



## **SiVEST SA (PTY) LTD**

**PROPOSED CONSTRUCTION OF THE HEUWELTJIES  
WIND ENERGY FACILITY, NEAR BEAUFORT WEST,  
WESTERN CAPE PROVINCE, SOUTH AFRICA**

# Archaeological Impact Assessment

<b>DFFE Reference:</b>	TBA
<b>Report Prepared by:</b>	<b>PGS Heritage Pty Ltd</b>
<b>Issue Date:</b>	9 December 2022
<b>Version No.:</b>	0.3

### **Declaration of Independence**

- I, Nikki Mann, declare that –
- General declaration:
- I act as the independent heritage practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting heritage impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

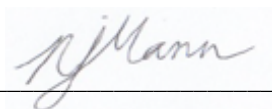
### **Disclosure of Vested Interest**

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

**HERITAGE CONSULTANT:** PGS Heritage (Pty) Ltd

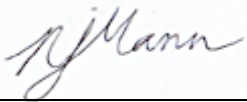

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**SIGNATURE:**



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### ACKNOWLEDGEMENT OF RECEIPT

<b>Report Title</b>	PROPOSED CONSTRUCTION OF THE OF THE HEUWELTJIES WIND ENERGY FACILITY, NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE, SOUTH AFRICA		
<b>Control</b>	<b>Name</b>	<b>Signature</b>	<b>Designation</b>
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*PGS confirms that this HIA report is done in accordance with the QMS implemented by PGS Heritage. The report structure and format followed is that of SIVEST Environmental as per the appointment scope and deliverable of SIVEST. The authors did implement the PGS HIA SOP and requirements*

# **SiVEST SA (PTY) LTD**

## **PROPOSED CONSTRUCTION OF THE HEUWELTJIES WIND ENERGY FACILITY, NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE, SOUTH AFRICA**

### **ARCHAEOLOGICAL IMPACT ASSESSMENT**

#### **EXECUTIVE SUMMARY**

PGS Heritage (Pty) Ltd (PGS) has been appointed by SiVest (PTY) Ltd (hereafter referred to as “SiVEST”), on behalf of South African Mainstream Power Developments (Pty) Ltd (hereafter referred to as “Mainstream”), to assess the proposed construction of the 240MW Heuweltjies Wind Energy Facility (WEF) near Beaufort West in the Western Cape Province of South Africa.

#### **1. SITE NAME**

The Heuweltjies WEF and associated infrastructure.

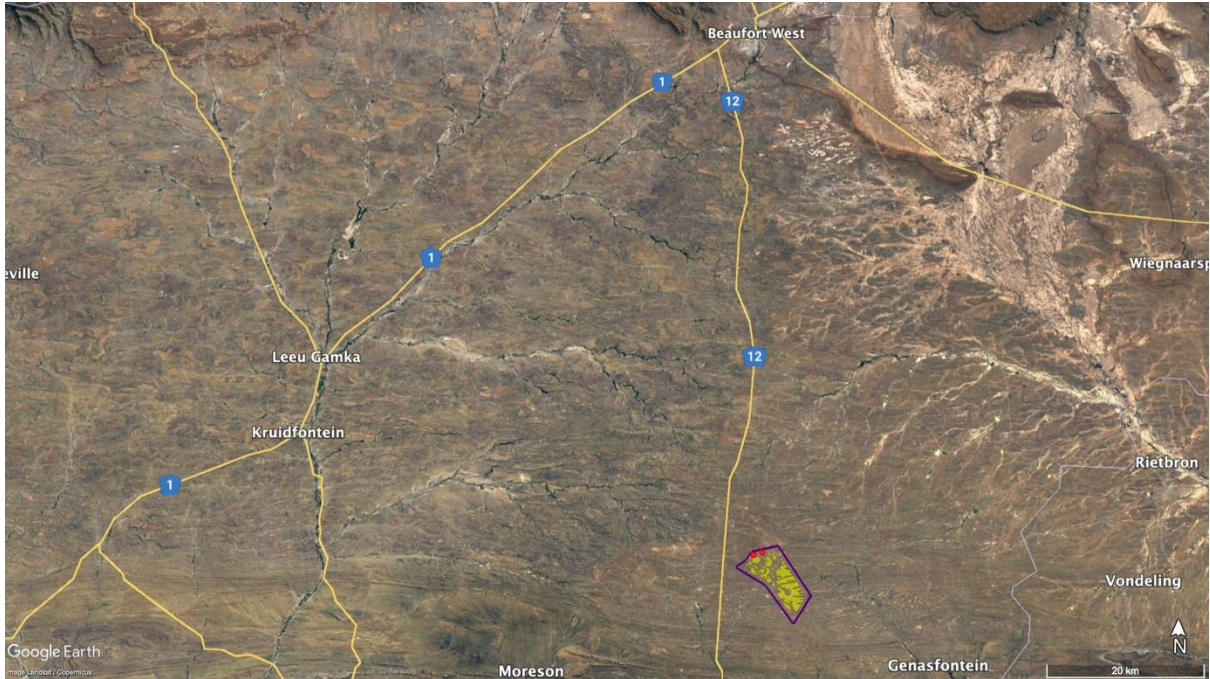
#### **2. LOCATION**

The proposed WEF is located approximately 70km south of Beaufort West in the Western Cape Province. It is within the Prince Albert Local Municipality, in the Central Karoo District Municipality (**Figure 1**).

The WEF application site is approximately 4017.6 hectares (ha) in extent and incorporates the following farm portions:

- Remainder of the Farm Witpoortje No 16
- Portion 8 Of The Farm Klipgat No 114

A smaller buildable area (1673 ha) has however been identified as a result of a preliminary suitability assessment undertaken by Mainstream and this area is likely to be further refined with the exclusion of sensitive areas determined through various specialist studies being conducted as part of the EIA process.

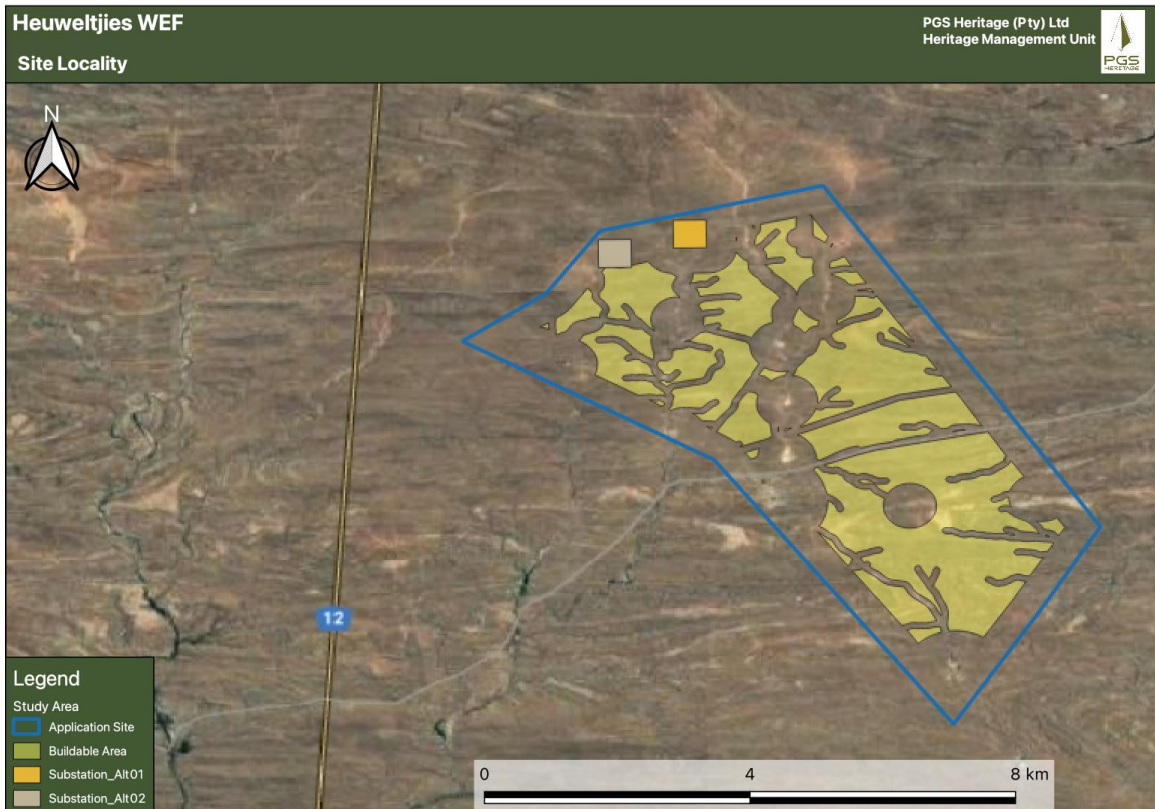


**Figure 1: Locality of Heuweltjies study area.**

### **3. DESCRIPTION OF THE PROPOSED DEVELOPMENT**

It is anticipated that the proposed Heuweltjies WEF will comprise of up to sixty (60) wind turbines with a maximum total energy generation capacity of up to approximately 240MW (**Figure 2**). The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line.

The 132kV overhead power line will however require a separate EA and will be subject to a separate Basic Assessment (BA) process, which will be undertaken in parallel to the EIA process as far as possible. A BESS will be located next to the onsite 11-33/132kV substation.



**Figure 2: Proposed layout and development area for Heuweltjies WEF and associated infrastructure.**

#### **4. HERITAGE RESOURCES IDENTIFIED**

A selective survey of the study area was conducted in February 2021. Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

##### **Archaeology, built environment and burial grounds and graves**

The fieldwork conducted for the evaluation of the possible impact of the new Heuweltjies WEF has revealed the presence of twenty-seven (27) heritage resources.

##### *Burial Grounds and graves*

Two (2) burial grounds (**H006, H016**) were rated as having high heritage significance.

##### *Historical structures*

Five (5) structures (**H001, H002, H008, H014, H014/1**) were rated as having medium heritage significance and three (3) structures (**H007, H015, H017**) were rated as having low heritage significance.

### *Archaeological features*

Three (3) Stone Age sites (**H013, H013/1, H013/3**) were rated as having medium heritage significance.

Fourteen (14) find spots (**H003-5, H009-12, H018-24**) comprise a number of low-density Stone Age surface artefact scatters and were rated as having low heritage significance. These are primarily from the Middle Stone Age (MSA), although both the Later Stone Age (LSA) and earlier Early Stone Age (ESA) material were identified. All of these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region.

## **5. ANTICIPATED IMPACTS ON HERITAGE RESOURCES**

The pre-construction and construction phase of the proposed WEF will entail extensive surface clearance as well as excavations into the superficial sediment cover and underlying bedrock (e.g. for widened or new access roads, wind turbine foundations, hardstanding areas, on-site substation, underground cables, construction laydown area, O&M building and BESS). The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall **MODERATE NEGATIVE** rating but with the implementation of the recommended buffers and management guidelines will be reduced to a **LOW NEGATIVE** impact.

## **6. RECOMMENDATIONS**

The calculated impact as summarised in **Section 9** of this report confirms the impact of the new Heuweltjies WEF will be reduced with the implementation of the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources.

An assessment of the final footprint of the new Heuweltjies WEF must be conducted with the final walkdown of the area during the finalization of the Layout and EMPr.

### **The following mitigation measures will be required:**

- An archaeological walk down of the final approved layout will be required before construction commences;
- 50m buffer zones around grave sites (**H006, H016**)
- 30m buffer zone around farmsteads (**H001, H002, H008, H014 (H014/1)**)
- 30m buffer zone around historical structures (**H007, H015, H017**)
- 30m buffer zones around Stone Age sites with a medium heritage significance (**H013, H013/1, H013/3**)

- If significant Stone Age sites (medium heritage significance or higher) can't be avoided, then sites must be sampled by a qualified specialist under a permit issued by HWC.
- A heritage management plan for the heritage resources and a grave management plan needs to be compiled and approved for implementation during construction and operations of the project.
- A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation.

## **General**

In the event that heritage resources are discovered during site clearance, construction activities must stop in the vicinity, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.

The overall impact of the Heuweltjies WEF, on the heritage resources, is seen as acceptably **low** after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be granted environmental authorisation.



**NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) - REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)**

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page ii of Report- Contact details and company  Section 1.2 and <b>Appendix A</b>
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page ii
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1
(cA) an indication of the quality and age of base data used for the specialist report;	Section 2, 6 and 7
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 8, 9 and 10
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 2 and 6
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 2
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 7 and 8
g) an identification of any areas to be avoided, including buffers;	Section 8 and 12
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	<b>Figure 19, Figure 20, Figure 21, Section 8</b>
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	Executive Summary and Section 9, 10, 11
k) any mitigation measures for inclusion in the EMPr;	Section 8, 11 and 12
l) any conditions for inclusion in the environmental authorisation;	Section 8, 11 and 12
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 8, 11 and 12
n) a reasoned opinion-	Executive Summary; Section 12

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
i. (as to) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMP, and where applicable, the closure plan;	
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	
q) any other information requested by the competent authority.	
2) Where a government notice <i>gazetted</i> by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	NEMA Appendix 6 and GN648

## SiVEST SA (PTY) LTD

# PROPOSED CONSTRUCTION OF THE HEUWELTJIES WIND ENERGY FACILITY, NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE, SOUTH AFRICA

## Archaeological Impact Assessment

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## Glossary of Terms

### **Archaeological resources**

This includes:

- 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;
- 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;
- 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 and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

## **Holocene**

The most recent geological time period which commenced 20 000 years ago.

## **Late Stone Age**

The archaeology of the last 30 000 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 20 000-300 000 years ago, associated with early modern humans.

## **Heritage Site**

Site in this context refers to an area place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.



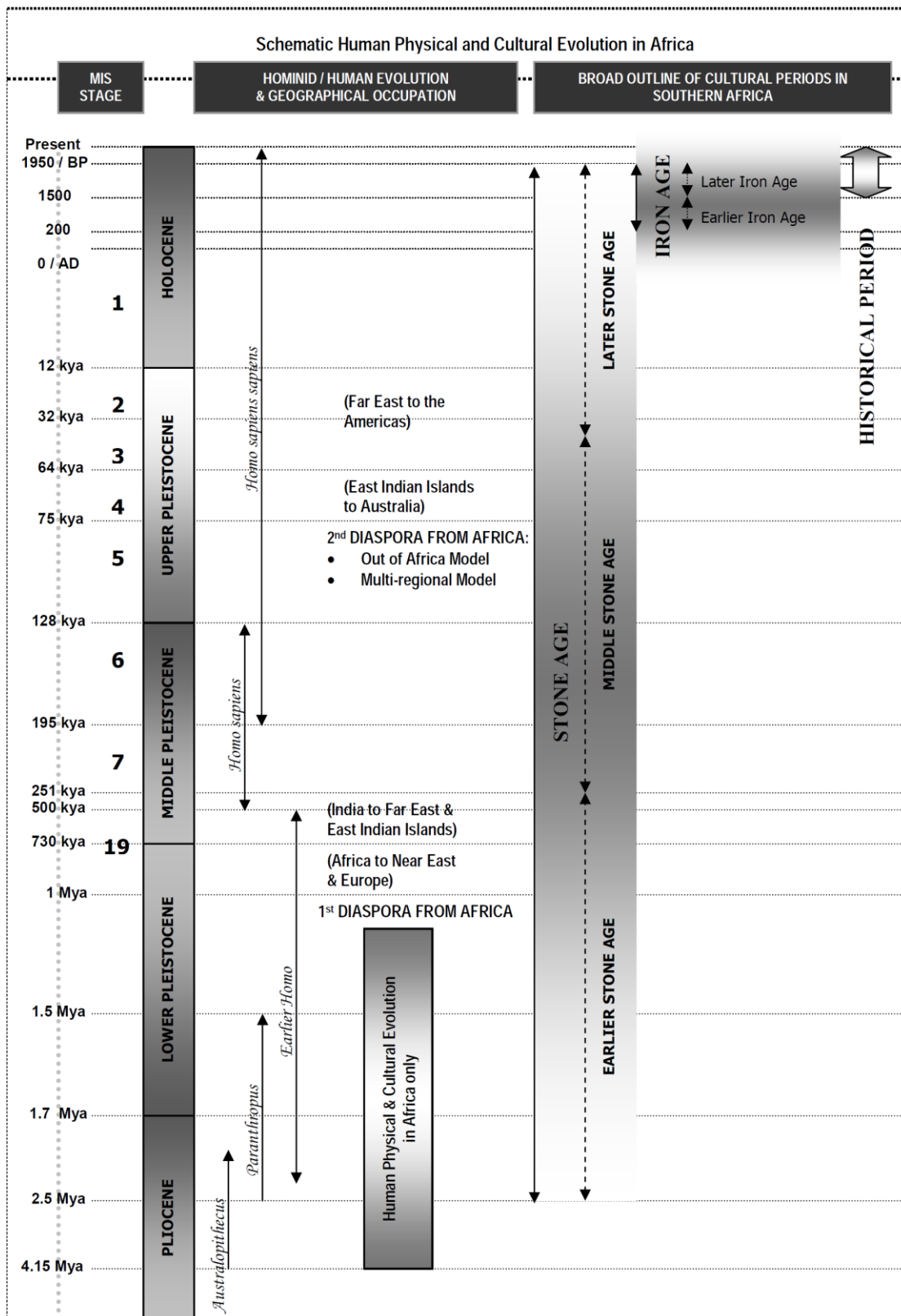


Figure 3: Human and Cultural Timeline in Africa (Morris, 2008).

List of Abbreviations

<b>Abbreviations</b>	<b>Description</b>
AIA	Archaeological Impact Assessment
APHP	Association of Professional Heritage Practitioners
ASAPA	Association of South African Professional Archaeologists
BESS	Battery Energy Storage System
CRM	Cultural Resource Management
DFFE	Department of Forestry, Fisheries and Environment
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GN	Government Notice
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
Mainstream	South African Mainstream Power Developments (Pty) Ltd
MSA	Middle Stone Age
MIA	Middle Iron Age
NCA	National Competent Authority
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
O&M	Operation and Maintenance
PGS	PGS Heritage (Pty) Ltd
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SIVEST	SiVEST (PTY) Ltd
WEF	Wind Energy Facility



heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Wouter Fourie, the Project Coordinator, is registered with the ASAPA as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

Ms. Nikki Mann, the author of this report, graduated with her Master's degree (MSc) in Archaeology and is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA).

Ruan van der Merwe, field archaeologist holds a BA (Hons) in Archaeology.

Wynand van Zyl, field archaeologist holds a BA (Hons) in Archaeology.



Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 1** and **Table 2**).

**Table 1: Rating system for archaeological resources**

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by HWC. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

**Table 2: Rating system for built environment resources**

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province	May be declared as a Provincial Heritage Site managed by HWC.	Exceptionally High Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House		
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or other cultural significance



### 3. ASSUMPTIONS AND LIMITATIONS

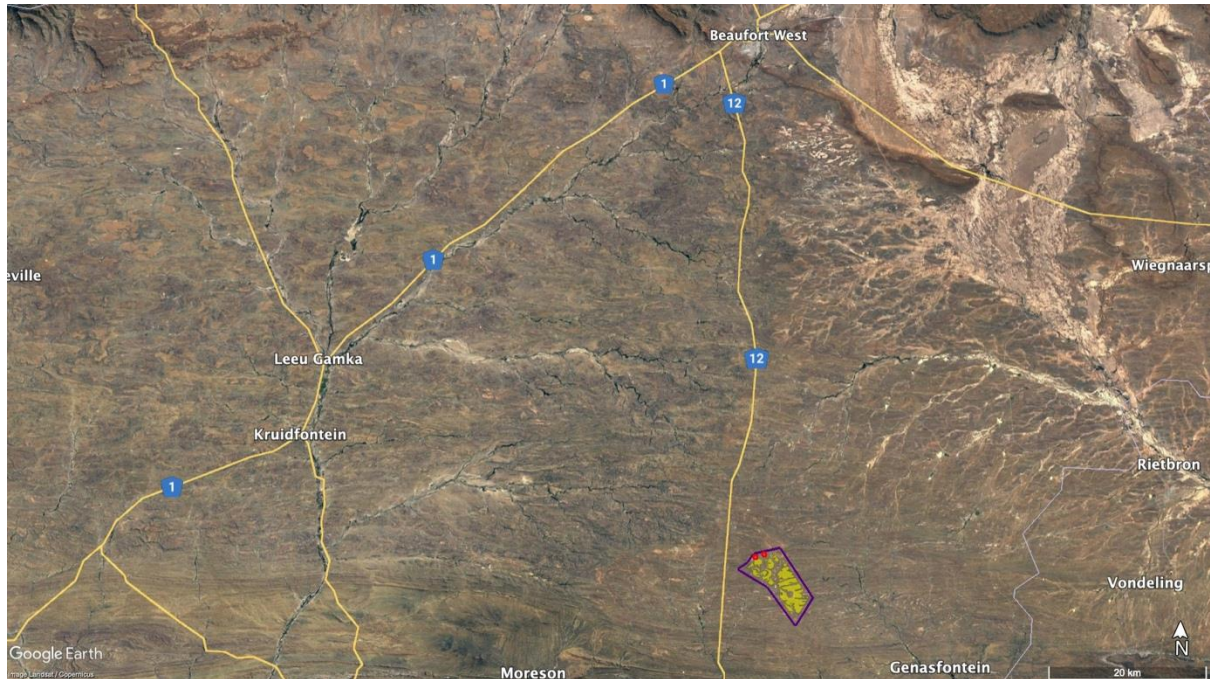
Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out in **Section 5**.

## 4. TECHNICAL DESCRIPTION

### 4.1 Project Location

The proposed WEF and associated infrastructure is located approximately 70km south of Beaufort West in the Western Cape Province and is within the Prince Albert Local Municipality in the Central Karoo District Municipality (**Figure 4**).



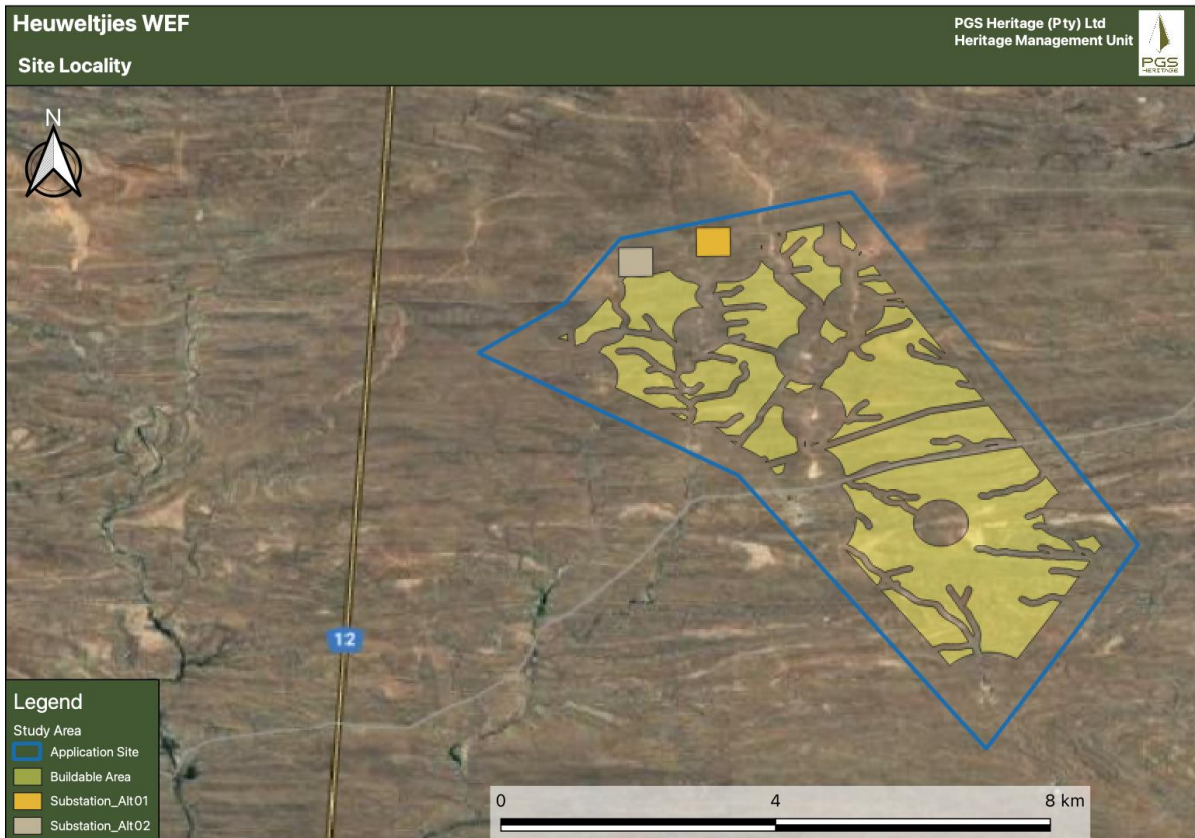
**Figure 4: Regional Context Map.**

#### 4.1.1 WEF

The WEF application site, as shown on the locality map below (**Figure 5**) is approximately 4017.6 hectares (ha) in extent and incorporates the following farm portions:

- Remainder of the Farm Witpoortje No 16
- Portion 8 of the Farm Klipgat No 114

A smaller buildable area (1673 ha) has however been identified as a result of a preliminary suitability assessment undertaken by Mainstream and this area is likely to be further refined with the exclusion of sensitive areas determined through various specialist studies being conducted as part of the EIA process.



**Figure 5: Heuweltjies WEF Site Locality.**

## 4.2 Project Description

It is anticipated that the proposed Heuweltjies WEF will comprise of maximum of up to sixty (60) wind turbines with a maximum total energy generation capacity of up to approximately 240MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line. The 132kV overhead power line will however require a separate EA and is subject to a separate BA process, which is currently being undertaken in parallel to this EIA process.

### 4.2.1 Wind Farm Components

- Up to sixty (60) wind turbines, with a maximum export capacity of approximately 240MW. This will be subject to allowable limits in terms of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The final number of turbines and layout of the WEF will, however, be dependent on the outcome of the Specialist Studies conducted during the EIA process;
- Each wind turbine will have a hub height of between 120m and 200m and rotor diameter of up to approximately 200m;
- Permanent compacted hard standing areas / platforms (also known as crane pads) of approximately 90m x 50m (total footprint of approx. 4 500m<sup>2</sup>) per turbine during construction and for on-going maintenance purposes for the lifetime of the proposed development;
- Each wind turbine will consist of a foundation of up to approximately 15m x 15m in diameter. In addition, the foundations will be up to approximately 3m in depth;



## 4.3 Alternatives

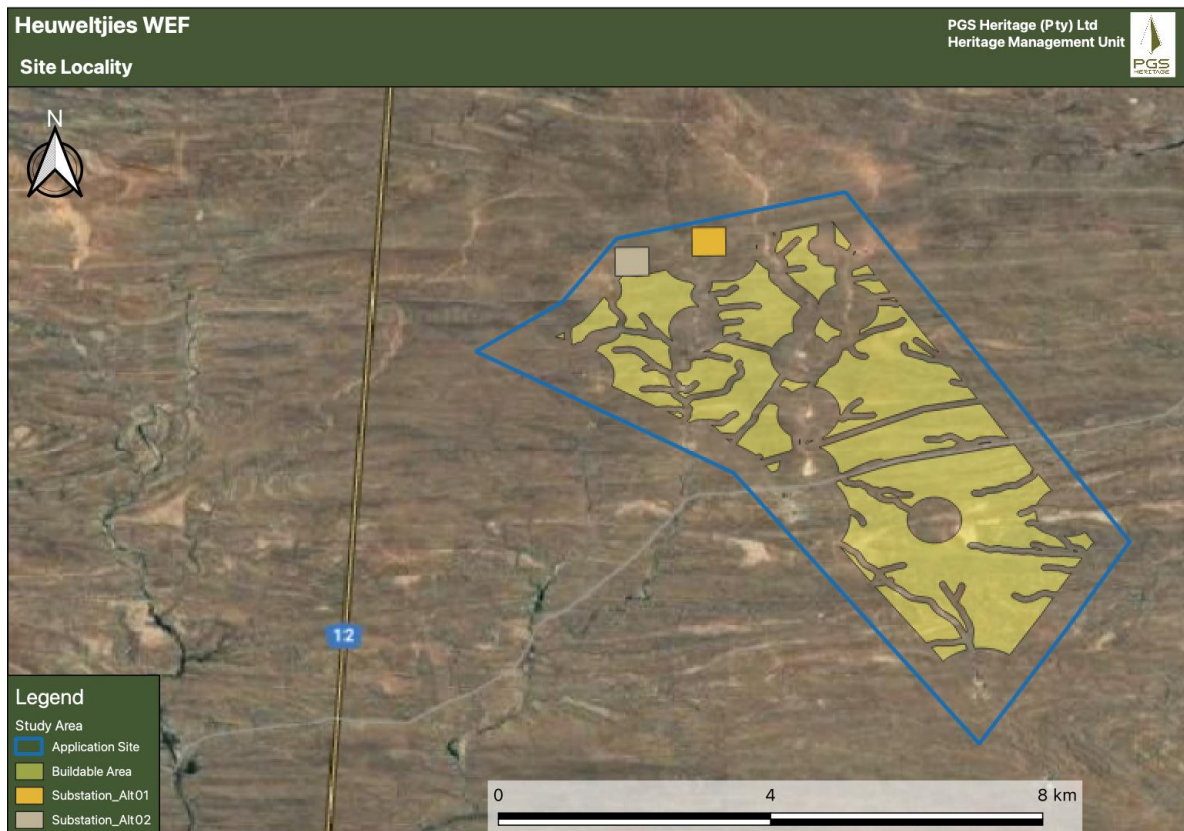
### 4.3.1 Wind Energy Facility

No other activity or site alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view and a wind energy facility is considered suitable for this site due to the high wind resource in this area.

The choice of technology selected for the Heuweltjies WEF is based on environmental constraints and technical and economic considerations. No other technology alternatives are being considered as wind energy facilities are more suitable for the site than other forms of renewable energy due to the high wind resource.

The size of the wind turbines will depend on the development area and the total generation capacity that can be produced as a result. The choice of turbine to be used will ultimately be determined by technological and economic factors at a later stage.

Design and layout alternatives will be considered and assessed as part of the EIA. These include alternatives for the Substation locations and also for the construction / laydown area. The proposed preliminary layout is shown in **Figure 6** below.



**Figure 6: Preliminary layout and development area**

#### 4.3.2 *No-go Alternative*

The 'no-go' alternative is the option of not undertaking the proposed WEF and associated infrastructure projects. Hence, if the 'no-go' option is implemented, there would be no development, and thus no associated environmental impacts on the site or the surrounding area. It provides the baseline against which other alternatives are compared and will be considered throughout the report.

## 5. LEGAL REQUIREMENT AND GUIDELINES

### 5.1 Statutory Framework: The National Heritage Resources (Act 25 of 1999)

The NHRA has applicability, as the study forms part of an overall HIA in terms of the provisions of Section 34, 35, 36 and 38 of the NHRA and forms part of a heritage scoping study that serves to identify key heritage resources, informants, and issues relating to the palaeontological, archaeological, built environment and cultural landscape, as well as the need to address such cases during the impact assessment phase of the HIA process.

#### 5.1.1 Section 35 – Archaeology, Palaeontology and Meteorites

According to Section 35 (Archaeology, Palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the NHRA, PIAs and AIAs are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistory and the historic period.

#### 5.1.2 Section 36 – Burial Grounds & Graves

A section 36 permit application is made to the Heritage Western Cape (HWC) or the competent provincial heritage authority which protects burial grounds and graves that are older than 60 years and must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. HWC must also identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the following conditions:

Permitting requirements for burial grounds and graves older than 60 years (prehistoric) and historic burials to the HWC:

- a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves.
- b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or





- The identification and mapping of heritage resources in the area affected.
- The assessment of the significance of such resources.
- The assessment of the impact of the development on the heritage resources.
- An evaluation of the impact on the heritage resources relative to sustainable socio/economic benefits.
- Consideration of alternatives if heritage resources are adversely impacted by the proposed development.
- Consideration of alternatives.
- Plans for mitigation in the future.

#### 5.1.4 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and paleontological (2012) assessments<sup>1</sup> were published by SAHRA and Heritage Western Cape<sup>23</sup>, GN.648 requires sensitivity verification for a site selected on the national web based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this Government Notice (GN) are listed in **Table 3** and the applicable section in this report noted. The screening tool indicated a **low** archaeological and cultural heritage significance (**Figure 7**).

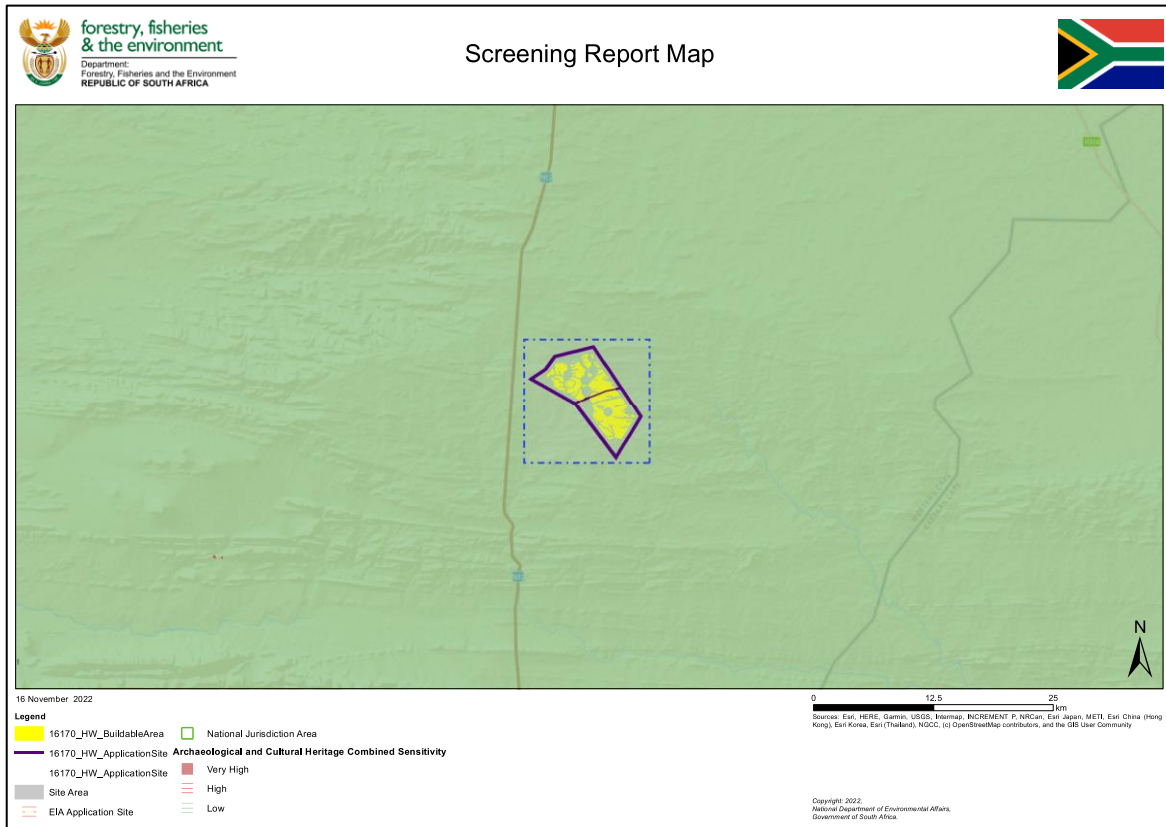
**Table 3: Reporting requirements for GN648**

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery;	Section 7	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	Section 6	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web- based environmental screening tool;	Section 6	-
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	Section 6 provides a description of the current use and confirms/doesn't confirm the status in the screening report.	-

<sup>1</sup> South African Heritage Resources Agency. 2007. *Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports*. May 2007.

<sup>2</sup> Heritage Western Cape. 2016. *Guide for Minimum Standards for Archaeology and Palaeontology Reports Submitted to Heritage Western Cape*. June 2016.

<sup>3</sup> Heritage Western Cape 2016. *Guidelines for Heritage Impact Assessments required in terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999)*.



**Figure 7: DFFE Screening tool outcome indicating low significance**

### 5.1.5 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) Appendix 6 requirements for specialist reports as indicated in the table on page vi and vii of this report.

## 6. DESCRIPTION OF THE RECEIVING ENVIRONMENT

A field survey was conducted by two archaeologists from PGS in February 2021. The general vicinity of the proposed development area was assessed.

The proposed development area is located approximately 70km south of the town of Beaufort West in the Western Cape Province. The study area is located within an arid and sparsely vegetated region of the Karoo which is currently experiencing a drought. This has resulted in farms in the area being restricted to farming small numbers of livestock which include Dorper sheep, cattle and game which include kudu, gemsbok and small buck.

The study area is underlain by Karoo Supergroup sedimentary rocks. Rock types encountered include hornfels, CCS (chert), mudstones, siltstone, carbonates and fine-grained sandstones, some of which have been silicified and metamorphosed. In terms of the topography, the study area comprises relatively flat portions of land which have undergone extensive erosion with the development of occasional scree slopes. There are also remnants of rocky ridges. The flat sandy plains (often bioturbated) with areas of sheet wash are frequently cut by ephemeral streams. The soils were predominately sandy with gravel and large rock fragments.

The vegetation of the study area is typical of the Nama-Karoo biome and comprises grasses, stunted shrubs and thorn trees which are established along stream courses (Palmer & Hoffman, 1997). Therefore, the archaeological visibility of the area was ideal for surveying.

The study area is serviced by the formal N12, graded gravel roads and farm tracks. Photographs of the general study area are provided below.



**Figure 8: General view of the topography of the study area.**



**Figure 9: General view of bioturbated rocky sands.**



**Figure 10: View of sparse vegetation within a deflation zone.**

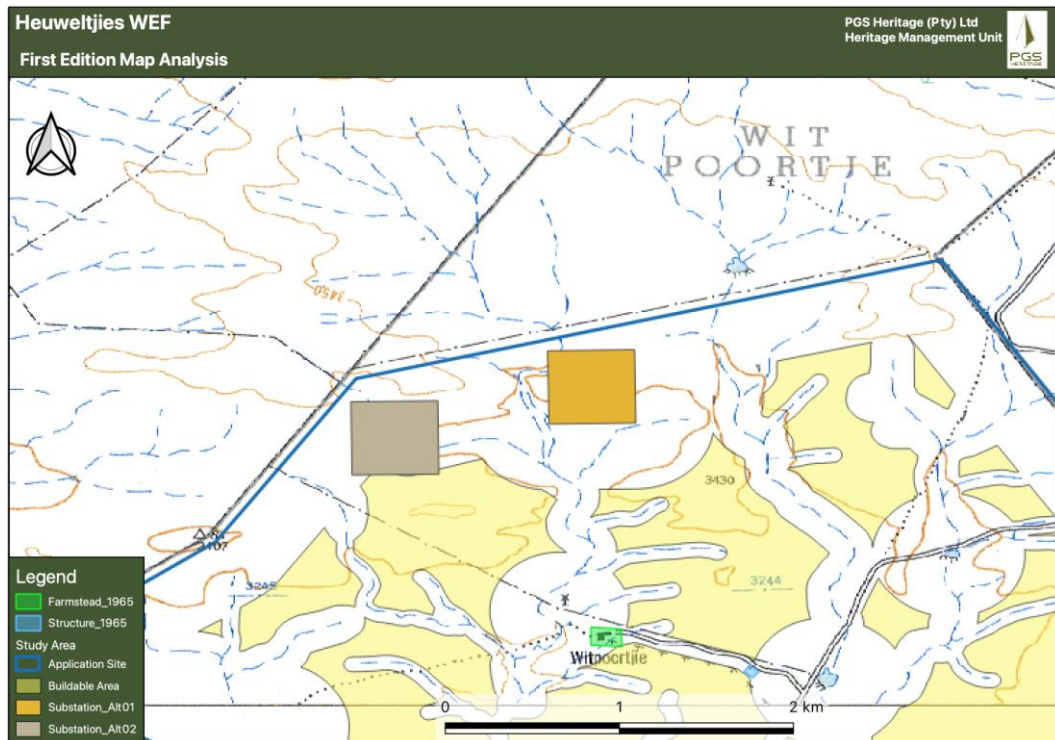


**Figure 11: View of a typical rocky ridge.**

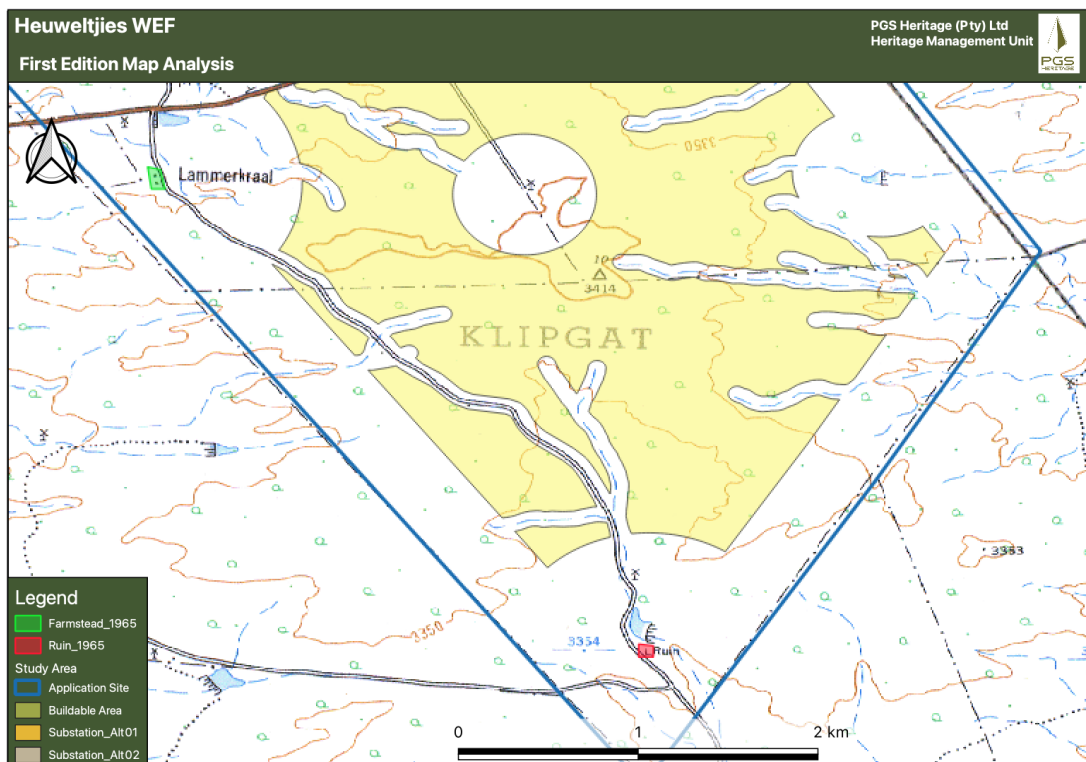


**Figure 12: General view of outwash plain.**





**Figure 13: First Edition of 3222DC Topographic Map 1: 50 000 dating to 1965, showing the proposed Heuweltjies WEF, with two possible heritage features (Farmstead: green polygon; structure: blue polygon) located within the project area.**



**Figure 14: First Edition of 3322BA Topographic Map 1: 50 000 dating to 1965, showing the proposed Heuweltjies WEF, with two possible heritage features (farmstead: green polygon; ruin: red polygon) located within the project area.**



## 7.2 Aspects of the area's history

### 7.2.1 Previous Heritage Studies in area

It is well known that the Karoo contains a long and rich archaeological record dating from the ESA to the historic period. However, vast areas of the region have yet to be subjected to systematic analytical research.

Scatters of ESA through to LSA artefacts have been widely reported in the general vicinity of Beaufort West. This is a result of the erosional nature of the environment, which tends to leave artefacts exposed on the surface rather than buried beneath layers of sediment. To date, heritage studies in the area have shown that these artefacts have occurred in secondary contexts, often associated with gravel deposits, having been subjected to erosion of the soils in which they were once deposited (Dreyer 2005; Halkett 2009; Kaplan 2006, 2007; Orton 2010; Webley & Hart 2010a, 2010b; Webley & Lanham 2011). Although context is generally poor, the Karoo is still regarded as a region that is very rich in archaeological and historical heritage.

Historical resources, such as farmsteads, kraals and graves, are also observed within the Beaufort West region (Halkett 2009; Webley & Hart 2010b). To the northeast of Beaufort West, rock engravings have been identified on dolerite boulders that are characteristic of parts of the Karoo (Orton, 2010; Parkington *et al.*, 2008). The lack of caves and rock shelters in the Karoo region, results in the majority of archaeological sites in the area being classified as open-air sites. As such, the artefacts are generally not *in-situ* and organic remains are rarely preserved.

A review of SAHRIS has revealed that a number of other archaeological studies have been performed within the wider vicinity of the study area. The following studies were conducted around the study area of this report:

- ***Cape Archaeological Survey (CAS) cc and Associates. 2016. Heritage Impact Assessment: Proposed Construction of Two Power Lines & Three Substations for the Mainstream Wind Energy Facility. Land Parcel Beaufort West, Remainder of Farm Trakaskuilen No 15, Portion 1 Trakaskuilen No 15, Portion 1 of Witpoortje No 16. CAS was appointed by SiVest Environmental Division on behalf of their client Mainstream Renewable Power South Africa (Pty) Ltd to conduct an AIA report. The study area was situated on the N12 between Beaufort West and Klaarstroom. Several MSA open sites, positioned on the summit areas of low rides and koppies, were identified. There was also a general background presence of MSA with occasional flakes or cores observed in the open. There was little evidence of LSA activity in the area. Most of the raw material used was a fine-grained chert with a reddish outer patina (grey when flaked). In terms of colonial period archaeology, there were several farm complexes with buildings, historic dumps and derelict structures. The area***

hadn't been systematically studied or researched, so the archaeological sensitivity of the proposed wind farm on archaeological features was seen as high.

- **Dreyer, C. 2005. Archaeological and historical investigation of the proposed residential developments at the farms Grootfontein 180 & Bushmanskop 302, Beaufort West, south-western Cape.** The study area is located approximately 20km west of Beaufort West. Scattered and isolated lithics were found in the area. A trihedra, Acheulian or Victoria West I handaxe, a bifacial worked Oldowan chopper with minimal retouch, a number of isolated flakes and core flakes and several small assemblages of LSA scrapers were identified. On the flood plain near the Sand River, fragments of ostrich eggshell and one single ostrich eggshell bead were also identified.
- **Fourie, W. 2018. AIA: Proposed Construction of a Linking Station, two (2) Power Lines and two (2) On-site Substations for the Beaufort West and Trakas Wind Farms, near Beaufort West in the Western Cape Province.** PGS Heritage (Pty) Ltd (PGS) was appointed by SiVEST to undertake an Archaeological Impact Assessment (AIA). The study area was located approximately 50km south of Beaufort West. Two archaeological sites and seven findspots were identified. The archaeological resources identified during the fieldwork comprised a large number of Stone Age surface artefact scatters. These were primarily from the MSA, although both LSA and earlier ESA material was identified. All of these artefact assemblages occurred in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered.
- **Halkett, D. 2009. An archaeological assessment of uranium prospecting on portions 1, 3 and 4 of the farm Eerste Water 349, and remainder of the farm Ryst Kuil 351, Beaufort West.** ACO Associates was appointed by Ferret Mining and Environmental Services (Pty) Ltd to undertake a scoping survey. Heritage sites were quite sparse in the area. Pre-colonial stone age sites (ESA, MSA and LSA) and colonial sites related to farming and settlement (incl. cemeteries, small ruined dwellings, stone kraal, fragments of annular ware and transfer printed refined earthenware ceramics) were identified. There were patinated and polished ESA/MSA artefacts made of hornfels and siltstone. LSA material is rarer but one scatter of LSA material was identified in close proximity to a dry river course.
- **Kinahan, J. 2008. Archaeological Baseline Survey of the Proposed Ryst Kuil Uranium Project.** Kinahan was appointed by Turgis Consulting (Pty) Ltd on behalf of UraMin-Mago-Lukisa JV Company (Pty) Ltd to conduct an archaeological baseline survey. The study area was located approximately 45km southeast of Beaufort West. In general, the study area was characterised by a low density of surface material, with much displacement by sheet erosion. None of the ESA material (isolated quartzite artefacts) were in-situ as all showed evidence of fluvial transport. Isolated MSA finds were observed. These finds probably formed part of a continuous surface scatter but lateral disturbance may have greatly exaggerated the distribution and number of these sites. The lack of focal points in the landscape means that there were no major MSA site concentrations. MSA artefacts were dominated by quartzite and hornfels. There was also some evidence of Levallois core production and a few Howieson's

Poort segments found at a number of sites. Isolated and local scatters of LSA materials were also apparent. A number of these sites were associated with lithic raw material sources (chert and hornfels outcrops). Late pre-colonial sites included a number of suspected hut circles and short lengths of stone walling, as well as possible burial cairns. Historic stone structures (dry-stone construction and mud-brick construction) along with imported items (crochery and rifle cartridges) were also noted.

- **Nilssen, P. 2011. Archaeological Impact Assessment. Proposed Beaufort West Photovoltaic (Solar) Park: southern portion of properties; 2/158 Lemoenkloof, RE 9/161 Kuilspoor, RE 162 Suid-lemoensfontein and RE 1/163 Bulskop, Beaufort West, Western Province.** The study area was approximately 8km south east of Beaufort West. The finds included numerous isolated and very low-density scatters of Stone Age artefacts ranging in age from the ESA to the LSA. Due to their temporally mixed nature and the absence of other faunal/cultural remains, these finds were considered to be of low heritage significance. There were also several archaeological occurrences that represented isolated events that were recorded as medium to high heritage significance.
- **Orton, J. 2011. Heritage Impact Assessment for a proposed Photo-Voltaic Facility on Steenrots Fontein 168/1, Beaufort West Magisterial District, Western Cape. University of Cape Town: Archaeology Contracts Office.** The UCT Archaeological Contracts Office was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct a HIA. Most of the archaeological material was likely MSA (background scatters) and the artefacts were generally weathered. Historical material included fragments of a bottle and fragments of an annular ware bowl. All of the finds were recorded as low significance.
- **Webley, L. & Halkett, D. 2015. Archaeological Impact Assessment: Proposed Uranium Mining and Associated Infrastructure on Portions of the Farms Quaggasfontein and Rystkuil\* near Beaufort West in the Western Cape and De Pannen near Aberdeen in the Eastern Cape.** Webley and Halkett were appointed by Ferret Mining & Environmental Services (Pty) Ltd, on behalf of a client, to conduct an AIA report. Archaeological material comprised small numbers of ESA artefacts, scatters of MSA and occasional LSA. The majority were manufactured on indurated shales (hornfels) and some artefacts were manufactured from a chert band. Artefact numbers were very low and of low significance. One LSA site, Site D009, was located on the banks of a little stream. Amongst the identified lithics, was a characteristic LSA drill and thumbnail scraper.
- **Webley, L. & Lanham, J. 2011. Heritage Assessment of the Proposed upgrade to the stormwater retention facilities at Beaufort West, Western Cape.** Archaeology Contracts Office (ACO) were appointed by Kayad Knight Piesold (Pty) Ltd to conduct a heritage impact assessment. No heritage resources were identified.
- **Vidamemoria Heritage Consultants. 2015. Heritage Impact Assessment: DR 2403 Central Karoo, Beaufort West – Central Karoo District Municipality, Western Cape.** Vidamemoria was appointed by Aurecon South Africa (Pty) Ltd to conduct a HIA for a proposed borrow pit.

The study area was located approximately 44.5km southeast of Murraysburg. No heritage resources were identified.

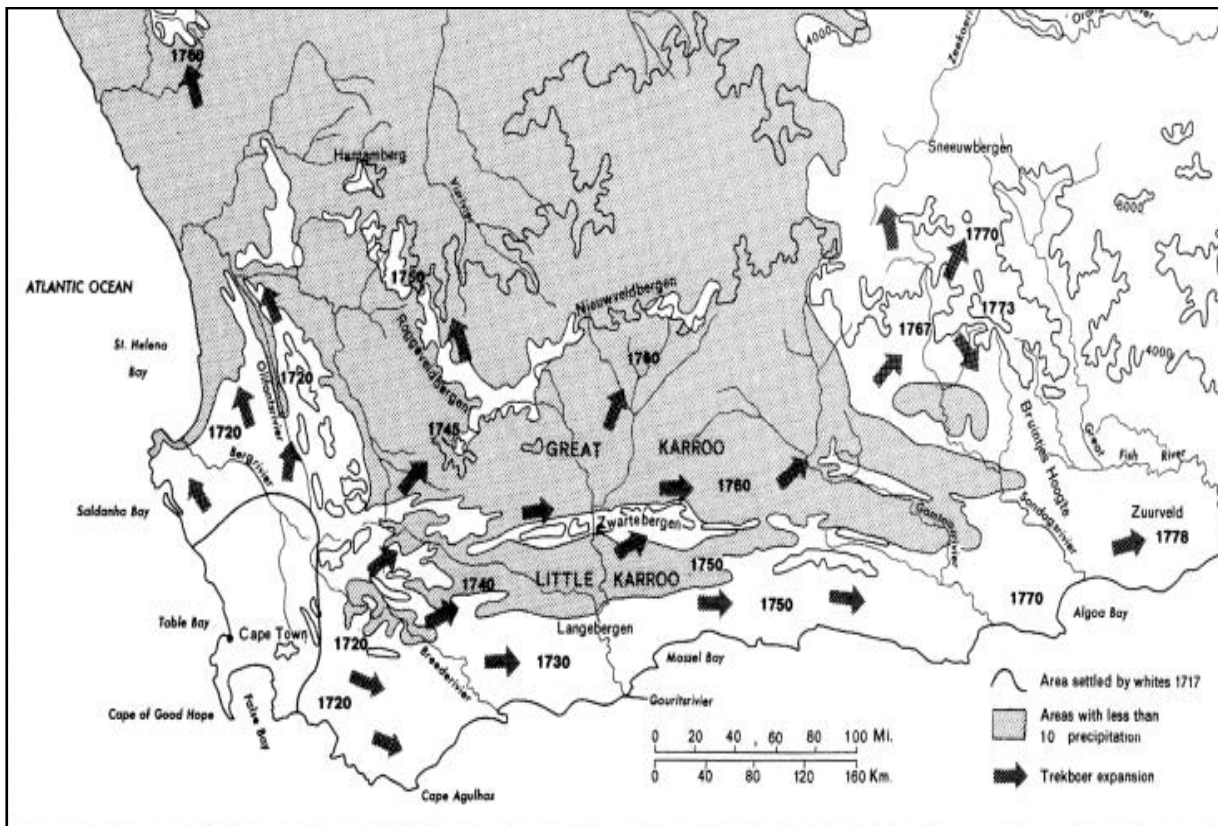
- **Vidamemoria Heritage Consultants. 2012. Heritage Impact Assessment: DR 2308 Central Karoo, Beaufort West – Central Karoo District Municipality, Western Cape.** Vidamemoria was appointed by Aurecon South Africa (Pty) Ltd to conduct a HIA for a proposed borrow pit. The study area was located approximately 40km southwest of Beaufort West. Low density scatters of mixed MSA and LSA artefacts were observed in a secondary context and were of low archaeological heritage significance.

### 7.2.2 Archaeological Background

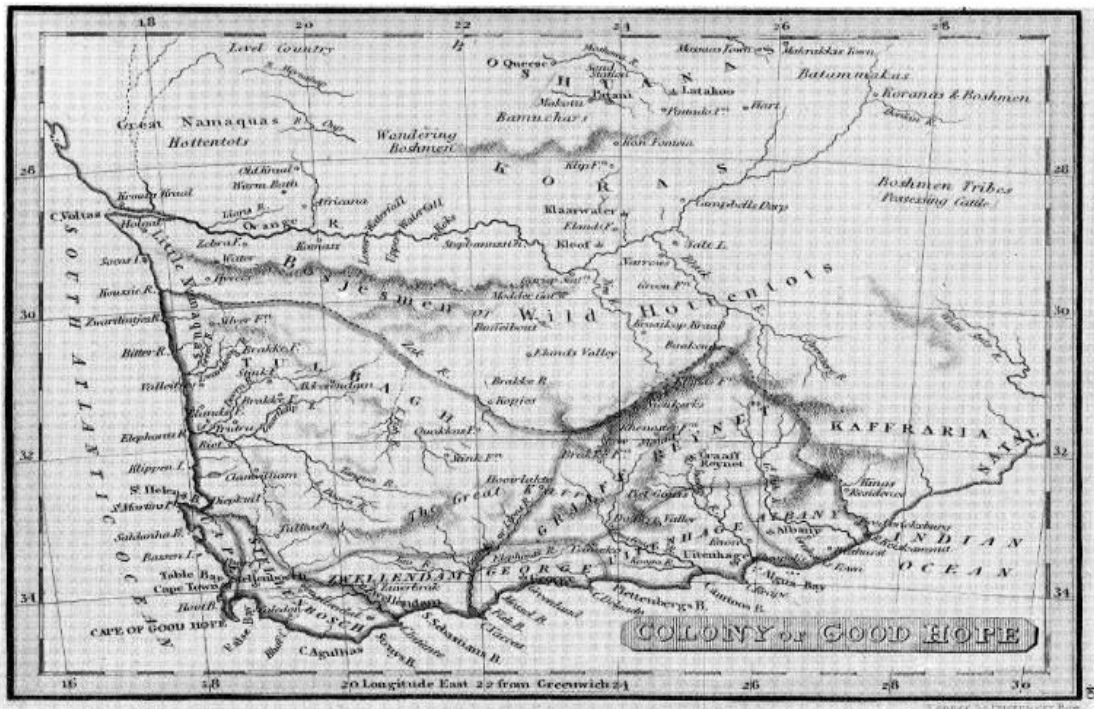
**Table 4: Summary of archival data found on the general area.**

DATE	DESCRIPTION
<p><b>Early Stone Age (2.5 million to 250 000 years ago)</b></p>	<p>The Earlier Stone Age (ESA) is the first phase identified in South Africa’s archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates to approximately 1.5 million years ago.</p> <p>Isolated ESA lithics, including occasional hand axes have been reported from the area surrounding Beaufort West, but they are generally quite ephemeral. Kinahan (2008) identified 7 ESA sites during an assessment of Ryst Kuil. He recorded isolated quartzite artefacts and commented that “none of the ESA material was considered to be in primary context and therefore of little research value”.</p> <p>No Early Stone Age sites are known within the immediate vicinity of the study area. However, this is probably due more to a lack of research on the surroundings of the study area rather than a lack of sites.</p>
<p><b>Middle Stone Age (250 000 to 40 000 years ago)</b></p>	<p>The Middle Stone Age (MSA) is the second oldest phase identified in South Africa’s archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called ‘prepared core’ technique.</p> <p>Within the region around Beaufort West, heritage reports have shown that MSA artefacts are widespread and occur in isolated as well as relatively dense concentrations over large areas. According to Kinahan (2008), the MSA sites in his assessment (Ryst Kuil) “probably formed part of a continuous surface scatter almost without focal points”. He noted that the MSA artefacts were mainly made from quartzite and hornfels.</p> <p>No Middle Stone Age sites are known within the immediate vicinity of the study area. However, this is probably due more to a lack of research on the surroundings of the study area rather than a lack of sites.</p>
<p><b>Later Stone Age (40 000 years ago to the historic past)</b></p>	<p>The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths.</p> <p>According to heritage reports conducted in the region, LSA artefacts are not as common as ESA and MSA stone artefacts in the area. Artefacts are generally made from hornfels</p>

DATE	DESCRIPTION
	<p>and in some cases chert which was most likely sourced from a chert horizon that caps some of the low hills in the area. LSA artefacts are generally located close to dry river courses (Kinahan, 2008; Halkett, 2009). There have also been hut circles and stone kraals identified which have been interpreted as representing pre-colonial pastoralist groups.</p> <p>No Later Stone Age sites are known in the vicinity of the study area. However, this is likely rather due to a lack of research focus on the surroundings of the study area than a lack of sites.</p>
<p><b>17<sup>th</sup> – 19<sup>th</sup> Century</b></p>	<p>Beaufort West historically was an important centre for sheep farming, trade and transport. This was also an area of interaction between various cultural groups.</p> <p>During the eighteenth and early nineteenth century the Koup was one of the last refuges of the San. A shortage of surface water meant that populations of San hunter-gatherers, and later Khoekhoe pastoralists were confined to areas with springs. During the second half of the 18th century, farmers started moving northward into the Karoo, settling in areas known as the Nuweveld and the Koup (<b>Figure 15, Figure 16</b>).</p> <p>The movement of small groups of Xhosa into the Karoo during the 18th century resulted from a century of frontier wars in the Eastern Cape. The movement of Xhosa into the Karoo accelerated after the great cattle killing of 1856 and 1857. Many Xhosa migrated into the Karoo in search of work to survive. Many of these migrants fleeing starvation in the devastated lands east of the Kei River helped build some of the beautiful stone kraals that have become a feature of the Karoo.</p>



**Figure 15: Trekkers and colonial expansion by 1717-1788 in the study region  
(Reference: Guelke & Shell 1992: 818).**



The Cape Colony, 1820

**Figure 16: Early map of the Cape illustrates the expansion of farmers towards the east and northeast Karoo (Reference: Watson, R.L. 1990).**

### 7.3 Findings of the historical desktop study

The findings can be compiled as follows and have been combined to produce a heritage sensitivity map for the project based on the desktop assessment (**Figure 17**).

#### 7.3.1 Heritage Screening

A Heritage Screening Report was compiled using the Department of Forestry, Fisheries and Environment National Web-based Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended. According to the Heritage screening report, the directly affected area has a low sensitivity rating (**Figure 7**).

The study area's field work demonstrates that historical heritage structures warrant conservation. The low rating as provided by the Environmental Screening Tool possibly reflects scarcity of heritage reports conducted in the region.

### 7.3.2 Heritage Sensitivity

The sensitivity maps were produced by overlying:

- Satellite Imagery;
- Current Topographical Maps;
- First edition Topographical Maps dating from the 1960's

This enabled the identification of possible heritage sensitive areas around the proposed development area that included:

- Structures/Buildings
- Archaeological Heritage sites

By superimposition and analysis, it was possible to rate these structure/areas according to age and thus their level of protection under the NHRA. Note that these structures refer to possible tangible heritage sites as listed in **Table 5**.

**Table 5: Tangible heritage sites in the study area**

Name	Description	Legislative protection
Architectural Structures/Dwellings	Possibly older than 60 years	NHRA Sect 3 and 34
Archaeological sites	Artefacts and/or structures/sites	NHRA Sect 3 and 35 and Sect 27

Observation of the previous heritage reports has shown that archaeological sites are in abundance in the surrounding areas and especially near certain landscape features. This factor needs to be held in consideration.

### 7.3.3 Possible Heritage Finds

The evaluation of satellite imagery and the analysis of the studies previously undertaken in the area has indicated that certain areas may be sensitive from a heritage perspective. Archaeological surveys and studies in the area have shown rocky outcrops, dry river beds, riverbanks and confluence to be prime localities for archaeological finds and specifically Stone Age sites (Kinahan, 2008; Halkett, 2009; Webley & Halkett, 2015).

The analysis of the studies conducted in the area assisted in the development of the following landform to heritage find matrix in **Table 6**. Dry river courses have been referenced as having possible heritage sensitivity within the study area (**Figure 17**). It must be noted that the proposed development layout for the most part has excluded river courses from the footprint.

**Table 6: Landform type to heritage find matrix**

<b>LAND FORM TYPE</b>	<b>HERITAGE TYPE</b>
Crest and foot hill	MSA scatters
Pans/ dry river courses	LSA/MSA scatters
Outcrops	Occupation sites dating to LSA
Farmsteads	Historical archaeological material





Figure 17: Possible heritage sensitivity areas: Structure (blue polygon), farmsteads (green polygons) and ruin (red polygon) within the Heuweltjies WEF study area.

## 8. FIELDWORK FINDINGS

A selective survey of the study area was conducted in February 2021. Due to the nature of cultural remains, with most artefacts occurring below surface, two archaeologists from PGS conducted a vehicle and foot-survey of the proposed development area. The fieldwork was logged with GPS devices to provide a tracklog of the area covered.

The fieldwork identified 27 heritage finds that were then classified as either find spots, structures (incl. historical farmsteads), burial grounds and graves. The fieldwork completed for the AIA component has confirmed the presence of 3 Stone Age sites (**H013, H013/1, H013/3**), 14 findspots (**H003-5, H009-12, H018-24**), 8 structures (**H001, H002, H007, H008, H014, H014/1, H015, H017**) and 2 burial ground sites (**H006, H016**) that may be affected by the proposed development.

**Section 8.1** describes the heritage resources identified within the WEF study area.

## 8.1 WEF Field Assessment

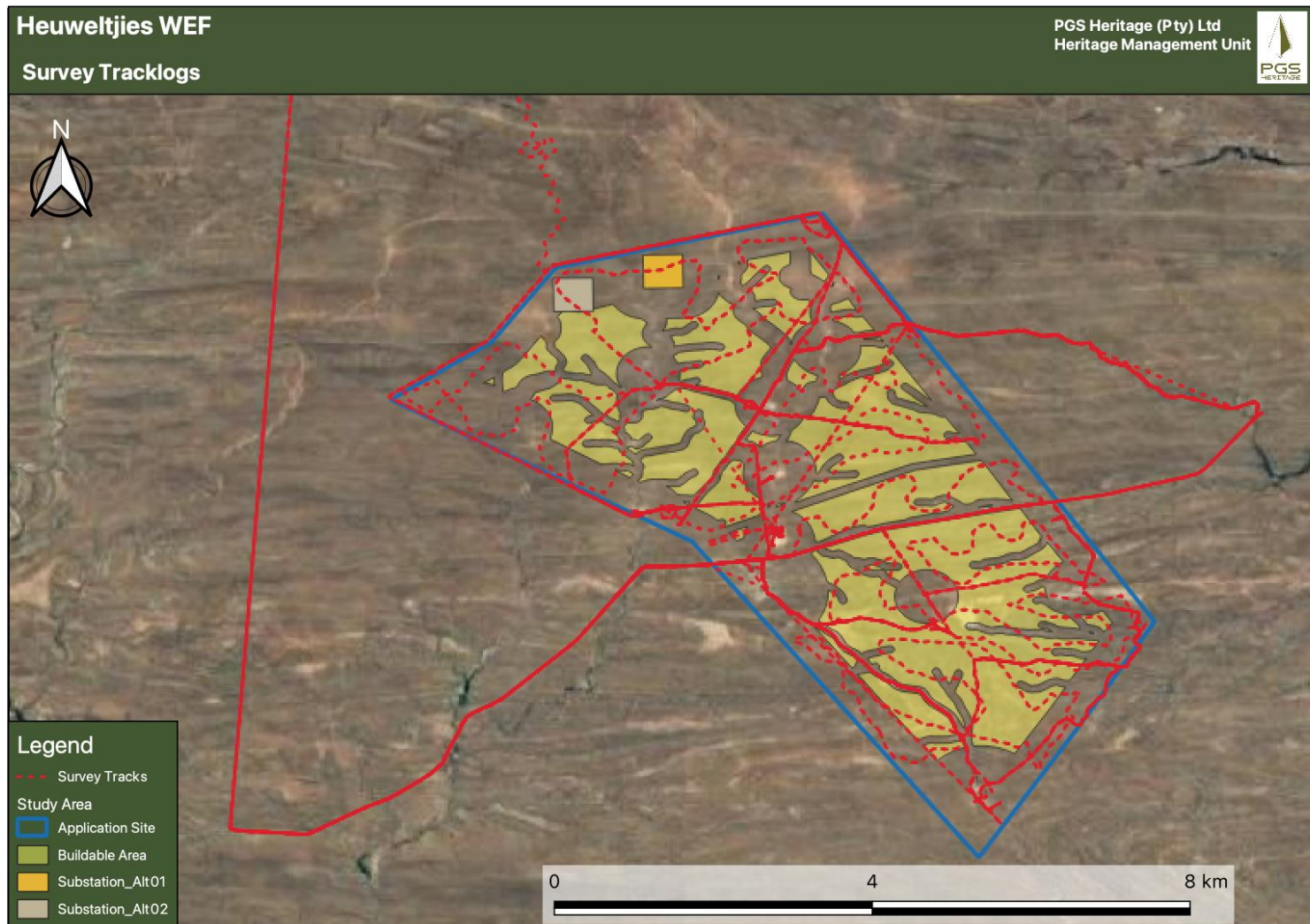


Figure 18: Track log recordings from the site visit to Heuweltjies WEF.

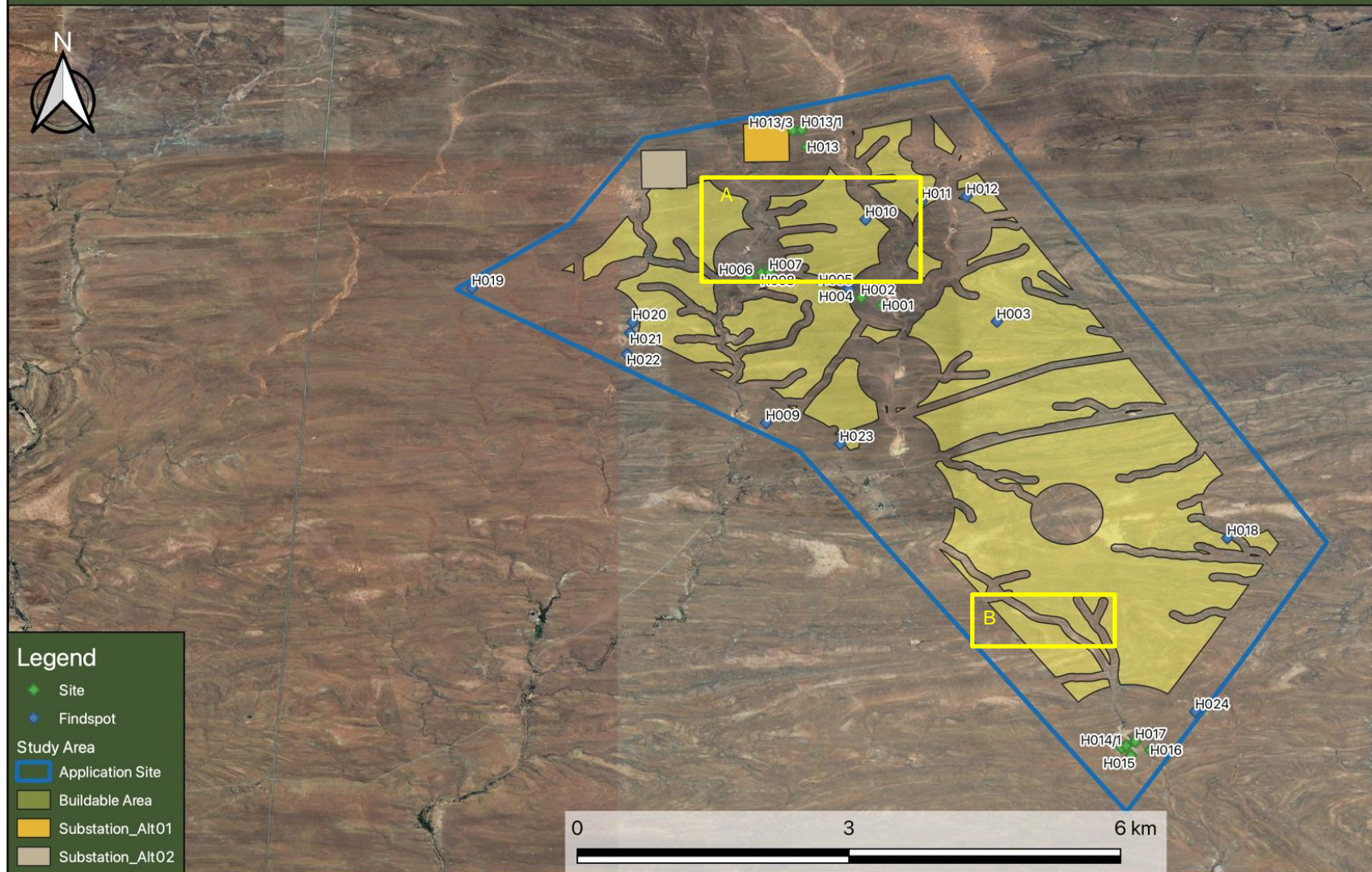


Figure 19: Locality of the heritage resources identified within the WEF study area. See insets A and B below.



Figure 20: Heuweltjies WEF. Inset A.



Figure 21: Heuweltjies WEF. Inset B.

### 8.1.1 Find spots

The fourteen (14) find spots (**Table 7**) were only documented where more than 5 identifiable modified lithics were observed within a 5-metre radius. Most of the find spots were found to coincide with ridges and sheet wash plains which were characterised by low density scatters of lithics consisting mainly of flakes, debitage and cores. This observation also correlates with the findings of the previous heritage studies undertaken in the Beaufort West region. Raw materials utilised included hornfels, silcrete, CCS (chert), silicified mudstone, silicified siltstone and quartzite. Mostly MSA flakes and debitage were identified, although some ESA and LSA artefacts were observed within the study area. Additionally, single isolated artefacts were also observed across portions of the study area.

**Table 7: Find spots identified within the WEF**

Site Number	Lat	Lon	Description	Sensitivity	Heritage Rating
H003	33°0'5.82"S	22°37'13.82" E	Low density LSA and MSA scatter	Low	NCW
H004	33°59'51.83" S	22°36'10.72" E	Low density LSA and MSA scatter	Low	NCW
H005	33°59'51.28" S	22°36'10.52" E	Low density LSA and MSA scatter	Low	NCW
H009	33°0'48.94"S	22°35'35.50" E	Low density LSA and MSA scatter	Low	NCW
H010	33°59'22.39" S	22°36'17.87" E	Low density LSA and MSA scatter	Low	NCW
H011	33°59'14.65" S	22°36'42.76" E	Low density LSA and MSA scatter	Low	NCW
H012	33°59'12.63" S	22°37'0.92"E	Low density LSA and MSA scatter	Low	NCW
H018	33°1'37.92"S	22°38'51.93" E	Low density LSA and MSA scatter	Low	NCW
H019	33°59'51.64" S	22°33'30.31" E	Low density LSA and MSA scatter	Low	NCW
H020	33°0'6.14"S	22°34'38.73" E	Low density LSA and MSA scatter	Low	NCW
H021	33°0'10.72"S	22°34'37.66" E	Low density LSA and MSA scatter	Low	NCW
H022	33°0'19.63"S	22°34'36.26" E	Low density LSA and MSA scatter	Low	NCW
H023	33°0'57.89"S	22°36'7.01"E	Low density LSA and MSA scatter	Low	NCW
H024	33°2'51.77"S	22°38'38.34" E	Low density LSA and MSA scatter	Low	NCW


### 8.1.2 Sites


The structures (H001, H002, H007, H008, H014, H014/1, H015, H017), grave and burial ground sites (H006, H016) and Stone Age sites (H013, H013/1, H013/3) identified (Table 8), were predominantly situated a fair distance away from proposed development areas.

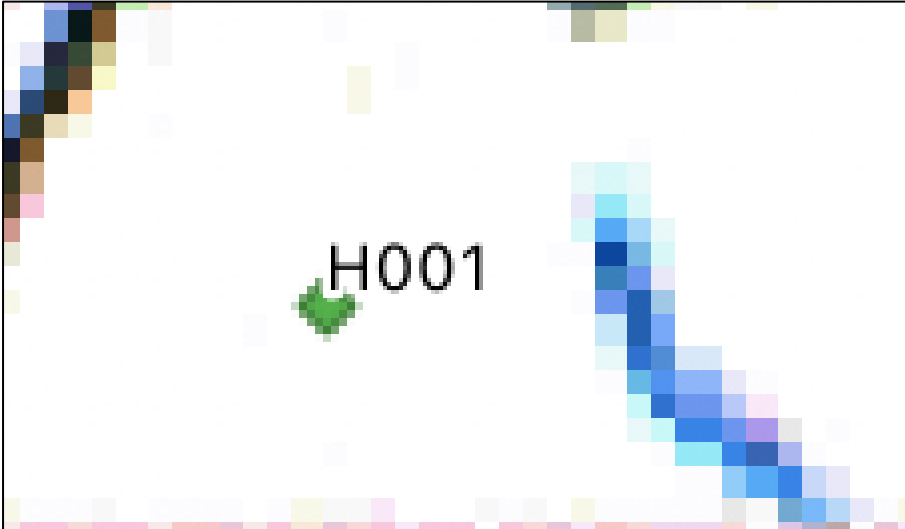
**Table 8: Archaeological resources identified within the WEF**

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
H001	32°59'58.91"S	22°36'24.99"E	<p>The site comprises a ruined stone enclosure and dipping pit/feature with a cement floor with inlaid river pebbles. It is situated adjacent to a dry river bed. This feature is related to the farmstead located at H002 (250m NW of H001) and was most likely used for the dipping/treatment of livestock against ticks and other pests. The feature is built from large stone blocks as well as a small amount of brickwork. Various historical refuse material was scattered around the site. The kraal is situated on an open area of rocky and sandy terrain. A large man-made dam is also located near this feature.</p> <p>No structures were identified at this locality on the 3222DC topographical sheet dating to 1965 or 1987. The site is therefore younger than 60 years. As no additional information was available, the site is provisionally rated as IIIB with medium heritage significance.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- H001 is located approximately 85m adjacent to an existing farm road.</li> <li>- If there are plans to expand the current farm road, it is recommended that a no-go-buffer-zone of at least 30m is kept to the closest WEF infrastructure.</li> <li>- If development occurs within 30m of H001, the structure will need to be satisfactorily studied and recorded before impact occurs.</li> <li>- Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of the structure (c) measured drawings of the floor plans of the structure.</li> </ul>	Medium	IIIB



Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 <p data-bbox="719 1134 1547 1161">Figure 22: Views of the large packed stone kraal and dipping pit at H001.</p>					



Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 <p data-bbox="757 1262 1505 1289">Figure 23: Various refuse/midden material scattered across H001.</p>					

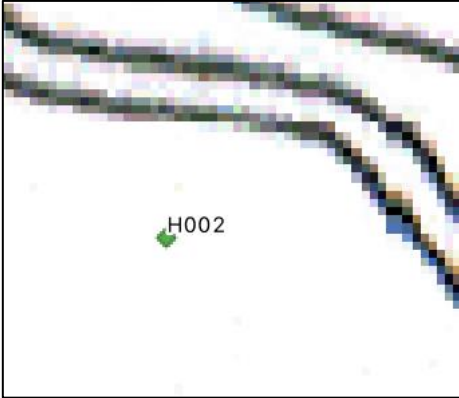
Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p data-bbox="640 815 1621 842">Figure 24: 3222DC topographical sheet surveyed in 1965 depicts no structure at H001.</p>		
H002	32°59'55.54"S	22°36'16.05"E	<p data-bbox="804 916 1615 1078">The site comprises a small degraded historical farmstead. It is situated on a large open area with rocky and sandy terrain, adjacent to a farm track. The site contains a large, degraded structure. The materials used in the construction indicate a mix of local stone (large blocks) and modern brick, which suggests modification and additions through time. The structure walls are still intact however there is no more roof left.</p> <p data-bbox="804 1107 1603 1190">A large, weathered ox wagon is parked near the structure. It is unclear if this was used by the occupants as transport or as an ornament. The midden material from H001 seems to be related to the homestead at H002.</p> <p data-bbox="804 1219 1608 1358">A structure was not depicted at this locality on the 3222DC topographical sheet dating to 1965 or 1987, however building style and materials suggest that the structure is older than 60 years. As no additional information was available, the site is provisionally rated as IIIB with medium heritage significance.</p>	Medium	IIIB

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- H002 is located approximately 50m adjacent to an existing farm road.</li> <li>- If there are plans to expand the current farm road, it is recommended that a no-go-buffer-zone of at least 30m is kept to the closest WEF infrastructure.</li> <li>- If development occurs within 30m of H002, the structure will need to be satisfactorily studied and recorded before impact occurs.</li> <li>- Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of the structure (c) measured drawings of the floor plans of the structure.</li> </ul>		



Figure 25: Views of the large degraded farm house at H002.


Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p data-bbox="728 780 1534 807">Figure 26: Views of the Ox wagon situated next to farm house at H002.</p>		
			 <p data-bbox="938 1275 1323 1302">Figure 27: General views of H002.</p>		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<p><b>Figure 28: 3222DC topographical sheet surveyed in 1965 depicts no structure at H002.</b></p>					
H006; H007; H008	32°59'47.04"S	22°35'28.19"E	<p>The site comprises a ruined historical farmstead, a demolished water reservoir and a small cemetery. The site is situated adjacent to a farm track in a large area which has been excluded from the proposed development area.</p> <p>H008 – Large degraded structure built with modern materials. The walls are still standing however the roof has collapsed. The structure is built on a stone foundation.</p> <p>H007 – Degraded water reservoir.</p> <p>H006 – Small cemetery containing large graves with white marble/granite covers and headstones. The oldest grave dates to 1941.</p> <p>A structure is depicted at this locality on the 3222DC topographical sheet dating to 1965, which suggests that the main structure is at least 57 years old. As no additional information was available, the farmstead is provisionally rated as IIIB with medium heritage significance.</p> <p>Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the cemetery is provisionally rated as having a high heritage significance with a heritage rating of IIIA. All graves have high levels of emotional, religious and in some cases historical significance. It is also</p>	Medium-High	IIIA/IIIB

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<p>important to understand that the identified graves could have significant heritage value to the relevant families.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- The site is located in an area that is not demarcated for development. Unless the existing farm road is expanded, it is unlikely that the site will be impacted upon.</li> <li>- In terms of the farmstead, a no-go-buffer-zone of at least 30m should be kept to the closest WEF infrastructure.</li> <li>- The grave sites should be demarcated with a 50-meter no-go-buffer-zone and the graves should be avoided.</li> <li>- A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs to be approved by HWC prior to construction).</li> </ul>		



Figure 29: View of the large, degraded structure at H008.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<p><b>Figure 30: View of the degraded water reservoir at H007.</b></p>					









Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating		
							

Figure 31: Views of the Small cemetery at H006.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<p align="center"><b>Figure 32: 3222DC topographical sheet surveyed in 1965 depicts a structure at H007.</b></p>					
H013; H013/1; H013/3	32°58'44.23"S	22°35'50.61"E	<p>A large scatter of mostly MSA artefacts was identified at this location. The relatively high density of artefacts were scattered across a wide area, around a rocky ridge that was situated near the northern edge of the proposed project area (east of a proposed substation site). The rocky ridge is situated near a large drainage line. The artefacts consist mostly of cores and debitage (flakes, chips and chunks) and are made from CCS, hornfels and silcrete.</p> <p>The high artefact density suggests that the site may represent multiple periods of occupation. However, as reported in other heritage studies in the region, it is unlikely that the artefacts are observed in their primary context due to the erosional nature of the environment, which tends to leave artefacts exposed on the surface. The site is provisionally rated as IIIB with medium heritage significance due to the density of the material and the quality of the artefacts.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- The sites are not in the proposed buildable area or existing farm roads. Therefore, no impact is expected.</li> <li>- A 30m buffer is recommended to maintain the sites integrity.</li> </ul>	Medium	IIIB

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
<div style="display: flex; justify-content: space-around;">   </div>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
<div style="display: flex; justify-content: space-around;">   </div> <p data-bbox="613 954 1648 983" style="text-align: center;"><b>Figure 33: Large assemblage of MSA Lithic artefacts observed at H013, H013/1 and H013/3.</b></p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<p data-bbox="698 874 1563 901"><b>Figure 34: General views of the rocky ridge line at H013, H013/1 and H013/3.</b></p>		
H014; H014/1	33° 3'6.28"S	22°38'8.85"E	<p data-bbox="804 975 1608 1054">The site comprises a ruined historical farmstead with two partly demolished structures as well as a large, packed stone kraal. It is situated in a large open area near a large drainage line, adjacent to a farm track.</p> <p data-bbox="804 1086 1608 1193">A ruin was depicted at this locality on the 3322BA topographical sheet dating to 1965. The building style and materials also suggest that the structure is older than 60 years. As no additional information was available, the site is provisionally rated as IIIB with medium heritage significance.</p> <p data-bbox="804 1225 1016 1249"><b>Recommendation:</b></p> <ul data-bbox="804 1254 1590 1390" style="list-style-type: none"> <li>- H014 and H014/1 are located directly adjacent to an existing farm road.</li> <li>- If there are plans to expand the current farm road, it is recommended that a no-go-buffer-zone of at least 30m is kept to the closest WEF infrastructure.</li> </ul>	Medium	IIIB


Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<ul style="list-style-type: none"> <li>- If development occurs within 30m of the site, the structures will need to be satisfactorily studied and recorded before impact occurs.</li> <li>- Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of the structure (c) measured drawings of the floor plans of the structure.</li> </ul>		



Figure 35: Views of the historical structures at H014.



Figure 36: Views of the large, packed stone kraal at H014/1.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 <p><b>Figure 37: 3322BA topographical sheet surveyed in 1965 depicts a ruin at H014.</b></p>					
H016	33° 3'8.09"S	22°38'19.19"E	<p>The site comprises a small historical cemetery that contains both formal (white granite/marble) and informal graves (packed stone). The cemetery is situated near H014, approximately 30m east of a large drainage line. The cemetery is fenced off by a small wire fence. The oldest graves are dated to 1921.</p> <p>Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the cemetery is provisionally rated as having a high heritage significance with a heritage rating of IIIA. All graves have high levels of emotional, religious and in some cases historical significance. It is also important to understand that the identified graves could have significant heritage value to the relevant families.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- H016 is not in the proposed buildable area. It is unlikely that the site will be impacted upon.</li> <li>- The grave sites should be demarcated with a 50-meter no-go-buffer-zone and the graves should be avoided.</li> <li>- A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs to be approved by HWC prior to construction).</li> </ul>	High	IIIA



Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p data-bbox="795 853 1473 882" style="text-align: center;"><b>Figure 38: – Views of the small historical cemetery at H016.</b></p>					






Figure 39: Views of formal graves at H016.



Figure 40: View of an informal grave at H016.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
H017	33° 3'4.46"S	22°38'12.75"E	<p>The site comprises a small historical stone-built feature. It is located approximately 50m west of an ephemeral stream. The stone feature appears to be part of a packed stone structure or possibly an entrance to a stone-built structure. This feature may be part of a livestock dipping station as it has a trench-like feature. This site may represent infrastructure that is associated with the historical farmstead at H014.</p> <p>The exact age of the poorly preserved structure is not known. However, the building style and materials suggest that the structure is potentially older than 60 years. As no additional information was available, the site is provisionally rated as IIIC with low heritage significance.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- H017 is not in the proposed buildable area. It is unlikely that the site will be impacted upon.</li> <li>- No mitigation is required.</li> <li>- The documentation of the site in this HIA report is sufficient and the site can be destroyed without a permit, only with the approval of this report as provided here.</li> </ul>	Low	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 <p data-bbox="815 863 1447 887"><b>Figure 41: Views of the historical stone feature at H017.</b></p>					
H015	33° 3'10.39"S	22°38'10.93"E	<p data-bbox="804 908 1597 1043">The site comprises a small packed stone enclosure with remnants of large packed stone foundations. The site also contains a large midden near the packed stone feature. The site is situated in an open area with sandy and rocky soil near a large drainage line. It is near sites H014; H016 and H017 and probably forms part of a larger historical farmstead.</p> <p data-bbox="804 1075 1606 1182">The exact age of the poorly preserved structure is not known. However, the building materials suggest that the structure is potentially older than 60 years. As no additional information was available, the site is provisionally rated as IIIC with low heritage significance.</p> <p data-bbox="804 1214 1016 1238"><b>Recommendation:</b></p> <ul data-bbox="804 1270 1574 1355" style="list-style-type: none"> <li>- H015 is not in the proposed buildable area. It is unlikely that the site will be impacted upon.</li> <li>- No mitigation is required.</li> </ul>	Low	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			- The documentation of the site in this HIA report is sufficient and the site can be destroyed without a permit, only with the approval of this report as provided here.		



Figure 42: Views of the packed stone foundation at H015.


Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					

Figure 43: View of the midden material identified at H015.

## 9. IDENTIFICATION AND ASSESSMENT OF IMPACTS

The fieldwork findings have shown that the study area is characterised by find spots, Stone Age sites, structures, and burial grounds. From the proposed location of the Heuweltjies WEF, the cultural significance of some of the heritage resources and their context may be impacted by proximity to development area.

Archaeological remains are rare objects, often preserved due to unusual circumstances and are non-renewable resources. When a development is proposed, and specialist studies are undertaken as part of the wider evaluation of heritage resources, this provides an opportunity into a depository that would not otherwise exist. In this sense the impact is POSITIVE for archaeology if efforts are made to preserve or mitigate heritage resources in the study footprint, prior to and during the construction phase of the development.

The general nature of impacts from the proposed development will be visual with regard to spatial and built heritage, and physical with regard to archaeological heritage resources. Mitigation measures for heritage resources will be recommended to mitigate impacts.

### 9.1 General Observations

In this section, an assessment will be made of the impact of the proposed development on the identified heritage sites. An overlay of all the heritage sites identified during the fieldwork over the proposed development footprint areas was made to assess the impact of the proposed development on these identified heritage sites. This overlay resulted in the following observations:

The following general observations will apply for the impact assessment undertaken in this report:

- The impact assessment rating is based on the rating scale as contained in **Appendix B**.
- Heritage sites assessed to have a low heritage significance are not included in these impact risk assessment calculations. The reason for this is that sites of low significance will not require mitigation. The documentation of these sites in this HIA report is sufficient and the sites can be destroyed without a permit, but only with the approval of this report as provided here. These sites are 14 findspots (**H003-5, H009-12, H018-24**) and 3 structures (**H007, H015, H017**).
- Three Stone Age sites (H013, H013/1 **H013/3**) are located more than 40m from a proposed substation site (Alternative 1).
- Two burial grounds (**H006 and H016**) of high heritage significance were located more than 100m away from proposed buildable areas (incl. existing farm tracks). As a result, an impact is not expected from the proposed development on these sites.

- Five structures (**H001, H002, H008, H014, H014/1**) of medium heritage significance were located less than 100m away from existing farm tracks. If the farm tracks were to be expanded, it is possible that there will be an impact from the proposed development on these sites
- It is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the size of the study area and the subterranean nature of some heritage sites. The impact assessment conducted for heritage sites assumes the possibility of finding heritage resources during the project life and has been conducted as such.
- Three project phases have been identified by SiVEST namely the Pre-Construction Phase, Construction Phase and Operational Phase. As site clearing activities of all the development footprint areas are grouped under the Pre-Construction Phase, the highest level of impact on the identified heritage sites is expected during this phase. No impacts are expected during the Operational Phase. All the identified heritage sites are expected to be destroyed in terms of the pre-mitigation impact assessments undertaken below, whereas only those sites not mitigated by amendments to the proposed development footprints will also be destroyed in terms of the post-mitigation impact assessment calculations undertaken below.

The following impact rating table is based on the proposed WEF development layout within the region.

## 9.2 Pre construction

Table 9: Assessment of the Impact of Proposed WEF on Heritage Sites

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
<b>Planning Phase</b>																				
Damage to five historical structures (H001, H002, H008, H014, H014/1)	Five structures are located less than 100m away from existing farm roads within the proposed development area. The expansion of existing farm roads may impact the sites.	2	2	4	4	4	2	32	-	Medium	<ul style="list-style-type: none"> <li>- A <b>no-go-buffer-zone</b> of at least <b>30m</b> should be kept to the closest WEF infrastructure (incl. roads).</li> <li>- If development occurs within 30m of the site, the structure will need to be satisfactorily studied and recorded before impact occurs.</li> <li>- Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of the structure (c)</li> </ul>	2	1	4	4	4	1	15	-	Low



ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S			
												<p>measured drawings of the floor plans of the structure.</p> <ul style="list-style-type: none"> <li>- A baseline report must be compiled for the site within which the recorded drawings from the previous item as well as all existing information on the structure can be included. This baseline report will then be utilised as a part of the HMP to determine any future unforeseen impacts on the heritage resources.</li> <li>- The baseline report must be submitted to the relevant heritage authorities with a permit application in the event that the site will be impacted.</li> </ul>											
Unidentified heritage resources	Due to the size of the area assessed, there's	1	3	4	2	4	2	28	-	Medium	A management plan, after a walkdown of the final layout, for the	1	3	4	2	4	1	14	-	Low			



### 9.3 Cumulative Impacts

This section evaluates the possible cumulative impacts (CI) on heritage resources with the addition of the Heuweltjies WEF. The CI on heritage resources evaluated a 35-kilometer radius (**Figure 44**).

The following must be considered in the analysis of the cumulative effect of development on heritage resources:

- **Fixed datum or dataset:** There is no comprehensive heritage data set for the Beaufort West region and thus we cannot quantify how much of a specific cultural heritage element is present in the region. The region has never been covered by a heritage resources study that can account for all heritage resources. Further to this none of the heritage studies conducted can with certainty state that all heritage resources within the study area has been identified and evaluated;
- **Defined thresholds:** The value judgement on the significance of a heritage site will vary from individual to individual and between interest groups. Thus, implicating that heritage resources' significance can and does change over time. And so, will the tipping threshold for impacts on a certain type of heritage resource;
- **Threshold crossing:** In the absence of a comprehensive dataset or heritage inventory of the entire region we will never be able to quantify or set a threshold to determine at what stage the impact from developments on heritage resources has reached or is reaching the danger level or excludes the new development on this basis. (Godwin, 2011)

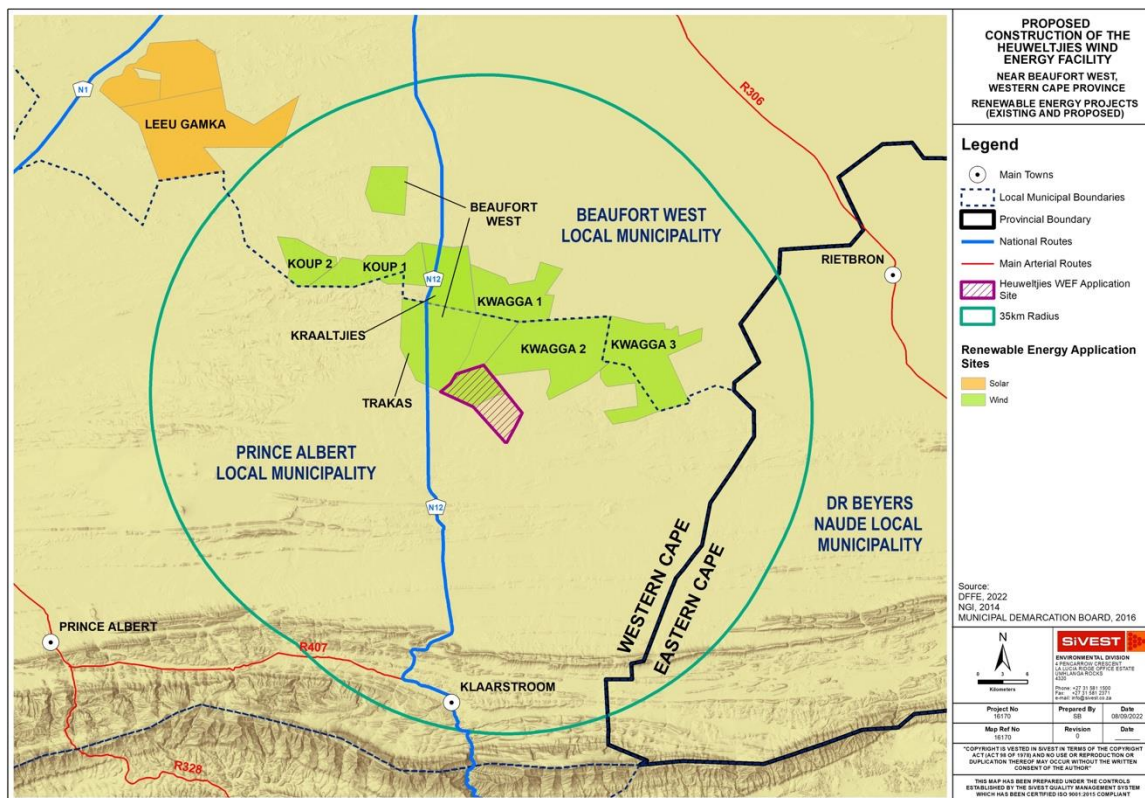
With regards to the historical resources, in most cases given a low-medium heritage significance on a local scale and in the majority of the cases were recommended as being easily mitigated or avoidable.

While the graves sites in all cases given a high heritage significance on a local scale and in the majority of the cases were recommended as being no-go areas or extensive mitigation required.

**Table 11** provides an analysis of the projected cumulative impact this project will add to impact on heritage resources.

**Table 10: Renewable energy developments proposed within a 35km radius of the Heuweltjies WEF application site.**

Project	DEA Reference No	Technology	Capacity	Status of Application / Development
Proposed Beaufort West Wind Farm	12/12/20/1784/1	Wind	140MW	Approved
Proposed Trakas Wind Farm	12/12/20/1784/2	Wind	140MW	Approved
Proposed Wind and Solar Facility on the Farm Lombardskraal 330	14/12/16/3/3/2/406	Solar	20MW	EIA in Process
Proposed Kraaltjies WEF	TBA	Wind	140MW	EIA in Process
Kwagga WEF 1	Pending	Wind	279 MW	EIA in Process
Kwagga WEF 2	Pending	Wind	341 MW	EIA in Process
Kwagga WEF 3	Pending	Wind	204.6 MW	EIA in Process
Koup 1 WEF	TBA	Wind	140 MW	EIA in Process
Koup 2 WEF	TBA	Wind	140 MW	EIA in Process



**Figure 44: Renewable energy facilities proposed within a 35km radius of the proposed development (provided by SiVEST).**

**SiVEST Environmental**

**Prepared by: PGS Heritage Pty Ltd for SiVEST**

**Project Description: Proposed Construction of the Heuweltjies Wind Energy Facility - AIA**

**Version No. 0.3**

**Date: 13 December 2022**

**Table 11: Impact rating - Cumulative**

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS	S		E	P	R	L	D	I / M	TOTAL	STATUS	S
<b>CumulativePhase</b>																				
Heritage Resources	The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources.	4	2	4	4	4	2	36	-	Medium	It can clearly be noted that the area in general is abundant with Stone Age and historical remains.  However, until a regional detailed study is commissioned by HWC or SAHRA, no further mitigations measures can be proposed other than those already recommended for the site-specific mitigation of sites in this report.	4	1	4	4	4	1	17	-	Low

## 9.4 Overall Impact Rating

It is the author's considered opinion that this additional load on the overall impact on heritage resources will be **low**. With a detailed and comprehensive regional dataset this rating could possibly be adjusted and to be more accurate.

## 10. COMPARATIVE ASSESSMENT OF ALTERNATIVES

Two alternatives were provided for the substation sites.

An assessment of the options for the substation shows that there will be an impact on heritage resources if the Option 1 substation is chosen. Therefore, there is a preference for substation Option 2.

### Key

<b>PREFERRED</b>	The alternative will result in a low impact/reduce the impact
<b>FAVOURABLE</b>	The impact will be relatively insignificant
<b>NOT PREFERRED</b>	The alternative will result in a high impact/increase the impact
<b>NO PREFERENCE</b>	The alternative will result in equal impacts

Alternative	Preference	Reasons
<b>SUBSTATION</b>		
Substation site Option 1 within WEF	<b>NOT PREFERRED</b>	A site of medium heritage significance occurs less than 50m east of this location.
Substation site Option 2 within WEF	<b>PREFERRED</b>	No heritage resources have been identified in the general area of the substation footprint.

### 10.1 The No-Go Alternative

Environmental and heritage legislation requires the consideration of the no-go option. There will be impacts as the project would not proceed. There would also be no socio-economic benefits or increase in energy generation of renewable energy sources (see Section 5 of this report for a full description of the legal requirement).

## 11. GENERAL RECOMMENDATIONS AND MITIGATION MEASURES

### 11.1 Construction phase

The project will encompass a range of activities during the construction phase, including vegetation clearance, excavations and infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past, and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project, and these must be catered for. Temporary infrastructure developments are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented as part of the Environmental Management Programme (EMPr).

### 11.2 Chance finds procedure

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts. The ECO (following this training) can be permitted to provide similar induction and awareness training to contractors that will undertake construction of the project.
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted using the appropriate protocol.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have a contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.



### 11.3 Possible finds during construction

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed development activities, could uncover the following:

- High density concentrations of stone artefact; and
- Unmarked graves.

### 11.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 12** gives guidelines for lead times on permitting.

**Table 12: Lead times for permitting and mobilisation**

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	Approximately 1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and HWC	Approximately 3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	Approximately 3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and HWC	Approximately 2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, HWC, local government and provincial government	Approximately 6 months

## 11.5 Heritage Management Plan for EMPr implementation

Table 13: Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
<b>General project area</b>	<ul style="list-style-type: none"> <li>Implement chance find procedures in case where possible heritage finds are uncovered.</li> </ul>	Construction and operation	During construction and operation	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report
<b>Graves and Burial grounds (H006, H016)</b>	<ul style="list-style-type: none"> <li>The sites should be demarcated with a <b>50-meter</b> no-go-buffer-zone and the graves should be avoided and left in situ.</li> <li>A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by HWC prior to construction).</li> <li>If the site is going to be impacted directly and the graves need to be removed a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social</li> </ul>	Construction	Prior to and during construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from HWC under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
	consultation and public participation process before grave relocation permits can be applied for with the HWC under the NHRA and National Health Act regulations.						
<b>Historical Structures</b> that were rated as low heritage significance ( <b>H007, H015, H017</b> ) and don't fall within an area demarcated for development.	<ul style="list-style-type: none"> <li>No mitigation is required.</li> <li>The documentation of the site in this HIA report is sufficient and the site can be destroyed without a permit, only with the approval of this report as provided here.</li> </ul>	Pre-construction	Pre-construction and during construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA	ECO Monthly checklist/report
<b>Historical Structures</b> that were rated as medium heritage significance ( <b>H001, H002, H008, H014, H014/1</b> ).	<ul style="list-style-type: none"> <li>As the sites are located less than 100m adjacent to an existing farm road, it is possible that the sites will be impacted upon if the road is expanded.</li> <li>If there are plans to expand the current farm road, it is recommended that a no-go-buffer-zone of at least <b>30m</b> is kept to the closest WEF infrastructure.</li> <li>If development occurs within 30m of the site, the structure will need to be satisfactorily studied and recorded before impact occurs.</li> </ul>	Pre-construction	Pre-construction and during construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA	ECO Monthly checklist/report

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
	<ul style="list-style-type: none"> <li>▪ Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of the structure (c) measured drawings of the floor plans of the structure.</li> <li>▪ A baseline report must be compiled for the site within which the recorded drawings from the previous item as well as all existing information on the structure can be included. This baseline report will then be utilised as a part of the HMP to determine any future unforeseen impacts on the heritage resources.</li> <li>▪ The baseline report must be submitted to the relevant heritage authorities with a permit application in the event that the site will be impacted.</li> </ul>						
<b>Stone Age sites</b> that were rated as medium heritage significance ( <b>H013, H013/1,</b>	<ul style="list-style-type: none"> <li>▪ No mitigation required.</li> <li>▪ A <b>30m</b> buffer is recommended to retain the sites integrity.</li> </ul>	Pre-construction	Pre-construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from HWC under Section 36 and 38 of NHRA	ECO Monthly checklist/report

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
H013/3) but don't fall within an area demarcated for development.	<ul style="list-style-type: none"> <li>▪ If the site can't be avoided, then it must be sampled by a qualified specialist under a permit issued by SAHRA</li> <li>▪ A management plan, after a walkdown of the final layout, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.</li> </ul>						



the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources.

An assessment of the final footprint of the new Heuweltjies WEF must be conducted with the final walkdown of the area during the finalization of the Layout and EMPr.

**The following mitigation measures will be required:**

- An archaeological walk down of the final approved layout will be required before construction commences;
- 50m buffer zones around grave sites (**H006, H016**)
- 30m buffer zone around farmsteads (**H001, H002, H008, H014 (H014/1)**)
- 30m buffer zone around historical structures (**H007, H015, H017**)
- 30m buffer zones around Stone Age sites with a medium heritage significance (**H013, H013/1, H013/3**)
- If significant Stone Age sites (medium heritage significance or higher) can't be avoided, then sites must be sampled by a qualified specialist under a permit issued by SAHRA
- A heritage management plan for the heritage resources and a grave management plan needs to be compiled and approved for implementation during construction and operations of the project.
- A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation.

## **12.5 General**

In the event that heritage resources are discovered during site clearance, construction activities must stop in the vicinity, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.

The overall impact of the Heuweltjies WEF, on the heritage resources, is seen as acceptably **low** after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be granted environmental authorisation.

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## APPENDIX A – CV

**NIKKI MANN**  
**Professional Archaeologist, PGS Heritage**

**Key Qualifications:**

**MSc Archaeology** (phytolith analysis) - University of Cape Town - 2017

**BSc Honours Archaeology** - University of Cape Town – 2014

**Bachelor of Science (BSc)** - University of Cape Town - Majors in Archaeology, and Environmental and Geographical Science -2013

Professional Archaeologist – Association of Southern African Professional Archaeologists (**ASAPA**)

**Archaeological Experience**

- 2021- Current – Archaeologist – PGS Heritage (Pty) Ltd
- Kathu Tyre Management Plant HIA. Kathu. EXM. **Position:** Heritage Specialist.
- Kathu Borrow Pit Screening. Kathu. EXM. **Position:** Heritage Specialist.
- Kolomela Mine Expansion. Postmasburg. EXM. **Position:** Heritage Specialist.
- Kudumane HIA update. Hotazel. SRK. **Position:** Heritage Specialist.
- Victoria West Pipeline project. Victoria West. iXEng. **Position:** Heritage Specialist.
- 10MW Chelsea Solar PV. Gqeberha, Eastern Cape. SLR. **Position:** Heritage Specialist.
- Koup 1 and Koup 2 WEF. Beaufort West, Western Cape. SiVEST. **Position:** Heritage Specialist.
- Victoria West Pipelines. Victoria West, Northern Cape. iXEng. – **Position:** Heritage Specialist.
- East Orchards Poultry Farm Project. Delmas, Mpumalanga. EcoSphere. – **Position:** Heritage Specialist.
- Phase 1 Archaeological Impact Assessment (**Phase 1 AIA**): Gunstfontein Wind Energy Facility (WEF) and overhead powerline, near Sutherland, Northern Cape, South Africa. – Position: Archaeological Specialist (November 2020).
- Phase 1 Archaeological Impact Assessment (**Phase 1 AIA**): Proposed development of an overhead powerline for the approved Oya PV Facility, between Sutherland and Matjiesfontein, Northern and Western Cape, South Africa. – Position: Archaeological Specialist (October 2020).
- Phase 1 Archaeological Impact Assessment (**Phase 1 AIA**): Proposed development of infrastructure for the approved Kudusberg Wind Energy Facility (WEF), between Sutherland and Matjiesfontein, Northern and Western Cape, South Africa. – Position: Archaeological Specialist (October 2020).
- Phase 1 Archaeological Impact Assessment (**Phase 1 AIA**): Proposed Square Kilometre Array (SKA) fibre optic cable, between Beaufort West and Carnarvon, Northern and Western Cape, South Africa. (September 2020).
- Phase 1 Archaeological Impact Assessment (**Phase 1 AIA**): Kolkies PV (Photovoltaics) Project, north of Touws River, Western Cape, South Africa. – Position: Archaeological Specialist (September 2020).
- Phase 1 Archaeological Impact Assessment (**Phase 1 AIA**): Pienaarspoort Wind Energy Facility (WEF) Project 1 and 2, north-west of Matjiesfontein, Western Cape, South Africa. – Position: Archaeological Specialist (September 2020).

- Phase 1 Archaeological Impact Assessment (**Phase 1 AIA**): Swellendam Wind Energy Facility (WEF), Swellendam, Western Cape, South Africa. – Position: Archaeological Specialist (August 2020).
- **Phase 2 Archaeological Mitigation**: Proposed development of infrastructure in the Port of Ngqura within the Coega Industrial Development Zone (IDZ), Nelson Mandela Bay Municipality, Eastern Cape, South Africa: Contract Archaeologist, excavation of Later Stone Age (LSA) shell middens (July 2020). Contracted to work with PGS Heritage.
- Polihali Dam Heritage Management Project, Lesotho: Junior field archaeologist, excavation of Later Stone Age (LSA) sites (May 2019- May 2020) as part of PGS Heritage.
  - Duties included excavation of rock shelters, site supervision, site recording, photography, lab work, section drawing and digital illustration (Inkscape and Photoshop), assisting in report writing and implementation of HSE practices.
- Ledi-Geraru Research Project, Ethiopia: excavation of Early Stone Age (ESA) sites (February-March 2020; Directed by Dr David R. Braun)
- Gorras Farm, Northern Cape, South Africa: excavation of middens next to a corbelled building; Historical site (October 2018; supervised by Simon Lee Hall and UCT PhD student Ms Vuyiswa Thembelihile Lupuwana)
  - Duties included excavation of middens and surface collection.
- **Phase 2 Archaeological Mitigation**: Proposed development of boreholes and associated pipelines for the Langebaan Aquifer within the Hopefield Private Nature Reserve, Hopefield, Western Cape.- Position: Archaeological specialist (August 2018).
- Koobi Fora Field School, Kenya: Intern, excavation of Early Stone Age (ESA) and Middle Stone Age (MSA) sites (June-July 2018; Directed by Dr David R. Braun, Kathryn Ranhorn (Postdoctoral Research Fellow at Harvard University) and Jonathan Reeves (PhD student at The George Washington University))
- Data extraction to SAHRIS (South African Heritage Resource Agency) for CTS Heritage (April 2018)
- Phase 1 Archaeological Impact Assessment (**Phase 1 AIA**): Matjiesfontein Road Extension Project,. Matjiesfontein, Western Cape. – Position: Archaeological Specialist (April 2018).
- Ledi-Geraru Research Project, Ethiopia: excavation of Early Stone Age (ESA) sites (February-March 2018; Directed by Dr David R. Braun)
- Ferrycarrig, Irish National Heritage Park, Wexford, southeast Ireland: Excavation of ringwork castle site associated with the Anglo-Norman invasion of Ireland (January 2018; Directed by Dr Denis Shine and Dr Stephen Mandal)

## WOUTER FOURIE

### Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

#### Summary of Experience

Specialised expertise in Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems, including *inter alia* -

Involvement in various grave relocation projects (some of which relocated up to 1000 graves) and grave “rescue” excavations in the various provinces of South Africa

Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
- Iron Age Mitigation Work for various projects, including archaeological excavations and monitoring
- Involvement with various Heritage Impact Assessments, outside South Africa, including -
- Archaeological Studies in Democratic Republic of Congo
- Heritage Impact Assessments in Mozambique, Botswana and DRC
- Grave Relocation project in DRC

#### Key Qualifications

BA [Hons] (Cum laude) - Archaeology and Geography - 1997

BA - Archaeology, Geography and Anthropology - 1996

Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member

Accredited Professional Heritage Specialist – Association of Professional Heritage Practitioners (APHP) CRM Accreditation (ASAPA) -

Principal Investigator - Grave Relocations

Field Director – Iron Age

Field Supervisor – Colonial Period and Stone Age

Accredited with Amafa KZN

#### Key Work Experience

2003- current - Director – Professional Grave Solutions (Pty) Ltd

2007 – 2008 - Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand

2005-2007 - Director – Matakoma Heritage Consultants (Pty) Ltd

2000-2004 - CEO– Matakoma Consultants

1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng

1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

Worked on various heritage projects in the SADC region including, Botswana, Mozambique, Malawi, Mauritius and the Democratic Republic of the Congo



## APPENDIX B – IMPACT ASSESSMENT METHODOLOGY

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) METHODOLOGY

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

### 1.1 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in **Table 1**.

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

### 1.2 Impact Rating System

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

- Planning;
- Construction;
- Operation; and
- Decommissioning.

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

***The significance of Cumulative Impacts should also be rated (As per the Excel Spreadsheet Template).***

#### 1.2.1 Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

**Table 1:** Rating of impacts criteria

<b>ENVIRONMENTAL PARAMETER</b>		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).		
<b>ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE</b>		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
<b>EXTENT (E)</b>		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
<b>PROBABILITY (P)</b>		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
<b>REVERSIBILITY (R)</b>		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
<b>IRREPLACEABLE LOSS OF RESOURCES (L)</b>		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
<b>DURATION (D)</b>		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		



1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
<b>INTENSITY / MAGNITUDE (I / M)</b>		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
<b>SIGNIFICANCE (S)</b>		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:		
<b>Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.</b>		

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.



## **APPENDIX C: SITE SENSITIVITY VERIFICATION REPORT**

(IN TERMS OF PART A OF THE ASSESSMENT PROTOCOLS PUBLISHED IN GN 320 ON 20 MARCH 2020)

## 1. Introduction

South African Mainstream Power Developments (Pty) Ltd is proposing to construct the Heuweltjies WEF, comprising up to sixty wind turbines with a maximum total energy generation capacity of up to approximately 240MW, with a 132kV overhead power line connection to the national grid. A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. The WEF project area is in the Great Karoo region approximately 70 km south of Beaufort West, Western Cape Province.

In accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification has been undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

## 2. Site sensitivity verification

The site sensitivity verification of the proposed Heuweltjies WEF is based on:

- A desktop review of (a) the relevant 1:50 000 scale topographic map 3222DC and 3322BA - Current and historical editions (1965, 1987, 2005), (b) Google Earth© satellite imagery, (c) published historical and archaeological literature, as well as (d) several previous HIA and AIA assessments undertaken in the general vicinity of the study area.
- A field assessment of the Heuweltjies WEF project area by the author and field archaeologists during February 2021.

## 3. Outcome of site sensitivity verification

It is well known that the Karoo contains a long and rich archaeological record dating from the ESA to the historic period. However, vast areas of the region have yet to be subjected to systematic analytical research.

The evaluation of satellite imagery and the analysis of the studies previously undertaken in the area has indicated that certain areas may be sensitive from a heritage perspective. Archaeological surveys and studies in the area have shown rocky outcrops, dry riverbeds, riverbanks and confluence to be prime localities for archaeological finds and specifically Stone Age sites (Kinahan, 2008; Halkett, 2009; Webley & Halkett, 2015).

Scatters of ESA through to LSA artefacts have been widely reported in the general vicinity of Beaufort West. This is a result of the erosional nature of the environment, which tends to leave artefacts exposed on the surface rather than buried beneath layers of sediment. To date, heritage studies in the area have shown that these artefacts have occurred in secondary contexts, often associated with gravel deposits, having been subjected to erosion of the soils in which they were once deposited (Dreyer 2005; Halkett 2009; Kaplan 2006, 2007; Orton 2010; Webley & Hart 2010a, 2010b; Webley & Lanham 2011). Although

context is generally poor, the Karoo is still regarded as a region that is very rich in archaeological and historical heritage.

The field work in the study area demonstrates that burial grounds, Stone Age sites and historical structures of heritage significance warrant conservation.

#### **4. National Environmental Screening Tool**

The Archaeological and Cultural Heritage Sensitivity Map for the Heuweltjies WEF project area prepared using the DFFE screening tool indicates a **Low Sensitivity** rating for the study area (**Figure 7**). The low rating as provided by the Environmental Screening Tool possibly reflects scarcity of heritage reports conducted in the region. The field work that was conducted in the study area demonstrates that there are in fact burial grounds, Stone Age sites and historical structures of heritage significance that warrant conservation.

Therefore, the DFFE screening tool sensitivity map in **Figure 7** is not fully supported based on the findings of this fieldwork.

#### **5. Conclusion**

The Archaeological and Cultural Heritage sensitivity of the Heuweltjies WEF project area has been evaluated, based on desktop studies and a site visit. It is concluded that the low rating as provided by the Environmental Screening Tool likely reflects the scarcity of heritage reports conducted in the region.