

# PROPOSED DE AAR WIND ENERGY FACILITY ON THE NORTH AND SOUTH PLATEAU, NORTHERN CAPE PROVINCE

(Assessment conducted under Section 38 (8) of the National Heritage Resources Act as part of an EIA.)

Prepared for

Aurecon South Africa (Pty) Ltd

On behalf of

Mulilo Renewable Energy (Pty) Ltd

December 2011



Prepared by:

Lita Webley & Jayson Orton  
Archaeology Contracts Office  
University of Cape Town  
Private Bag  
Rondebosch 7700  
Tel: 021 650 2357

Email: [Lita.Webley@uct.ac.za](mailto:Lita.Webley@uct.ac.za)

## EXECUTIVE SUMMARY

The Archaeology Contracts Office has been appointed by Aurecon South Africa (Pty) Ltd on behalf of the client, Mulilo Renewable Energy (Pty) Ltd, to undertake a Heritage Impact Assessment for the establishment of two 150-200MW wind energy facilities on the Eastern Plateau some 20 km east of De Aar, Northern Cape Province. The project has been split into two halves, namely the North and South projects, with the potentially 145 turbines on the former and 105 turbines on the latter area. The power generated by the two proposed projects will be transmitted to the national grid via five proposed sub-stations connecting into three existing transmission lines crossing the site and linking into an existing substation outside of De Aar. In addition, there will be access roads, underground and some overhead cabling, laydown areas and maintenance/control buildings on the sites. At this stage, no alternative sites have been proposed for the facility as a selection process was undertaken to select the proposed site.

Prior to this project, very little was known of the pre-colonial or colonial archaeology around De Aar. Fieldwork was undertaken by Lita Webley and Jayson Orton in November 2011. Limitations included mountainous terrain and an absence of roads which made survey work difficult.

### Heritage Indicators

- There is a widespread distribution of Middle Stone Age (MSA) artefacts of patinated hornfels across the top of the plateau. In general the artefacts do not appear to represent *in situ* sites and are of low significance. There are a few discrete Later Stone Age (LSA) sites of medium to high significance as they represent a pre-ceramic interior variant on the Wilton and/or Smithfield about which very little is known.
- There are a number of stone kraal complexes that may represent seasonal utilisation of the “winterveld” on top of the plateau during the late 19<sup>th</sup> and early 20<sup>th</sup> century. They are of medium significance as this pattern of land use has not been recorded.
- While most of the permanent farmsteads are located below the plateau, there are some farm buildings, including sheds, kraals, etc on top of the plateau. While none are of high significance, some are older than 60 years and protected in terms of the NHRA.
- No cemeteries or graves were identified on the plateau.
- The cultural landscape comprises typical Karoo landscape which has been slightly modified by its use for agricultural purposes.

It is assumed that the construction of the proposed facility will have a physical impact on above and below ground heritage resources and visual impacts on the broader cultural landscape. These impacts are the same for the North and South Plateau.

### Recommendations

- With respect the archaeology, two alternative mitigation measures are proposed. Either an archaeologist should be involved with the placement of the turbines and associated infrastructure during the site-specific EMP phase or selective sampling of one MSA factory site and two LSA sites on the South Plateau and one LSA site on the North Plateau is recommended;

- The kraal complexes identified during the survey must be avoided, and this means that access roads must be re-routed to ensure they are not damaged. It is anticipated that additional kraals may occur which were not recorded during the fieldwork and these should also be avoided;
- Since kraal complexes are found in valleys, in general terms, construction of turbines and roads in valley bottoms should be kept to a minimum;
- Re-routing of access roads to avoid passing in close proximity to farmsteads and associated farm buildings older than 60 years, must also be implemented;
- In general, a 500m buffer should be implemented around farmsteads particularly if the farm buildings are older than 60 years. This buffer can be reduced if the building contains no elements of heritage significance;
- The Visual Impact specialist should consider the impact of the proposed facility on the Cultural Landscape;
- Road alignments must be planned in such a way that the minimum of cut and fill operations are required;
- If any human remains are uncovered during the construction phase, work in that area should stop immediately and the South African Heritage Resources Association (SAHRA) must be notified;
- During the detailed planning phase, drawings of proposed road alignments, infrastructure and near-final turbine positions should be submitted to an archaeologist for review. Micro-adjustment of alignments and turbine positions is likely to be sufficient to achieve adequate mitigation;
- Guarantees for demolition of turbines after their useful life must be in place as a condition of approval.

## ***Declaration of Consultants Independence***

I, Lita Ethel Webley, author of the De Aar Wind Energy Facility specialist heritage report, hereby declare that I am an independent consultant appointed by Aurecon South Africa (pty) Ltd to provide specialist input on the Mulilo Renewable Energy. I hereby confirm that I have no business, financial, personal or other interest in the activity, application or appeal in respect of which I have been appointed other than fair remuneration for work performed in connection with the activity and application. All opinions expressed in my specialist report are my own.



SIGNATURE

NAME: Lita Ethel Webley  
January 2012

Lita Webley and Jayson Orton are independent specialist consultants who are in no way connected with the proponent, other than delivery of consulting services.

Lita Webley (PhD) is an archaeologist with 12 years of working experience in heritage throughout southern Africa and joined the Archaeology Contracts Office in 2008. She is accredited with Principal Investigator status with the Association of Professional Archaeologists of Southern Africa.

Jayson Orton (MA) has been employed as a full-time heritage practitioner by the Archaeology Contracts Office since 2004. He is accredited with Principal Investigator status with the Association of Professional Archaeologists of Southern Africa.

The Archaeology Contracts Office and ACO Associates have considerable experience in assessing the impacts of renewable energy projects on heritage, having completed the specialist studies on no fewer than 25 renewable energy projects in the Eastern, Northern and Western Capes.

## **GLOSSARY**

**Archaeology:** *Remains resulting from human activity which is 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.*

**Early Stone Age:** *The archaeology of the Stone Age between 700 000 and 2 500 000 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.*

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

**Hornfels:** *A type of indurated shale used in the production of stone tools in the Karoo.*

**Late Stone Age:** *The archaeology of the last 20 000 years associated with fully modern people.*

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

**National Estate:** *The collective heritage assets of the Nation.*

**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.*

**Pleistocene:** *A geological time period (of 3 million – 10 000 years ago).*

**SAHRA:** *South African Heritage Resources Agency – the compliance authority which protects national heritage.*

**Smithfield:** *This term was coined in 1929 for a number of interior stone tools assemblages, made on indurated shale, and dating to the last 2000 years of the Later Stone Age. Various variants have been identified in different parts of the country but the term has not been clearly defined.*

**Structure (historic):** *Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.*

**Wilton:** *A Late Stone Age microlithic industry dating to between 6000 and 4000 years ago.*

## **Acronyms**

DEA	Department of Environmental Affairs
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency

## TABLE OF CONTENTS

1. INTRODUCTION .....	8
1.1 Development Proposals .....	8
1.2 Terms of Reference .....	11
2. LEGISLATION .....	<a href="#">1212</a>
2.1 Wind Energy Guidelines .....	<a href="#">1313</a>
3. METHODOLOGY .....	<a href="#">1313</a>
3.1 Restrictions and assumptions .....	<a href="#">1414</a>
4. RECEIVING ENVIRONMENT .....	<a href="#">1414</a>
4.1 The Archaeological Context .....	<a href="#">1515</a>
4.2 The Historical Context .....	<a href="#">1616</a>
5. FINDINGS OF THE HERITAGE SURVEY: NORTH PLATEAU .....	<a href="#">1919</a>
5.1 Pre-colonial archaeology .....	<a href="#">1919</a>
5.2 Historical Archaeology .....	<a href="#">2121</a>
5.3 Graves, stone cairns and features .....	<a href="#">2222</a>
5.4 General Built Environment .....	<a href="#">2222</a>
5.5 Cultural landscape .....	<a href="#">2323</a>
6. FINDINGS OF THE HERITAGE SURVEY: SOUTH PLATEAU .....	<a href="#">2323</a>
6.1 Pre-colonial archaeology .....	<a href="#">2323</a>
6.2 Historical Archaeology .....	<a href="#">2525</a>
6.3 Graves, stone cairns and features .....	<a href="#">2626</a>
6.4 General Built Environment .....	<a href="#">2626</a>
6.5 Cultural landscape .....	<a href="#">2626</a>
7. IMPACTS DURING CONSTRUCTION PHASE: NORTH & SOUTH PLATEAU .....	<a href="#">2727</a>
7.1 Impacts typically associated with Wind Energy Facilities .....	<a href="#">2727</a>
7.2 Impacts on the North Plateau .....	<a href="#">2828</a>
7.3 Impacts on the South Plateau .....	<a href="#">3232</a>
7.4 Mitigation and Conservation .....	<a href="#">3636</a>
8. IMPACTS OF THE OPERATION PHASE: NORTH & SOUTH PLATEAU .....	<a href="#">3737</a>
9. CONCLUSIONS AND RECOMMENDATIONS .....	<a href="#">3838</a>
10. EMP – HERITAGE IMPACT ASSESSMENT .....	<a href="#">3939</a>
10.1 Reduce impact on the archaeological heritage .....	<a href="#">3939</a>
10.2 Avoid destruction of the Built Environment .....	<a href="#">3939</a>
10.3 Avoid impacts on the Cultural Landscape .....	<a href="#">4040</a>
10.4 To reduce impact on Unidentified/Below ground Heritage Resources during the construction phase .....	<a href="#">4141</a>
10.5 To reduce impact on Buried Human Remains during the construction phase .....	<a href="#">4141</a>
11. REFERENCES .....	<a href="#">4242</a>

## 1. INTRODUCTION

The Archaeology Contracts Office has been appointed by Aurecon South Africa (Pty) Ltd on behalf of the client, Mulilo Renewable Energy (Pty) Ltd (MRE), to undertake a Heritage Impact Assessment for the establishment of two 150-200MW wind energy facilities on the Eastern Plateau some 20 km east of De Aar, Northern Cape Province. MRE have split the project into two halves, namely the North and South projects.

Aurecon South Africa (Pty) Ltd (Aurecon) has been appointed to undertake the environmental process as required in terms of the National Environmental Management Act (No. 107 of 1998), amended, on behalf of MRE. Two applications have been submitted to Environmental Affairs (DEA) and both are to be processed within one Environmental Impact Assessment (EIA) process.

### 1.1 Development Proposals

MRE proposes to construct two wind energy facilities on the Eastern Plateau approximately 20 km east of De Aar in the Northern Cape. MRE have proposed that the northern portion will potentially consist of 145 turbines and the southern portion of 105 turbines. The two proposed facilities are adjacent to each other but are considered to be two separate projects. The power generated by the two proposed projects would be transmitted to the national grid via five proposed sub-stations connecting into three existing transmission lines crossing the site and linking into Eskom's Hydra substation some 9 km south-east of De Aar.

The turbines will connect to the proposed on-site substations via a 22 kV overhead transmission line that will follow the route of the proposed access roads. The proposed route for the southern site is approximately 70 km long and the northern site approximately 50 km long.

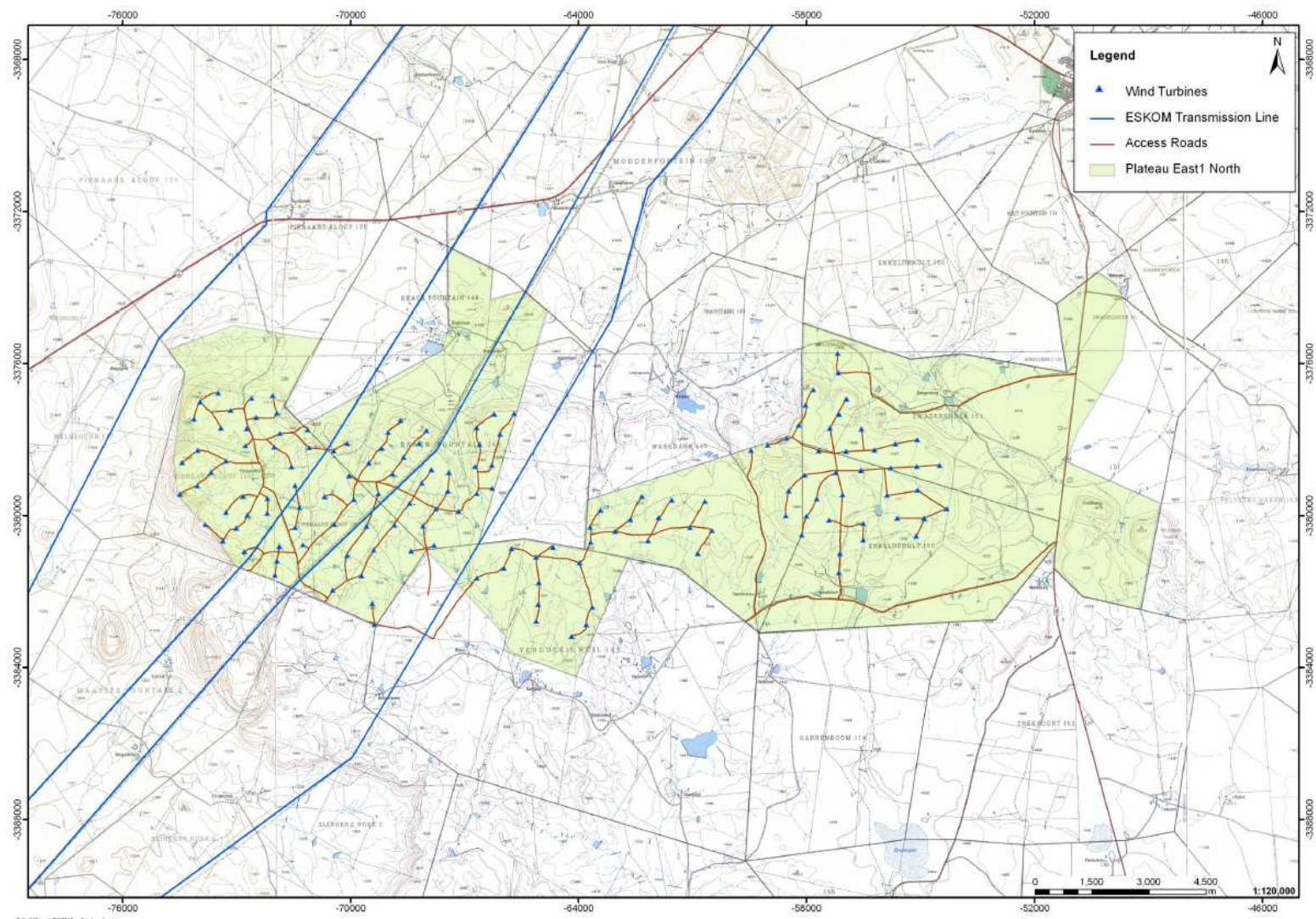
The Northern site is approximately 14 500 ha in size and consists of 14 portions of six farms (Figure 1), namely:

<b>Farm Name</b>	<b>Farm Number</b>	<b>Portion Number/s</b>
Pienaarskloof	136	1 & 6
Brack Fountain	148	RE, 2, 4
Washbank	149	1
Enkeldebult	150	RE, 4
Zwagershoek	151	1, 2
Vendussie Kuil	165	1 & 7

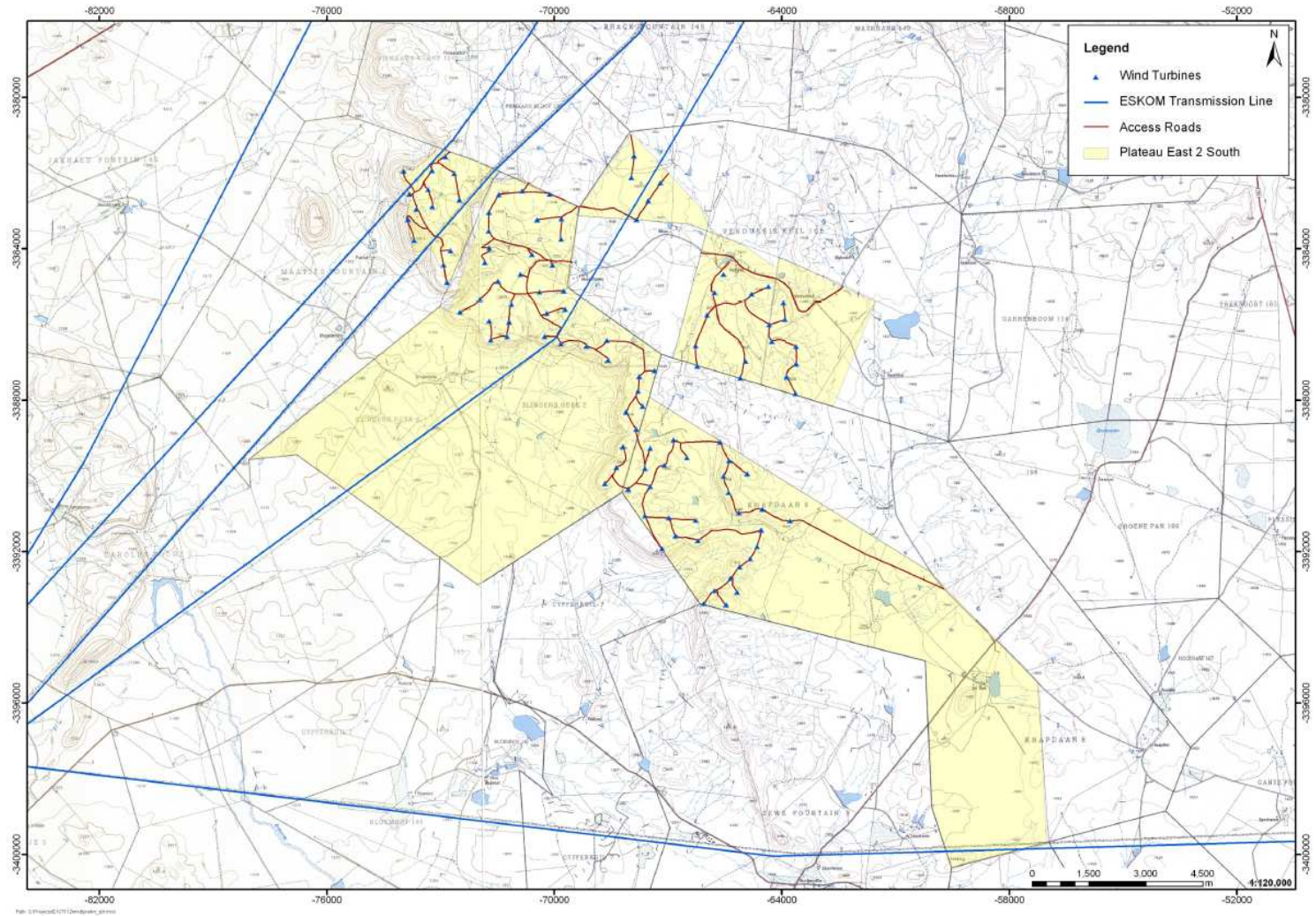
The Southern site is approximately 9 200 ha in size and consists of nine portions of four farms (Figure 2), namely:

<b>Farm Name</b>	<b>Farm Number</b>	<b>Portion Number/s</b>
Knapdaar	1	8
Slingershoek	2	RE, 2 & 4
Matjiesfontein	5	1
Vendussie Kuil	165	RE, 2, & 11





**Figure 1:** View of the turbines and access roads on the Northern Plateau (map supplied by client). Note the three Eskom lines crossing the site.



**Figure 2:** View of the turbines and access roads on the Southern Plateau (map supplied by client). Note the three Eskom lines crossing the site.

The background information to this report is derived from the Scoping Report undertaken by Aurecon (2011).

The no-go alternative consists of maintaining the status quo.

## 1.2 Terms of Reference

The HIA forms part of the EIA process, as determined by the National Environmental Management Act (No. 107 of 1998), as amended. It is required to identify potential heritage resources which may be impacted during the *construction, operation* and *decommissioning* phases of the project, to assess their significance and to provide recommendations for mitigation.

The heritage practitioner is required to provide:

- Conduct a detailed desk-top level investigation to identify archaeological, cultural and historic sites in the proposed development areas;
- Undertaking field work to verify results of desktop investigation with the proviso that specialists were provided with a preliminary layout of the WEF infrastructure and distribution and a thorough survey was therefore not possible (see limitations);
- Document (GPS coordinates and map) all sites, objects and structures identified on the candidate sites;
- Submit the relevant application form, as required by South African Heritage Resources Agency and Northern Cape Provincial Heritage (Boswa ya Kapa Bokone);
- Compile a report which would include identification of archaeological, cultural and historic sites within the proposed development areas;
- Assess the sensitivity and significance of archaeological remains in the site;
- Evaluation of the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources, in terms of the scale of impact (local, regional, national), magnitude of impact (low, medium or high) and the duration of the impact (construction, up to 10 years after construction (medium term), more than 10 years after construction (long term));
- Recommendation of mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance;
- The preparation of a heritage resources management plan which includes recommendations on the management of the objects, sites or features, and also guidelines on procedures to be implemented if previously unidentified cultural resources are uncovered during later developments in the area;
- Consideration of relevant guidelines; and
- Cognisance must be taken of the Department of Environmental Affairs and Development Planning guideline: "Guideline for involving heritage specialists in EIA processes".
- Finally, prepare a single specialist report on the proposed site with clear delineation between the two separate projects as well as the cumulative effect with relation to each other.

## 2. LEGISLATION

The basis for all heritage impact assessment is the National Heritage Resources Act 25 (NHRA) of 1999. The Act has defined certain kinds of heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage which must be considered in any heritage assessment includes:

- Buildings and structures (greater than 60 years of age)
- Archaeological sites (greater than 100 years of age)
- Palaeontological sites and specimens
- Shipwrecks and aircraft wrecks
- Graves and grave yards.
- Cultural Landscape

With respect to the last entry, the Visual Impact Assessment is being conducted by a VIA specialist. Nevertheless, in terms of Section 3 (2)(d) of the NHRA, No 25 of 1999, the National Estate may include “landscapes and natural features of cultural significance”. It is important that the VIA specialist examines the impact of the development on the cultural landscape or consults with a heritage practitioner in this regard.

Section 38 of the NHRA requires that Heritage Impact Assessments (HIA's) are required for certain kinds of development such as rezoning of land greater than 10 000 sq m in extent or exceeding 3 or more sub-divisions, or for any activity that will alter the character or landscape of a site greater than 5 000 sq m.

**Table 2:** Grading of heritage resources (Source: Baumann & Winter 2005: Box 5).

Grade	Level of significance	Description
1	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
2	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
3A	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3A heritage resources.
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources.

## 2.1 Wind Energy Guidelines

A pilot study commissioned by the Provincial Government of the Western Cape “Towards a Regional Methodology for Wind Energy Site Selection in the West Cape region” (May 2006) is the only locally available policy guideline in South Africa. The study looked at landscape character rather than at the “cultural landscape” or “heritage” but concluded that wind energy facilities can have a profound impact on the landscape in terms of quality of place. In general terms it recommends a buffer of at least 500 m between a wind turbine and heritage sites. Neither SAHRA nor Heritage Western Cape (HWC) has developed policies with respect to the impact of renewable energy facilities on heritage resources.

## 3. METHODOLOGY

This study has been commissioned as a Heritage Impact Assessment that attempts to assess the impacts of the proposed facility on the heritage resources of the area. Since the Heritage Scoping Report was undertaken by Aurecon, a brief desktop review of the pre-colonial archaeology and history of the area is included here. The information applies equally to both the Northern and Southern Plateau.

The source of information is primarily based on published archaeological reports and unpublished Archaeological, Heritage and Palaeontological Impact Assessments for the general area.

A physical survey of the project area was completed which involved an 8 day field trip conducted in November 2011 by two principle heritage practitioners: Lita Webley and Jayson Orton. The positions of the turbines and access roads were loaded onto hand-held GPS receivers (on the WGS84 datum) which enabled us to target the relevant areas. Data collection also took place in the field as landowners were consulted regarding the whereabouts of heritage on their property (old buildings, cemeteries, settlement, San (bushman) engravings and archaeological sites). Farm buildings were visited and assessed for heritage significance; archaeological sites were recorded, mapped and photographed. No archaeological material was removed from the project area, but recorded and photographed *in situ*.

The reader of this report is referred to the appendices which contain the details of observations made in the field. Only a small percentage of actual turbine positions were reached during the survey. However, the terms of reference for specialists clearly states that “It must be noted that these are preliminary layouts and hence turbine positions and other infrastructure may move in response to specialist recommendations and micro-siting”. Instead, during the field assessment we undertook targeted searches of particular locations with a view towards maximising our understanding of the heritage landscape and enhancing our chances of correctly assessing the impacts of the proposed facilities on the heritage resources.

Assessment focussed on which areas held the highest potential for heritage material, and particularly significant heritage material. The analysis of archaeological material is based upon the experience of the team members who are familiar with the standard classification systems for artefactual material in use to the degree that they can roughly date and characterise an archaeological site based on its content. Built

environment is considered in terms of the grading system for structures that is presently employed by a number of SAHRA offices and some provincial compliance offices. Heritage resources are graded following the system established by Winter and Baumann (2005) in the guidelines for involving heritage practitioners in EIAs (Table 2).

### 3.1 Restrictions and assumptions

- The terrain is mountainous and the majority of the areas are only accessible by four wheel drive. There are very few roads on the escarpment and some farms, such as Matjiesfontein, could only be reached with great difficulty;
- Reaching isolated areas is extremely time-consuming and it was therefore not possible to undertake a general survey of the entire plateau. A thorough survey would require several weeks, and this is not feasible in terms of the budget allocation;
- Farm roads tend to follow the valleys while the turbines will be placed on top of mountain ridges. In many cases, a walk of 500m or more was required to reach a single turbine position;
- The farm Washbank was not visited because of difficulty accessing the land owner. However, this is not considered a serious limitation;
- It was not possible to survey portions 1 and 2 of Vendussie Kuil due to difficulty finding a road onto the land;
- The impact of the proposed development on the Cultural Landscape will be undertaken by the Visual Impact specialist.

It is assumed that those areas which could be surveyed (Figure 3) provide an accurate sample of the types of heritage resources which might be anticipated in the more isolated areas.

## 4. RECEIVING ENVIRONMENT

This part of the Northern Cape is characterised by wide open plains interspersed with koppies. The facilities are proposed for a large flat plateau to the east of De Aar. The plateau rises at least 100 m above the surrounding plains. The plateau is typically flat and covered in typical Karoo scrub and grasses, but there are more dense clusters of trees in some of the deeply incised valleys. There are a number of dry stream beds which may flow periodically after summer rains.



Plate 1: View of the plateau from the R48 between De Aar and Philipstown.



Plate 2: View of the plains from the top of the plateau at Slingers Hoek.



Plate 3: Large sections of the plateau are flat and covered in grass; Plate 4: The incised valleys are densely vegetated with thick thorn bush.

The plateau itself does not have a local name and none of the streams have names (local information). The plateau is chiefly used for the grazing of livestock such as sheep and cattle, although some farmers are introducing game such as springbok and zebra as well. The area is extremely arid but due to the elevation, it is slightly cooler than the surrounding plains.

#### **4.1 The Archaeological Context**

Information on the pre-colonial archaeology of the area is derived largely from the exhaustive archaeological survey work in the Zeekoe River Valley (Seacow River Valley), about 30 km to the west of the proposed facility, undertaken by Prof CG Sampson (1985 & 1992) of the Southern Methodist University in the United States. This has resulted in a comprehensive body of information which we may “borrow from” in terms of predicting the general pre-colonial heritage of the area.

Sampson (1985) discusses both Acheulian quarries and sites from the upper reaches of the Seacow River Valley but there are no reports of Early Stone Age (ESA) material from the vicinity of De Aar. He reports that the ESA sites tend to cluster

close to quarries, rather than being close to sources of water. They are found on the flats rather than on ridges and hills.

Sampson (1968) has reported at least 290 Middle Stone Age (MSA) stone artefact occurrences from the “Orange River Scheme Area”. These sites are all “open sites” and no MSA assemblages have been recorded in rock shelters. He describes the open sites as occurring in erosion features along stream banks. However, MSA artefacts are widely distributed across the landscape, in the form of “ancient litter” and are frequently found on the edges of pans, streams and at the base of small hills or koppies.

Sampson (1985) has recorded thousands of Later Stone Age sites (LSA) in the Zeekoe River Valley. These are attributed to the ancestors of the San peoples and after 2000 years ago, by Khoekhoen pastoralists. San sites are generally found in the open as rock shelters are scarce. Sites comprise large scatters of stone tools. Traces of their presence can also be found as rock engravings on dolerite boulders. Sampson (1985) describes the earliest phase of the LSA as the Lockshoek – it is contemporary with the Oakhurst/Albany Industries and dates to around 10 000 years ago. The Lockshoek has large, sidescrapers, frontal scrapers, endscrapers, thick backed adzes and a wide variety of ground stone implements. He notes that they are overwhelmingly situated near water points. The Lockshoek is followed by the ‘Interior Wilton’ (IW) which Sampson describes as including small convex scrapers, adzes, drills, reamers as well as ceramics in the final phase of the IW. Unlike the Lockshoek, IW sites are found on hills and ridges with commanding views of rivers and valleys. The IW is followed by the Smithfield which is characterised by abundant endscrapers made on elongated flakes, often with extensive trimming down the margins. Sampson’s Smithfield is generally associated with ceramics.

The introduction of pastoralism (sheep and goats, later cattle) roughly 2000 years along with the arrival of the Khoekhoen may have resulted in changes in land use, for example it is suggested the Khoekhoen followed a transhumant<sup>1</sup> lifestyle, and are likely to have utilized the grazing opportunities of the Karoo on a seasonal basis. The San appear to have retreated to the Great Karoo with the arrival of the first Dutch Trekboers in the mid-18<sup>th</sup> century. Here they managed to eke out an existence which includes hunting, gathering and raiding the livestock of the Trekboers, resulting in the “Bushman War”. Eventually the *kommandos* which were dispatched from regional centres such as Graaff Reinet prevailed, and the “wild bushman” of the Karoo were rendered extinct by the early 19<sup>th</sup> century.

Smit (1963) reports of Bushmen engravings on farms in the De Aar area such as Damfontein & Brandfontein while land owners in the study area also reported incidences of rock engravings on the plains below the Eastern escarpment.

## 4.2 The Historical Context

The first Trekboers arrived in the area around the 1770s but many were driven out by attacks from Bushmen (Sampson et al. 1994; Smit 1963). When van Plettenberg visited the area in 1778 he found very few European settlers in the area. After the

---

<sup>1</sup> The seasonal migration of livestock to suitable grazing grounds.



district of Graaff Reinet was established in 1786, many farmers returned to their farms; they were able to quell the Bushmen and some settled as far north as Renosterberg (Middelburg) and the upper reaches of Seekoei River (today Hanover).

From about the beginning of the 19<sup>th</sup> century, stock farmers started moving in the direction of the De Aar area in search of better winter grazing – thus the name “Wintersveld” was given to this veldkornetskap of the District Graaff Reinet (Smit 1963). From about 1819, the name “Wintersveld” occurs regularly in the “opgaafrolle”. The European population of the area comprised 450 people. By 1837, the veldkornetskap of Wintersveld fell under the newly established District of Colesberg and comprised 163 heads of families.

While the Loan farms were listed, they were not mapped and no diagrams of the earlier Loan Farm allocations were lodged. After 1813 farmers were able to apply for their lands to be granted to them in Perpetual Quitrent. One condition of quitrent title was that the deed should be accompanied by a properly drawn up survey diagram of the farm. However, the shortage of trained surveyors meant that the frontier districts were neglected. The Survey Diagrams for the nine different farms forming the wind energy facilities on the North and South Plateau show that the farms were surveyed in 1824, with the first farm granted perpetual quitrent being Slingers Hoek in 1839. The others were granted up until 1842. Zwagershoek was initially part of Enkeldebult and was only surveyed in the mid 19<sup>th</sup> century.

Farmers were urged to make peace with the San through gifts of meat, tobacco and trinkets. Between 1825 and 1840, travellers reported increasing numbers of farm Bushmen acting as herders and servants. San either settled on Dutch farms, becoming farm labourers, or others lived on Crown Land between the farms. The last Crown Land was taken in the Zeekoe Valley in the 1880s, signifying the end of an autonomous existence for the San.

In 1881, the Parliament which was sitting in Cape Town took the important decision that two important railway lines would meet on the farm De Aar. The line was finished in 1884 and became an important impetus to the establishment of the town which eventually occurred in 1902.



## 5. FINDINGS OF THE HERITAGE SURVEY: NORTH PLATEAU

Both pre-colonial and colonial period scatters of material were documented during the survey of the North Plateau. These are too extensive to document individually in this report and are summarised in Appendix 1. The finds include Middle and Late Stone Age archaeological material, historic period ruins and stone kraal complexes and scatters of historic material. The built environment of the site comprises a number of late 19<sup>th</sup> century and early 20<sup>th</sup> century farm houses.

### 5.1 Pre-colonial archaeology

**Early Stone Age:** No ESA material was identified in the area.

**Middle Stone Age** material was found scattered throughout the project area and may be described as the dominant Stone Age archaeological material. The raw material on which the artefacts are made is a very heavily patinated, weathered indurated shale (hornfels). Hornfels is a black flinty rock which through the weathering process acquires a thin, reddish-brown colour protective skin or patination (Plates 6 & 7). Sampson (1985) is of the opinion that the thickness of the patination can be used as an indirect form of dating. The artefacts include cores, flakes, blades and snapped blades. There were few diagnostic MSA elements, these being occasional triangular flakes with dorsal ridges removed or long blades with parallel dorsal scars. Some flakes and blades have signs of utilisation damage. Some of the blades resemble examples illustrated by Sampson (1968) from the Orange River Scheme Area.



Plates 5 & 6: Typical weathered and patinated MSA stone artefacts found widely distributed across the area.

No artefacts typical of the Howieson's Poort industry or bifacially worked points (Stillbay) were recognised. Archaeological sites with clearly defined margins could generally not be easily identified due to the universal spread (so-called "ancient litter") of the material. A relatively few dense scatters were identified and recorded as archaeological sites (L009, J027-29). No MSA sites with fossil bone or other organic material were identified.

Some weathered MSA implements appear to have been targeted as a source of raw material by Later Stone Age peoples, showing signs of fresh retouch and/or flaking.

**Late Stone Age** sites are relatively uncommon in the project area. A few discrete sites were recorded (Appendix 1). The LSA artefact assemblages are all made on hornfels and they tend to have a pale grey patina or are black and sharp, suggesting that they may be recently flaked. The endscrapers, on long flakes, are typical of the “Smithfield Industry” (Sampson 1985). On the North Plateau, the best examples of LSA materials were recorded at Enkeldebult (J035).



Plate 7 & 8: LSA artefacts from the site of J035 on Enkeldebult.

However, none of these LSA sites are associated with any pottery. The LSA assemblages from the North Plateau can be loosely described as a pre-ceramic “Smithfield” although this term has come under considerable criticism in recent years. The approximate date of this stone tool industry is not known.

**Engraving/s** on dolerite boulders were reported by the owner of Zwagershoek. There are reportedly two engravings on Zwagershoek, one on the koppie behind the main farmhouse, and another in the veld below the plateau.



Plate 9: the boulder with engravings behind Zwagershoek; Plate 10: Close-up of the images.

Only the former was recorded, the latter will not be impacted by the development and its location is known only to the owner. It consists of an engraving of an ostrich and an unknown animal. There is more modern graffiti, consisting of a scribbled

signature, on the larger adjoining rock.

## 5.2 Historical Archaeology

A large number of stone kraal complexes were documented during the survey. They were found on Enkeldebult (L019-20; J030-31; J035) and Pienaarskloof (L059-60; J113-117) on the North Plateau.



Plate 11: A stone feature on Enkeldebult.

Many of the kraal complexes were located in valleys in extremely isolated localities, far from the closest homestead. It was more difficult to date these complexes as they had little or no associated occupational debris. Some include small ruined shepherd's huts built of stone. A number of kraals have associated historic material such as 19<sup>th</sup> century and early 20<sup>th</sup> century ceramics, glass and metal. Many of the stone features consist of walling comprising packed inner and outer skins with rubble infill. The majority of kraals were rectangular or square suggesting they date to the historical period. A few circular (or oblong) kraals were recorded at Enkeldebult and it is conceivable that they may date to the pre-colonial period but there is little substantive evidence, in the form of associated artefacts, for this. These stone kraals do not resemble the pre-colonial kraals reported by Hart (1987) for the Zeekoei River Valley.

The wife of one of the property owners, with a keen interest in local history, told us that the top of the plateau had been used for winter grazing and was therefore only used seasonally by 19<sup>th</sup> century Trekboers. She indicated that the old settlements could still be identified by historic scatters of material. It is possible that the stone kraal complexes we recorded are in fact the seasonal outposts of the 19<sup>th</sup> century Trekboers and/or their shepherds. This would account for the absence of substantial settlement debris.



Plate 12: Stone walled features on Pienaarskloof.

### 5.3 Graves, stone cairns and features

Any farms which have been settled for 150 years are likely to contain the graves of the farm owners and their family as well as farm workers. It is assumed that such graveyards will be located close to old farm houses. In the case of the study area, the owners of Zwagershoek, Pienaarskloof and Brack Fountain pointed out to us that their permanent dwellings are generally located below the plateau. There are only a few permanent dwellings on the plateau, such as at Enkeldebult. While we questioned all landowners about possible graves in the study area, none were reported to us. We did record a number of graves on Zwagershoek but these will not be impacted by the facility. It is possible that there will be unmarked graves on the plateau which will be disturbed during the development.

### 5.4 General Built Environment

Farm Houses and buildings (within the project area) were inspected for their heritage significance.



Plates 13: Farmhouse on Enkeldebult; Plate 14: Stone shed on Pienaarskloof.

The majority of permanent farm dwellings are located below the plateau (e.g. Brack Fountain or Diepfontein, Washbank and Zwagershoek) and will therefore not be impacted by the facility. Apart from the farmhouse complex of Enkeldebult on the Northern Plateau, there are abandoned farm houses, sheds, workers cottages, etc on Pienaarskloof, Washbank and Portion 1 of Vendussie Kuil. Some of the sheds are of stone and probably date to the late 19<sup>th</sup> or early 20<sup>th</sup> century. Almost every farm has buildings with elements which are greater than 60 years of age and which are protected under NHRA. Some have features which are of medium to heritage significance and worthy of conservation efforts.

## **5.5 Cultural landscape**

The cultural landscape consists of a Karoo landscape of vast open plains covered in low scrub and grasses. Interspersed on these plains are low ridges and small hills. In the case of the study area, the facilities will be constructed on a plateau which rises about 100m above the plains (Plate 1). The dense distribution of archaeological material, and the fact that the rocky outcrops were used as factory sites by prehistoric populations, suggests that this landscape was also an archaeological landscape of significance to prehistoric peoples. Historically, this area was recently settled by colonial Trekboers who imposed their structure on the landscape in the form of farm boundaries and isolated farm settlements. The landscape has wilderness qualities as the population densities are low, with minimal infrastructure such as roads and powerlines crossing the area. However, the landscape can be described as being somewhat monotonous, and without remarkable scenic qualities that would make it a desirable tourism destination.

## **6. FINDINGS OF THE HERITAGE SURVEY: SOUTH PLATEAU**

Both pre-colonial scatters of material and aspects of the historic period were documented during the survey of the South Plateau. These are too extensive to document individually in this report and are summarised in Appendix 2. The finds include Middle and Late Stone Age archaeological material, historic period ruins and stone kraal complexes and scatters of historic material. The built environment of the site comprises a number of late 19<sup>th</sup> century and early 20<sup>th</sup> century farm houses.

### **6.1 Pre-colonial archaeology**

**Early Stone Age:** No ESA material was identified in the area.

**Middle Stone Age** material was found scattered throughout the project area and may be described as the dominant Stone Age archaeological material. The raw material on which the artefacts are made is a very heavily patinated, weathered indurated shale (hornfels). Hornfels is a black flinty rock which weathers with a thin, reddish-brown colour protective skin (Plates 6 & 7). The artefacts include cores, flakes, blades and snapped blades. There were few diagnostic MSA elements, these being occasional triangular flakes with dorsal ridges removed or long blades with parallel dorsal scars. Some flakes and blades have signs of utilisation damage. Some of the blades resemble examples illustrated by Sampson (1968) from the Orange River Scheme Area.

No artefacts typical of the Howieson's Poort industry or bifacially worked points (Stillbay) were recognised. Archaeological sites with clearly defined margins could not be easily identified due to the universal spread (so-called "ancient litter") of the material. A relatively few dense scatters were identified and recorded as archaeological sites. Most significant was the "factory" Site 064-066 on Knapdaar, with extensive evidence for knapping of both MSA and LSA material on site.



Plates 15 & 16: Selection of artefacts from the "factory" site 064-066 which has evidence of both MSA and LSA knapping on site.

Some weathered MSA implements appear to have been targeted as a source of raw material by Later Stone Age peoples, showing signs of fresh retouch and/or flaking.

**Late Stone Age** sites are relatively uncommon in the project area. A few discrete sites were recorded (Appendix 2). The LSA artefact assemblages are all made on hornfels and they tend to have a pale grey patina or are black and sharp, suggesting that they may be recently flaked. Historically, these artefacts would have been described as belonging to the "Smithfield Industry" (Sampson 1974:373), more specifically Smithfield B as they include long endscrapers (or duckbill scrapers) and at least one grindstone fragment. Interestingly, we recovered at least one large hollow or strangulated adze (spokeshave) which typically occurs in the Smithfield N from Natal (Plate 11).



Plate 17: Site J089 on the farm Knapdaar; Plate 18: Spokeshave from Site J085 on the farm Kranskop (Vendussie Kuil).



Site J089 from the banks of a small stream on the farm Knapdaar, also included a broken grindstone fragment and some ostrich eggshell fragments. However, none of the LSA sites (recorded on Slingers Hoek, Vendussie Kuil or Knapdaar) had any pottery.

The LSA assemblages from the plateau can be loosely described as a pre-ceramic “Smithfield” although this term has come under considerable criticism in recent years because the term has not been clearly defined due to a lack of research in the area. The approximate date of this stone tool industry is not known.

**Engraving/s** on dolerite boulders were reported by the owner of Slingers Hoek. The engravings on Slingers Hoek are located on a little koppie behind the main farmhouse and are not close to the plateau. They will not be impacted. According to the owner, they consist of late 19<sup>th</sup> century historic graffiti, engraved by the soldiers who were stationed on the farm during the Boer War.

## 6.2 Historical Archaeology

A large number of stone kraal complexes were documented during the survey (Appendix 1). They were found on Matjiesfontein (L030-35; J061-67; J068-74); Meyerfontein on Vendussie Kuil (L013-14; J011-12); and Knapdaar (L044-50; J098-108). We were informed of a second set of stone kraals on Knapdaar but were unable to access the site due to a lack of roads. Presumably there are more kraals in the study area which were not identified during the survey.

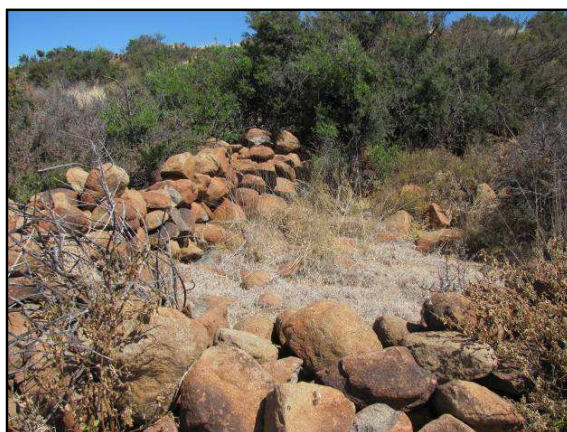


Plate 19: Section of stone walling from Knapdaar; Plate 20: A stone walled feature on Matjiesfontein.

The kraals near the ruined farmhouse of Meyersfontein (Vendussie Kuil) are clearly associated with the abandoned settlement and the coin of 1916 gives some indication of period of use. Many of the kraal complexes were located in valleys in extremely isolated localities, far from the closest homestead.

It was more difficult to date these complexes as they had little or no associated occupational debris. Some include small ruined shepherd's huts built of stone. A number of kraals have associated historic material such as 19<sup>th</sup> century ceramics, glass and metal. Many of the stone features consist of walling comprising packed

inner and outer skins with rubble infill. The majority of kraals were rectangular or square suggesting they date to the historical period. A few circular (or oblong) kraals were recorded at Knapdaar and it is conceivable that they may date to the pre-colonial period but there is little substantive evidence for this. These stone kraals do not resemble the pre-colonial kraals reported by Hart (1987) for the Zeekoei River Valley.

### **6.3 Graves, stone cairns and features**

Any farms which have been settled for 150 years are likely to contain the graves of the farm owners and their family as well as farm workers. It is assumed that such graveyards will be located close to old farm houses. In the case of the study area, the owners of Zwagershoek, Pienaarskloof, Brack Fountain, Matjiesfontein and Slingershoek pointed out to us that their permanent dwellings are generally located below the plateau. There are a number of permanent dwellings on Vendussie Kuil (some now abandoned), Enkeldebult and Knapdaar. While we questioned all landowners about possible graves in the study area, none were reported to us.

### **6.4 General Built Environment**

Farm Houses and buildings (within the project area) were inspected for their heritage significance. While almost every farm house has elements which are greater than 60 years of age not all of them are worthy of grading or particular conservations efforts. Two of the permanent farm dwellings are located below the plateau (Matjieskloof and Slingershoek), and will therefore not be impacted by the facility. There are a number of abandoned farmhouses on the various portions of Vendussie Kuil, but none will be directly impacted. The facility may be visible from the farmhouse of Kranskop (Vendussie Kuil) and from the farmhouse of Knapdaar, neither of which are permanently occupied.

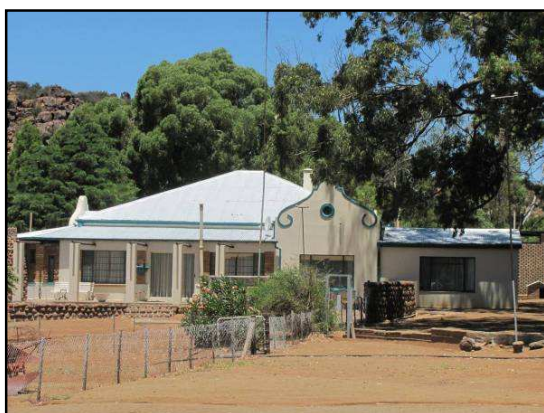


Plate 21: Cape Dutch revival homestead of Kranskop on Vendussie Kuil; Plate 22: The barn on Knapdaar dating to 1942.

### **6.5 Cultural landscape**

The cultural landscape consists of a Karoo landscape of vast open plains covered in low scrub and grasses. Interspersed on these plains are low ridges and small hills. In

the case of the study area, the facilities will be constructed on a plateau which rises about 100m above the plains. The South Plateau also contains an elevated ridge on the farm Matjiesfontein. It rises at least 50 m above the surrounding plateau and is very conspicuous. The dense distribution of archaeological material, and the fact that the rocky outcrops were used as factory sites by prehistoric populations, suggests that this landscape was also an archaeological landscape of significance to prehistoric peoples. Historically, this area was recently settled by colonial Trekboers who imposed their structure on the landscape in the form of farm boundaries and isolated farm settlements. The landscape has wilderness qualities as the population densities are low, with minimal infrastructure such as roads and power lines crossing the area. However, the landscape can be described as being somewhat monotonous, and without remarkable scenic qualities that would make it a desirable tourism destination

## **7. IMPACTS DURING CONSTRUCTION PHASE: NORTH AND SOUTH PLATEAU**

### **7.1 Impacts typically associated with Wind Energy Facilities**

Wind energy facilities are big developments that can produce a wide range of impacts that will affect the heritage qualities of an area. Typically each turbine can be up to 100m high with blades/rotors up to 60m in radius. Each turbine site needs road access that can be negotiated by a heavy lift crane(s) which means that in undulating topography (such as in the study area) deep cuttings and contoured roads will have to be cut into the landscape to create workable gradients. During the construction phase each of the turbine sites will have to be leveled off to create a solid platform for cranes as well as a lay-down area for materials. This will involve earthmoving and road construction, followed by the bringing in of materials and plant. The actual construction of the turbines will involve excavation into the land surface to a depth of 2m and over an area of 225m<sup>2</sup> for the concrete base. The turbines are connected to underground cables to a sub-station(s) (positioned to be determined) and from there the generated current will be fed to the national grid via 132 or 220kV transmission lines.

#### **7.1.1. Construction of the wind farm**

During the construction phase the following physical impacts to the landscape and any heritage that lies on it can be expected:

- Bulldozing of roads to turbines sites with a possibility of cut and fill operations in places.
- Upgrading of existing farm tracks
- Creation of working and lay-down areas close to each turbine site
- Excavation of foundations for each tower
- Excavation of many kilometers of linear trenches for cables
- Erection of a 22 kV power line (pole design or route not finalised)
- Construction of electrical infrastructure in the form of a number of sub-stations (five).

## 7.2 Impacts on the North Plateau

### 7.2.1 Impacts to Pre-Colonial and Colonial Archaeology

In terms of impacts to heritage, archaeological sites which are highly context sensitive are most vulnerable to the alteration of the land surface. The fieldwork which was undertaken to inform this assessment has identified a wide-spread distribution of MSA material of relatively low significance and the overall impacts to this material will be relatively small. Furthermore that sheer volume of scattered artefacts on this vast landscape means that the combined overall impact of roads, turbines and infrastructure is in terms of the broader picture, relatively small.

The LSA archaeological material on the plateau is relatively sparse and appears to be in primary context. It is of relatively greater significance because of the information it can provide on LSA settlement in this area. The LSA on the plateau differs from that which Sampson (1988) has described 30 km to the east and its destruction would result in loss of heritage. It was initially thought that the LSA sites were limited to valley bottoms, but a single site has also been found on top of a range of hills. It will be difficult to avoid destroying these randomly distributed LSA sites unless each turbine position and access road is checked individually. *A single significant LSA site (J035) was found on Enkeldebult but is in no direct danger of destruction as it is some distance from the closest turbines and roads.*

The historic kraal complexes represent an unrecorded slice of the 19<sup>th</sup> century farming settlement pattern in this part of the Karoo. These kraal complexes have not been studied or described and their destruction would result in a loss of heritage. The kraal complexes on Pienaarskloof and Enkeldebult can be avoided through careful placement of turbines and access roads. However, of concern is the likelihood that additional stone kraal complexes may occur on the plateau but have not yet been identified.

There is always a chance that below-ground archaeological material may be exposed during excavations for the wind energy facility. All archaeological material over 100 years of age is protected and may only be altered or removed from its place of origin under a permit issued by SAHRA. In the event of anything unusual being encountered, SAHRA must be consulted immediately so that mitigation action can be determined and be implemented if necessary. Mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or archaeological/palaeontological sampling is completed.

**Table 3: Summary of impacts to archaeological material: North Plateau**

<b>NATURE OF IMPACT: Impacts to archaeological material could involve localised displacement of material at turbine footings, access roads, etc.</b>		
	<b>Without mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Site specific	Site specific
<b>Duration</b>	Long term (archaeological sites are non renewable)	No impact
<b>Magnitude</b>	Medium	Low
<b>Probability</b>	Probable	Unlikely

<b>Significance</b>	Medium	Low
<b>Status</b>	Negative	Neutral
<b>Reversibility</b>	No, once archaeological sites are destroyed, they cannot be replaced.	
<b>Can impacts be mitigated?</b>	Yes, impacts can be mitigated.	
<b>Mitigation:</b>	Two alternatives are possible for mitigation: 1) Mitigation could involve avoidance of certain areas which are known to have archaeological sites. An archaeologist should be involved with the placement of the turbines and associated infrastructure during the site-specific EMP phase, specifically where sensitive areas have been identified. 2) Alternatively, targeted sampling (excavation) of at least one LSA site on the North Plateau would allow the LSA of the plateau to be described and characterised.	
<b>Cumulative Impacts:</b>	The cumulative impact of a number of wind energy facilities on the plateau may result in significant loss of archaeological knowledge, if no mitigation occurs.	
<b>Residual Impacts:</b>	Once the turbines are removed and the access roads are re-vegetated, there will be no further impacts on the archaeological landscape	

### 7.2.2 Impacts to the Built Environment

In the absence of clearly established guidelines in the Northern Cape for the minimum distance between turbines and buildings/structures older than 60 years, this report supports the guidelines of the Western Cape Provincial Government. They recommend that turbines are placed at least 500m from heritage sites. This would presumably include buildings which are older than 60 years and protected by the NHRA. An appropriate buffer should be established between the infrastructure of the wind energy facility and both occupied and abandoned homesteads. In the case of the North Plateau, no farm buildings are threatened by the present distribution of turbines.

However, the access road to the Zwagershoek property is across an old stone dam wall (which may be older than 60 years) and in close proximity to both the farmhouse and the engraving on the koppie behind the house. Re-routing of the access road will be required. Access roads on both Pienaarskloof and Vendussie Kuil pass in close proximity to historic farm sheds and associated ruins. These structures are vulnerable to both destruction and vandalism. Negative impacts may be expected unless measures are taken to conserve them.

**Table 4: Summary of impacts to Built Environment: North Plateau**

<b>NATURE OF IMPACT: The construction of access roads in close proximity to aspects of the Built Environment, such as sheds, workers' cottages, etc could result in accidental damage and/or vandalism.</b>		
	<b>Without mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Site specific	Site specific
<b>Duration</b>	Permanent (heritage sites are non renewable)	No impact
<b>Magnitude</b>	Low	Very Low
<b>Probability</b>	Probable	Unlikely
<b>Significance</b>	Medium (buildings of Grade 3C significance)	Low
<b>Status (positive or negative)</b>	Negative	Neutral
<b>Reversibility</b>	No, once buildings are destroyed, they cannot be	

<b>Irreplaceable loss of resources?</b>	replaced. Yes, once buildings are destroyed, they cannot be replaced.
<b>Can impacts be mitigated?</b>	Yes, impacts can be mitigated
<b>Mitigation:</b> An archaeologist should be involved with the placement of the turbines and associated infrastructure during the site-specific EMP phase, specifically where sensitive buildings have been identified. Old buildings should be fenced off during construction to avoid vandalism.	
<b>Cumulative Impacts:</b> The cumulative impact of a number of wind energy facilities on the plateau may result in significant loss of the built environment, if no mitigation occurs.	
<b>Residual Impacts:</b> Once the turbines are removed and the access roads are re-vegetated, there will be no further impacts on the built environment.	

### 7.2.3 Impacts to Cemeteries and graves

While there are no visible farm cemeteries which are directly threatened by the proposed facility, there may be graveyards belonging to farm workers on Pienaarskloof, Vendussie Kuil, Enkeldebult and Washbank which may be difficult to identify as they may lack headstones and fences. Exhumation of graves is generally not recommended due to the legal processes which are required and it is preferable that they are avoided.

Should any unmarked human remains be disturbed, exposed or uncovered during excavations and earthworks for the proposed project, these should immediately be reported to the SAHRA Burials Unit. Burial remains should not be disturbed or removed until inspected by an archaeologist.

**Table 5: Summary of impacts to Cemeteries and Graves: North Plateau**

<b>NATURE OF IMPACT: The excavation of turbine footings, access roads, etc may result in the destruction of cemeteries and graves which are not clearly marked.</b>		
	<b>Without mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Regional	Local (severity can be mitigated)
<b>Duration</b>	Permanent	Permanent (even with mitigation, graves uncovered accidentally are still likely to be destroyed).
<b>Magnitude</b>	Severe	Low
<b>Probability</b>	Probable	Unlikely
<b>Significance</b>	High	Moderate
<b>Status (positive or negative)</b>	Negative	Neutral
<b>Reversibility</b>	No, once graves have been destroyed, they cannot be replaced.	
<b>Irreplaceable loss of resources?</b>	Yes, once graves are destroyed, they cannot be replaced.	
<b>Can impacts be mitigated?</b>	No, difficult to mitigate in advance, as locations of graves cannot be predicted in advance. The only mitigation is to ensure proper procedures are followed when graves uncovered.	
<b>Mitigation:</b> If graves are uncovered, work must stop in that area immediately and the SAHRA Burials Unit notified. An archaeologist will be asked to investigate, and various procedures may be proposed, including covering up the human remains and moving the turbines, etc elsewhere. If exhumation is approved, this may be a lengthy process and costs		

will be for the developer.

**Cumulative Impacts:** The cumulative impact of several wind farms in the area enhances the likelihood of uncovering human remains.

**Residual Impacts:** None.

#### 7.2.4. Impacts to the Cultural Landscape

The cultural landscape around De Aar is representative of the great Karoo. It is a natural landscape with some vestiges of agricultural activities in the form of isolated farmhouses, fences and wind pumps. There are vast tracts of Karoo landscape and the development of a portion of it for the development of a wind energy facility will not result in the loss of a significant portion of the Karoo Cultural Landscape.

**Table 6: Summary of impacts to the Cultural Landscape: North Plateau**

<b>NATURE OF IMPACT: The construction of turbines, substations and overhead transmission lines may have a negative visual impact on the cultural landscape.</b>		
	<b>Without mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local	Site specific
<b>Duration</b>	Long-term	Long -term
<b>Magnitude</b>	Medium	Low
<b>Probability</b>	Probable	Unlikely
<b>Significance</b>	Low	Low
<b>Status (positive or negative)</b>	Negative	Neutral
<b>Reversibility</b>	Yes, once the turbines are removed after 25 years, the landscape will return to its approximate earlier state.	
<b>Irreplaceable loss of resources?</b>	No, once the turbines are removed, the landscape qualities will return to their earlier condition.	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation:</b> The visual impact of the turbines and associated infrastructure on the Cultural Landscape will be dealt with by the Visual Impact specialist.		
<b>Cumulative Impacts:</b> The cumulative impact of several wind farms in the area will increase the visual impact on the cultural landscape of the Karoo.		
<b>Residual Impacts:</b> None.		

## **Significance Statement**

The significance of impacts during the construction phase to physical heritage such as archaeological material and the built environment is likely to be medium but the potential impact to graves may be high. The latter however, is impossible to predict. These are acceptable levels as long as mitigation is implemented.

### **The no-go alternative.**

Not implementing the proposal will result in no impacts to heritage, apart from those impacts caused by natural forces such as erosion.

## **7.3 Impacts on the South Plateau**

### **7.3.1 Impacts to Pre-Colonial and Colonial Archaeology**

In terms of impacts to heritage, archaeological sites which are highly context sensitive are most vulnerable to the alteration of the land surface. The fieldwork which was undertaken to inform this assessment has identified a wide-spread distribution of MSA material of relatively low significance and the overall impacts to this material will be relatively small. Furthermore that sheer volume of scattered artefacts on this vast landscape means that the combined overall impact of roads, turbines and infrastructure is in terms of the broader picture, relatively small. However, a single “factory” site was identified in close proximity to a turbine position on Knapdaar and this site will be negatively impacted by the construction of both the turbine and the access roads. It is possible that other significant MSA sites may occur but were not identified during the survey.

The LSA archaeological material on the plateau is relatively sparse and appears to be in primary context. It is of greater significance because of the information it can provide on LSA settlement in this area. The LSA on the plateau differs from that which Sampson (1988) has described 30 km to the east and its destruction would result in loss of heritage. There are two significant sites on the farm Knapdaar which are in danger of destruction if the current access roads and turbine positions are maintained.

The historic kraal complexes represent an unrecorded slice of the 19<sup>th</sup> century farming settlement pattern in this part of the Karoo. These kraal complexes have not been studied or described and their destruction would result in a lost of heritage.

There is always a chance that archaeological material may be exposed during excavations for the wind energy facility. All archaeological material over 100 years of age is protected and may only be altered or removed from its place of origin under a permit issued by SAHRA. In the event of anything unusual being encountered, SAHRA must be consulted immediately so that mitigation action can be determined and be implemented if necessary. Mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or archaeological/palaeontological sampling is completed.



**Table 7: Summary of impacts to archaeological material: South Plateau**

<b>NATURE OF IMPACT: Impacts to archaeological material could involve localised displacement of material at turbine footings, access roads, etc.</b>		
	<b>Without mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local	Site specific
<b>Duration</b>	Permanent (archaeological sites are non renewable)	No impact
<b>Magnitude</b>	Medium	Zero
<b>Probability</b>	Probable	Unlikely
<b>Significance</b>	Medium	Low
<b>Status (positive or negative)</b>	Negative	Neutral
<b>Reversibility</b>	No, once archaeological sites are destroyed, they cannot be replaced.	
<b>Irreplaceable loss of resources?</b>	Yes, once archaeological sites are destroyed, they cannot be replaced.	
<b>Can impacts be mitigated?</b>	Yes, impacts can be mitigated.	
<b>Mitigation:</b> Two alternatives are possible for mitigation: 1) Mitigation could involve avoidance of certain areas which are known to have archaeological sites. An archaeologist should be involved with the placement of the turbines and associated infrastructure during the site-specific EMP phase, specifically where sensitive areas have been identified. 2) Targeted sampling (excavation) of one MSA “factory” site and two LSA sites on the South Plateau is recommended in order to sample the MSA and to describe and characterise the LSA of the plateau.		
<b>Cumulative Impacts:</b> The cumulative impact of a number of wind energy facilities on the plateau may result in significant loss of archaeological knowledge, if no mitigation occurs.		
<b>Residual Impacts:</b> Once the turbines are removed and the access roads are re-vegetated, there will be no further impacts on the archaeological landscape		

### 7.3.2 Impacts to the Built Environment

In the absence of clearly established guidelines in the Northern Cape for the minimum distance between turbines and buildings/structures older than 60 years, this report supports the guidelines of the Western Cape Provincial Government. They recommend that turbines are placed at least 500m from heritage sites. This would presumably include buildings which are older than 60 years and protected by the NHRA. An appropriate buffer should be established between the infrastructure of the wind energy facility and both occupied and abandoned homesteads. In the case of the North Plateau, no farm buildings are threatened by the present distribution of turbines.

The farmsteads of Slingers Hoek, Knapdaar and Matjiesfontein are a considerable distance from the proposed facility and will not be impacted. However, there are a number of old farmhouses on Vendussie Kuil, including Meyersfontein, Witput, Kranskop and Vendussie Kuil which may be impacted by the access road. All three farmsteads, with the exception of Kranskop, are abandoned and vulnerable to both destruction and vandalism. Negative impacts may be expected unless measures are taken to conserve them. There may be a visual impact to Kranskop which is discussed elsewhere.

**Table 8: Summary of impacts to Built Environment: South Plateau**

<b>NATURE OF IMPACT: The construction of access roads in close proximity to aspects of the Built Environment, such as sheds, workers' cottages, etc could result in accidental damage and/or vandalism.</b>		
	<b>Without mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Site specific	Site specific
<b>Duration</b>	Permanent (heritage sites are non renewable)	No impact
<b>Magnitude</b>	Moderate	Very Low
<b>Probability</b>	Probable	Unlikely
<b>Significance</b>	Medium (buildings of Grade 3C significance)	Low
<b>Status (positive or negative)</b>	Negative	Neutral
<b>Reversibility</b>	No, once buildings are destroyed, they cannot be replaced.	
<b>Irreplaceable loss of resources?</b>	Yes, once buildings are destroyed, they cannot be replaced.	
<b>Can impacts be mitigated?</b>	Yes, impacts can be mitigated	
<b>Mitigation:</b> An archaeologist should be involved with the placement of the turbines and associated infrastructure during the site-specific EMP phase, specifically where sensitive buildings have been identified. Old buildings should be fenced off during construction to avoid vandalism.		
<b>Cumulative Impacts:</b> The cumulative impact of a number of wind energy facilities on the plateau may result in significant loss of the built environment, if no mitigation occurs.		
<b>Residual Impacts:</b> Once the turbines are removed and the access roads are re-vegetated, there will be no further impacts on the built environment.		

### 7.3.3 Impacts to Cemeteries and graves

While there are no visible farm cemeteries which are directly threatened by the proposed facility, there may be graveyards belonging to farm workers on Vendussie Kuil, Matjiesfontein and Knapdaar which may be difficult to identify as they may lack headstones and fences. Exhumation of graves is generally not recommended due to the legal processes which are required and it is preferable that they are avoided.

Should any unmarked human remains be disturbed, exposed or uncovered during excavations and earthworks for the proposed project, these should immediately be reported to the SAHRA Burials Unit. Human remains should not be disturbed or removed until inspected by an archaeologist.

**Table 9: Summary of impacts to Cemeteries and Graves: South Plateau**

<b>NATURE OF IMPACT: The excavation of turbine footings, access roads, etc may result in the destruction of cemeteries and graves which are not clearly marked.</b>		
	<b>Without mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Regional	Local (severity can be mitigated)
<b>Duration</b>	Permanent	Permanent (even with mitigation, graves uncovered accidentally are still likely to be destroyed).
<b>Magnitude</b>	High	Very Low
<b>Probability</b>	Probable	Unlikely
<b>Significance</b>	High	Moderate

<b>Status (positive or negative)</b>	Negative	Neutral
<b>Reversibility</b>	No, no graves have been destroyed, they cannot be replaced.	
<b>Irreplaceable loss of resources?</b>	Yes, once graves are destroyed, they cannot be replaced.	
<b>Can impacts be mitigated?</b>	No, difficult to mitigate in advance, as locations of graves cannot be predicted in advance. Only mitigation is to ensure proper procedures are followed when graves uncovered.	
<b>Mitigation:</b> If graves are uncovered, work must stop in that area immediately and the SAHRA Burials Unit notified. An archaeologist will be asked to investigate, and various procedures may be proposed, including covering up the human remains and moving the turbines, etc elsewhere. If exhumation is approved, this may be a lengthy process and costs will be for the developer.		
<b>Cumulative Impacts:</b> The cumulative impact of several wind farms in the area enhances the likelihood of uncovering human remains.		

### 7.3.4 Impacts to the Cultural Landscape

The cultural landscape around De Aar is representative of the great Karoo. It is a natural landscape with some vestiges of agricultural activities in the form of isolated farmhouses, fences and wind pumps. There are vast tracts of Karoo landscape and the development of a portion of it for the development of a wind energy facility will not result in the loss of a significant portion of the Karoo Cultural Landscape. However, a portion of the plateau, on the farm Matjiesfontein, is elevated about 50 m above the surrounding area and will be highly visible from the R48 which connects De Aar to Philipstown.

**Table 10: Summary of impacts to the Cultural Landscape: South Plateau**

<b>NATURE OF IMPACT: The construction of turbines, substations and overhead transmission lines may have a negative visual impact on the cultural landscape.</b>		
	<b>Without mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local	Site specific
<b>Duration</b>	Long-term	Construction period
<b>Magnitude</b>	Medium	Low
<b>Probability</b>	Probable	Unlikely
<b>Significance</b>	Medium	Low
<b>Status (positive or negative)</b>	Negative	Neutral
<b>Reversibility</b>	Yes, once the turbines are removed after 25 years, the landscape will return to its approximate earlier state.	
<b>Irreplaceable loss of resources?</b>	No, once the turbines are removed, the landscape qualities will return to their earlier condition.	
<b>Can impacts be mitigated?</b>	Yes.	
<b>Mitigation:</b> The visual impact of the turbines and associated infrastructure on the Cultural Landscape will be dealt with by the Visual Impact specialist.		
<b>Cumulative Impacts:</b> The cumulative impact of several wind farms in the area will increase the visual impact on the cultural landscape of the Karoo.		
<b>Residual Impacts:</b> None.		

### Significance Statement

The significance of impacts during the construction phase to physical heritage such

as archaeological material and the built environment is likely to be medium but the potential impact to graves may be high. The latter however, is impossible to predict. These are acceptable levels as long as mitigation is implemented.

### **The no-go alternative.**

Not implementing the proposal will result in no impacts to heritage, apart from those impacts caused by natural forces such as erosion.

## **7.4 Mitigation and Conservation**

It is expected that much of the impacts to surface archaeological heritage (pre-colonial and colonial) will be controllable through avoidance of sensitive areas, which must be identified before development proceeds. If for any reason mitigation by avoidance is not feasible, the usual process is to record and sample the archaeological site before its destruction is permitted. This is generally considered a second best approach as the process that has to be used is exacting and time-consuming, and therefore expensive. Furthermore the NHRA requires that archaeological material is stored indefinitely which has cost implications and places an undue burden on the limited museum storage space available in the province.

It is recommended that the following mitigation measures are implemented:

- Two options are proposed for the mitigation of the archaeological materials discovered during the survey. 1) Mitigation could involve avoidance of certain areas which are known to have archaeological sites. An archaeologist should be involved with the placement of the turbines and associated infrastructure during the site-specific EMP phase, specifically where sensitive areas have been identified. 2) Alternatively, one LSA site on the North Plateau and one MSA and two LSA sites on the South Plateau will require sampling (archaeological testing);
- The kraal complexes identified during the survey must be avoided – a general buffer of 500m is recommended for the distance between a heritage site and development, and this means that access roads must be re-routed to ensure they are not damaged. It is anticipated that additional kraals may occur which were not recorded during the fieldwork and these should also be avoided;
- Re-routing of access roads to avoid passing in close proximity (less than 500m) to farmsteads (such as Zwagershoek and Pienaarskloof) and associated farm buildings older than 60 years, must also be implemented. Ruined sheds, kraals, etc which are in close proximity to turbines, substations etc, should be fenced to avoid vandalism;
- In general, a 500m buffer should be implemented around farmsteads, particularly if the farm buildings are older than 60 years. This buffer can be reduced if the building contains no elements of heritage significance;
- The impact of the turbines and associated infrastructure on the Cultural Landscape will be assessed by the Visual Impact specialist;

- If any human remains are uncovered during the construction phase, work in that area should stop immediately and SAHRA should be notified;
- During the detailed planning phase, drawings of proposed road alignments, infrastructure and near-final turbine positions should be submitted to an archaeologist for review. Micro-adjustment of alignments and turbine positions is likely to be sufficient to achieve adequate mitigation.

## **8. IMPACTS OF THE OPERATION PHASE: NORTH AND SOUTH PLATEAU**

During the operational life of the wind farm, it is expected that physical impacts to heritage will diminish or cease. Impacts to intangible heritage are expected to occur. Such impacts relate to changes to the feel, atmosphere and identity of a place or landscape. Such changes are evoked by visual intrusion, noise, changes in land use and population density. In the case of this project, impacts to remote and rural landscape and wilderness qualities are likely but need to be assessed by the Visual specialist. The point at which a wind turbine may be perceived as being “intrusive” from a given visual reference point is a subjective judgment, however it can be anticipated that the presence of such facilities close to (for example) wilderness and heritage areas will destroy many of the intangible and aesthetic qualities for which an area is valued. The fact that turbines are continuously revolving results in a visual impact that can be very disturbing and destructive to the sense of serenity of a place.

- Due to the size of the turbines, they are very difficult to mitigate, however indications are (PGWC 2006) that they are perceived to be aesthetically/artistically more acceptable in agricultural or manicured landscapes;
- The fact that the turbines are in continuous motion creates a visual impact more severe than that caused by static objects and buildings;
- Shadow flicker – an impact particular to wind turbines is very large moving shadows created by the giant blades when the sun is low on the horizon. Continuous shadow flicker will have a serious impact on the sense of place of a heritage site;
- Visual impact of road cuttings into the sides of slopes will affect the cultural, natural and wilderness qualities of the area;
- Residual impacts can occur after the cessation of operations. The large concrete base will remain buried in the ground indefinitely. Bankruptcy or neglect by a wind energy company can result in turbines standing derelict for years creating a long term eyesore.

Intangible impacts include the visual intrusion of the proposed construction on historic buildings in the proposed facilities as well as on adjoining properties, including those of Grade 3C (local) significance. For example, there are a number of historic farmsteads below the plateau, such as Pienaarskloof, Diepfontein (on Brack Fountain), Zwagershoek, etc which should be assessed by the Visual Specialist to ensure that impacts are kept to a minimum.

## 9. CONCLUSIONS AND RECOMMENDATIONS

While wind farms represent clean energy which is much needed in South Africa, they are not without impacts that are particular to this form of development. With reference to this particular project, the significant heritage resources that may be impacted include MSA and LSA sites, Colonial period stone kraal complexes and historic farm buildings.

Mitigation measures include:

- With respect the archaeology, two alternative mitigation measures are proposed. Either an archaeologist should be involved with the placement of the turbines and associated infrastructure during the site-specific EMP phase or selective sampling of one MSA factory site and two LSA sites on the South Plateau and one LSA site on the North Plateau is recommended;
- The kraal complexes identified during the survey must be avoided, and this means that access roads must be re-routed to ensure they are not damaged. It is anticipated that additional kraals may occur which were not recorded during the fieldwork;
- Since kraal complexes are found in valleys, in general terms, construction of turbines and roads in valley bottoms should be kept to a minimum;
- Re-routing of access roads to avoid passing in close proximity to farmsteads and associated farm buildings older than 60 years, must also be implemented;
- In general, a 500m buffer should be implemented around farmsteads particularly if the farm buildings are older than 60 years. This buffer can be reduced if the building contains no elements of heritage significance;
- The impact of the turbines and associated infrastructure on the Cultural Landscape will be assessed by the Visual Impact specialist;
- Road alignments must be planned in such a way that the minimum of cut and fill operations are required;
- If any human remains are uncovered during the construction phase, work should cease in that area and SAHRA should be notified;
- During the detailed planning phase, drawings of proposed road alignments, infrastructure and near-final turbine positions should be submitted to an archaeologist for review. Micro-adjustment of alignments and turbine positions is likely to be sufficient to achieve adequate mitigation.
- Guarantees for demolition of turbines after their useful life must be in place as a condition of approval.

The cumulative impact of both the North Plateau and South Plateau facilities together with others planned for the same area, are likely to be high in terms of a visual impact on the landscape.

In terms of broader context, the accumulative impact of wind farms on the “South African Experience” is perhaps greater than the impact of individual facilities. South Africa is internationally known for its scenic landscapes, its wilderness qualities and vast horizons. This national identity is one of the nation’s greatest heritage assets, tourism draw-cards and as such is reflected in the National Anthem. The cumulative effect of wind farms proliferating across the South African landscape is a direct threat to these almost intangible but very important qualities.

## 10. EMP – HERITAGE MANAGEMENT PLANNING

### 10.1 Reduce impact on the archaeological heritage of the region (as defined in the NHRA)

**OBJECTIVE 1: Reduce impact on the archaeological heritage of the region (as defined in the NHRA).**

The turbines and access roads may result in the destruction of archaeological sites (LSA sites and stone kraal complexes). Although the sites which were identified during the EIA process were generally of low to medium significance, there may be sites of potential significance which were not identified.

Project component/s	Turbines, substations, laydown areas, roads, cabling, etc
Potential impact	Destruction of potentially significant archaeological sites
Activity/Risk source	Excavations for turbine foundations and construction of roads
Mitigation Target/Objective	Conserve significant archaeological sites.

Mitigation: Action/Control	Responsibility	Time frame
Avoid placing turbines and access roads along river banks. An archaeologist should assess the final turbine locations before work begins	Archaeologist & Environmental Officer	Prior to construction

Performance Indicator	No destruction of significant archaeological sites.
Monitoring	No monitoring will be required.

### 10.2 Avoid destruction of the Built Environment

**OBJECTIVE 2: Avoid destruction of the Built Environment**

The construction of access roads may result in the destruction of structures (buildings, sheds, kraals, etc) close to the roads.

Project component/s	Turbines, substations, access roads, laydown areas, cabling, etc
Potential impact	Destruction of potentially significant sites
Activity/Risk source	Excavations for turbine and substation foundations

	and construction of roads
Mitigation Target/Objective	Conserve significant sites

Mitigation: Action/Control	Responsibility	Time frame
Avoid old buildings including sheds, shepherd's houses, workers cottages, stone kraals, etc. If they are in proximity to development, they should be cordoned off and employees instructed to avoid them.	Archaeologist & Environmental officer	Before commencement of construction.

Performance Indicator	No destruction of sites.
Monitoring	No monitoring will be required.

### 10.3 Avoid impacts on the Cultural Landscape

OBJECTIVE 3: To avoid the construction of pylons and roads across Landscapes of Cultural significance.

The proposed facility may impact on the Cultural Landscape of the area.

Project component/s	Turbines, substations, access roads, laydown areas, cabling, etc
Potential impact	Negative visual impact on the cultural landscape
Activity/Risk source	The placement of turbines in areas of cultural and scenic value
Mitigation Target/Objective	Reduce the impact of the turbines by avoiding the highest ridges in the study area

Mitigation: Action/Control	Responsibility	Time frame
Avoid placing turbines on the highest ridges of the South Plateau where they will be visually prominent.	Visual Specialist and Environmental Officer	Prior to construction.

Performance Indicator	Impacts of Turbines on cultural landscape reduced to acceptable level
Monitoring	No monitoring will be required



#### 10.4 To reduce impact on Unidentified/Below ground Heritage Resources during the construction phase

**OBJECTIVE 4:** To reduce the impact on unidentified and/or buried heritage resources during the construction phase.

During the construction phase of the project, significant archaeological or palaeontological material may be uncovered. If they are not adequately dealt with, they may be accidentally destroyed.

Project component/s	Turbines, substations, access roads, laydown area, cabling, etc
Potential impact	Accidental destruction of archaeological material
Activity/Risk source	Construction activities
Mitigation Target/Objective	Reduce impact on sub-surface remains

Mitigation: Action/Control	Responsibility	Time frame
If finds are accidentally uncovered, they must be reported to an archaeologist and also to Dr Maria-Grazia Galimberti at SAHRA.	Environmental officer or senior person on site	Immediately

Performance Indicator	Reduce likelihood of destruction of sites
Monitoring	None

#### 10.5 To reduce impact on Buried Human Remains during the construction phase

**OBJECTIVE 5:** To ensure that human remains which are uncovered during construction are properly dealt with

During the construction phase of the project, buried human remains may be uncovered. If they are not adequately dealt with, they may be accidentally destroyed. Human remains are protected by several sets of legislation which means that certain protocols must be followed in the event of a find.

Project component/s	Turbines, substations, access roads, laydown areas, cabling, etc
Potential impact	Accidental destruction of human remains
Activity/Risk source	Construction activities
Mitigation Target/Objective	Reduce impact on buried human remains

Mitigation: Action/Control	Responsibility	Time frame
If human remains are accidentally uncovered: <ul style="list-style-type: none"> <li>• Leave remains in</li> </ul>	Environmental officer or senior person on site	Immediately

place, do not move anything; <ul style="list-style-type: none"> <li>• Cordon off the area;</li> <li>• Call the archaeologist at SAHRA</li> <li>• Contact an archaeologist who will indicate whether to inform the SA Police Services;</li> <li>• If exhumation is required, a permit will have to be obtained from the SAHRA Burials Unit</li> </ul>		
--	--	--

Performance Indicator	Reduce impact of construction on buried human remains
Monitoring	None

## 11. REFERENCES

Aurecon. 2011. Proposed Wind Energy Facility (North & South) situated on the Eastern Plateau near De Aar, Northern Cape: Draft Scoping Report, Report No.5755.

Baumann, N. & Winter, S. 2005. Guideline for involving heritage specialists in EIA process. Edition 1. CSIR report No ENV-S-C 2005 053E. Provincial Government of the Western Cape: Department of Environmental Affairs and Developmental Planning.

Hart, TJG. 1987. Haaskraal and Volstruisfontein: Later Stone Age events in the Zeekoe Valley, Great Karoo, South Africa. Unpublished MA Thesis: University of Cape Town.

Provincial Government of the Western Cape, 2006. Strategic Initiative to Introduce Commercial Land Based Wind Energy Development in the Western Cape. Towards a Regional Methodology for wind energy site selection. Dated May 2006.

Sampson, C.G. 1968. The Middle Stone Age Industries of the Orange River Scheme Area. National Museum, Bloemfontein Memoir No 4.

Sampson, C.G. 1974. The Stone Age Archaeology of Southern Africa. New York: Academic Press.

Sampson, C.G. 1985. Atlas of Stone Age settlement in the Central and Upper Seacow Valley. Memoirs van die Nasionale Museum Bloemfontein No 20: 1-116.

Sampson, C.G., 1992. Stylistic boundaries among mobile hunter-gatherers in the Zeekoe Valley, Eastern Cape. Washington, Smithsonian Institution Press.

Sampson, CG., Samspon, BE & Neville, D. 1994. An early Dutch Settlement pattern on the north east frontier of the Cape Colony. Southern African Field Archaeology 3: 74-81.

Smit, A.P. 1963. Kerktoring teen die treinspoor deur. Gedenkboek by the Goue Jubileum van die Ned. Geref. Kerk De Aar 1913-1963.

## APPENDIX 1: NORTH PLATEAU

Site No	GPS co-ordinates	Description	Photos	Significance
017	S30 34.851 E24 16.706	At the gate leaving the farmstead of Meyersfontein, on the ground at the gate and next to the historic building. A collection of freshly flaked, LSA artefacts on hornfels. A scraper/adze? A scraper made on glass? This site is in the road, and will be impacted by any upgrading.	6318-21	Low
018	S30 34.259 E24 18.157	Old farmhouse at Witputs on Vedussiekraal. Abandoned house, Victorian era. Some ruins nearby, a stone kraal and some worker's cottages. Nearby is a pan/dam.	6323-26 3377-85	Low
019	S30 32.919 E24 25.030	On farm Enkeldebult, drive up behind the farmhouse. In a little valley, complex of stone kraals. Near some stone koppies. One complex consists of two lobes, one 22m x 18m, the other 15m x 12m. They are of roughly packed stone, now only two stone high (less than 50cm). There is some historic ceramics (late 19 <sup>th</sup> century) ceramics in the smaller lobe. Jayson's sites are: J030-032; J035 & J035A.	6345-51	Medium
020	S30 32.921 E24 25.166	Another stone kraal against a small koppie in a little valley. It is also a very rough, low stone wall, 10m x 14m in size. There are stone artefacts lying around the front of the kraal, no historic material	6356	Low
021	S30 30.714 E24 25.979	Engraving on a rock behind the Zwegershoek farmhouse, of an ostrich and unknown animal. Some more recent graffiti nearby. Lots of stone artefacts around these koppies. Opposite J038.	6360- 6362;6368 6363-- 6365	High
022	S30 32.075 E24 18.134	19 November: Very ephemeral, weathered patinated hornfels MSA flakes on edge little valley on Brack Fountain.	-	Low
023	S30 33.000 E24 18.793	Very ephemeral, weathered patinated hornfels MSA flakes on edge of little hill on edge of Brack Fountain/Vendussie Kuil.	-	Low
024	S30 33.280 E24 18.212	Ruins of little settlement on top of escarpment, Vendussie Kuil portion 1 or 2 belonging to Mr van den Heever. Comprises one standing building and a number of ruins. A stone shed with corrugated iron roofing. Two interior rooms. Wooden lintels above doors. Pointing of the stone work on the one wall. A car ramp for servicing vehicles nearby.	6383-87	Medium
025	S30 33.267 E24 18.223	Ruins of a small structure nearby, same proportions as the standing shed. Square with a small front stoep and possible "voorkamer". Stone foundations with red brick walls. One brick with "frog". No	6388-6390	Medium

		signs of interior divisions in the building, was this another shed or house?		
026	S30 33.251 E24 18.216	A stone water reservoir lined with cement near Sites 24 and 25. Behind the reservoir, a flat slab of cement. A possible "trapvloer" or else the floor of a corrugated iron reservoir which has been removed.	6392	Low
027	S30 33.856 E24 17.532	Weathered, patinated Middle Stone Age	-	Low
028	S30 33.436 E24 17.491	Weathered, patinated Middle Stone Age	-	Low
029	S30 33.397 E24 17.436	Weathered, patinated Middle Stone Age	-	Low
037	S30 31 56.2 E24 16 39.1	Weathered, patinated MSA along the base of a rocky ridge	6417-6419	Low
038	S30 32 13.3 E24 15 39.7	Little (93mx2m) stone shepherd's house on the edge of a valley on Pienaarskloof belonging to Mr van den Heever, the farm road has cut through one corner of it. Built of two outer walls (skins) and inner rubble.	6420-6421	Low
039	S30 32 58.9 E24 18 09.7	? Located near the sub-station	?	?
055	S30 31 34.8 E24 14 48.5	A stone shed with corrugated iron roofing on the top of Pienaarskloof. There is some pointing of cement. Air vents along the base of the walls. There are wooden partitions inside the building for livestock. Loopholes in the one wall (these match the main farm complex at the base of the mountain).	6469, 6470-73; 6475-78.	Medium
056	S30 31 35.5 E24 14 46.9	A small stone kraal behind the shed, walls 2m high, with gate, kraal 10mx8m in size. The wire kraal adjacent this has a cobbled floor.	6474	Medium
057	S30 31 35.3 E24 14 48.9	Near the shed, there is a small square stone (10mx10m) structure of about 1m in height, with a gate, and an exit down into a small, circular tank of about 2m in diameter. This appears to be a stone kraal and adjacent dipping tank.	6479-6482	Medium
058	S30 31 37.9 E24 14 48.6	Ruins of a ruined brick house, only one standing wall. The rest has collapsed.	6483-6484	Low
059	S30 32 33.1 E24 15 19.2	A very large stone kraal on a hill, stone walling comprises and outer and inner skin, with rubble between. Stones have not been shaped. Walling about 1m high and size 45mx45m.	6485-87	Medium
060	S30 32 32.9 E24 15 21.0	Some 10m away, a second stone kraal, sections of its walling reaching 1m in height. About 28m long and 8m wide, but has a funnel shape and sections may be wider.	6488-6490	Medium
061	S30 32 32.6 E24 15 22.1	Some 36m from kraal 2 is two lines of rock, not a kraal but 5m apart, possibly a clearing to allow a road up the hill to the kraals. Very occasional, weathered MSA flakes around the kraals but no	-	Low

		association.		
062	S30 31 32.0 E24 14 44.1	The workers' cottages at the Pienaarskloof shed complex. They are of stone and long abandoned. One has a fireplace in a corner. Two doors in front, but at least three rooms. Little stone circle in front of door may be a skerm or small kraal. Lots of iron, glass and bone rubbish lying around.	6491-4	Medium
063	S30 31 32.6 E24 14 45.3	A long narrow stone kraal and loading ramp in front of the worker's cottages, see above.	-	Low
-	S30 34 48.3 E24 16 39.7	Meyersfontein building outside gate. LSA scraper and adze here too. See L017.	3376	Medium
-	S30 30 36.6 E24 25 59.1	Zwagershoek farmhouse	3391	Medium
-	S30 33 26.1 E24 24 19.5	Enkeldebult farmhouse	3392	Medium
J017	S30 30 45.5 E24 23 43.4	Weathered and patinated HF MSA. Location photo only.	3397	Low
J018	S30 30 53.1 E24 24 17.0	Small, dense LSA scatter of 20 – 30 artefacts in about 4 m <sup>2</sup> . Very discrete. One adze-type artefact.	3399-3400	Medium
J019	S30 30 50.5 E24 24 17.6	Ephemeral LSA scatter with thumbnail scraper.	3401, 3403	Low
-		At least 10 isolated artefacts in this little valley including 1 scraper.		Low
J020 - 24	S30 31 50.9 E24 24 15.0	One big scatter of weathered and patinated HF MSA. Set of five GPS co-ordinates indicate the size of the site.	3405-08	Low
J025	S30 31 42.2 E24 24 37.2	Ephemeral weathered and patinated HF MSA.		Low
J026	S30 32 06.1 E24 25 06.0	Stone beacon, quite informal	3409	Low
J027 - 29	S30 32 11.9 E24 24 58.6	Very widespread weathered and patinated HF MSA. Set of three points around site.		Low
J028 can	S30 32 16.5 E24 25 00.2	Single old food can.	3410-11	Low
J030	S30 32 52.9 E24 24 59.3	Historical kraal. Two spaces with bits built onto smaller one. See photo 3468 for dimensions. LSA and MSA here too. See L019.	3419-21, 3468	Medium
J031	S30 32 54.1 E24 24 58.6	Smaller roundish kraal built up against boulders. Plus associated wall and smaller circle. See photo 3468 for dimensions.	3422, 3424-26, 3468	Medium
J032	S30 32 54.1 E24 24 59.2	LSA HF scatter	3423	Low
J033	S30 32 50.1 E24 25 02.1	?LSA scatter, but quite patinated		Low
-		Kraal recorded by Lita	3428-29	
J034	S30 32 54.6 E24 25 12.9	Much Stone Age material, mostly weathered and patinated HF MSA but occasional LSA too.		Low
J035	S30 32 55.6 E24 24 59.5	Dense LSA scatter, some scrapers, one duckbill endscraper, many blades, lots of artefacts	3430-33	High
-		Tweefontein house	3434	Low

J036	S30 33 08.9 E24 27 10.9	Stone kraal on edge of low rocky hill (not visited)		Medium
J037	S30 30 38.8 E24 26 07.5	Zwagershoek dam wall	3435-37	Low
J038	S30 30 41.7 E24 26 00.3	(Palaeo) ripple marks in bedrock. Opposite L021	3438	Low
L021		Engraving	3439	High
J039	S30 30 41.6 E24 25 53.5	Single frag. of Chinese coarse porcelain, frag of burnt bone, some other bone frags and one tiny frag of European gun flint.	3440-41	Low
J040	S30 30 34.5 E24 25 49.8	Graveyard. 1963, 1976, 1978 are only dated ones. Informal low stone mound type graves with three metal "signs" with dates on. 15 graves. 15m from road.	3442-44	High
J041	S30 30 35.2 E24 25 49.8	Walled graveyard but wall is like a kraal (piled stone wall). 7 graves inside, one informal rectangular and of square shale slabs, the other 6 are informal stone mounds. No dates. 7 m from road.	3445-48, 3469	High
J042	S30 30 33.8 E24 25 40.6	Battenhausen graveyard. 14 plaques with 2 or 3 on some graves. Death dates all 1916 onwards. Earliest were born in Germany. Cacti planted on graves and fancy rocks brought in for graves.		High
J043	S30 29 58.5 E24 24 24.3	Lots of MSA and LSA here on Zwagerhoek.	3451	Low
J044	S30 30 01.2 E24 24 19.4	Widespread but ephemeral weathered and patinated HF MSA.		Low
J045	S30 29 55.9 E24 24 11.5	Dense LSA scatter. Many blades. Thousands of artefacts. ? Factory site as there are also lots of "broken" HF small blocks.	3452-55	Medium
J046	S30 29 55.7 E24 24 14.7	Dense scatter as above but far less blades.		Medium
J047	S30 29 56.1 E24 24 17.8	As for J046. J045 – J047 are all on lip of hill overlooking the plains.		Low
J048	S30 29 53.7 E24 24 21.8	Dense LSA scatter at the foot of the hill.		Low
J049	S30 30 52.3 E24 25 32.1	?LSA artefacts in road including a scraper.		Low
J050	S30 31 59.1 E24 18 17.1	Weathered and patinated HF MSA on Brack Fountain.		Low
J051	S30 31 58.1 E24 18 18.3	LSA scatter with some weathered and patinated HF MSA.	3470-71	
J052	S30 31 57.9 E24 18 21.0	Weathered and patinated HF MSA. Ephemeral but very widespread.		Low
J053	S30 31 56.2 E24 18 27.3	Weathered and patinated HF MSA.		Low
J054	S30 31 56.9 E24 18 21.7	LSA scatter.	3472	Low
J055	S30 31 05.1 E24 18 23.5	As above	3473	Low
J056	S30 31 03.3 E24 18 20.0	Weathered and patinated HF MSA in neck between hills.	3474-75	Low
J057	S30 31 02.9 E24 18 18.7	?LSA/MSA scatter in neck. Small scatter. Another good patch of LSA nearby.	3476-78	Low
J058	S30 31 10.3 E24 18 20.3	Weathered and patinated HF MSA.		Low

J059	S30 32 41.6 E24 18 50.7	Weathered and patinated HF MSA. Some very big flakes.	3479	Low
J060	S30 34 02.7 E24 17 34.0	Weathered and patinated HF MSA.		Low
J075	S30 31 40.0 E24 16 57.7	Widespread weathered and patinated HF MSA.		Low
J076	S30 32 29.2 E24 15 38.9	Low density LSA HF scatter.		Low
J109	S30 31 29.9 E24 14 47.0	Pienaarskloof: Old kraal broken down to floor level and rocks removed. 12 x 25 m.	3571-73	Low
J110	S30 31 29.7 E24 14 48.2	Small rectangular stone structure broken down to floor level and stones removed. C. 2 x 3 m. 20 <sup>th</sup> century glass and ceramics and metal scattered about including car axle.	3574-77	Low
J111	S30 31 37.8 E24 14 49.4	Leiwater with stones covering it in roadway near to ruined house (see L058).	3582	Low
J112	S30 32 40.4 E24 15 24.6	Small and discrete LSA scatter over about 4 m diameter. One core and 30 or 40 flakes.	3583	Low
J113	S30 32 39.5 E24 15 33.2	Sites J113-J117 is a complex of stone structures on Pienaarskloof opposite L059-L061. Kraal complex. J113 is NW kraal, J114 is SE kraal. See picture for description and sizes. Some plain white ceramics, clear (but solarised) and pale green glass scattered widely over whole area but only a few pieces.	3585-88, 3598	Medium
J114	S30 32 39.9 E24 15 34.4	As above.	As above	Medium
J115	S30 32 42.6 E24 15 35.4	Long rectangular three roomed stone structure. 3m wide and rooms are 7.5, 7.5 and 2.5 m long 12m SSE is a small circular structure of c. 4 m diameter (not visited, over fence). Plain white fragment of base of a small bowl seen here.	3589-92	Low
J116	S30 32 39.7 E24 15 39.3	Stone structure in quite poor condition. Two enclosures and probably small structure in corner of large one. Small enclosure built against rock outcrop.	3593, 3597	Low
J117	S30 32 40.5 E24 15 36.2	Stone kraal and smaller enclosure built against rock outcrop. Main kraal 20 m long.	3594-96	Low

## APPENDIX 2: SOUTH PLATEAU

Site No	GPS co-ordinates	Description	Photos	Significance
001/400	S30 35.825 E24 16.540	Scatter of 5 patinated, weathered hornfels flakes and cores (probably MSA). On the edge of the escarpment, overlooking Slingers Hoek.	6279-6282	Low
002	S30 35.603 E24 16.081	On margins of a stream which flows down the escarpment as a waterfall. There is a large scatter of patinated, weathered hornfels flakes, cores and	6284-86	Medium



		chunks on the level, silt-rich margins of the stream, while the majority is MSA there is some flakes with more recent retouch. The source of the hornfels is in the stream bed.		
003	S30 35.605 E24 16.113	Upstream of Site 002, is another scatter of artefacts positioned where a rocky ledge projects toward the stream, forming secluded area. These hornfels flakes and cores are freshly flaked and appear sharp. Probably LSA.	6287-8	Medium
004	S30 35.574 E24 16.283	Upstream of Site 003, on the other side of the stream, is another site. It lies between the stream and a rocky koppie. This site is characterized by some large flaked hornfels artefacts. An aardvark has dug two holes into the soil, which is white and crumbly.	6289-91	Medium
005	S30 35.366 E24 16.071	A scatter of very weathered MSA flakes, the weathered patinated outer surface is a rich red colour.	6293	Low
006	S30 35.387 E24 16.211	A surface scatter of very weathered, patinated hornfels flakes.	6294	Low
007	S30 35.389 E24 16.199	Nearby, a scatter of more freshly flaked artefacts. Some appear to have been flaked on weathered older artefacts. Re-use of MSA materials?	-	Low
008	S30 35.420 E24 16.260	As above	-	Low
009	S30 35.423 E24 16.310	A very dense scatter of very weathered, patinated MSA flakes, cores, chunks, etc. Next to a small koppie, with a sheet of flat rock nearby. The scatter is over a wide area. Next to the road.	6296-97	Medium
010	S30 35.341 E24 16.395	Ephemeral scatter of weathered, patinated hornfels flakes, they appear slightly less patinated than some other sites.	-	Low
011	S30 35.319 E24 16.470	A discrete concentration of freshly flaked hornfels artefacts (LSA?) on the slope of a hill overlooking the Meyerfontein farmhouse, Vendussie Kuil.	6299-6300	Low
013	S30 34.726 E24 16.405	A rectangular stone kraal on the farm road leading out from Meyersfontein (same as J011).	6307	Low?
014	S30 34.695 E24 16.383	A stone kraal of roughly packed stone (around 6m x 10m) with a lamb kraal in one corner (3m x 4m).	6308-09	Low
015	S30 34.685 E24 15.865	Semi-circular stone erosion walling on side of road	6312	Low
016	S30 34.396 E24 15.524	At a windmill, and a little dry river bed, is a scatter of freshly flaked, LSA artifacts on hornfels. They are on both sides of the banks – same as J016. A scraper made on an MSA artifact. Vendussie Kuil	6315-17	Medium
030	S30 33.470 E24 15.270	A complex of stone ruins in a valley on Matjiesfontein (see J061-J067). Site 30 consists of two features. The first is a 2 roomed structure, both rooms 3mx2m.	6393	Medium

		The stone walling is roughly built and this does not appear to be a dwelling. Nearby is a rectangular stone structure, about 1m in height, with size 3mx8m, and a single entrance. Probably a kraal. There is a scatter of late 19 <sup>th</sup> century ceramics nearby.		
031	S30 33.474 E24 15.250	Nearby is a very large kraal, comprising several sections, which is constructed against the hill, and bisected by a fence line. The portion on this side of the fence is 30mx20m in size, but there is a further portion which is measured by Jayson. Behind the kraals is a flat terrace which could be an earlier road.	6394-5.	Medium
032	S30 33.467 E24 15.237	Is a small, circular stone kraal feature also with a 19 century ceramic scatter. Nearby is an open LSA site lying on a gravel wash next to the small stream which runs through the valley.	6400-6401 6402-6405	Medium
033	S30 33.457 E24 15.278	Another stone structure on the other side of the gravel road, it is rectangular 10mx3m, and almost appears built up with sand in the inside.	-	Medium
034	S30 33.440 E24 15.080	Across the river, and around the side of a hill, but possibly part of the earlier complex, is a set of 3 stone features which appear to run up the hill. A roughly packed stone circle (4m in diameter), a stone square (2mx2m) and third stone circle (2m in diameter) which is Site 035.	6406-6409	Medium
035	S30 33.458 E24 15.061	A stone circle, part of previous complex, high against the hill, 2m in diameter. In addition, there is a straight stone wall which appears to run down the hill. These stone structures have been partially impacted by the erection of the Eskom pylons which go through sites.	6410	Medium
036	S30 33.684 E24 14.387	In another valley, higher up on Matjiesfontein, is another stone shepherd's cottage. Square, about 5mx6m, one roomed. Some modern glass and iron nearby. There is also a more recently abandoned corrugated iron hut nearby.	6412-13.	Medium
040	S30 35 02.4 E24 18 46.3	Some freshly flaked hornfels in a plain of weathered, angular hornfel pieces. The site in on the way to a turbine on the farm Vendussie Kuil of Mr Venter.	6426, 6429	Low
041	S30 39 10.7 E24 21 27.4	At the gate on Knapdaar, going through to a little stream and a grove of poplars, is a scatter of hornfels with superimposition of recent ceramics, glass, iron and cartridge case.	6438-39	Low
042	S30 39 04.8 E24 21 28.6	The little stream (see above) has been dammed with a stone wall, on the banks of the stream is a scatter of flaked hornfels artefacts (see J087 & J088)	6442-3	Low
043	S30 38 24.8 E24 19 15.4	At the river which travels through Knapdaar. This is a large LSA site, with	6445	High

		a dense scatter of cores, duckbill end scrapers, end scrapers on blades, large scrapers (c. 5-8cm) , etc made on freshly flaked hornfels. The site seems to be concentrated on some crumbly white soils. There are associated ostrich eggshell fragments, 1 quartz chip and 1 broken lower grindstone. This is J089. Opposite side of river is a scatter MSA and LSA together. <b>MITIGATE</b>		
044	S30 37 12.8 E24 17 57.3	At the end of the valley on Knapdaar, a stone kraal complex above the dam. Site 44 is a roughly packed stone kraal, only 3 sides still standing, about 1m high and around 15mx20m in size. On the way from Site 44 to Site 45, there is a scatter of European artefacts on the ground, including ceramics, iron and glass.	6446-7	Medium
045	S30 37 13.7 E24 17 50.8	A very big square kraal made of roughly packed stones. Up to 1.5m high in places, located on top of a flat sheet of rock. It is about 22mx26m in size. A fragment of ceramic with pink transfer ware nearby. A second stone kraal lies to the east of this kraal, it appears more ephemeral with many stones dismantled (same as J099).	6448-6450	Medium
046	S30 37 12.8 E24 17 48.7	This is another kraal, about 50m from Site 45. It has rough stone walling, reaching 1.5m in height, and is about 20mx20m in size (same as J098)	6451	Medium
047	S30 37 15.3 E24 17 49.2	This site is a small stone feature, a square structure with one entrance, possibly a shepherd's dwelling as it is located high about the kraals, in the nek of the valley. It is about 2mx1m in size.	6453	Medium
048	S30 37 11.7 E24 17 50.2	A roughly packed stone kraal, hidden in bushes, near previous kraals. It is about 15mx8m in size (same as J106).	-	Low
049	S30 37 08.5 E24 17 47.1	An oblong shaped stone feature comprising rather large boulders against the side of the valley, 7mx5m in size. It has a more indigenous look than other stone kraal complexes. It is a few metres from Site 50.	6454-56	Medium
050	S30 37 08.0 E24 17 47.7	A second roughly packed stone feature, oblong in shape, partially constructed on a flat rock sheet, some of the boulders quite large. Is this a kraal? Same as J107.	6458	Medium
051-052	S30 37 05.6 E24 17 53.1 S30 37 09.2 E24 17 54.4	Two ends of the stone dam wall which stretches across the valley, below the stone kraal complexes. It has been breached in one place. See J092.	6459	Low
053	S30 37 10.7 E24 17 53.6	Another rectangular stone structure, 4mx10m, very roughly packed, unlikely to be a house.	-	Low
054	S30 38 21.7 E24 19 25.5	On way out of valley on Knapdaar, a square roughly packed stone kraal against the slope of the valley. It has a	6462-63	Low

		packed outer skin of stone and inner rubble. About 15mx25m in size.		
064-66	S30 39 30.7 E24 19 13.2 S30 39 33.7 E24 19 07.2 S30 39 33.4 E24 19 01.0	A very wide and dense scatter of artefactual material over this hill around turbine 41 on the farm Knapdaar. There are older, weathered artefacts (probably MSA) and more recent signs of flaking (probably LSA). Lots of very large cores with flakes removed. Appears to be a factory site. <b>MITIGATE</b>	6502-6516	High
J001	S30 35 42.2 E24 16 18.1	Isolated HF (hornfels) scraper in road.	3351-52	Low
J002	S30 35 25.3 E24 16 05.6	Weathered and patinated HF MSA in stream bed.		Low
J003	S30 35 25.9 E24 16 17.7	Weathered and patinated HF MSA.	3353	Low
J004	S30 35 22.6 E24 16 29.7	Weathered and patinated HF MSA.		Low
J005	S30 35 25.5 E24 16 37.0	Weathered and patinated HF MSA and LSA in eroded area.	3354	Low
J006	S30 35 28.2 E24 16 37.7	Diffuse scatter of weathered and patinated HF artefacts alongside stream.		Low
J007	S30 35 25.3 E24 16 39.1	Dense LSA HF scatter alongside stream.	3356-57; (3355 is close by)	High
J008	S30 35 24.2 E24 16 38.9	Dense LSA HF scatter alongside stream. (Stream has reeds and damp patches in places).	3358	High
J009	S30 35 19.9 E24 16 35.4	Scatter of LSA and older HF artefacts in flat area between boulders and rock outcrops.		Medium
J010	S30 34 43.8 E24 16 22.6	Small historical stone structure, glass, metal and ceramics scattered about. Main circle is about 2.5 m diameter while a smaller adjoining one is about 1.5 m diameter. Small stone feature (grave-like) alongside (3365).	3361-65	Low
J011	013 Lita	Large rectangular/square historical kraal split into two rectangular enclosures. 1916 one penny coin found here. No other artefacts.	3366-68	Medium
J012	S30 34 38.9 E24 15 57.7 S30 34 43.2 E24 15 58.8 S30 34 35.4 E24 15 55.6	Stone wall stretching between two hills. 012 is where it crosses the road and would need to be demolished for road upgrade, 012A and B are the ends against the hills.	3370-72	Low
J013	S30 34 42.3 E24 15 58.3	LSA HF flakes on top of hill.		Medium
J014	S30 34 53.7 E24 15 31.0	Widespread scatter of weathered and patinated HF flakes all over this area.	3373	Low
J015	S30 34 44.5 E24 15 49.5	Short erosion control wall. The whole road in this area is a historic feature of the cultural landscape as well.		Low
J016	S30 34 22.9 E24 15 30.6	Scatter of LSA and older HF artefacts alongside stream. 1 LSA scraper. (Same as L016)	3374-75	Medium
-	S30 34 48.3 E24 16 39.7	Meyersfontein building outside gate. LSA scraper and adze here too. See L017.	3376	Medium

-	S30 30 36.6 E24 25 59.1	Zwagershoek farmhouse	3391	Medium
-	S30 33 26.1 E24 24 19.5	Enkeldebult farmhouse	3392	Medium
J061 - 7	S30 33 28.7 E24 15 13.9	Werf (see L030-L033) – complex of stone ruins on the farm Matjiesfontein. A series of six points around the edge of the site	3482-92	Medium
J068 - 74	S30 33 27.4 E24 15 03.5	Werf on Matjiesfontein, around the valley from previous stone kraal complex (see L034-L035). Set of five points.		Medium
J077	S30 35 23.3 E24 19 17.8	On Vendussie Kuil. Weathered and patinated HF MSA but with occasional LSA too. Near a stream.	3500-02	Low
J078	S30 35 45.0 E24 19 27.4	Weathered and patinated HF MSA but with occasional LSA too. Near a stream.	3503-04	Low
J079	S30 35 48.3 E24 19 47.7	Weathered and patinated HF MSA.		Low
J080	S30 35 47.2 E24 19 47.5	Low density LSA and weathered and patinated HF MSA.		Low
J081	S30 36 11.9 E24 19 37.6	Extensive weathered and patinated HF MSA.		Low
J082	S30 35 56.5 E24 19 31.3	Dense LSA HF artefact scatter in valley bottom. Long sidescraper/adze present.	3511-13	Medium
J083	S30 35 49.6 E24 18 33.3	Low density but widespread weathered and patinated HF MSA on grassy plain.		Low
J084	S30 35 52.3 E24 18 31.4	High density, concentrated weathered and patinated HF MSA.	3517-18	Low
J085	S30 34 59.8 E24 18 46.0	Area of HF gravel with some weathered and patinated MSA but also a few LSA artefacts. One classic spokeshave present.	3520-21	Low
-	S30 34 43.9 E24 19 14.8	Photos of kraal and house at Kranskop.	3522-23	Medium
-	S30 40 43.6 E24 23 13.6	Photos of Barn and house at Die Dam (Knapdaar)	3524-26	Medium
J086	S30 39 42.3 E24 21 45.6	Weathered and patinated HF MSA in pan on Knapdaar.	3527-28	Low
J087	S30 39 08.8 E24 21 26.5	LSA and weathered and patinated HF MSA on silt alongside stream. Suspicious larger rocks on silt (close to L041 & L042).	3529-30	Low
J088	S30 39 05.7 E24 21 24.5	LSA and weathered and patinated HF MSA in eroded area alongside river.	3532-33	Low
J089	S30 38 24.3 E24 19 14.7	See L043. Mitigate	3534-42	High
J090	S30 37 01.4 E24 18 00.2	Extensive LSA scatter in valley over wide area, 1 scraper seen.	3543	Medium
J091	S30 37 03.8 E24 17 59.2	Extensive weathered and patinated HF MSA in gravel patch.		Low
J092	S30 37 07.5 E24 17 59.1	c. 60 cm high earth berm to carry water from the dam. 92B is point where it exits the dam and 92C is approximately the end of the channel. Photos of west end at dam (see L051-52).	3559-61	Low
J093-6	S30 37 19.8 E24 17 48.8 S30 37 20.0 E24 17 47.9	Extremely dense LSA on sandy plain on top of the mountain above the stone kraal complex. One area in particular has many blades. Thousands of artefacts.	3546-49	High

	S30 37 21.0 E24 17 49.0	MITIGATE		
J097	S30 37 19.4 E24 17 44.8	Good LSA scatter but older than the previous one (J093) since it is more patinated.	3550-51	Medium
-		J093 on left in front of two bushes, J097 on right among rocks.	3552	Low
J098	S30 37 12.8 E24 17 48.7	Square kraal (same as L046)		Medium
J099	S30 37 13.9 E24 17 50.3	Square kraal (same as L045).		Medium
J100	S30 37 12.9 E24 17 50.5	Low-walled enclosure. One plain white ceramic just outside NW corner.		Medium
J101	S30 37 12.4 E24 17 50.0	Square structure 2x2m.		Medium
J102	S30 37 12.8 E24 17 51.0	House, doorway still has the lintel on top.	3553	Medium
J103	S30 37 12.1 E24 17 51.4	Possible grave alongside house.	3554	High
J104	S30 37 10.4 E24 17 51.8	Dense LSA scatter with OES. Some transfer ware around here as well. One brown, one green.	3555, 57	Medium
J105	S30 37 09.8 E24 17 50.9 S30 37 11.2 E24 17 50.4	Wall. Two skins with rubble fill. GPS at both ends.	3558	Low
J106	S30 37 11.9 E24 17 50.0	Rectangular structure 10x7m (same as L048).		Medium
J107	S30 37 08.0 E24 17 47.7	Oval enclosure 6x5m with low straight wall to the south (same as L050).		Medium
-		Cross-section structure of dam wall.	3562	Low
J108	S30 38 25.0 E24 19 17.0	Small stone structure alongside road.	3565-66	
J118	S30 39 20.9 E24 19 17.7	Sites J118-J121 is on Knapdaar. Generally extensive weathered and patinated MSA HF scatter over the whole lower slopes of the hill in this area.		Low
J119	S30 39 22.6 E24 19 11.4	Extensive scatter of ?MSA/?LSA artefacts among HF gravel. Artefacts are quite bit but mostly unpatinated, some nice big blades. Although this part is different with the fresh artefacts, the scatter in general is continuous with J118.	3599-600	Low
J120	S30 39 17.8 E24 19 28.0 J121- S30 39 18.8 E24 19 28.4	Complex of stone structures. J120 at west end and J121 at right end. See picture for sizes and layout. Consists of two pairs of small structures and some walling between rock outcrops on a ridge. Although it loos pre-colonial, the walls are two skins with rubble fill so must be historical.	3601-07	Medium