found in the Northern Cape, and are likely to be around the area of Windsorton.

Unfortunately there are no secure methods of dating engravings (Dowson 1992). There have been some advances in terms of scraping of the patina, or outer shine of the engraving and dating that (ibid.). However, this method is still highly experimental and there still exists no secure method of dating engravings. Therefore, we can only rely on the archaeological data which suggests a Later Stone Age general date for the engravings. However, a small number of sheep, cattle and goats can be found in the engravings represented which show the distribution of Khoi and East-African groups in the area in more recent times (Morris 1988).

This National Monument is situated on the farm Nooitgedact adjacent to the farm Droogfontein, some 30 kilometers south west of the study area, contains 3 sections of glaciated pavement with over 250 Bushman and Khoe rock engravings (**Figure 6**)

### *Iron Age*

A single daga base exists in the upper layers of the site of Rietputs is the only secure evidence of possible Iron Age settlement in the area (Leader 2009 :25). It seems that the Iron Age settlements in this area date from the Late Iron Age (LIA) (Huffman 2007) which lasted from 1300 – 1840 approximately. It is suggested that these settlements can be attributed to the south-western branch of the Sotho-Tswana (Mitchell 2002; Penn 2005; Huffman 2007).



*Figure 6: (Khoi)San Engraving of and Eland on glacial pavement at Nooitgedacht  
([http://commons.wikimedia.org/wiki/File:Rock\\_Art\\_at\\_Nooitgedacht.jpg](http://commons.wikimedia.org/wiki/File:Rock_Art_at_Nooitgedacht.jpg))*

The ceramics from this site, although not found at Windsorton, would exhibit bands of hatching, or multiple incisions which would be spaced down the vessel with bands that were untextured coloured red or black (Mitchell 2002:344 – 345). These Iron Age individuals were farmers who would have brought cattle with them and formed traditional central cattle pattern settlements where the cattle are kept in the middle of the village and are given primacy over all other animals (Mitchell 2002; Huffman 2007). However, given the aridity of the central area of southern Africa there is not extensive evidence of settlement by cattle-keeping groups in the area (Huffman 2007). The Sotho-Tswana were found just north of the area of Windsorton and thus were almost certainly part of the politics dominating the later era around the site.

The Southern Tswana is associated with the Tlhaping who dominated the Barkley west/Kimberley area between 1800-1870 (Shillington, 1985). The Tlhaping settled predominantly in the Harts River valley, a tributary of the Vaalriver. A set of 17 settlements from Taung in the north down south towards Barkley West and Dikgatlhong to the west of the study area attest to their dominance during the late 1800's (**Figure 7**).



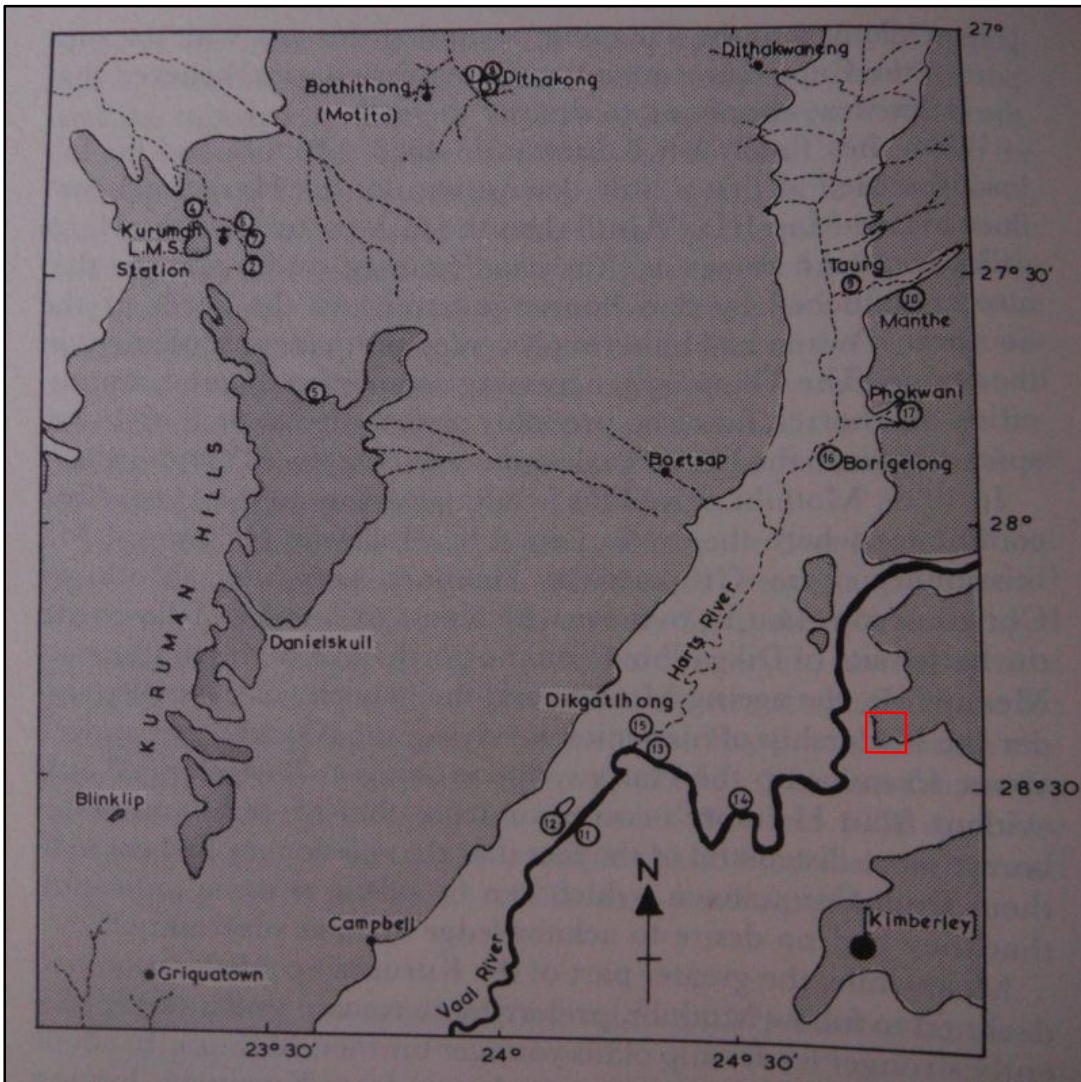


Figure 7: Distribution Map of Tlhaping settlements 1800-1870 (Shillington, 1985)(Study area in red)

## Historical Background

### *The Pastoralists and the Historical Period*

The Orange River was a great attraction to the historical settlers of the area due to the aridity of the general area around the River. Historical accounts from various European travellers, most importantly Robert Gordon (1988), detail the inhabitants of the area and how they were affected by the colonisation of the Cape. San were found in the area, as evidenced by the rock art, but there were also Khoi individuals who kept stock and participated in raiding of European farms in order to stay alive (Gordon 1988).

The Khoi groups that predominated the area were those of the Eniqua and the Korana (Boonzaier et al). These groups were trading across the Orange River with the Sotho-Tswana

groups for items such as copper, iron beads, glass beads, copper earrings, knives, and barbed assegais (ibid.). The relations between these Bantu-speakers and the Khoi groups were generally good, and there was much intermarriage between the two groups (ibid.).

The Koranna were chief group in this area. Eventually they came to dominate the area (Penn 2005). This led to many cattle raids and resistance to the European intrusion in the area and began what is known as the 'Bastaard' Resistance in the area (ibid.).

#### *The Koranna Resistance*

Due to conflict with the Europeans and the cut-off from vital resources, the Khoe group (although San, escaped slaves, and European individuals were part of this group) in the Orange River area had assimilated into what was known as the Koranna. This group was a highly motivated and capable group of individuals and by the mid-nineteenth century they mounted a resistance against the advancing European invasion of groups looking to settle in the area just north of the Orange River ( Boonzaier et al).

Nigel Penn (2005) who has written extensively on this area has noted that between the 1840's and the 1870's much resistance between the Koranna and the Europeans took place. In 1847 the area south of the Orange River known as Bushmanland was annexed by the Cape colony and magistrates were appointed (ibid.). By 1862 local economies were greatly affected by the settlement of Europeans and trekboers in the area which resulted in violence and raiding from the Koranna against the trade networks of the Colony and the Tswana ( Strauss 1979; Penn 2005).

Between 1868 and the 1870's much colonial settlement of the area took place (Penn 2005). This led to increased violence and hostility towards the colonial government. A revolt in 1878 by the Koranna individual by the name of Klaas Lukas led to a defensive move of the Khoe groups to the islands on the Orange River and finally a successful campaign against these so called 'rebels' was carried out by Captain McTaggart in 1878, capturing the islands and their inhabitants ( Wilcox 1986).

The leaders of the Koranna were eventually sent to Robben Island in the late 1800's becoming the first political prisoners on the island ( Boonzaier et al 1996). As a result, most of the land

surrounding Kimberly and thus, Windsorton, was relocated to Europeans and this shaped the future history of the area during the Anglo-Boer War.

### *The Griqua State*

Below we trace the formation of the Griqua nation and the establishment and the development of Griqualand in order to observe the evolution of the cultural landscape of the study area.

### *The Formation of the Griqua Nation and the Establishment of Griqualand*

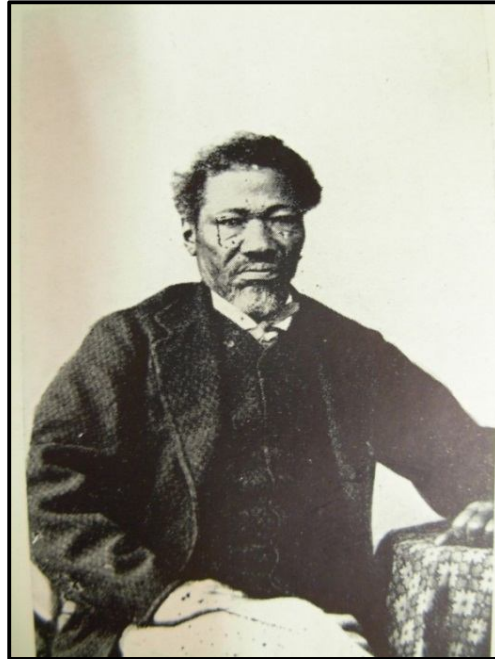
The establishment of Griqualand, now characterised by Griquatown (south-west) and Campbell (south-east of the study area) and Daniëlskuil (Griqualand West) among the popular towns of Griqualand came about with the trekking of the so called 'Bastaards' - a name that acknowledges multiple ethnogenesis (Ross, 1976) in Ouzman (2005) and '*....other lesser privileged inhabitants from the Cape Colony during a period when their rights to land and livestock were being eroded in Cape Colony*' (Cronje, 2006). In the Cape they had been conscripted to serve in the commandos established by the Cape Government. Not incline to conscription, and possibly other laws of the Cape Colony they decided; under the leadership of Adam Kok I (1710-1795)(**Figure 8**), to trek (emigrate) to the interior regions of the country; in the processes occupying areas of land in the Orange River region.

It is here that in the second half of the 18th century Adam Kok I and his followers became dominant inhabitants of the region. However, following his emancipation in the mid-18th century, Kok I is suggested to have moved to the area immediate of Piketberg where in 1751 he acquired grazing rights to a farm, Stinkfontein, from the Dutch East India Company. It is here that a number of Khoi (Hottentots) descents, namely the Goringhaiqua and the Namaqua and some 'Bastaards' attached to Adam Kok I group first established themselves. Adam Kok I possibly got married to the daughter of the Xarixuriqua chief; a move that could have potentially strengthen his hold and enhanced his status among his group and followers as the leader of the newly formed nation to be later called, the Griqua's (circa. 1813).

Adam Kok I initiated longstanding relations between himself, his successors and the administrators of the Cape Colony; in the process attracting either official support and/or sanctions (Cronje, 2006). This led to his recognition by the Cape Colony as the headman over the Khoi in the region, subsequently assuming the title of a chief or captaincy, Kaptyn as referred to in the Affairs of the Cape of Good Hope, 1871. His stay in the area did not last long



as they had to move to the Kamiesberg area to escape increasing pressure and encroachment by the farmers who were moving west coast of the Cape Colony in their search for new lands for grazing and cultivation. Access to water sources also played a significant role in this encroachment.



*Figure 8 – Adam Kok I*

Another resettlement by Kok and his group took place when he sent his son, Cornelius I, to explore the area along the Orange River; during this process several cattle posts were established for grazing purposes. Cronje (2006) suggests that, *“in the course of time they increasingly adopted the Cape Dutch language but gave it their own idiom”*; this became the language for the Griqua people. This is important because language is a defining trait of any nation and many Griqua people still speak Afrikaans to this day. However, the identity politics and rights to land of this newly formed nation did not end there as they continued for many generations to come which included periods of contestation for chieftainship and land between and among the Griqua’s and many other nations, both ‘black’ and ‘white’.

These contestations were pertinent in the period after Kok I stepped down as the chief of the Griqua people in Campbell, relinquishing his powers as chief to his son Cornelius Kok I. At the same time Adam Kok II (in Griquatown in 1816) was elected by London Missionary Society (LMS) as the overall chief in Griquatown.

The LMS tried to persuade the Griqua to abolish their hereditary leadership in favour of elected officials. Kok and Barend Barends did not take well to this proposed practice and moved away with their followers –Kok to Campbell and Barends to Daniëlskuil (Snyman, 1988).

The San residing at Daniëlskuil was not impressed with the new arrivals and a period of conflict resulted between Barends' Griqua and the local San inhabitants. This continued until 1820 when Jager Afrikaner (San representative) and Barends proclaimed a truce. The Griqua stayed fairly autonomous up to 1860 after which landowner's right and the expansion of the colonial empire started to encroach on their land.

In the 1860's this dispute of ownership of the Campbell lands and the surrounding areas between the Orange Free State and the Zuid Afrikaansche Republiek of the Transvaal on the one hand and Waterboer supported by the Cape Government on the other resulted in the eventual demise of the Griqua territory.

“The basis of Free State claims to the Campbell lands was the deed of sale dated December 1861 signed by Henry Harvey who purported to be the authorised agent of Adam Kok III” (Cronje, 2006). Meaning that Kok III had sold land to the Orange Free State without consulting with Waterboer, a process which had been negated by Sir Cathcart's devaluation of the treaty that had been sign earlier between Andries Waterboer and D'Urban. In the process Henry Harvey had also sold land of Kok III which did not belong to the Griqua government seated in Philippolis. Fires of these land claim sagas where propelled further when diamond field were discovered in the region.

This led to the 1871 discussion between Barkly (who had personally visited the area and the newly discovered diamond fields at Kimberley), the Presidents of the Orange Free State and the Zuid Afrikaansche Republiek to submit the border dispute with Waterboer to arbitration.

This process of border negotiation and arbitration ended with the 1871 declaration by Barkly (who had acceded to Waterboer's request) of Griqualand West as a British territory. This resulted in the division of Griqualand into Western and the Eastern parts.



as a long march towards the Transvaal (Ryan n.d.). This Battalion was henceforth involved in a number of difficult and key battles in the War.

Indeed, Windsorton is quoted as a back – up station during the War. The town was never under great siege, never being a big or pivotal town to begin with. However, as a town which was found on the railway and served as a siding for a number of trains who used it to restock, Windsorton was nevertheless a town which was attacked during the siege of Kimberley.

The Siege of Kimberley's precursor was the movement of Boer forces from the Free State and Transvaal in two definitive groups with the aim of cutting of Kimberley and the British forces within from the outside world. At 1.35am on 15 October 1899 the Free State kommando cut the telegraph lines between Kimberley and Fourteen Streams and blew up the train bridge at Slypklip and by 10 am they reached Windsorton Road Station where some British intelligence riders were captured (Breytenbach, 1978).

During the South African War, also referred to as the Anglo Boer war, Kimberley was besieged by Boer forces from 14 October 1899 to 15 February 1900. For 4 months the Boer forces placed a total lock down on the town of Kimberley and besieged it until the town was relieved by General French on 15 February 1900.

Archival work has shown that the larger area around the Slypklip Study area is rich in heritage and spans an immense temporal scale from the Earlier Stone Age (latest around 400 000 BP) through the Iron Age with the Tlhaping and into the Colonial and historic areas with the Griqua history and the South African War.

#### *4.1.2 Field work findings*

Field work and an archaeological survey of the footprint area has revealed no heritage resources (Refer to **Figure 10** for Tracklogs of survey done by archaeologist)

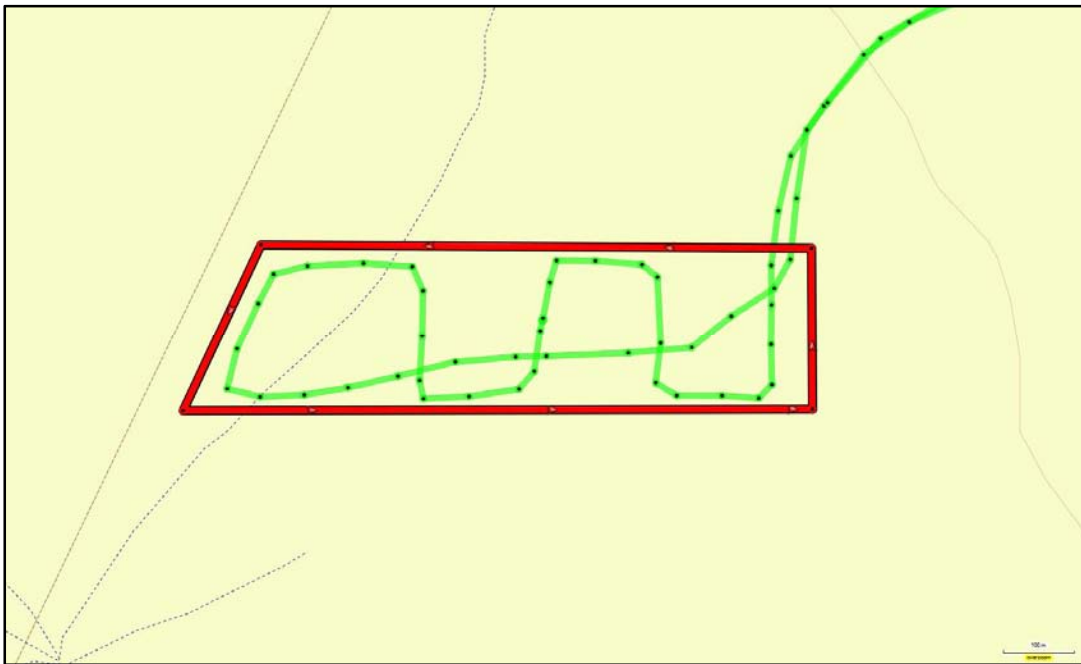


Figure 10 – Griqualand West locations, 1880-1900 (Shillington, 1985) (Study area in red)

## 5 IMPACT EVALUATION

### 5.1 Impact on site specific heritage resources

The evaluation of possible impacts on undiscovered heritage resources is evaluated below.

| IMPACT TABLE FORMAT                             |   |
|---|---|
| <i>Environmental Parameter</i>                  | Discovery of possible sub-surface heritage resources  |
| <i>Issue/Impact/Environmental Effect/Nature</i> | Destruction of sub-surface heritage resources   |
| <i>Extent</i>                                   | Limited to the site where discovery is made   |
| <i>Probability</i>                              | Possible  |
| <i>Reversibility</i>                            | Only reversibel through mitigation measures as proposed in management sections                      |
| <i>Irreplaceable loss of resources</i>          | Cultural resources are irreplaceable  |
| <i>Duration</i>                                 | If the cemetery is not avoided and destroyed without mitigation measures the loss will be permanent |

|                            |  |                               |
|----------------------------|--|-------------------------------|
| <i>Cumulative effect</i>   | Low impact is expected   |                               |
| <i>Intensity/magnitude</i> | A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily |                               |
| <i>Significance Rating</i> | A brief description of the importance of an impact which in turn dictates the level of mitigation required                             |                               |
|                            |  |                               |
|                            | Pre-mitigation impact rating   | Post mitigation impact rating |
| <i>Extent</i>              | 1  | 1                             |
| <i>Probability</i>         | 2  | 1                             |
| <i>Reversibility</i>       | 4  | 2                             |
| <i>Irreplaceable loss</i>  | 4  | 2                             |
| <i>Duration</i>            | 4  | 4                             |
| <i>Cumulative effect</i>   | 2  | 1                             |
| <i>Intensity/magnitude</i> | 4  | 2                             |
| <i>Significance rating</i> | -68 (high negative)  | -22 (low negative)            |
| <i>Mitigation measures</i> | Implement management measure for reporting heritage finds and action forward   |                               |

## 5.2 Impact on Cultural Landscape

Heritage significance of the cultural landscape is derived from the interaction between the natural landscape, such as valleys, undulating plains and rivers courses usually framed by mountain ranges or accentuated by ridges and koppies, and access routes, human settlements and farmsteads. Also interacting with these physical entities are intangible and historic landscapes and events that is known to have added to the cultural fabric of a place or area.

The evaluation of the study area and surrounds as demarcated shown the area to be rich in heritage resources spanning the archaeological to historical timeframe.

The cultural landscape of the study area has an agricultural rural appearance, with industrial activities associated with the proposed electrical energy generation in the form of the proposed Slypklip Solar Park consisting of PV as well as CSP infrastructure.

The visual impact of the proposed development on the cultural landscape will be addressed in the Visual Impact Assessment of the BA, as well as the possible mitigation measures. These mitigation measures will in most instances also alleviate impacts on the cultural landscape.

### **5.3 Cumulative Impact on Heritage Resources**

This 20 hectares PV project will be surrounded in future by a larger PV development on the rest of the 700 hectares of Farm 198 – Slypklip. This will increase the possibility of impacting on sub-surface heritage resources and add to the possible cumulative impact on possible heritage resources.

With regards to the cultural landscape, larger study area is already impacted and sensitised towards infrastructure, notably the railway lines, roads (tarred and dirt), however the addition of a further 500-700 hectares of solar park consisting mainly of mirror like panels may aggravate the cumulative effect of this infrastructure type on the cultural landscape.

The impact on heritage resources is seen as low negative with only the current project (20 hectare PV) implemented in the landscape. It is however in magnitude smaller than the larger proposed project and the addition of this 20 hectare foot print will not add significantly to the cumulative impact of a 500-700 hectare solar facility, and is thus seen as a low cumulative impact on possible heritage resources.

## **6 CONCLUSIONS AND RECOMMENDATIONS**

The HIA has shown that the study area has a rich history of occupation from the Stone Age with hunter gatherers to the Thlaping and Thlaro during the Iron Age period. The 1800's saw the rise of the Griqua people in the area and their loss of sovereignty after 1880 to Cape rule and the South African War at the turn of the century of 1900, all adds to the richness of the heritage landscape.

The field work that feeds into the HIA utilised the findings of the archival work to guide this work. Field work and an archaeological survey of the footprint area has indicated that no heritage resources are present on site.

Further to these recommendations the general Heritage Management Guideline in Section 7 needs to be incorporated in to the EMP for the project.

The overall impact of the development on heritage resources is seen as acceptably low and can impacts can be mitigated to acceptable levels.

## **7 HERITAGE MANAGEMENT GUIDELINES**

### **7.1 General Management Guidelines**

1. The National Heritage Resources Act (Act 25 of 1999) states that, any person who intends to undertake a development categorised as-
  - (a) the construction of a road, wall, transmission line, 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.

**In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the South African Heritage Resources Agency (SAHRA) needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.**



2. In the event that a further heritage assessment is required it is advisable to utilise a qualified heritage practitioner preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA).

This survey and evaluation must include:

- (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 of the National Cultural Resources Act;
- (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.

3. It is advisable that an information section on cultural resources be included in the SHEQ training given to contractors involved in surface earthmoving activities. These sections must include basic information on:

- a. Heritage;
- b. Graves;
- c. Archaeological finds; and
- d. Historical Structures.

This module must be tailor made to include all possible finds that could be expected in that area of construction.

4. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.
5. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
6. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.

7. After mitigation an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
8. If during the initial survey sites of cultural significance is discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological/palaeontological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist.
9. In the event that human remains are uncovered or previously unknown graves are discovered a qualified archaeologist needs to be contacted and an evaluation of the finds made.
10. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA needs to be followed. This includes an extensive social consultation process.

The definition of an archaeological/palaeontological monitoring programme is a formal program of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

***The purpose of an archaeological/palaeontological monitoring programme is:***

- To allow, within the resources available, the preservation by record of archaeological/palaeontological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works
- To provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological/palaeontological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard.
- A monitoring is not intended to reduce the requirement for excavation or preservation of known or inferred deposits, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits.

- The objective of the monitoring is to establish and make available information about the archaeological resource existing on a site.

PGS can be contacted on the way forward in this regard.

Table 4: Roles and responsibilities of archaeological and heritage management

| ROLE  | RESPONSIBILITY           | IMPLEMENTATION  |
|---|--------------------------|---|
| A responsible specialist needs to be allocated and should sit in at all relevant meetings, especially when changes in design are discussed, and liaise with SAHRA.                  | The client               | Archaeologist and a competent archaeology supportive team         |
| If chance finds and/or graves or burial grounds are identified during construction or operational phases, a specialist must be contacted in due course for evaluation.              | The client               | Archaeologist and a competent archaeology supportive team         |
| Comply with defined national and local cultural heritage regulations on management plans for identified sites.  | The client               | Environmental Consultancy and the Archaeologist                   |
| Consult the managers, local communities and other key stakeholders on mitigation of archaeological sites.   | The client               | Environmental Consultancy and the Archaeologist                   |
| Implement additional programs, as appropriate, to promote the safeguarding of our cultural heritage. (i.e. integrate the archaeological components into employee induction course). | The client               | Environmental Consultancy and the Archaeologist,                  |
| If required, conservation or relocation of burial grounds and/or graves according to the applicable regulations and legislation.  | The client               | Archaeologist, and/or competent authority for relocation services |
| Ensure that recommendations made in the Heritage Report are adhered to.   | The client               | The client  |
| Provision of services and activities related to the management and monitoring of significant archaeological sites.  | The client               | Environmental Consultancy and the Archaeologist                   |
| After the specialist/archaeologist has been appointed, comprehensive feedback reports   | Client and Archaeologist | Archaeologist   |

|   |  |  |
|---|--|--|
| should be submitted to relevant authorities during each phase of development. |  |  |
|---|--|--|

## 7.2 All phases of the project

### 7.2.1 Archaeology

Based on the findings of the HIA, all stakeholders and key personnel should undergo an archaeological induction course during this phase. Induction courses generally form part of the employees' overall training and the archaeological component can easily be integrated into these training sessions. Two courses should be organised – one aimed more at managers and supervisors, highlighting the value of this exercise and the appropriate communication channels that should be followed after chance finds, and the second targeting the actual workers and getting them to recognize artefacts, features and significant sites. This needs to be supervised by a qualified archaeologist. This course should be reinforced by posters reminding operators of the possibility of finding archaeological/palaeontological sites.

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camps area and small scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during operations and may be recoverable, but this is the high-cost front of the operation, and so any delays should be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, but construction trenches do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project and these must be catered for. Temporary infrastructure is often changed or added to the subsequent history of the project. In general these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making and to make the correct judgment on which actions should be taken. A responsible archaeologist/palaeontologist must be appointed for this commission. This person

does not have to be a permanent employee, but needs to sit in at relevant meetings, for example when changes in design are discussed, and notify SAHRA of these changes. The archaeologist would inspect the site and any development recurrently, with more frequent visits to the actual workforce and operational areas.

In addition, feedback reports can be submitted by the archaeologist to the client and SAHRA to ensure effective monitoring. This archaeological monitoring and feedback strategy should be incorporated into the Environmental Management Plan (EMP) of the project. Should an archaeological/palaeontological site or cultural material be discovered during construction (or operation), such as burials or grave sites, the project needs to be able to call on a qualified expert to make a decision on what is required and if it is necessary to carry out emergency recovery. SAHRA would need to be informed and may give advice on procedure. The developers therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the material and data are recovered. The project thus needs to have an archaeologist/palaeontologist available to do such work. This provision can be made in an archaeological/palaeontological monitoring programme.

#### 7.2.2 *Graves*

In the case where a grave is identified during construction the following measures must be taken.

Mitigation of graves will require a fence around the cemetery with a buffer of at least 20 meters.

If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. To remove the remains a rescue permit must be applied for with SAHRA and the local South African Police Services must be notified of the find.

Where it is then recommended that the graves be relocated a full grave relocation process that includes comprehensive social consultation must be followed.

The grave relocation process must include:

- i. A detailed social consultation process, that will trace the next-of-kin and obtain their consent for the relocation of the graves, that will be at least 60 days in length;
- ii. Site notices indicating the intent of the relocation
- iii. Newspaper Notice indicating the intent of the relocation
- iv. A permit from the local authority;
- v. A permit from the Provincial Department of health;
- vi. A permit from the South African Heritage Resources Agency if the graves are older than 60 years or unidentified and thus presumed older than 60 years;
- vii. An exhumation process that keeps the dignity of the remains intact;
- viii. An exhumation process that will safeguard the legal implications towards the developing company;
- ix. The whole process must be done by a reputable company that are well versed in relocations;
- x. The process must be conducted in such a manner as to safeguard the legal rights of the families as well as that of the developing company.

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## 9 REFERENCES

BEAUMONT, P.B., SMITH, A.B., AND VOGEL, J.C. 1995. *Before the Einiqua: the archaeology of the frontier zone*. A. B. Smith (ed.). Einiqualand: studies of the Orange River frontier p236-264. Cape Town: University of Cape Town Press.

BLUNDELL, G. 2004. *Nqabayo's Nomansland: San rock art and the somatic past*. Uppsala: Uppsala University.

BOONZAIER.E., MALHERBE,C., BERENS,P. SMITH,A.1996. *Cape Herders: A history of the Khoikhoi of southern Africa*. Cape Town and Johannesburg: David Philip

BREYTENBACH, J.H. 1978. Die Geskiedenis van die Tweede Vryheidsoorlog in Suid-Afrika, 1899-1902. Deel I: Die Boere-Offensief, Okt.-Nov. 1899

CRONJE, J. 2006. *The Griqua of the Northern Cape: Land ownership, identity and leadership*. Sol Plaatjie Educational Trust, 32 Angel Street, Kimberley, 8301.

DE WIT M.J.C, MARSHALL T.R, AND PARTRIDGE,T.C. 2000 *Fluvial deposits and drainage evolution*. T.C. Partridge, R.R. Maud (Eds.), *The Cenozoic of Southern Africa*, Oxford University Press: New York: 55–72

DOWSON, T.N. 1992. *The rock engravings of southern Africa*. Johannesburg: Witwatersrand University Press.

GORDON, R. J. 1988. *Cape Travels, 1777 to 1786*. P. E. R. M.Boucher: Johannesburg.

HELGREN,D.M. 1979. *River of Diamonds: an Alluvial History of the Lower Vaal Basin, South Africa*. The University of Chicago Press: Chicago

HUFFMAN, T.N. 2007. *Handbook to the Iron Age: The archaeology of Pre-Colonial Farming Societies in southern Africa*. University of KwaZulu-Natal Press.

KUMAN, K. AND GIBBON,R.J, in press. *The early Acheulean of South Africa: Sterkfontein valley and the Vaal River basin*. de Lumley, H. (Ed.), *Les cultures à bifaces du Pléistocène Inferieur et Moyen dans le monde. Émergence du sens de l'harmonie*. Edusud: Nice.

LEADER, G.M. 2009. *Early Acheulean in the Vaal River basin, Rietputs Formation, Northern Cape Province, South Africa*. Msc Dissertation, University of the Witwatersrand.

LEWIS-WILLIAMS J.D. AND BLUNDELL . G. 1998. *Fragile Heritage: A rock art field guide*. Johannesburg: University of the Witwatersrand Press.

LEWIS-WILLIAMS, J. D. AND DOWSON, T. A 1989. *Images of Power: Understanding Bushman Rock Art*. Johannesburg: Southern Book Publishers.

MITCHELL, P. 2002. *The Archaeology of southern Africa*. University Press: Cambridge.

MORRIS, D. 1988. *Engraved in place and time: a review of variability in the rock art of the Northern Cape and Karoo*. South African Archaeological Bulletin 43: 109-121.

MORRIS, DAVID, 2006. *Cultural Resources Management Impact Assessment: A Portion of Van Zoelen's Laagte 158, Windsorton District, Northern Cape, South Africa*. McGregor Museum.

MORRIS, DAVID. 2008. *Archaeological and Heritage Impact Assessment on Remainder of Carter Block 458, near Lime Acres, Northern Cape*. McGregor Museum.

OUZMAN, S. 2005. *The Magical Art of a Raider Nation: Central South Africa's Korana Rock Art*. Goodwin Series: Vol 9.

PENN, N. 2005. *The Forgotten Frontier: Colonist and Khoisan on the Cape's Northern Frontier in the 18th Century*. Cape Town: Double Storey Books.

ROSS, R. 1975. *The !Kora Wars on the Orange River, 1830-1880*. The Journal of African History. 16(4)

RYAN, N. D. *The War in South Africa*.

STRAUSS, T. 1979. *War along the Orange*. University of Cape Town: Centre for African Studies, Communications 1.

SHILLINGTON, K. 1985. *The Colonisation of the Southern Tswana, 1870-1900*. Ravan Press (Pty) Ltd. Braamfontein.



WILKINSON,S. 1900. *Lessons of the War Being Comments from Week to Week to the Relief of Ladysmith*. Westminster Archibald Constable and Company Philadelphia: J.B. Lippincott Company.



**LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA****3.1 General principles**

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and palaeontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In the new legislation, permits are required to damage, destroy, alter, or disturb them. People who already possess material are required to register it. The management of heritage resources are integrated with environmental resources and this means that before development takes place heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves, which are older than 60 years and are not in a cemetery (such as ancestral graves in rural areas), are protected. The legislation protects the interests of communities that have interest in the graves: they may be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle will be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resource authority and if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the construction company's cost. Thus, the construction company will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that:

An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- 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;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 ( Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and
- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection, to all historic and pre-historic cultural remains, including graves and human remains.

### **3.2 Graves and cemeteries**

Graves younger than 60 years fall under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning, or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as

well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation.

If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.