



SiVest Environmental Division

LOERIESFONTEIN 2 WIND ENERGY FACILITY

Heritage Management Plan for Construction

South Africa Mainstream Renewable Power Loeriesfontein 2 (Pty) Ltd

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Declaration of Independence

The report has been compiled by PGS Heritage, an appointed Heritage Specialist for SiVest Environmental Division. The views stipulated in this report are purely objective and no other interests are displayed during the decision making processes discussed in the Heritage management Plan.

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EXECUTIVE SUMMARY

PGS Heritage (PGS) was appointed by SiVest Environmental Division to develop a Heritage Management Plan (HMP) for the construction of Loeriesfontein 2 Wind Energy Facility (WEF) on Portion 1 and 2 of the Farm Aan de Karree Doorn Pan 213, approximately 60km north of Loeriesfontein in the Northern Cape Province.

The outcome of the Heritage Impact Assessment (HIA) completed for the Environmental Impact Assessment of the Loeriesfontein 2 WEF outlined the need for a final walk down and field survey of the infrastructure foot print before construction commences. The recommendations of this walk down will then inform the Environmental Management Program (EMPr) for the management of the construction and operation of the facility.

The outcome of the field work has provided site specific management guidelines for the heritage sites identified as listed below:

HERITAGE SITE NUMBER	MITIGATION / MANAGEMENT MEASURE
Site 1	Site size: 30m x 30m. Demarcate site and include a 20m buffer area. Monitor during construction for possible high density Stone Age material (refer to section 3 for procedures during monitoring)
Site 4	Site size: 60m x 60m. Demarcate site and include a 20m buffer area. Monitor during construction phases.
Site 5	Site size: 10m x 10m. Demarcate site and include a 20m buffer area. Monitor during construction phases.
Site 6 feature	Site size: 20m x 20m. Demarcate site and include a 20m buffer area. Monitor during construction phases.

Further to the above general guidelines and monitoring is recommended in table 2 and Section 3 of this report.

This document fulfils that requirement as endorsed by South African Heritage Resources Agency (SAHRA).

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1 INTRODUCTION

PGS Heritage (PGS) was appointed by SiVest Environmental Division to develop a Heritage Management Plan (HMP) for the construction of Loeriesfontein 2 Wind Energy Facility (WEF) on Portion 1 and 2 the Farm Aan de Karree Doorn Pan 213 and on the Remainder of the Farm Sous 226, approximately 60km north of Loeriesfontein in the Northern Cape Province.

1.1 Scope of the Study

The scope of this study is to provide site specific heritage management guidelines for the construction activities during the construction of the Loeriesfontein 2 WEF and the associated power line.

1.2 Specialist Qualifications

This Heritage Management Plan (HMP) was compiled by PGS Heritage (PGS).

The staff at PGS has a combined experience of nearly 60 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes and will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Marko Hutten, heritage specialist and project archaeologist, has 15 years of experience in the industry and is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Field Director.

Wouter Fourie, Principal Heritage Specialist for this project, is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA) and has CRM accreditation within the said organisation, as well as being accredited as a Professional Heritage Practitioner with the Association of Professional Heritage Practitioners – Western Cape (APHP).

1.3 Legislative Context

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

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

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

- i. National Environmental Management Act (NEMA) Act 107 of 1998
 - a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
 - b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
 - c. Environmental Impact Assessment (EIA) – Section (32)(2)(d)
 - d. Environmental Management Programme (EMPr) – Section (34)(b)
- ii. National Heritage Resources Act (NHRA) Act 25 of 1999
 - a. Protection of Heritage Resources – Sections 34 to 36; and
 - b. Heritage Resources Management – Section 38
- iii. Mineral and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
 - a. Section 39(3)
- iv. Development Facilitation Act (DFA) Act 67 of 1995
 - a. The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development Facilitation Act, 1995. Section 31.

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...” The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of CRM those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through NEMA, MPRDA and the DFA legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any

authorizations are granted for development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impacts Processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008).

The NEMA 23(2)(b) states that an integrated environmental management plan should, “...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”.

A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 of the regulations (Fourie, 2008).

1.4 Terminology and Abbreviations

Archaeological resources

This includes:

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

Cultural significance

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

Development

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

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Early Stone Age

The archaeology of the Stone Age between 700 000 and 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).

Heritage resources

This means any place or object of cultural significance

Holocene

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

Late Stone Age

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

Late Iron Age (Early Farming Communities)

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

Middle Stone Age

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

Palaeontology

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

ABBREVIATIONS	DESCRIPTION
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWD	Heritage Walk Down
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age

NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
WEF	Wind Energy Facility

1.5 Project description

The proposed construction of the Loeriesfontein 2 Wind Farm will be situated on Portions 1 and 2 of the Farm Aan de Karree Doorn Pan 213 and on the Remainder of the Farm Sous 226, approximately 60km north of the town Loeriesfontein in the Calvinia Magisterial District, Northern Cape Province.

The Loeriesfontein 2 Wind Farm will have a capacity of 140MW and will consist of 61 wind turbines. The wind turbines will have a hub height of up to 120m. The rotor diameter will be up to 120m. The wind turbines will not be fixed and will be able to rotate to catch prevailing winds. The foundation of each wind turbine will be approximately 20m x 20m. The footprint for each wind turbine will therefore be approximately 400m². A hard standing area, of approximately 2 400m², for crane usage will accompany each wind turbine. Hence, the total footprint for each wind turbine and the associated hard standing area will be approximately 2 800m². The foundation will be approximately 2.5m deep. The wind turbines will be connected by underground cabling (approximately 1m deep) except where the cable cannot be buried. In this instance an overhead power line will be used.

To connect the wind farm to the national electricity grid, a 132kV overhead power line will be constructed that will route from the substation on site towards the south where it will cross Portions 1 and 2 of the Farm Sous 226 as well as the Remainder of the and it will eventually tie into Helios Substation. As previously mentioned, the power line will be approximately 11km in length. A substation will be constructed on the wind farm site which will occupy an area of 90m x 120m (approximately 10 800m²). An access road will be constructed that will be 6-10m wide. The roads will be gravel roads and will include turning circles for large trucks and passing points. A temporary construction and lay-down area is to be established which will be approximately 5

000m² (including an access route and contractor's site) and approximately 10 000m² respectively. Other infrastructure will include a warehouse and administration building that will occupy an area of approximately 5 000m².

1.6 Methodology

This Heritage Walk Down (HWD) report was compiled by PGS Heritage for the Loeriesfontein 2 WEF, including applicable maps, tables and figures, as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002) and requested by the South African Heritage Resources Agency (SAHRA). The HWD process consisted of three steps:

Step I – Literature Review: The background information to the field survey leans greatly on the HIA completed by Dr J. van Schalkwyk in 2011.

Step II – Physical Survey: A physical survey was conducted on foot through the proposed project area by qualified archaeologists (17-21 March 2014), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording, documentation and grading (Utilising the heritage grading system in **Appendix B**) of relevant archaeological resources, as well as mapping and constructive recommendations.

1.7 Physical surveying

Due to the nature of cultural remains, with the majority of artefacts occurring below surface, an intensive foot-survey that covered the study area was conducted. A controlled-exclusive surface survey was conducted over a period of 5 days on foot by one archaeologists and field assistant of PGS Heritage. Refer to **Appendix A** for tracklogs of field work.

The survey focussed on the foot print areas of the proposed nrastructure as supplied by SiVest Environmental Division.

All sites discovered both inside and bordering the proposed alignment was plotted on 1:50 000 maps and their GPS co-ordinates documented.

2 SITE SPECIFIC MANAGEMENT MEASURES

The site specific management measures are based on the map provided for the infrastructure of the WEF (**Figure 1**).

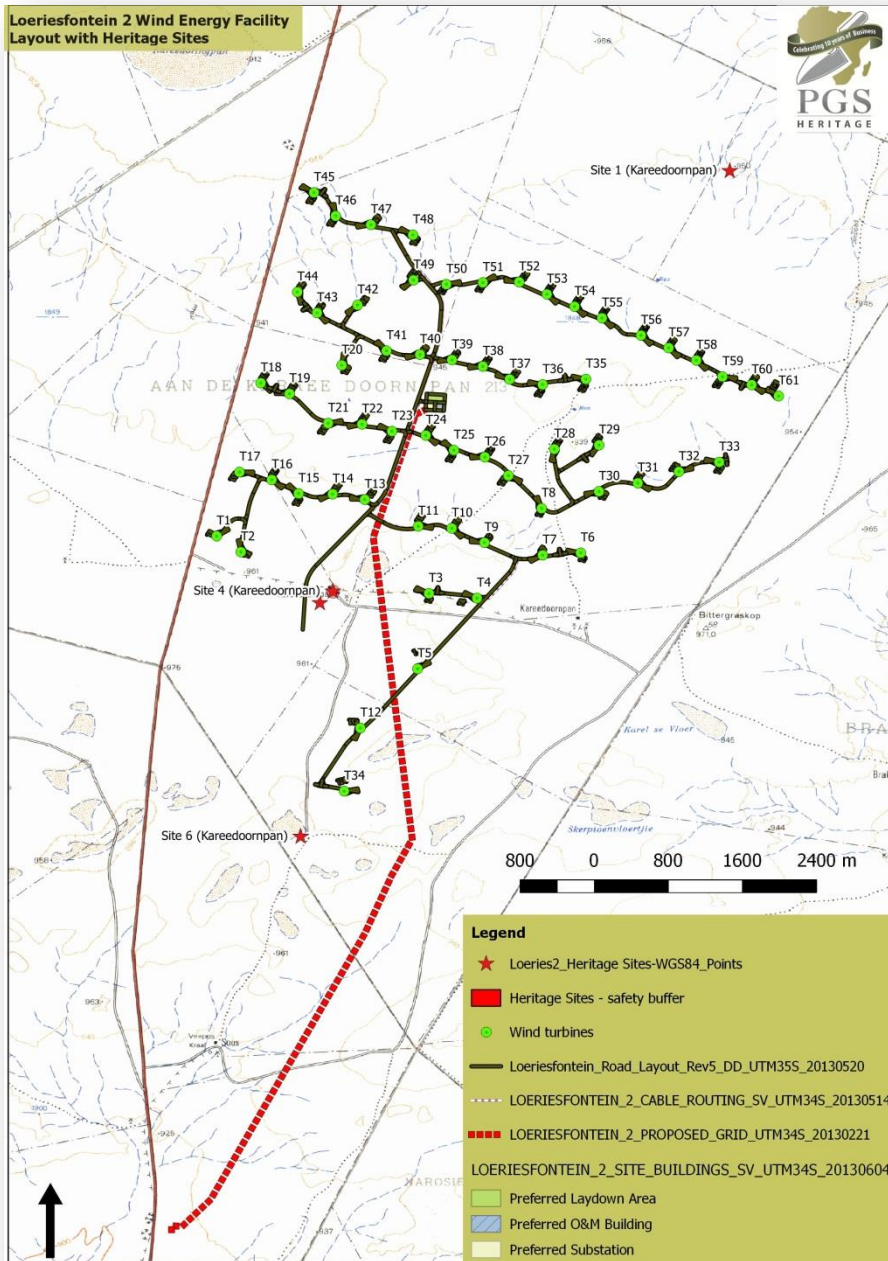


Figure 1 – Loeriesfontein 2 WEF layout

2.1 Sites identified during the initial HIA

The HIA for the Loeriesfontein 2 WEF was completed by Van Schalkwyk in 2011 and identified 4 heritage sites within the Loeriesfontein 2 WEF boundary. The field work and heritage survey of the infrastructure for the Loeriesfontein 2 WEF as completed by PGS for this report has yielded no further heritage resources.

The following site descriptions was taken directly from the Van Schalkwyk HIA (2011).

2.1.1 Site 1

Coordinates:

Site 1 - S 30.37768 E 19.62242

Site1 is "...located at the foot of low hills, with no. 1 in close proximity of an old streambed. The sites consist of low density surface scatters of MSA material, mostly of hardened shale and chalcedony. The density for site no. 1 is approximately 2 tools/flakes per m2, over an area roughly 30 x 30 metres."

Heritage Significance rating:

Low – Grade 4C

Locality of sites in relation to infrastructure:

Site 1 is situated approximately 2500 meter from the closest turbine positions at T55

2.1.2 Site 4 and 5

Coordinates:

Site 4 - S 30.42494 E 19.57780

Site 5 - S 30.42624 E 19.57634

Site 4 – *"An old farmstead was identified on the farm Aan de Karree Doorn Pan. It was built of clay bricks and later cladded with corrugated iron – quite a unique method. An old 'kookskerm', stone walled kraal and garage is found adjacent. Apparently it dates to about the 1920s, or slightly earlier. Considering the scarcity of farm buildings in the larger region and the unique construction method, this site is viewed to have high significance."*

Site 5 – “Informal cemetery with two graves. Only one has a headstone, that of HGJ Lintvelt, a young boy who died in 1913. These graves can probably be linked to the farmstead.”

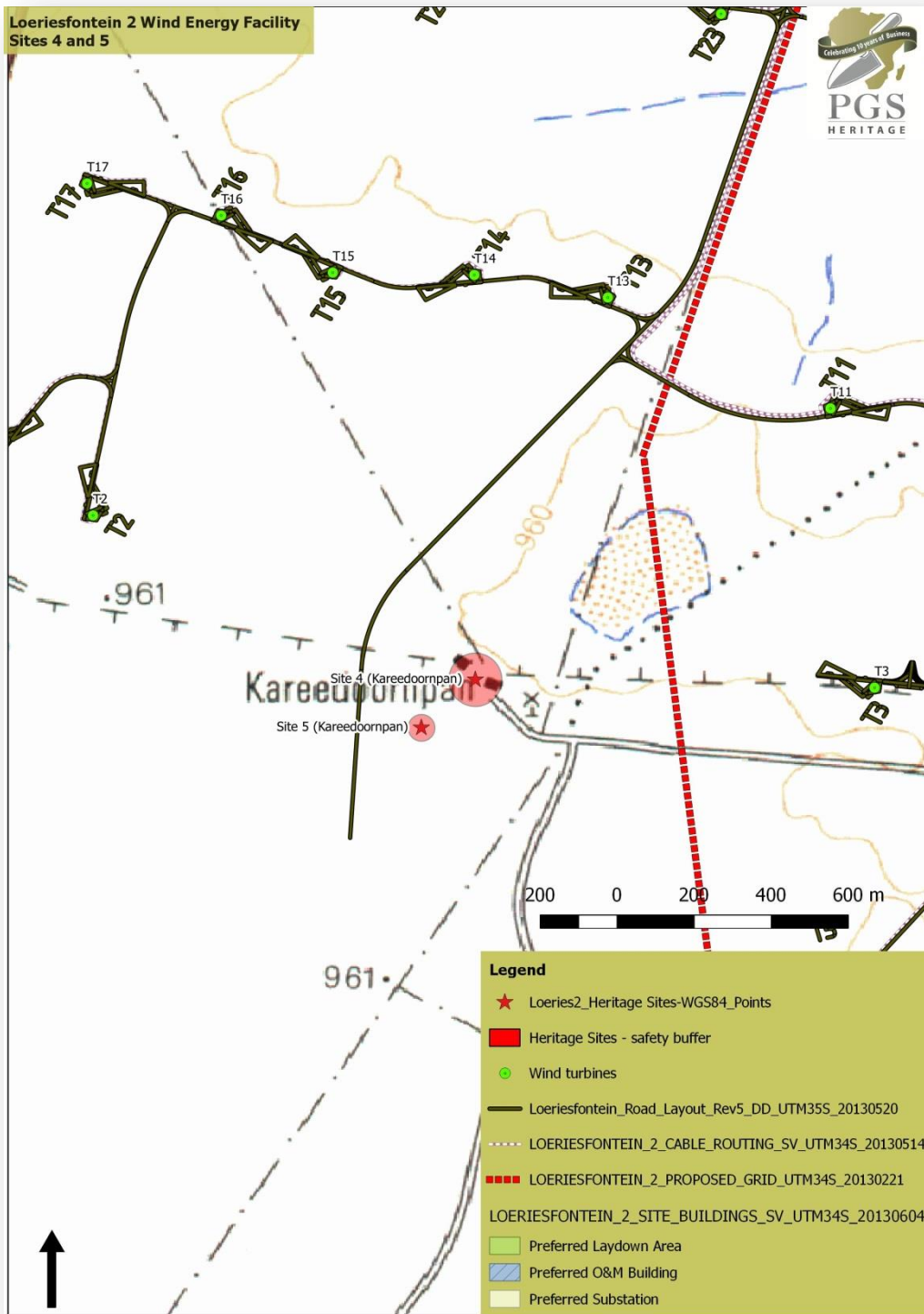


Figure 2 – Locality of Site 4 and 5 in relation to the infrastructure

Heritage Significance rating:

Site 4 – Grade 3

Site 5 – Grade 4A

Locality of sites in relation to infrastructure:

Site 4 and 5 is situated approximately 350 meter from the closest proposed road infrastructure and more than 1 km from the closest turbine position.

2.1.3 Site 6

Coordinates: S 30.45250 E 19.57417

“Water points for stock served by wind pumps. Although the wind pumps are not that old, it could have been replaced at any point, the associated dams are quite old..”

Heritage Significance rating: Low – Grade 4B

Locality of sites in relation to infrastructure:

Site 6 is situated more than 600m from the closest turbine positions at T34.

2.2 Site specific management measures

Table 1 – Site specific management measures

HERITAGE SITE NUMBER	MITIGATION / MANAGEMENT MEASURE
Site 1	Site size: 30m x 30m. Demarcate site and include a 20m buffer area. Monitor during construction for possible high density Stone Age material (refer to section 3 for procedures during monitoring)
Site 4	Site size: 60m x 60m. Demarcate site and include a 20m buffer area. Monitor during construction phases.
Site 5	Site size: 10m x 10m. Demarcate site and include a 20m buffer area. Monitor during construction phases.
Site 6 feature	Site size: 20m x 20m. Demarcate site and include a 20m buffer area. Monitor during construction phases.

Table 2: Environmental Management Plan for management of heritage resources:

Management / Environmental Component:		EMPr Reference Code:	
Heritage Resources		EMP-HR	
Primary Objective:			
Minimise impacts on heritage resources through timeous mitigation measures			
Implementation		Responsibility	Resources
1. Develop heritage training section to include in induction program for employees during construction		Environmental manager	Appointed heritage specialist
2. Development of chance find procedures and an action plan in the case of chance finds of heritage resources .		Environmental manager	Appointed heritage specialist
3. A baseline assessment of the identified heritage sites must be done before construction commences and evaluation of the status of the heritage sites must be done on a bi-monthly basis during construction and a bi-yearly basis during operation of the two sites.		Environmental manager	Appointed heritage specialist
4. Demarcate the identified heritage sites as no-go areas during construction activities.		Environmental manager	ECO, appointed heritage specialist

3 GENERAL HERITAGE MANAGEMENT GUIDELINES FOR IMPLEMENTATION OF MITIGATION MEASURES

As the possibility of the discovery of subsurface archaeological material in the foot print of the construction area have been identified during the HIA the following section pertains to chance finds and the process to be followed.

1. Include an information section on heritage resources in the **SHEQ training** given to contractors involved in earthmoving and trenching activities. These sections must include basic information on:
 - a) Heritage;
 - b) Graves;
 - c) Palaeontology;
 - d) Archaeological finds; and
 - e) Historical Structures.

This module must be tailor made to include all possible finds that could be expected in that area of construction, and can be developed by a Heritage Specialist before construction commence.

2. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.
3. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
4. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.
5. After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
6. In the event that human remains are uncovered, or previously unknown graves are discovered, a qualified archaeologist needs to be contacted and an evaluation of the finds made.
8. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA need to be followed. This includes an extensive social consultation process.

3.1.1 Procedure

In the case where archaeological finds are identified during construction the following measures must be taken:

- Upon the accidental discovery of archaeological finds, a buffer of at least 20 meters should be implemented.
- If archaeological finds are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find.
- If the evaluation of the finds require further documentation and mitigation such as excavations, surface collections and/or in situ documentation, a permit must be applied from SAHRA.
- This documentation and mitigation must conform to the guidelines and requirements of SAHRA and international accepted standards and must include as a minimum:
 - *Non-technical summary*

This should outline in plain, non-technical language the principal reason for the work, its objectives and main results. It should include reference to authorship and commissioning body.
 - *Introductory statements*

These could include acknowledgements, circumstances of the project such as planning background, the archaeological background, an outline nature of work, the site description (including size, geology and topography, location), when the project was undertaken and by whom.
 - *Aims and objectives*

These should reflect or reiterate the aims set out in the project design or specification.
 - *Methodology*

The methods used, including the detail of any variation to the agreed project design or specification should be set out carefully, and explained as appropriate. These should be set out as a series of summary statements, organised clearly in relation to the methods used, and describing structural data, associated finds and/or environmental data recovered. Descriptive material should be clearly separated from interpretative statements. Technical terminology (including

dating or period references) should be explained where necessary if the report is aimed at a largely non-archaeological audience. The results should be amplified where necessary by the use of drawings and photographs; and by supporting data contained in appendices (below).

- *Conclusions*

It is appropriate to include a section, which sums up and interprets the results and puts them into context (local, national or otherwise). Other elements should include a confidence rating on techniques used, or on limitations imposed by particular factors (e.g. weather or problems of access).

- *Archive location*

The final destination of the archive (records and finds) should be noted in the report.

- *Appendices*

These should contain essential technical and supporting detail, including for example lists of artefacts and contexts or details of measurements, gazetteers etc. It may also be appropriate to include the project design or specification for ease of reference.

- *Illustrations*

Most reports will need the inclusion of one or more illustrations for clarity; as a minimum a location plan should be included. Any plans or sections should be clearly numbered and easily referenced to the National Grid and related to the specified area.

- *References and bibliography*

A list of all sources used should be appended to the report.

- *Other*

Contents list, disclaimers.

3.1.2 Procedure for discovery of human remains / graves

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

- Upon the accidental discovery of graves, a buffer of at least 20 meters should be implemented.
- If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. To remove the remains a permit must be applied for from SAHRA and other relevant authorities. The local South African Police Services must immediately be notified of the find.
- Where it is recommended that the graves be relocated, a full grave relocation process that includes comprehensive social consultation must be followed.

The grave relocation process must include:

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

4 SOURCES USED

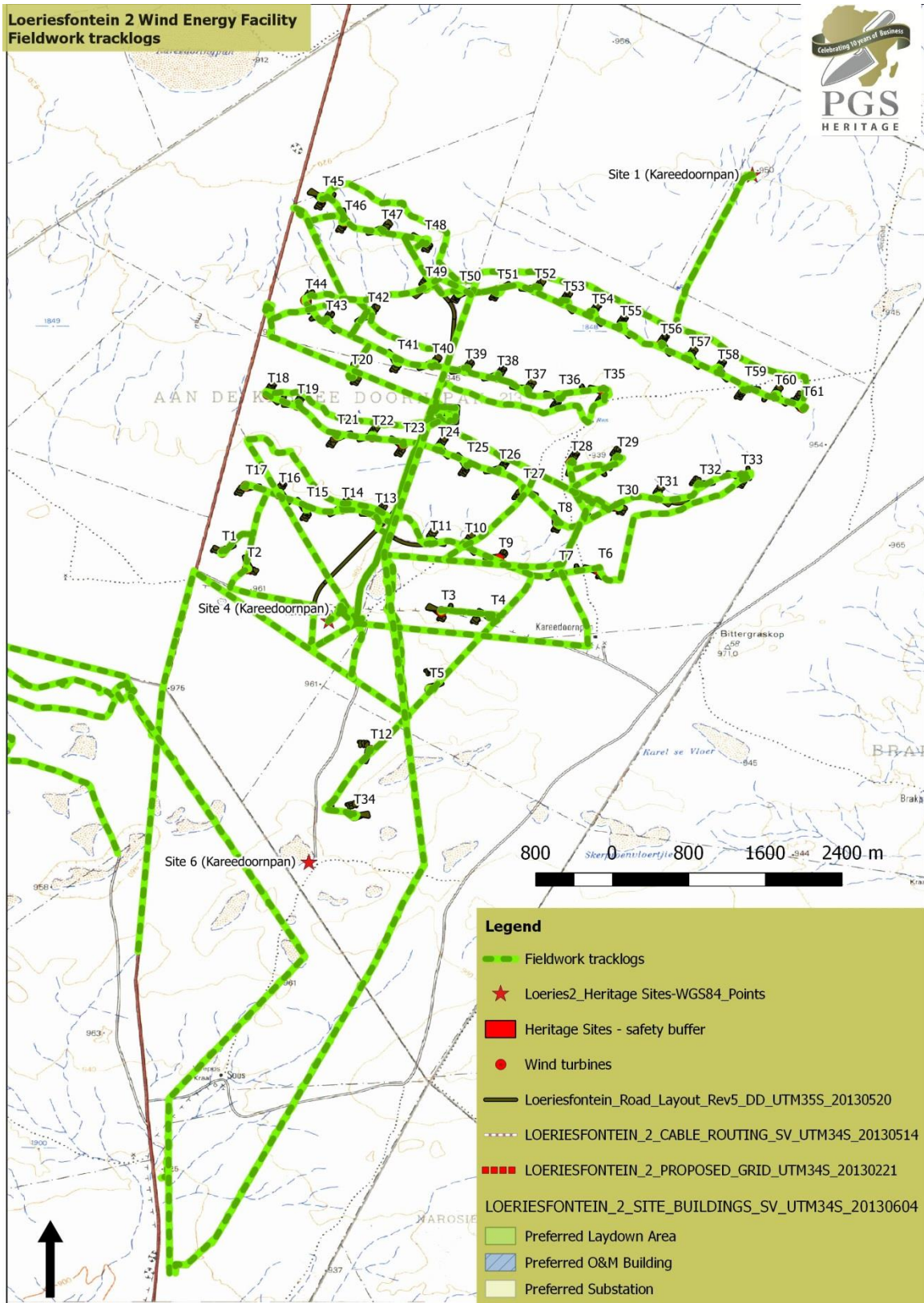
Fourie, W. 2008. Archaeological Impact Assessments within South African Legislation. South African Archaeological Bulletin, 63(187), pp. 77-85.

The Institute of Field Archaeologists, 2001. STANDARD AND GUIDANCE - for an archaeological watching brief. United Kingdom

Van Schalkwyk, J.A. 2011. Heritage Impact Assessment for the Proposed Establishment of a Wind Farm and PV Facility by Mainstream Renewable Power in the Loeriesfontein Region, Northern Cape Province.

Appendix A

Field work maps



APPENDIX B
HERITAGE ASSESSMENT METHODOLOGY

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

The Heritage Management Plan (HMP) report to be compiled by PGS Heritage (PGS) for the proposed Noupport WEF Utilised the following criteria in evaluation of the heritage resources identified during the HWD.

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

- **site integrity** (i.e. primary vs. secondary context),
- **amount of deposit, range of features** (e.g., stonewalling, stone tools and enclosures),
 - Density of scatter (dispersed scatter)
 - Low - <10/50m²
 - Medium - 10-50/50m²
 - High - >50/50m²
- **uniqueness** and
- **potential** to answer present research questions.

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

A - No further action necessary;

B - Mapping of the site and controlled sampling required;

C - No-go or mitigation

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

E - Preserve site

- Site Significance

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

Table 1: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	Grade 4A	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	Grade 4B	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	Grade 4C	Low Significance	Destruction