SiVEST SA (PTY) LTD

PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY AND ASSOCIATED GRID INFRASTRUCTURE, NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE, SOUTH AFRICA

Archaeological Impact Assessment

DEFF Reference: 14/12/16/3/3/2/2120
Report Prepared by: **PGS Heritage Pty Ltd**
Issue Date: 19 April 2022
Version No.: 0.2

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

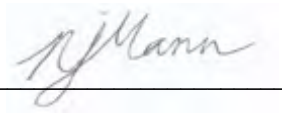
- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

HERITAGE CONSULTANT: PGS Heritage (Pty) Ltd

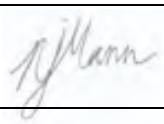
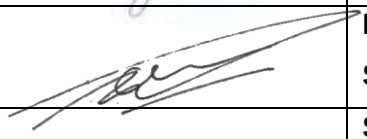
CONTACT PERSON: Nikki Mann - Archaeologist

Tel: +27 (0) 12 332 5305

Email: nikki@pgsheritage.co.za

SIGNATURE: 

ACKNOWLEDGEMENT OF RECEIPT

Report Title	PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY AND ASSOCIATED GRID INFRASTRUCTURE, NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE, SOUTH AFRICA		
Control	**Name**	**Signature**	**Designation**
Author	**Nikki Mann**		**Archaeologist/ PGS Heritage**
Reviewed	**Wouter Fourie**		**Principal Heritage Specialist**
Reviewed			**SiVEST/Environmental Division**

Date:	
Document Title:	Heritage Impact Report
Author:	Nikki Mann
Revision Number:	
Checked by:	
For:	SiVEST Environmental Division

SiVEST SA (PTY) LTD

PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY AND ASSOCIATED GRID INFRASTRUCTURE, 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 Genesis Enertrag Koup 1 Wind (Pty) Ltd (hereafter referred to as "Genesis"), to undertake the assessment of the proposed construction of the Koup 1 Wind Energy Facility (WEF) and associated grid connection infrastructure near Beaufort West in the Western Cape Province of South Africa.

1. SITE NAME

The Koup 1 WEF and grid infrastructure.

2. LOCATION

The proposed WEF and associated grid connection infrastructure is located approximately 55km south of Beaufort West in the Western Cape Province and is within the Beaufort West and Prince Albert Local Municipalities, in the Central Karoo District Municipality (**Figure 1**).

The WEF application site is approximately 4279.398 hectares (ha) in extent and incorporates the following farm portions:

- The Farm Riet Poort No 231
- Portion 11 of the Farm Brits Eigendom No 374
- Portion 15 of the Farm Brits Eigendom No 374
- Portion 5 of farm 380
- Portion 10 of farm 380
- Portion 11 of farm 380

A smaller buildable area (2445.667 ha) has however been identified as a result of a preliminary suitability assessment undertaken by Genesis 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.

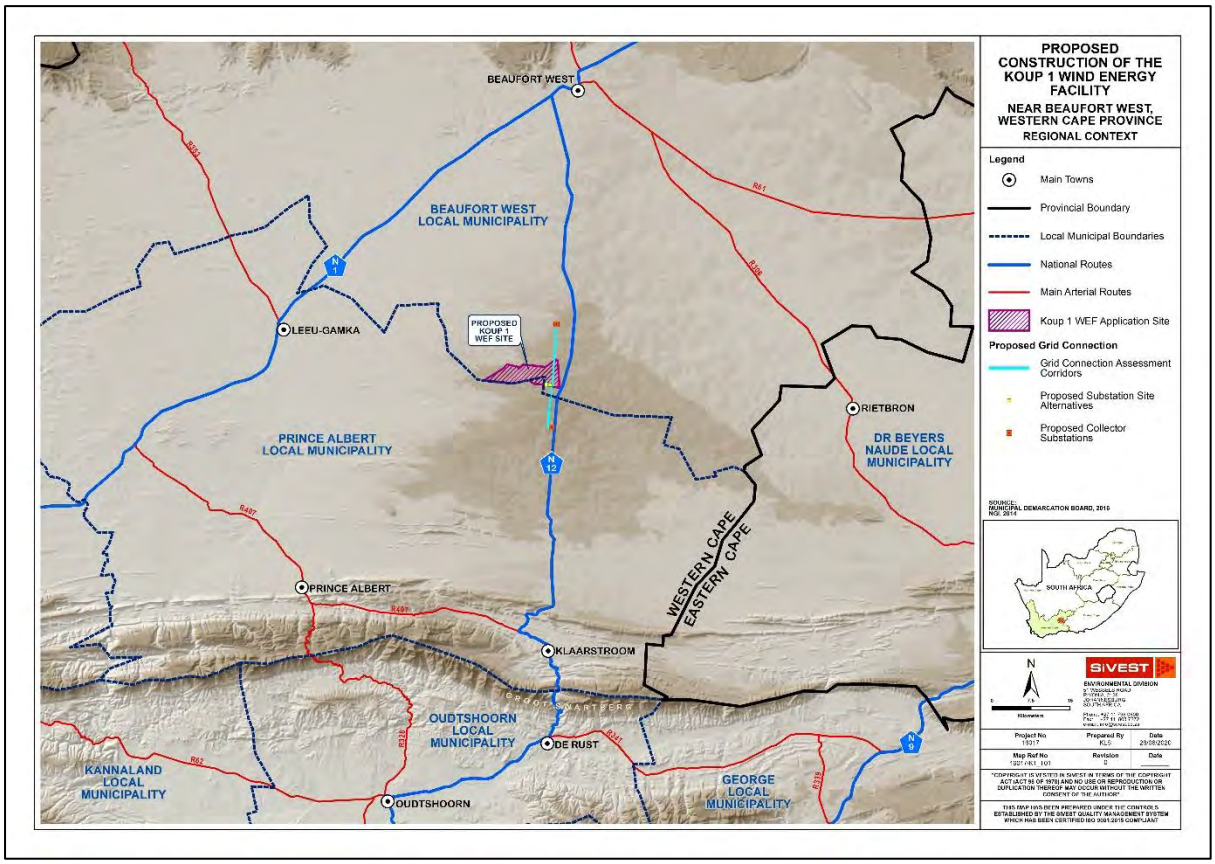


Figure 1: Locality of the Koup 1 study area.

3. DESCRIPTION OF THE PROPOSED DEVELOPMENT

It is anticipated that the proposed Koup 1 WEF will comprise twenty-eight (28) wind turbines with a maximum total energy generation capacity of up to approximately 140MW (**Figure 2**). The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line (**Figure 3**). A BESS will be located next to the onsite 33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.

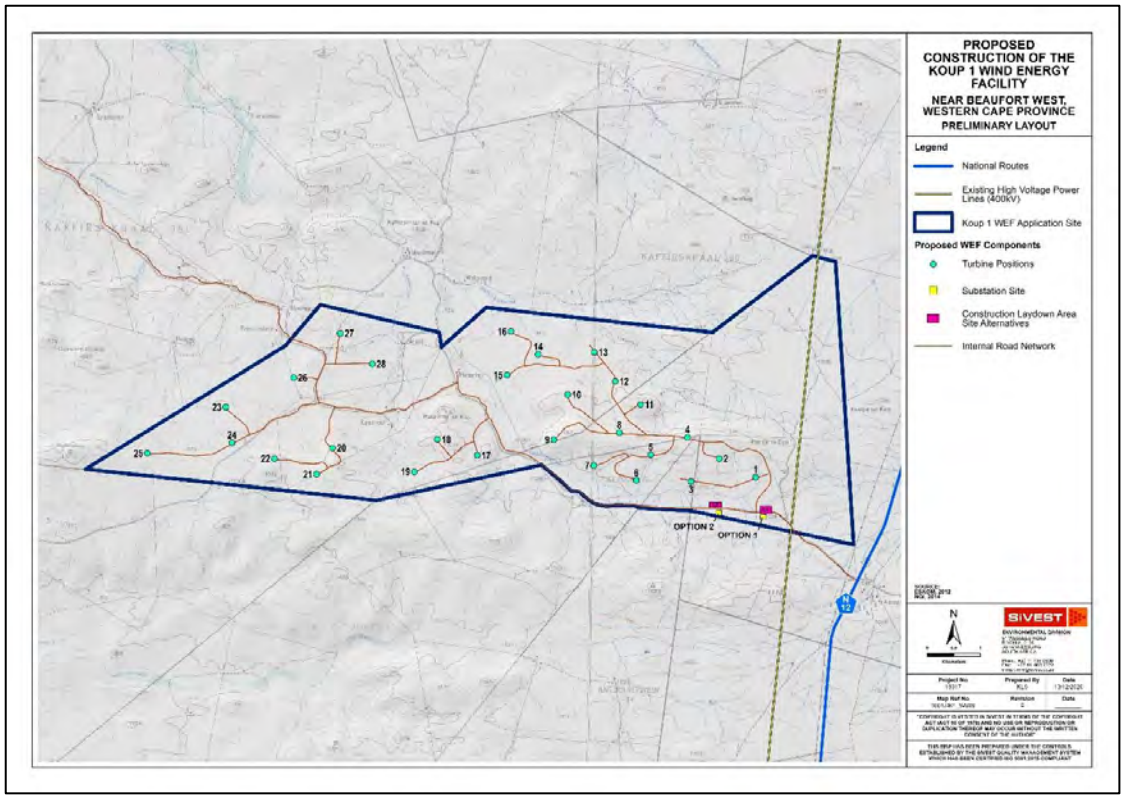


Figure 2: Alternatives originally proposed and considered as part of the Koup 1 assessment process.

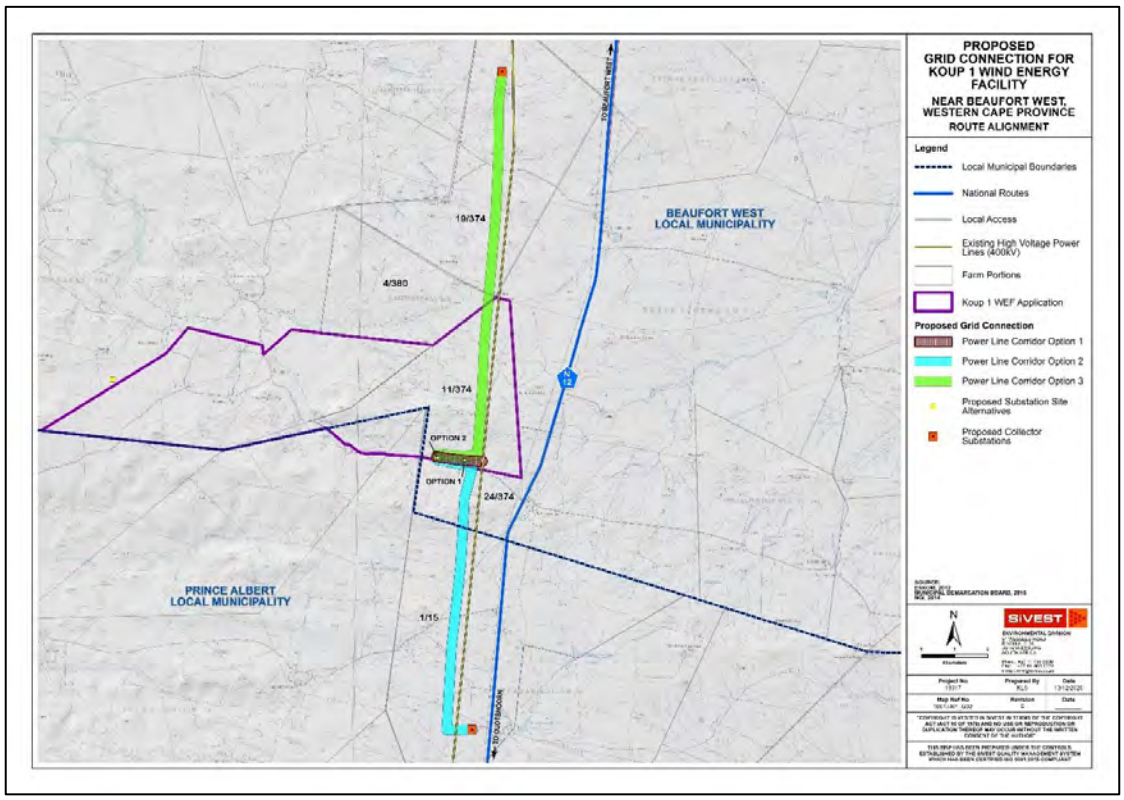


Figure 3: 132kV Power Line Route Alignments originally considered as part of the assessment process.

4. HERITAGE RESOURCES IDENTIFIED

A selective survey of the study area was conducted between June and July 2021. Focus was placed on the areas identified for the placement of the proposed turbines and associated internal roads, laydown areas and substation sites within the larger assessment area. Farmsteads and structures were documented from their property boundaries when access was restricted. 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 Koup 1 WEF and associated grid connection infrastructure has revealed the presence of 18 heritage resources. Four graves, burial grounds and possible graves (**KO-06 – KO-09**) were rated as having high heritage significance. Two structures (**KO-03**; **KO-05**) were rated as having medium heritage significance, 1 structure (**KO-02**) was rated as having low heritage significance and 2 structures (**KO-01; KO-04**) were rated as having no heritage significance. One archaeological site (**KO_18**) was rated as having a low heritage significance.

Eight find spots (**KO_10 – KO_17**) 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 Later Stone Age (LSA) and earlier Early Stone Age (ESA) material was 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. FINAL PROPOSED WEF LAYOUT

The final proposed WEF layout has considered the sensitivities identified during the 2021 field assessment. Grid Option 1 was not feasible as Eskom won't allow two collectors within a small radius, while Grid Option 3 has been eliminated as a result of identified bird nests. The route of the chosen Grid Option 2 and the preferred wind turbine, construction laydown area and substation site layout is shown in **Figure *4*** and **Figure *5***.

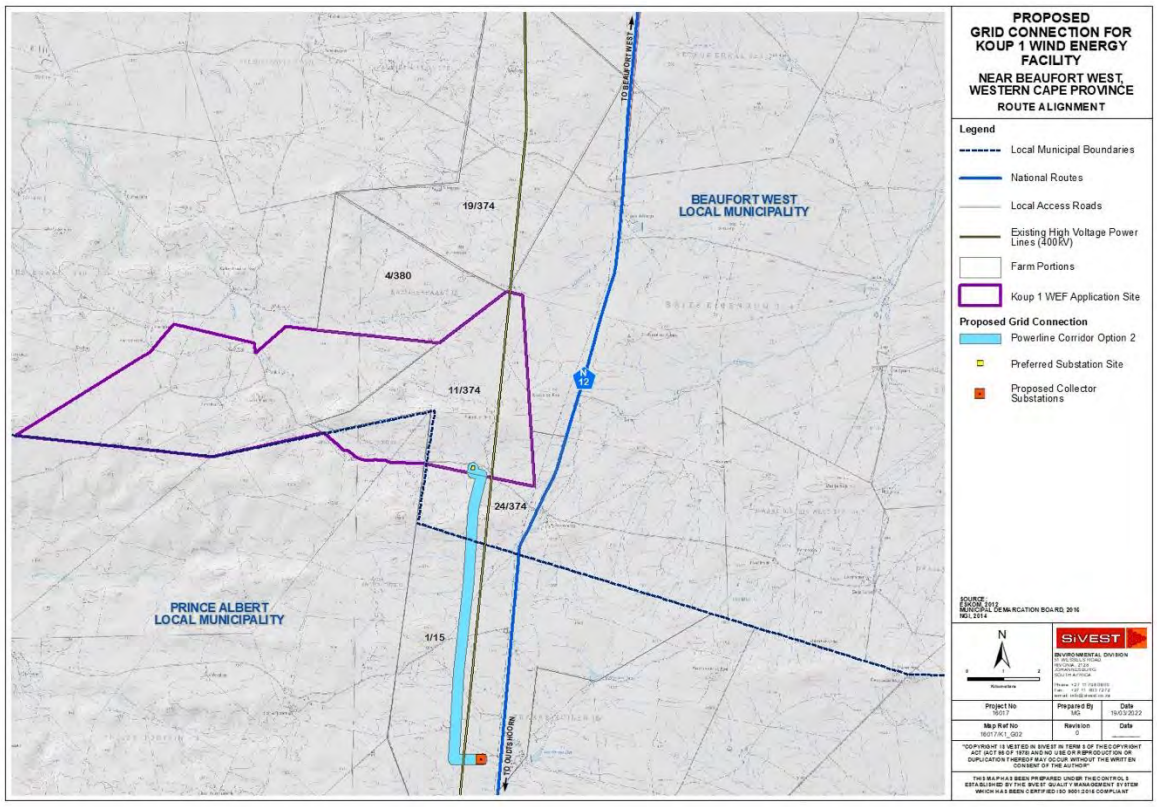


Figure 4: Final proposed 132kV Power Line Route Alignment (Option 2) for Koup 1.

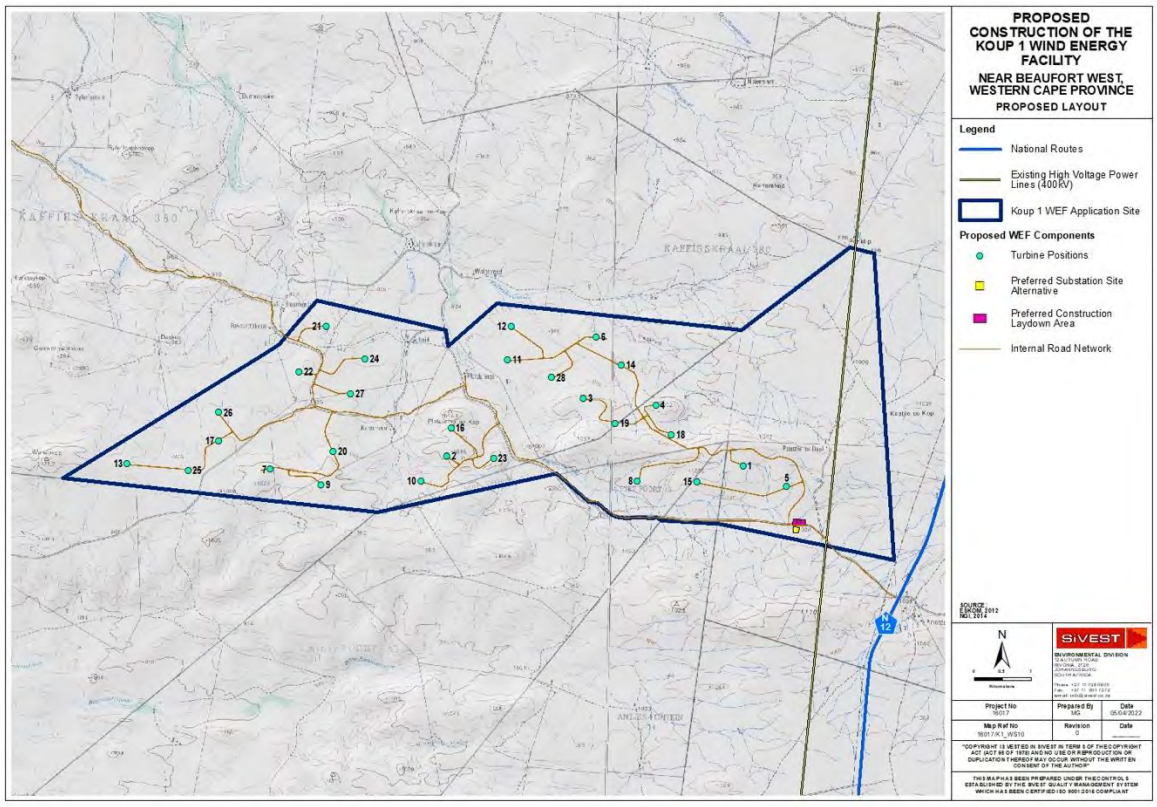


Figure 5: Final Proposed Layout for the Turbines, Construction Laydown Area and Substation Site Positions for Koup 1.

6. 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 finalised layout has considered the sensitivities identified during the field assessment. By selecting the Grid Option 2, the possible pre-construction impacts calculated on the tangible cultural heritage resources is overall reduced to a **LOW NEGATIVE** impact after the recommendations have been implemented.

7. RECOMMENDATIONS

The calculated impact as summarised in **Section 9** of this report confirms the impact of the new Koup 1 WEF and associated grid connection infrastructure 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 Koup 1 WEF and associated grid connection infrastructure must be conducted with the final walkdown of the area during the implementation of the EMPr.

The following mitigation measures will be required:

- 50m buffer zones around grave sites
- 30m buffer zone around farmsteads
- 30 buffer zone around historical structures
- Monitor find spot areas if construction is going to take place through them.
- A management plan for the heritage resources then needs to be compiled and approved for implementation during construction and operations.

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 Koup 1 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 authorised.

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 **Appendix A**
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;	Section 8
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 and 13
k) any mitigation measures for inclusion in the EMPr;	Section 8 and 12
l) any conditions for inclusion in the environmental authorisation;	Section 8 and 12

m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 8 and 12
n) a reasoned opinion- 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 EMPr, and where applicable, the closure plan;	Executive Summary; Section 13
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 *gazetted* 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 KOUP 1 WIND ENERGY FACILITY AND ASSOCIATED GRID INFRASTRUCTURE, NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE, SOUTH AFRICA

ARCHAEOLOGICAL IMPACT ASSESSMENT

Contents

EXECUTIVE SUMMARY

1. SITE NAME IV

2. LOCATION IV

3. DESCRIPTION OF THE PROPOSED DEVELOPMENT V

4. HERITAGE RESOURCES IDENTIFIED VII

5. FINAL PROPOSED WEF LAYOUT VII

6. ANTICIPATED IMPACTS ON HERITAGE RESOURCES IX

7. RECOMMENDATIONS X

1. INTRODUCTION 2

1.1 Scope of the Study 3

1.2 Specialist Credentials 3

2. ASSESSMENT METHODOLOGY 3

2.1 Site Significance classification standards 4

3. ASSUMPTIONS AND LIMITATIONS 7

4. TECHNICAL DESCRIPTION 7

4.1 Project Location 7

4.1.1 WEF 8

4.1.2 Grid Connection 9

4.2 Project Description 11

4.2.1 Wind Farm Components 11

4.2.2 Grid Components 13

4.3 Layout alternatives 13
4.3.1 Wind Energy Facility 13
4.3.2 Grid Components 15
4.3.3 No-go Alternative 16

5. LEGAL REQUIREMENT AND GUIDELINES 16
5.1 Statutory Framework: The National Heritage Resources (Act 25 of 1999) 16
5.1.1 Section 35 – Archaeology, Palaeontology and Meteorites 16
5.1.2 Section 36 – Burial Grounds & Graves 16
5.1.3 Section 38 HIA as a Specialist Study within the EIA in Terms of Section 38(8) 17
5.1.4 Notice 648 of the Government Gazette 45421 18
5.1.5 NEMA – Appendix 6 requirements 20

6. DESCRIPTION OF THE RECEIVING ENVIRONMENT 20

7. BACKGROUND RESEARCH 23
7.1 Archival/Historical Maps 23
7.1.1 1: 50 000 Topographical Map 3222DC and 3222CD - First Edition 1965 24
7.2 Aspects of the area's history 25
7.2.1 Previous Heritage Studies in area 25
7.2.2 Archaeological Background 28
7.3 Findings of the historical desktop study 31
7.3.1 Heritage Screening 31
7.3.2 Heritage Sensitivity 31
7.3.3 Possible Heritage Finds 32

8. FIELDWORK FINDINGS 34
8.1 Find spots 41
8.2 Sites 42

9. IDENTIFICATION AND ASSESSMENT OF IMPACTS 62
9.1 General Observations 62
9.2 Pre-construction 64
9.3 Cumulative Impacts 67
9.1 Overall Impact Rating 70

10. COMPARATIVE ASSESSMENT OF ALTERNATIVES 70
10.1 The No-Go Alternative 71

11. GENERAL RECOMMENDATIONS AND MITIGATION MEASURES 71

11.1 Construction phase 71
11.2 Chance finds procedure 71
11.3 Possible finds during construction 72
11.4 Timeframes 72
11.5 Heritage Management Plan for EMPr implementation 73

12. CONCLUSIONS AND RECOMMENDATIONS 76

13. REFERENCES 78

List of Tables

Table 1 : Rating system for archaeological resources 5
Table 2: Rating system for built environment resources 5
Table 3 : Reporting requirements for GN648 19
Table 4: Summary of archival data found on the general area. 28
Table 5: Tangible heritage sites in the study area 31
Table 6: Landform type to heritage find matrix 32
Table 7: Find spots 41
Table 8: Archaeological resources 42
Table 9: Assessment of the Impact of Proposed WEF on Heritage Sites 64
Table 10: Assessment of the Impact of Proposed Grid Infrastructure on Heritage Sites 66
Table 11: Impact rating - Cumulative 69
Table 12: Lead times for permitting and mobilisation 72
Table 13: Heritage Management Plan for EMPr implementation 73

List of Figures

Figure 1: Locality of the Koup 1 study area. v
Figure 2: Alternatives originally proposed and considered as part of the Koup 1 assessment process. vi
Figure 3: 132kV Power Line Route Alignments originally considered as part of the assessment process. vi
Figure 4: Final proposed 132kV Power Line Route Alignment (Option 2) for Koup 1. viii
Figure 5: Final Proposed Layout for the Turbines, Construction Laydown Area and Substation Site Positions for Koup 1. ix
Figure 6: Human and Cultural Timeline in Africa (Morris, 2008) xx
Figure 7: Regional Context Map 8
Figure 8: Koup 1 WEF Site Locality 9
Figure 9: Proposed 132kV Power Line Route Alignments originally considered as part of the assessment process. 10
Figure 10: Final proposed 132kV Power Line Route Alignment (Option 2) for Koup 1. 11
Figure 11: Alternatives originally proposed and considered as part of the Koup 1 assessment process. 14

Figure 12: Final Proposed Layout for the Turbines, Construction Laydown Area and Substation Site Positions for Koup 1. 15
Figure 13: DEFF Screening tool outcome indicating low significance 19
Figure 14: General regional view of landscape from the top of a ridge (facing SE).. 21
Figure 15: Typical hillock observed within the study area. 21
Figure 16: Sparsely vegetated flat plain with scattered rock fragments (facing north). 21
Figure 17: Flat plain with gravel surface in the north-western section of the WEF.. 21
Figure 18: Grass covered plain within the study area..... 21
Figure 19: Land surface with sheet wash. 21
Figure 20: Plain with dense rock fragments (siltstone and fine-grained sandstone). 22
Figure 21: Bioturbated sandy soil. 22
Figure 22: Main gravel farm road. 22
Figure 23: Example of farm fencing..... 22
Figure 24: Exfoliation of fine-grained rock (left) resulting in the formation of fragments which could be mistaken for having been knapped (right)..... 22
Figure 25: Foliated mudstone outcrop with pseudo flakes. 23
Figure 26: Proposed area for substation site option 1 (facing east towards N12). ... 23
Figure 27: First Edition of 3222CD Topographic Map 1: 50 000 dating to 1965, showing the proposed Koup 1 WEF, with several possible heritage features located within and near the project area. 24
Figure 28: First Edition of 3222DC Topographic Map 1: 50 000 dating to 1965, showing the proposed Koup 1 WEF, with one possible heritage features located within the study area. 25
Figure 29: Trekboer and colonial expansion by 1717-1788 in the study region (Reference: Guelke & Shell 1992: 818). 30
Figure 30: Early map of the Cape illustrates the expansion of farmers towards the east and northeast Karoo (Reference: Watson, R.L. 1990)..... 30
Figure 31: Possible heritage sensitivity areas; Farmstead (incl. structures; yellow polygon) and Dry Water Courses (blue polygon) in relation to the final proposed Koup 1 WEF project area. 33
Figure 32: Track log recordings from the 2021 site visit to Koup 1 WEF. 35
Figure 33: Track log recordings from the 2021 site visit in relation to the final proposed Koup 1 WEF layout. 36
Figure 34: Locality of the heritage resources identified within the study area. 37
Figure 35: Locality of find spots identified within the western part of the study area. 38
Figure 36: Locality of structures, graves and find spots identified within the central section of the proposed WEF development area. 39
Figure 37: Locality of the archaeological site and find spots identified in the eastern part of the study area. 40
Figure 38: Fine-grained sandstone artefact..... 41
Figure 39: Silicified mudstone artefacts..... 41
Figure 40: Artefacts at KO_18..... 43
Figure 41: Front view of KO-01 44
Figure 42: Back view of KO-01..... 44
Figure 43: Side view of KO-01 44
Figure 44: Rubbish associated with KO-01 44
Figure 45: 3222CD topographical sheet surveyed in 1987 depicts a structure at KO-01 44

Figure 46: View of KO-02 46
Figure 47: Side view of KO-02 46
Figure 48: Rubbish around KO-02 46
Figure 49: Collapsed roof at KO-02 46
Figure 50: 3222CD topographical sheet surveyed in 1965 depicts KO-02 47
Figure 51: Front view of KO-03 (facing south) 48
Figure 52: Side view of KO-03 48
Figure 53: Modern kraal between KO-02 and KO-03 48
Figure 54: 3222CD topographical sheet surveyed in 1965 depicts multiple structures within the vicinity of KO-03 48
Figure 55: View of KO-08 49
Figure 56: View of four graves at KO-07 51
Figure 57: Headstone inscription “Anna Magdalena Bothma, 23-07-1949” 51
Figure 58: View of grave and headstone inscription at KO-07 52
Figure 59: Grave and headstone inscription at KO-07 52
Figure 60: Grave and headstone inscription at KO-07 53
Figure 61: View of KO-04 54
Figure 62: 3222CD topographical sheet surveyed in 2005 depicts a structure at the location of KO-04 54
Figure 63: View of the KO-05 from farm track 56
Figure 64: View of one of the structures at KO-05 (facing east) 56
Figure 65: View of one of the structures and windmills at KO-05 56
Figure 66: Ruin in the northern part of KO-05 56
Figure 67: View from the ruin looking back towards the main farmhouse (facing south). 57
Figure 68: 3222CD topographical sheet surveyed in 1965 depicts a number of structures at the location of KO-05. 57
Figure 69: View of three of the graves situated in a row at KO-06 58
Figure 70: Closer view of one of the graves at KO-06 (furthest left grave in Figure 78) 58
Figure 71: Closer view of one of the graves at KO-06 (middle grave in Figure 78) . 59
Figure 72: Closer view of one of the graves at KO-06 (furthest right grave in Figure 78) 59
Figure 73: Fourth grave at KO-06 60
Figure 74: View of KO-09 61
Figure 75: Another view of KO-09 61
Figure 76: Renewable energy facilities proposed within a 35km radius of the proposed development (provided by SiVEST). 68

List of Appendices

APPENDIX A – CV

APPENDIX B – Impact Assessment Methodology

APPENDIX C – Site Sensitivity Verification Report

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.

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.

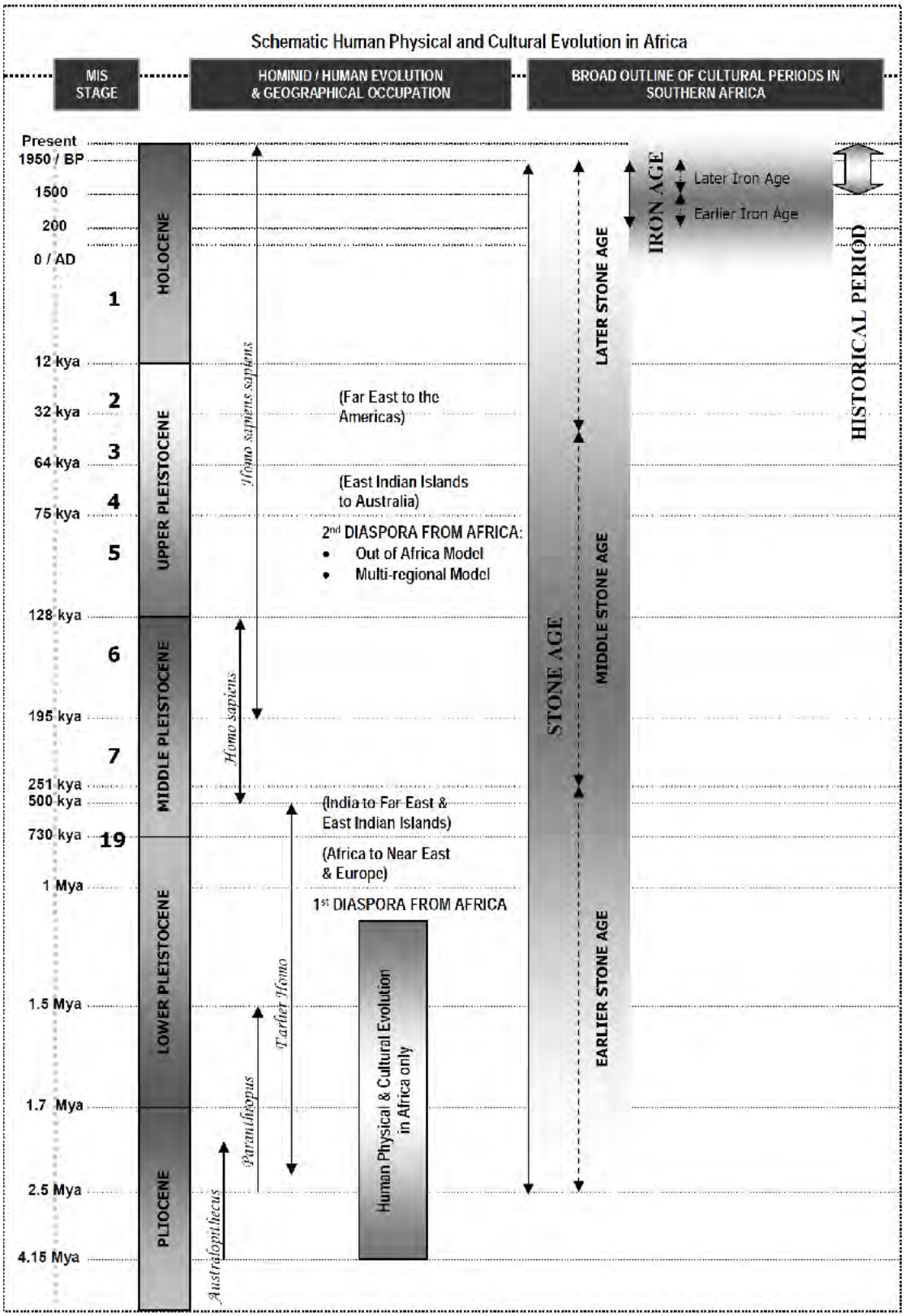


Figure 6: Human and Cultural Timeline in Africa (Morris, 2008)

List of Abbreviations

Abbreviations	Description
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
DEFF	Department of Environment, Forestry and Fisheries
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
Genesis	Genesis Enertrag Koup 1 Wind (Pty) Ltd
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
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

SiVEST (PTY) LTD

PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY AND ASSOCIATED GRID INFRASTRUCTURE, NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE, SOUTH AFRICA

ARCHAEOLOGICAL IMPACT ASSESSMENT

1. INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) has been appointed by SiVEST (PTY) Ltd (hereafter referred to as "SiVEST"), on behalf of Genesis Enertrag Koup 1 Wind (Pty) Ltd (hereafter referred to as "Genesis"), to undertake the assessment of the proposed construction of the Koup 1 Wind Energy Facility (WEF) and associated grid connection infrastructure near Beaufort West in the Western Cape Province of South Africa.

The overall objective of the development is to generate electricity by means of renewable energy technology capturing wind energy to feed into the National Grid.

It is anticipated that the proposed Koup 1 WEF will comprise twenty-eight (28) wind turbines with a maximum total energy generation capacity of up to approximately 140MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line. A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.

In terms of the Environmental Impact Assessment (EIA) Regulations, which were published on 04 December 2014 [GNR 982, 983, 984 and 985) and amended on 07 April 2017 [promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017], various aspects of the proposed development are considered listed activities under GNR 327 and GNR 324 which may have an impact on the environment and therefore require authorisation from the National Competent Authority (NCA), namely the Department of Environment, Forestry and Fisheries (DEFF), prior to the commencement of such activities. Specialist studies have been commissioned to assess and verify the project under the new Gazetted specialist protocols.

1.1 Scope of the Study

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

1.2 Specialist Credentials

This AIA was compiled by PGS.

The staff at PGS has a combined experience of nearly 70 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Ms. Nikki Mann, 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).

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).

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

2. ASSESSMENT METHODOLOGY

The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the NEMA (no 107 of 1998). The AIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey relies greatly on the Heritage Background Research.

Step II – Physical Survey: A physical survey was conducted on foot through the proposed project area by a qualified archaeologist (9-10 June 2021 and 23 July 2021), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant archaeological resources, the assessment of resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

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

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
  - Low - <10/50m2
  - Medium - 10-50/50m2
  - High - >50/50m2
- Uniqueness; and
- Potential to answer present research questions.

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

A - No further action necessary;

B - Mapping of the site and controlled sampling required;

C - No-go or relocate development activity position;

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

E - Preserve site.

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

2.1 Site Significance classification standards

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this report

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 or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	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
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
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	No research potential or other cultural significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
		structures in this category if they are older than 60 years.	

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 and the current dense vegetation cover. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist 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.**

The fieldwork was hampered by the mountainous terrain of the farms and made access and thus coverage of the farms difficult.

4. TECHNICAL DESCRIPTION

4.1 Project Location

The proposed WEF and associated grid connection infrastructure is located approximately 55km south of Beaufort West in the Western Cape Province and is within the Beaufort West and Prince Albert Local Municipalities, in the Central Karoo District Municipality (**Figure 7**).

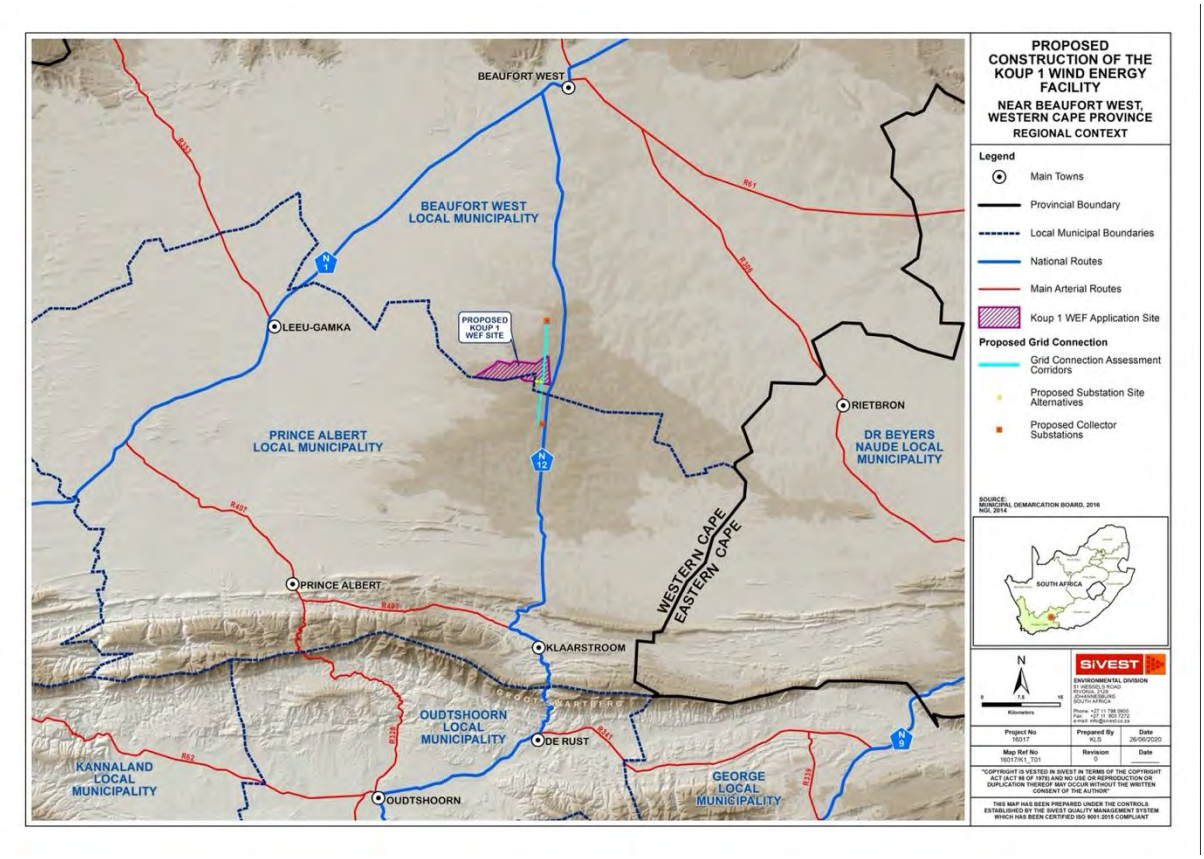


Figure 7: Regional Context Map

4.1.1 WEF

The WEF application site as shown on the locality map below (**Figure *8***) is approximately 4279.398 hectares (ha) in extent and incorporates the following farm portions:

- The Farm Riet Poort No 231
- Portion 11 of the Farm Brits Eigendom No 374
- Portion 15 of the Farm Brits Eigendom No 374
- Portion 5 of farm 380
- Portion 10 of farm 380
- Portion 11 of farm 380

A smaller buildable area (2445.667 ha) has however been identified as a result of a preliminary suitability assessment undertaken by Genesis 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.

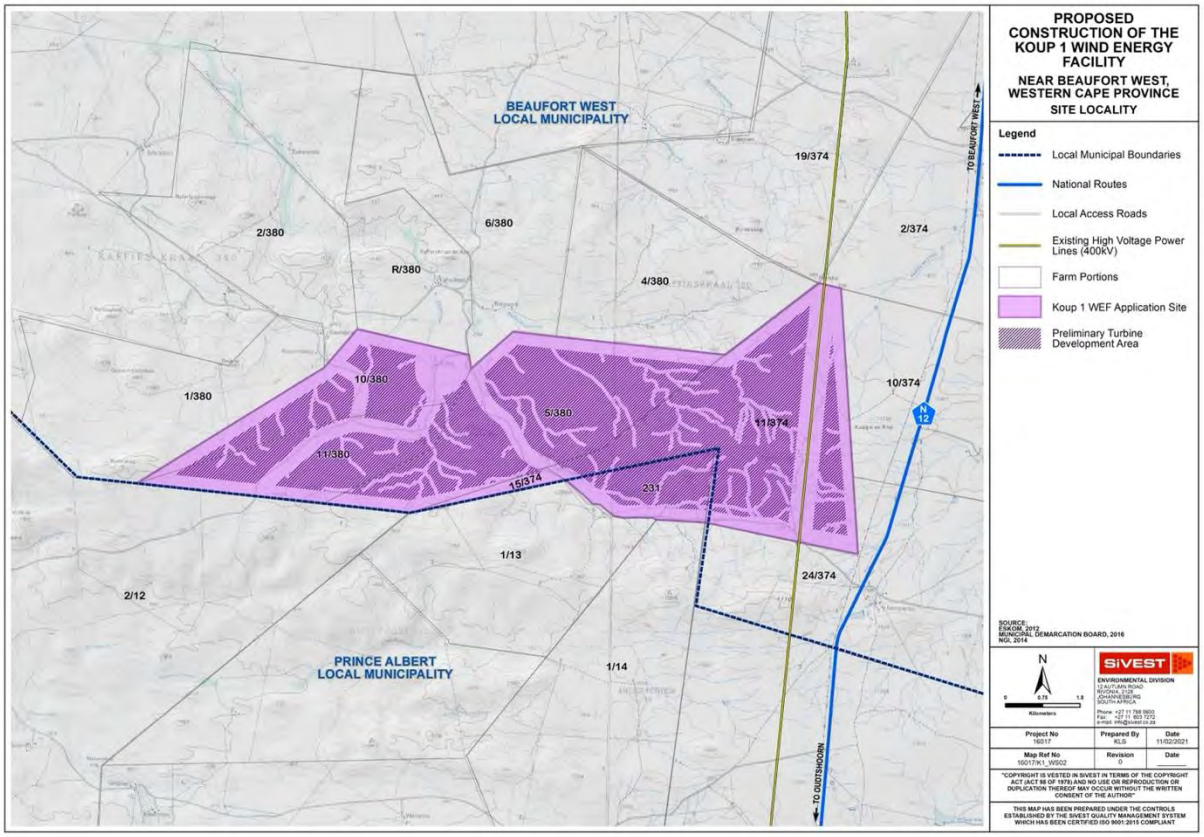


Figure 8: Koup 1 WEF Site Locality

4.1.2 Grid Connection

It is proposed that a 132kV overhead power line will connect the Koup 1 WEF on-site switching substation / collector to the national grid either by way of an off-site collector substation, or via a direct tie-in to existing 400kV transmission lines that traverse the Koup 1 WEF project site (**Figure 9**). Three route options have been assessed.

The finalised project proposal has considered the sensitivities identified during the 2021 field assessment. Grid Option 1 was not feasible as Eskom won't allow two collectors within a small radius, while Grid Option 3 has been eliminated as a result of identified bird nests. The route of the chosen Grid Option 2 is shown in **Figure 10**.

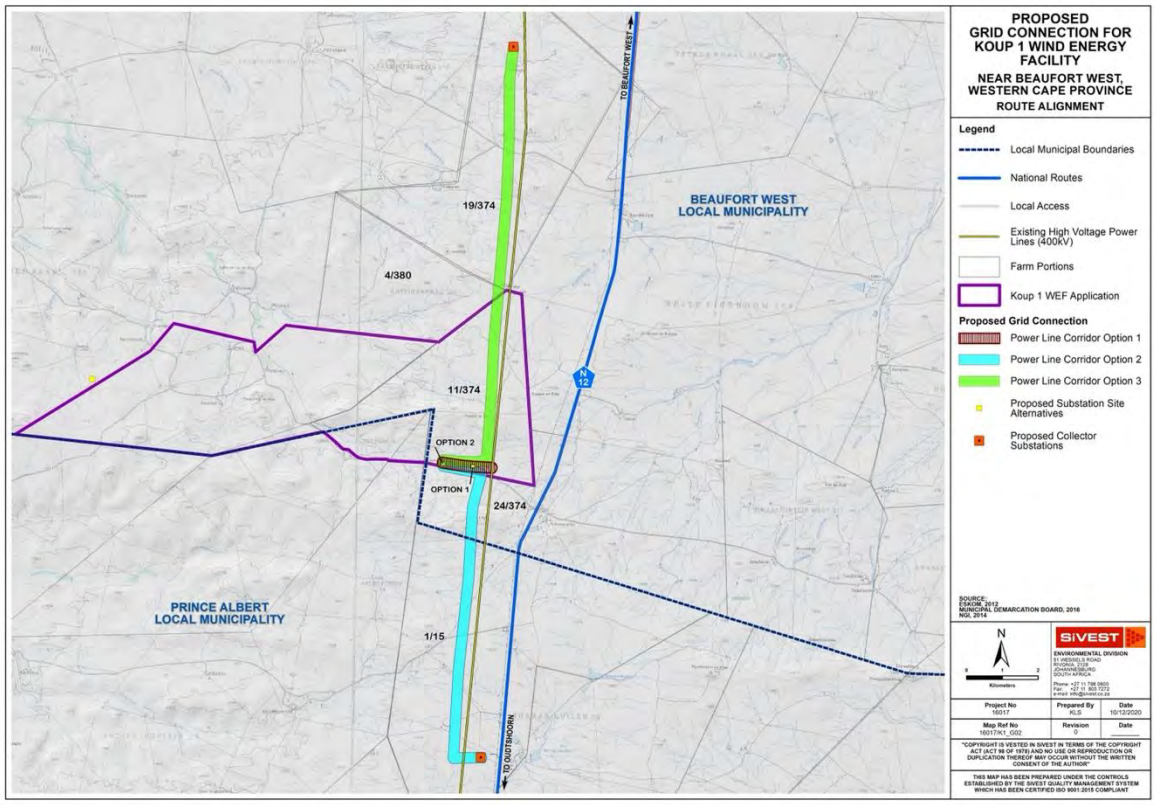


Figure 9: Proposed 132kV Power Line Route Alignments originally considered as part of the assessment process.

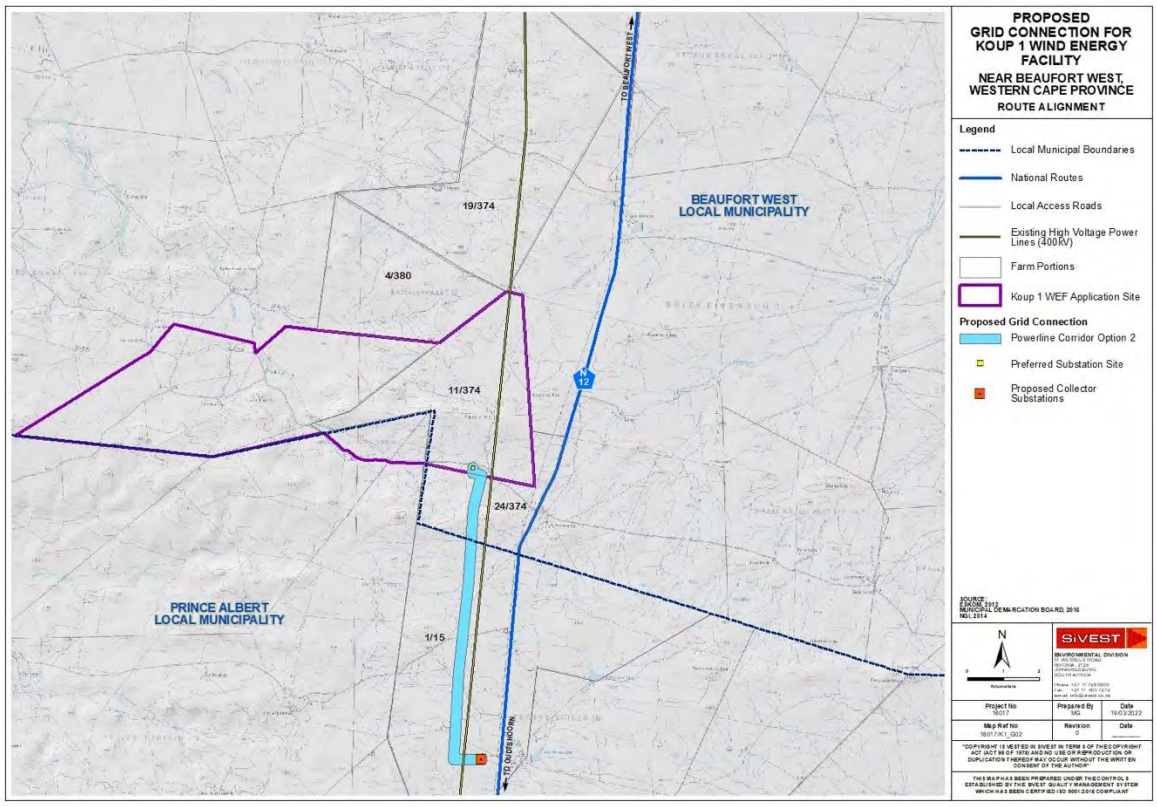


Figure 10: Final proposed 132kV Power Line Route Alignment (Option 2) for Koup 1.

4.2 Project Description

It is anticipated that the proposed Koup 1 WEF will comprise twenty-eight (28) wind turbines with a maximum total energy generation capacity of up to approximately 140MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line. A BESS will be located next to the onsite 33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.

4.2.1 Wind Farm Components

- Up to 28 wind turbines, each between 5.6MW and 6.6MW, with a maximum export capacity of approximately 140MW. 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 and rotor diameter of up to approximately 200m;

- Permanent compacted hardstanding areas / platforms (also known as crane pads) of approximately 90m x 50m (total footprint of approx. 4 500m2) 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;
- Electrical transformers adjacent to each wind turbine (typical footprint of up to approximately 2m x 2m) to step up the voltage to 33kV;
- One (1) new 33/132kV on-site substation and/or combined collector substation, occupying an area of approximately 1.5 ha . The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in the WEF EIA and in the grid infrastructure BA (substation and 132kV overhead power line) to allow for handover to Eskom. Following construction, the substation will be owned and managed by Eskom. The current applicant will retain control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction ;
- The wind turbines will be connected to the proposed substation via medium voltage (33kV) cables. Cables will be buried along access roads wherever technically feasible.
- A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks;
- Internal roads with a width of between 8m and 10m will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via an existing gravel road from the N12 National Route;
- One (1) construction laydown / staging area of up to approximately 2.25ha. It should be noted that no construction camps will be required in order to house workers overnight as all workers will be accommodated in the nearby town;
- One (1) permanent Operation and Maintenance (O&M) building, including an on-site spares storage building, a workshop and an operations building to be located on the site identified for the construction laydown area.
- A wind measuring lattice (approximately 120m in height) mast has already been strategically placed within the wind farm application site in order to collect data on wind conditions;
- No new fencing is envisaged at this stage. Current fencing is standard farm fence approximately 1-1.5m in height. Fencing might be upgraded (if required) to be up to approximately 2m in height; and
- Water will either be sourced from existing boreholes located within the application site or will be trucked in, should the boreholes located within the application site be limited.

4.2.2 Grid Components

The proposed grid connection infrastructure to serve the Koup 1 WEF will include the following components:

- One (1) new 33/132kV on-site substation and/or collector substation, occupying an area of up to approximately 1.5 ha. The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in both the EIA for the WEF and in the BA for the grid infrastructure to allow for handover to Eskom. The applicant will remain in control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction; and
- One (1) new 132kV overhead power line connecting the on-site and/or collector substation either to an off-site collector substation, or via a direct tie-in to the existing 400kV overhead power lines and thereby feeding the electricity into the national grid. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. Maximum tower height is expected to be approximately 25m.

4.3 Layout alternatives

4.3.1 Wind Energy Facility

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 site alternatives considered are shown in **Figure 11** and the final proposed layout is shown in **Figure *12***.

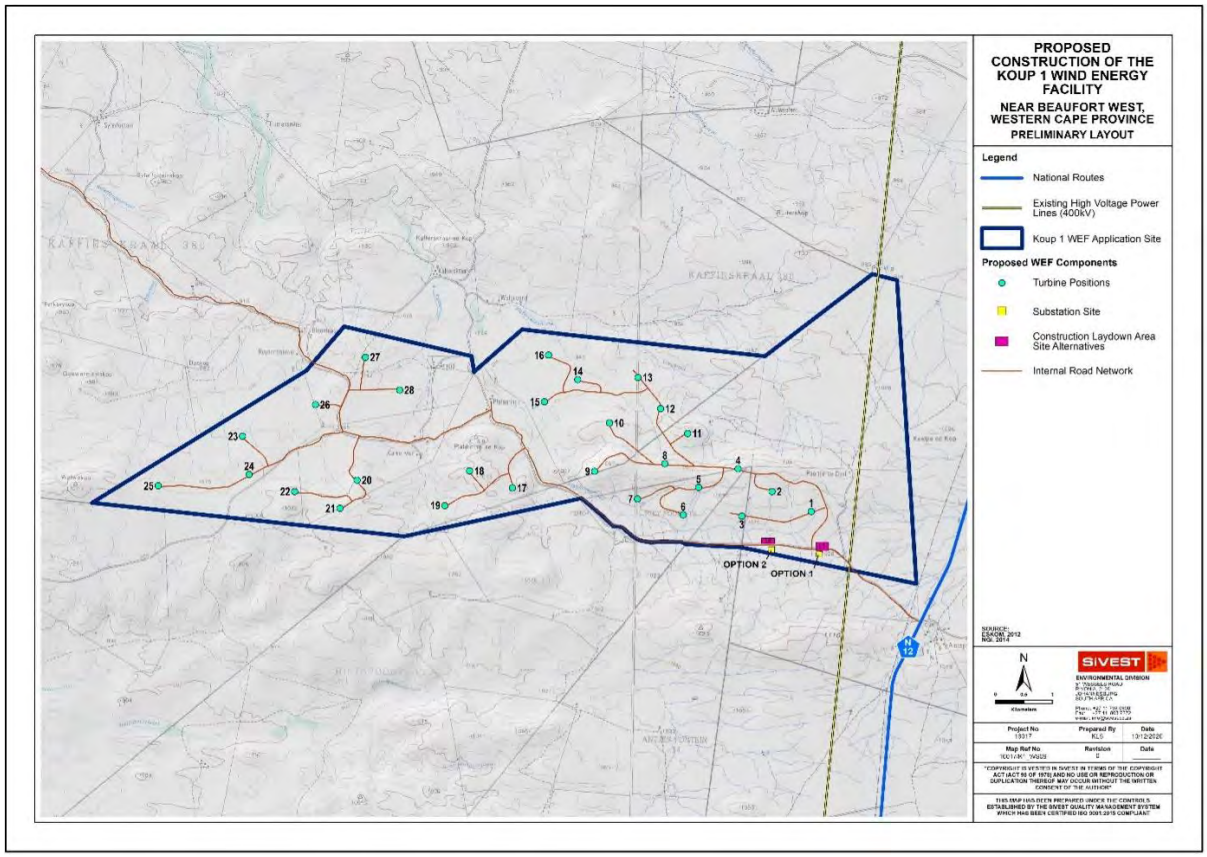


Figure 11: Alternatives originally proposed and considered as part of the Koup 1 assessment process.

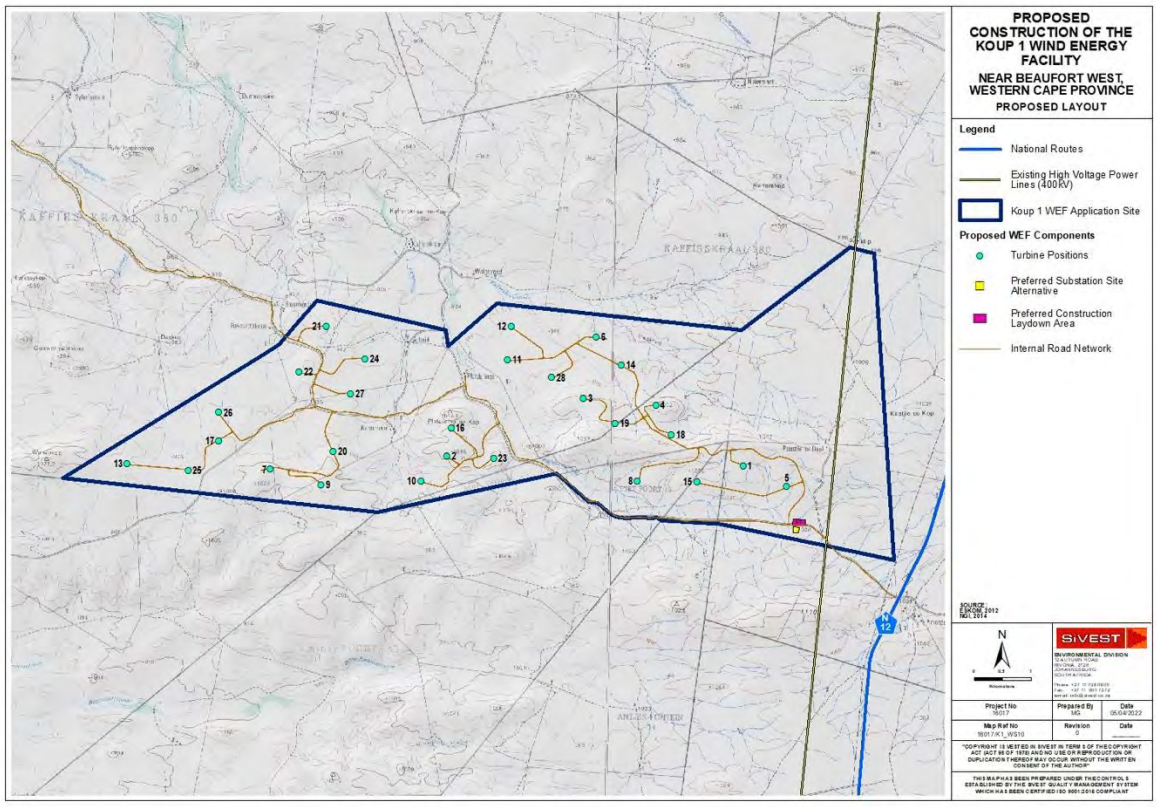


Figure 12: Final Proposed Layout for the Turbines, Construction Laydown Area and Substation Site Positions for Koup 1.

4.3.2 Grid Components

The grid connection infrastructure proposals include two (2) switching and collector substation site alternatives and three (3) power line route alignment alternatives (**Figure 9**). These alternatives will be considered and assessed as part of the BA process and will be amended or refined to avoid identified environmental sensitivities.

All three (3) power line route alignments will be assessed within a 300m wide assessment corridor (150m on either side of power line). These alternatives are described below:

- Power Line Corridor Option 1 is approximately 1.3km in length, linking either substation / collector Option 1 or Option 2 to the existing 400kV transmission lines.
- Power Line Corridor Option 2 is approximately 9.9km in length, linking either substation / collector Option 1 or Option 2 to a proposed Collector Substation to the south, adjacent to the existing 400kV transmission lines.

- Power Line Corridor Option 3 is approximately 12.9km in length, linking either substation / collector Option 1 or Option 2 to a proposed Collector Substation to the north, adjacent to the existing 400kV transmission lines.

As shown in **Figure *10***, the chosen grid connection is Option 2.

4.3.3 No-go Alternative

The 'no-go' alternative is the option of not undertaking the proposed WEF and / or grid connection infrastructure projects. Hence, if the 'no-go' option is implemented, there would be no development. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local 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 issues 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

c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

d) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant.

5.1.3 Section 38 HIA as a Specialist Study within the EIA in Terms of Section 38(8)

A NHRA Section 38 (Heritage Impact Assessments) application to HWC is required when the proposed development triggers one or more of the following activities:
Permitting requirements for demolition of built environment features:

a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
b) the construction of a bridge or similar structure exceeding 50 m in length;
c) any development or other activity which will change the character of a site,
i. exceeding 5 000 m2 in extent; or
ii. involving three or more existing erven or subdivisions thereof; or
iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

d) the re-zoning of a site exceeding 10 000 m2 in extent; or

e) any other category of development provided for in regulations by HWC or a provincial heritage resources authority

In this instance, the heritage assessment for the property is to be undertaken as a component of the BA for the project. Provision is made for this in terms of Section 38(8) of the NHRA, which states that:

This is an HIA submitted to the relevant authority in terms of Section 38(8) of the National Heritage Resources Act. The commenting authority is the HWC.

An HIA report is required to identify, and assess archaeological resources as defined by the Act, assess the impact of the proposal on the said archaeological resources, review alternatives and recommend mitigation (see methodology above).

Section 38 (3) Impact Assessments are required, in terms of the statutory framework to conform to basic requirements as laid out in Section 38(3) of the NHRA. These are:

- 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 palaeontological (2012) assessments[1] were published by SAHRA and Heritage Western Cape[2][3], GN.648 requires sensitivity verification for a site selected on the national web based environmental screening tool for which no specific assessment

[1] South African Heritage Resources Agency. 2007. *Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports*. May 2007.

[2] Heritage Western Cape. 2016. *Guide for Minimum Standards for Archaeology and Palaeontology Reports Submitted to Heritage Western Cape*. June 2016.

[3] 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).*

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 *13***).

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.	-

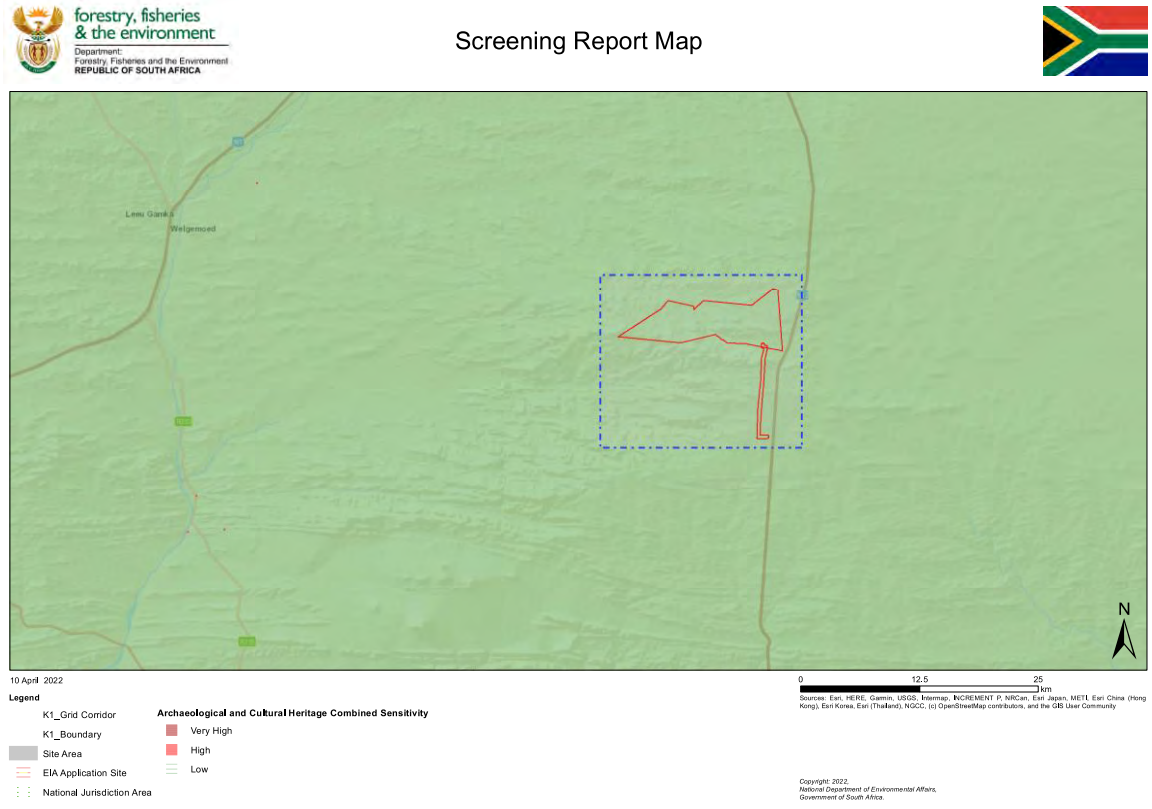


Figure 13: DEFF Screening tool outcome indicating low significance

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 site visit was conducted by two archaeologists and a field assistant from PGS from the 9th-10th June 2021 and 23rd July 2021. The general vicinity of the proposed development area was assessed.

The proposed development area is located approximately 55km 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 included kudu, gemsbok and small buck.

The study area is underlain by Karoo Supergroup sedimentary rocks. Rock types encountered include mudstones, siltstone, carbonates and fine-grained sandstones (**Figure 24**), some of which have been silicified and metamorphosed. The hilly terrain and flat plains (**Figure 15**) have undergone extensive erosion with the development of scree slopes and rocky gullies (**Figure 14**). The low lying flat sandy plains (often bioturbated; **Figure 21**) with areas of sheet wash (**Figure 19**) are frequently cut by ephemeral streams. The soils were predominately sandy with gravel (**Figure 17**) and large rock fragments (**Figure 20**).

The vegetation of the study area is typical of the Nama-Karoo biome and comprised grasses, stunted shrubs and thorn trees which are established along stream courses (Palmer & Hoffman, 1997; **Figure 16**). 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 (**Figure 22**). Existing infrastructure includes farmsteads with associated structures, fences, windmills and dams. Radio masts, telephone towers and trigonometric beacons were observed on hills.

Figure 14: General regional view of landscape from the top of a ridge (facing SE).

Figure 15: Typical hillock observed within the study area.

Figure 16: Sparsely vegetated flat plain with scattered rock fragments (facing north).

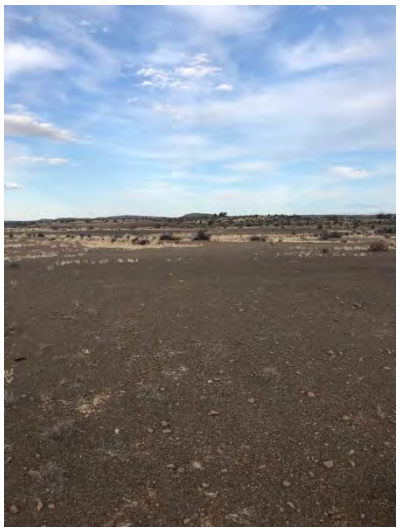


Figure 17: Flat plain with gravel surface in the north-western section of the WEF.

Figure 18: Grass covered plain within the study area.

Figure 19: Land surface with sheet wash.

Figure 20: Plain with dense rock fragments (siltstone and fine-grained sandstone).

Figure 21: Bioturbated sandy soil.

Figure 22: Main gravel farm road.

Figure 23: Example of farm fencing.

Figure 24: Exfoliation of fine-grained rock (left) resulting in the formation of fragments which could be mistaken for having been knapped (right).

Figure 25: Foliated mudstone outcrop with pseudo flakes.

Figure 26: Proposed area for substation site option 1 (facing east towards N12).

7. BACKGROUND RESEARCH

The previous section provided a topographical description of the proposed development area. This section seeks to describe the historical origins of the receiving environment.

The examination of heritage databases, historical data and cartographic resources represents a critical additional tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Therefore, an internet literature search was conducted, and relevant archaeological and historical texts were also consulted. Relevant topographic maps and satellite imagery were studied.

7.1 Archival/Historical Maps

Historical topographic maps (1:50 000) for various years (1965, 1987, 2005) were available for utilisation in the background study. These maps were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA.

There were several structures identified within the vicinity of the proposed development area. Most of the structures were identified as farmsteads are illustrated in the 1965 topographic map 3222CD (**Figure 27, Figure 28**).

7.1.1 1: 50 000 Topographical Map 3222DC and 3222CD - First Edition 1965

A section of the First Edition of the 3222DC and 3222CD Topographical Sheet is depicted in **Figure 27** and **Figure 28.** This map sheet was based on aerial photography undertaken in 1962, was surveyed in 1965 and was printed by the Trigonometrical Survey Office in 1966.

Several sites containing farmsteads are depicted in the vicinity of the study area. All these identified sites are likely to be at least 56 years old.

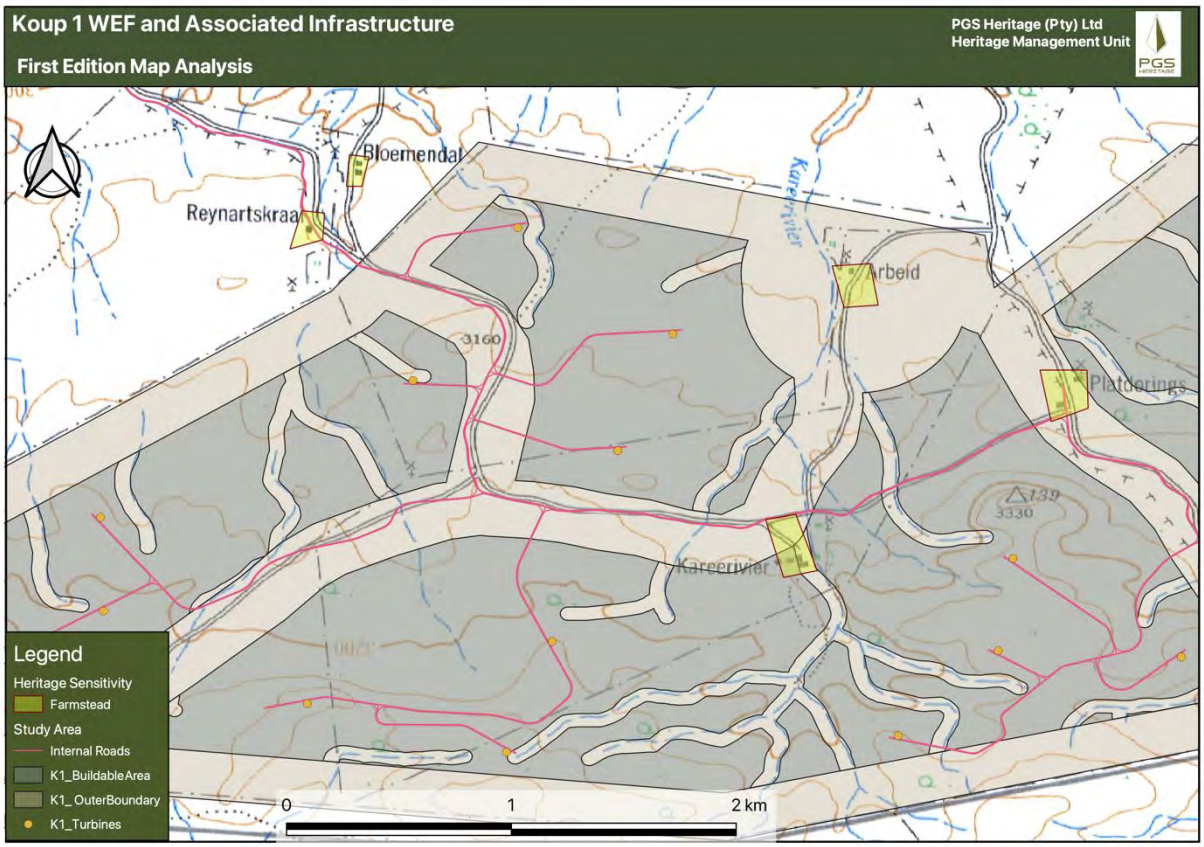


Figure 27: First Edition of 3222CD Topographic Map 1: 50 000 dating to 1965, showing the proposed Koup 1 WEF, with several possible heritage features located within and near the project area.

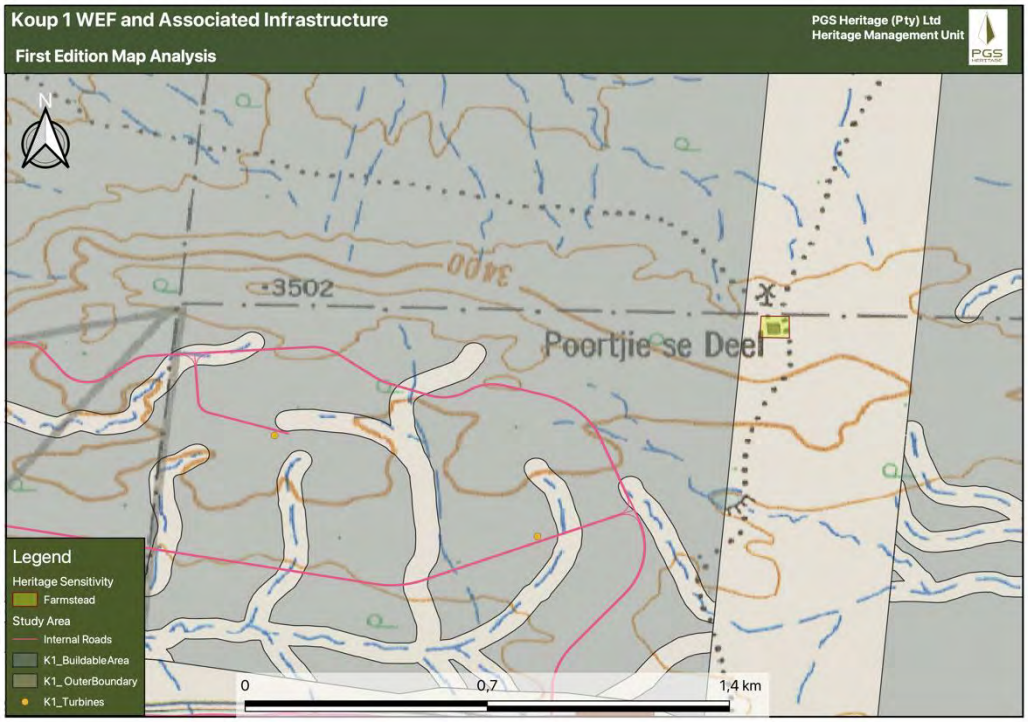


Figure 28: First Edition of 3222DC Topographic Map 1: 50 000 dating to 1965, showing the proposed Koup 1 WEF, with one possible heritage features located within the study area.

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 cnduct 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 (crockery 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 Kuilspoort, 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
Early Stone Age (2.5 million to 250 000 years ago)	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.

	Isolated ESA lithics, including occasional handaxes 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". 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.
Middle Stone Age (250 000 to 40 000 years ago)	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. 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 the area of 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. 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.
Later Stone Age (40 000 years ago to the historic past)	The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. 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 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. No Later Stone Age sites are known in the vicinity of the study area. However, this is in all likelihood rather due to a lack of research focus on the surroundings of the study area than a lack of sites.
17th – 19th Century	Beaufort West historically was an important centre for sheep farming, trade and transport. This was also an area of interaction between various cultural groups. 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 (**Figure 29**, **Figure 30**). 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 subsequent to the great cattle killing of 1856 and 1857. Many Xhosa migrated into the Karoo in search of work in order to survive. Many of these migrants

	fleeing starvation in the devasted lands east of the Kei River helped build some of the beautiful stone kraals that have become a feature of the Karoo.

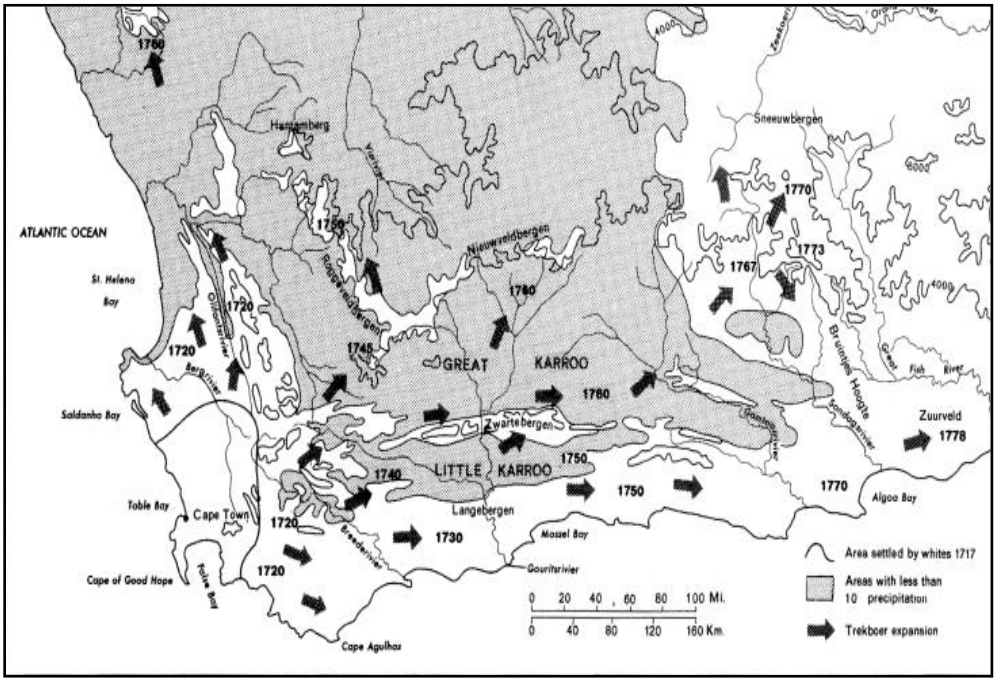
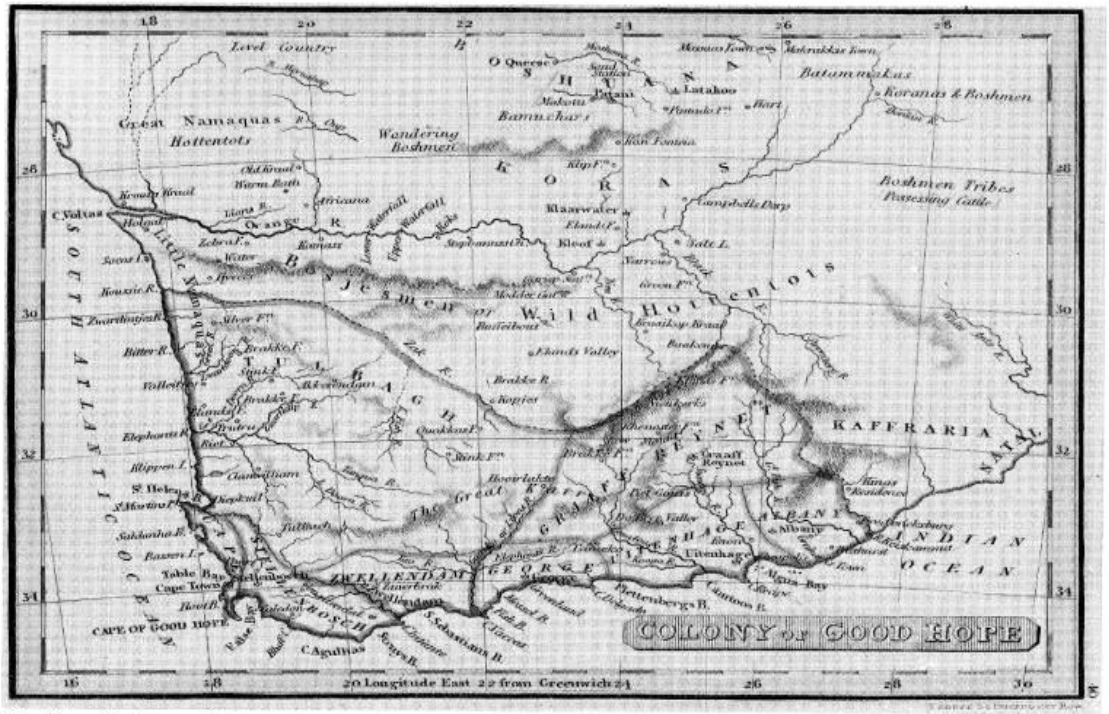


Figure 29: Trekboer and colonial expansion by 1717-1788 in the study region (Reference: Guelke & Shell 1992: 818).



The Cape Colony, 1820

Figure 30: 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 31**).

7.3.1 Heritage Screening

A Heritage Screening Report was compiled using the Department of Environment, Forestry and Fisheries 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 13**).

The field work in the study area demonstrates that historical structures of heritage significance 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 31**). 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

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

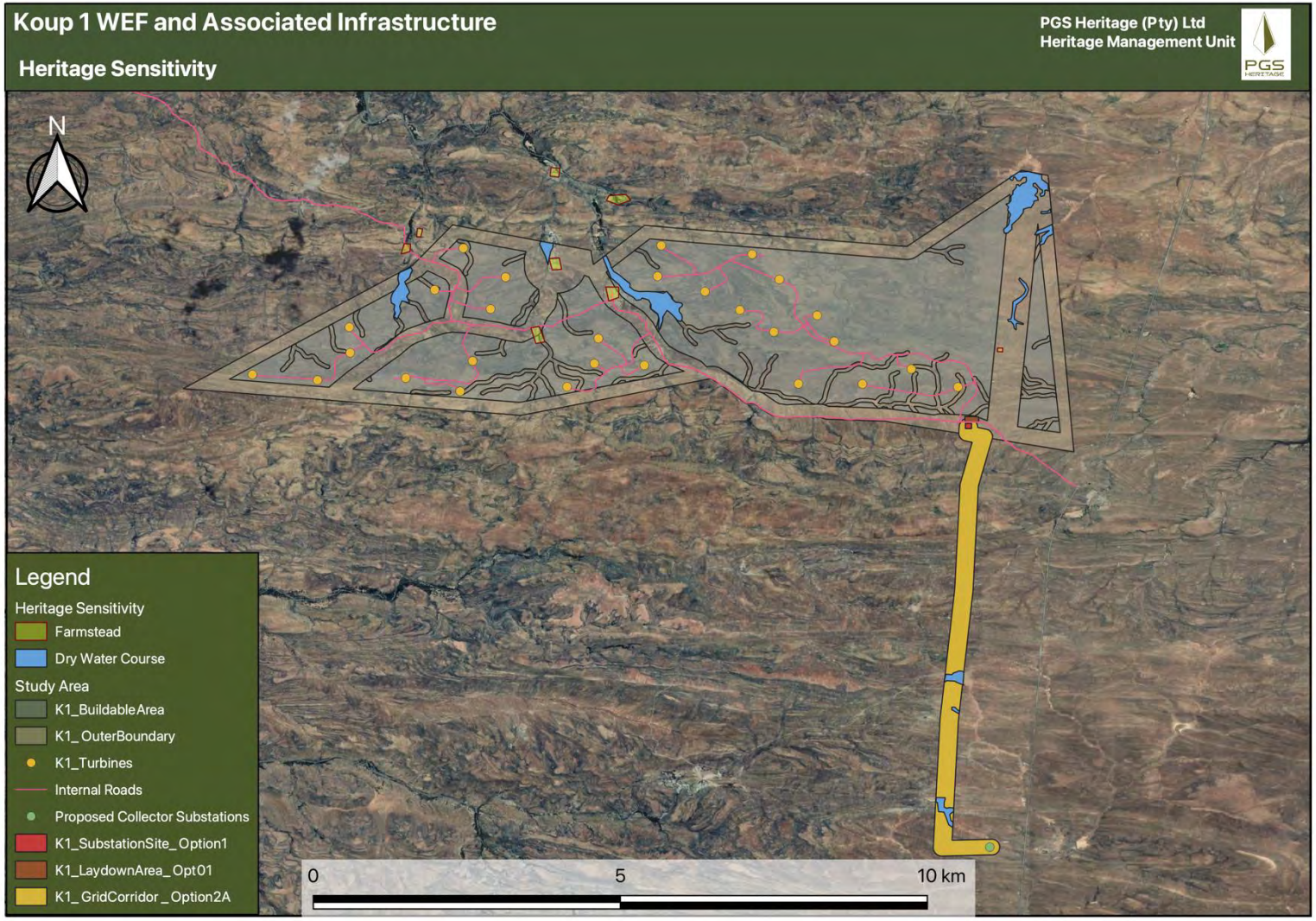


Figure 31: Possible heritage sensitivity areas; Farmstead (incl. structures; yellow polygon) and Dry Water Courses (blue polygon) in relation to the final proposed Koup 1 WEF project area.

8. FIELDWORK FINDINGS

A selective survey of the study area was conducted from the 9th-10th June 2021 and 23rd July 2021. Due to the nature of cultural remains, with the majority of 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 (**Figure 32**). Focus was placed on the areas identified for the placement of the proposed turbines and associated internal roads, laydown areas and substation sites within the larger assessment area. Farmsteads and structures were documented from their property boundaries when access was restricted. **Figure *33*** shows the 2021 field tracklog recordings in relation to the final proposed WEF layout.

The fieldwork identified 18 heritage finds that were then classified as either find spots, structures (incl. historical farmsteads) or graves. The fieldwork completed for the AIA component has confirmed the presence of 1 archaeological site (**KO_18**), 8 findspots (**KO_10 - KO_17**), 5 structures (**KO-01 – KO-05**), 2 grave and burial ground sites (**KO-06 – KO-07**) and 2 possible graves (**KO-08 - KO-09)** that may be affected by the proposed development (**Figure 34, Figure 35, Figure 36, Figure 37**).

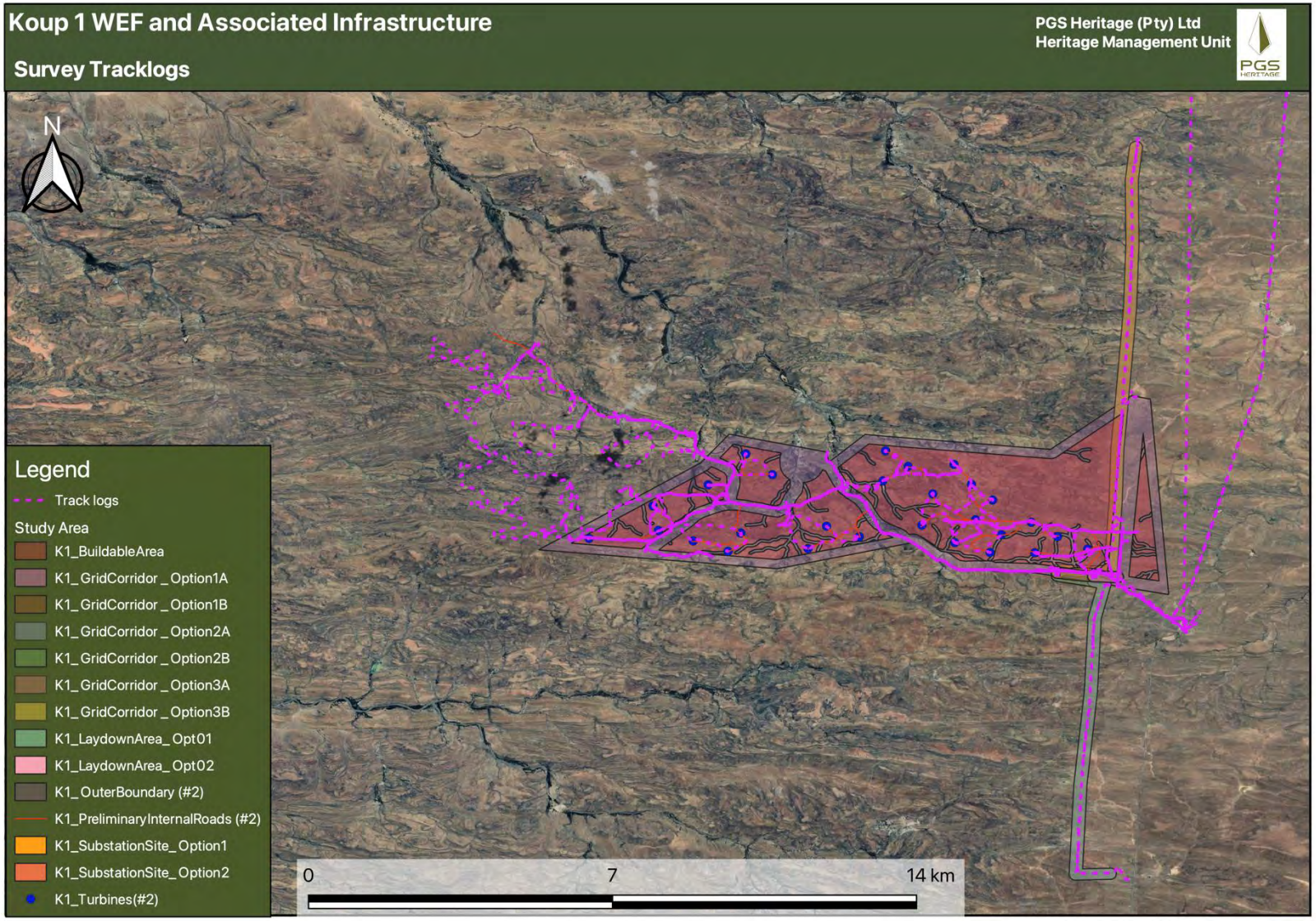


Figure 32: Track log recordings from the 2021 site visit to Koup 1 WEF.

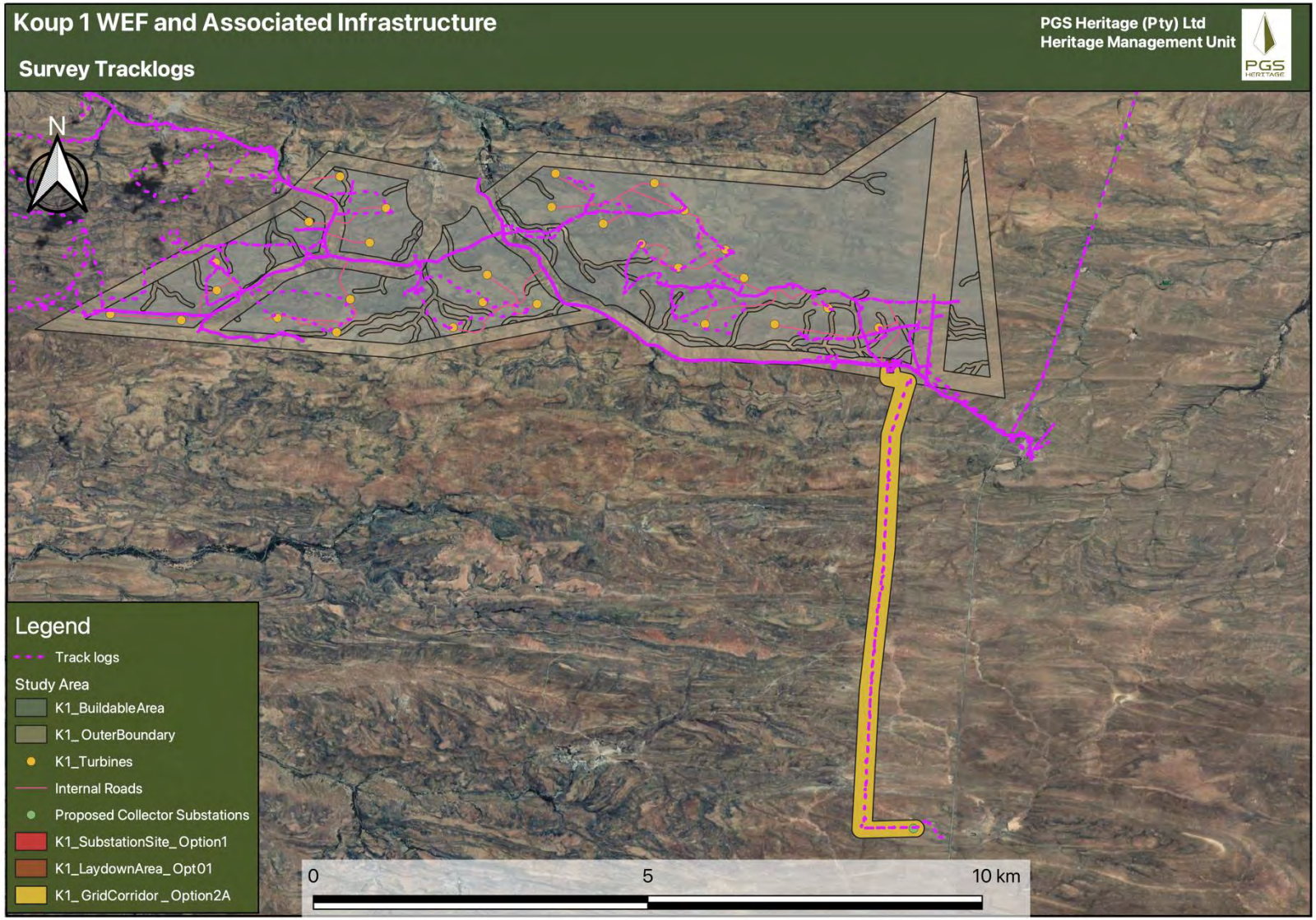


Figure 33: Track log recordings from the 2021 site visit in relation to the final proposed Koup 1 WEF layout.

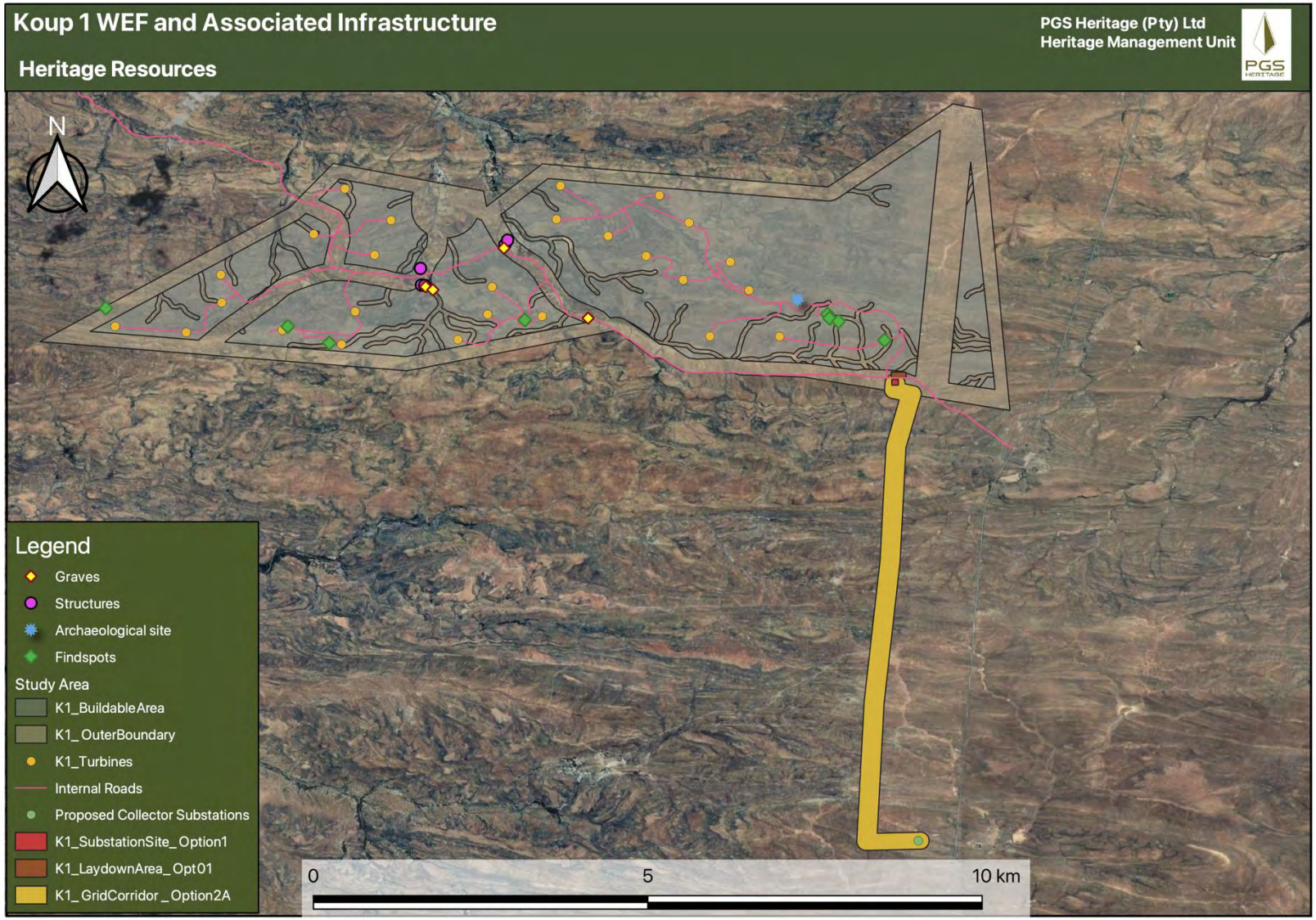


Figure 34: Locality of the heritage resources identified within the study area.

Figure 35: Locality of find spots identified within the western part of the study area.

Figure 36: Locality of structures, graves and find spots identified within the central section of the proposed WEF development area.

Figure 37: Locality of the archaeological site and find spots identified in the eastern part of the study area.

8.1 Find spots

The find spots (**KO_10 - KO_17; *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 silicified mudstone, siltstone and sandstones (**Figure 39**). 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 (**Figure 38**).

Table 7: Find spots

Site Number	Lat	Lon	Description	Sensitivity	Heritage Rating
KO_10	-32.866502°	22.407414°	Low density LSA and MSA scatter	Low	NCW
KO_11	-32.869424°	22.436545°	Low density MSA scatter	Low	NCW
KO_12	-32.872076°	22.443193°	Low density MSA scatter	Low	NCW
KO_13	-32.868403°	22.474457°	Low density LSA and MSA scatter	Low	NCW
KO_14	-32.871633°	22.532015°	Low density MSA scatter	Low	NCW
KO_15	-32.867462°	22.522904°	Low density LSA and MSA scatter	Low	NCW
KO_16	-32.868114°	22.523218°	Low density MSA and LSA scatter	Low	NCW
KO_17	-32.868621°	22.524661°	Low density MSA scatter	Low	NCW

Figure 38: Fine-grained sandstone artefact

Figure 39: Silicified mudstone artefacts

8.2 Sites

The structures (**KO-01 – KO-05; Kh001 and Kh001b**), grave and burial ground sites (**KO-06 – KO-07**), 2 possible graves (**KO-08 - KO-09)** and archaeological site (**KO_18**) identified (**Table 8**) were predominantly situated close to farm roads in the study area.

Table 8: Archaeological resources

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KO_18	-32.865126°	22.518090°	A low to medium density surface scatter (5-10 artefacts/10m^2) of mostly MSA artefacts was identified at this location (**Figure 40**). The scatter is situated on a gravel and rocky slope within proximity to turbine position 4. It is unlikely that these artefacts were observed in their primary context due to the nature of the environment. The artefacts are exposed due to some sheet erosion which occurs across the surface. The artefacts consist mostly of debitage (flakes, chips and chunks) which were produced from silicified mudstone. Some cores were also recognised. **Extent: approximately 20m x 20m** **Recommendation:** – No mitigation required.	Low	IIIC

Figure 40: Artefacts at KO_18

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KO-01	-32.860144°	22.457773°	The site comprises a brick labourer house (**Figure 41**, **Figure 42**, **Figure 43**). It is located immediately adjacent to the main farm road. The construction materials and technique are consistent with modern building methods. There was also rubbish scattered around the site (**Figure 44**). The structure was not depicted at this locality on the 3222CD topographical sheet dating to 1965 but was instead depicted on the 1987 topographical sheet (**Figure 45**). The site is therefore younger than 60 years. As no additional information was available, the site is provisionally rated as NCW as it has no research potential or is of other cultural significance. **Extent:7mx4m** **Recommendation:** – As KO-01 is located approximately 100m adjacent to an existing farm road, it is unlikely that it will be impacted. No mitigation is required.	No research potential or other cultural significance	NCW

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 41: Front view of KO-01

Figure 42: Back view of KO-01

Figure 43: Side view of KO-01

Figure 44: Rubbish associated with KO-01

Figure 45: 3222CD topographical sheet surveyed in 1987 depicts a structure at KO-01

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KO-02	-32.862803°	22.457924°	The site comprises the ruin of a stone-packed and mud brick structure. There are the remains of stone walling and wooden roof support beams (**Figure 47**, **Figure 49**). It is located approximately 180m from the main farm road. There is also other building materials and rubbish dumped around the site (**Figure 46**, **Figure 48**). A structure is depicted near this locality on the 3222CD topographical sheet dating to 1965 (**Figure 50**). The site is therefore older than 56 years. As no additional information was available, the site is provisionally rated as IIIC with low heritage significance. **Extent:10mx5m** **Recommendation:** – As KO-02 is located approximately 150m adjacent to an existing farm road, it is unlikely that it will be impacted.	Low	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 46: View of KO-02

Figure 47: Side view of KO-02

Figure 48: Rubbish around KO-02

Figure 49: Collapsed roof at KO-02

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 **Figure 50: 3222CD topographical sheet surveyed in 1965 depicts KO-02**		
KO-03	-32.862867°	22.458450°	The site comprises a stone house (**Figure 51**), a modern kraal (**Figure 53**) situated on the eastern side of the property and other farm infrastructure. The site is located approximately 30m west of KO-02. A number of structures were identified at this locality on the 3222CD topographical sheet dating to 1965 (**Figure 54**). The site is therefore older than 56 years. As no additional information was available, the site is provisionally rated as IIIB with medium heritage significance. **Extent: 12mx7m** **Recommendation:** – KO-03 is located approximately 170m adjacent to an existing farm road. It is recommended that a no-go-buffer-zone of at least **30-m** from the outer permitter of the farmstead (which is currently occupied) is kept to the closest WEF infrastructure (including turbines, substation facilities and roads). – If development occurs within 30m of KO-03 the main house will need to be satisfactorily studied and recorded before impact occurs. – Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings.	Medium	IIIB

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 51: Front view of KO-03 (facing south)

Figure 52: Side view of KO-03

Figure 53: Modern kraal between KO-02 and KO-03

Figure 54: 3222CD topographical sheet surveyed in 1965 depicts multiple structures within the vicinity of KO-03

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KO-08	-32.863077°	22.458603°	The site is a possible grave situated adjacent to KO-03 on the western side of the property. The only indication that it is possibly a grave is the stacked stones (**Figure 55**). Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site 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. **Recommendation:** – The site should be demarcated with a 50-meter buffer and the grave should be avoided and left in situ. – A Grave Management Plan should be developed for the grave which also needs to be approved by WHC, if graves are to be relocated. – If the site is going to be impacted and the grave needs to be removed, a grave relocation process for site KO-08 is recommended as a mitigation and management measure.	High	IIIA

Figure 55: View of KO-08

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KO-07	-32.863574°	22.459759°	Graves of the Bothma's family were found at KO-07 (**Figure 56**). It is located on the eastern side of an ephemeral stream, approximately 140m south-east of KO-03. The formal burial ground has four graves which contain headstones and grave dressings constructed from granite. The graves are fenced off with wire fencing. Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site 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. **Recommendation:** – The site should be demarcated with a 50-meter buffer and the graves should be avoided and left in situ. – A Grave Management Plan should be developed for the graves which also needs to be approved by WHC, if graves are to be relocated. – If the site is going to be impacted and the graves need to be removed, a grave relocation process for site KO-07 is recommended as a mitigation and management measure.	High	IIIA

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 **Figure 56: View of four graves at KO-07**			 **Figure 57: Headstone inscription "Anna Magdalena Bothma, 23-07-1949"**		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 58: View of grave and headstone inscription at KO-07

Figure 59: Grave and headstone inscription at KO-07

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			  **Figure 60: Grave and headstone inscription at KO-07**		
KO-04	-32.856379°	22.471279°	The site comprises a brick labourer house and outhouse (**Figure 61**). It is located immediately adjacent to the main farm road and Platdorings farmstead (KO-05). The construction materials and technique are consistent with modern building methods. Access to the property was prohibited, so an approximate size of the site was calculated. No other cultural material was identified around the site. The structure was only depicted at this locality on the 3222CD topographical sheet dating to 2005 (**Figure 62).** The site is therefore younger than 60 years. As no additional information was available, the site is provisionally rated as NCW as it has no research potential or is of other cultural significance. **Extent:4mx7m** **Recommendation:** – As KO-04 is located within the immediate vicinity of an existing farm road, it is possible that it will be impacted if the road is expanded. No mitigation is required.	No research potential or other cultural significance	NCW

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 61: View of KO-04

Figure 62: 3222CD topographical sheet surveyed in 2005 depicts a structure at the location of KO-04

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KO-05	-32.855620°	22.471717°	The site comprises a fenced-off property (Platdorings Farmstead) with four buildings and associated farm structures (**Figure 63**, **Figure 64**, **Figure 65**, **Figure 66**). Part of the farmstead falls within the proposed development area. Access to the property was prohibited, so it was not possible to thoroughly assess the site. The main house is most probably the newest addition to the farmstead, with the smaller stone built flat roof structures part of the original farmstead that is older than 60 years. A farmstead is depicted at this locality on the 3222CD topographical sheet dating to 1965 (**Figure 68**). The site is therefore older than 56 years. As no additional information was available, the site is provisionally rated as IIIB with medium heritage significance. **Extent:120x130m** **Recommendation:** – KO-05 is located adjacent farm road. Therefore, it is recommended that a no-go-buffer-zone of at least **30m** from the outer permitter of the farmstead (which is currently occupied) is kept to the closest WEF infrastructure (including turbines, substation facilities and roads).	Medium	IIIB

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 63: View of the KO-05 from farm track

Figure 64: View of one of the structures at KO-05 (facing east)

Figure 65: View of one of the structures and windmills at KO-05

Figure 66: Ruin in the northern part of KO-05

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 **Figure 67: View from the ruin looking back towards the main farmhouse (facing south).**			 **Figure 68: 3222CD topographical sheet surveyed in 1965 depicts a number of structures at the location of KO-05.**		
KO-06	-32.856898°	22.471120°	The site is an informal burial ground with four stone-packed graves (**Figure 69**, **Figure 70**, **Figure 71**, **Figure 72**, **Figure 73**). The site is situated approximately 80m from an intersection of farm roads. Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site 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. **Recommendation:** – The site should be demarcated with a 50-meter buffer and the graves should be avoided and left in situ. – A Grave Management Plan should be developed for the graves which also needs to be approved by WHC, if graves are to be relocated. – If the site is going to be impacted and the graves need to be removed, a grave relocation process for site KO-06 is recommended as a mitigation and management measure.	High	IIIA

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 69: View of three of the graves situated in a row at KO-06

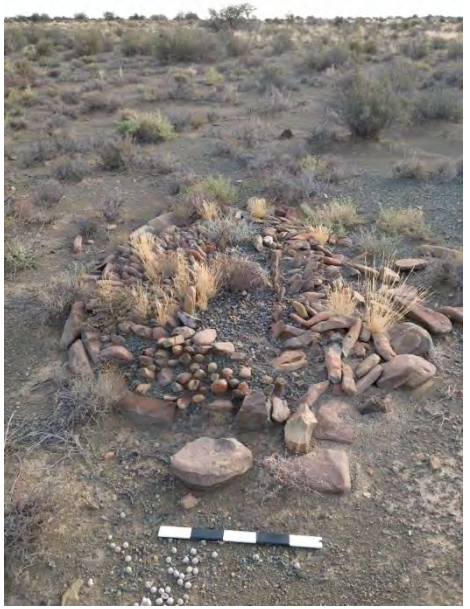


Figure 70: Closer view of one of the graves at KO-06 (furthest left grave in Figure 78)

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 71: Closer view of one of the graves at KO-06 (middle grave in Figure 78)

Figure 72: Closer view of one of the graves at KO-06 (furthest right grave in Figure 78)

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 **Figure 73: Fourth grave at KO-06**		
KO-09	-32.868100°	22.484592°	The site is a possible grave situated adjacent to a farm road. The only indication that it is possibly a grave are a number of rocks placed at the head and foot of a section of ground (**Figure 74**, **Figure 75**). Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site 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. **Recommendation:** – The site should be demarcated with a 50-meter buffer and the grave should be avoided and left in situ. – A Grave Management Plan should be developed for the grave which also needs to be approved by WHC, if graves are to be relocated.	High	IIIA

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			– If the site is going to be impacted and the grave needs to be removed, a grave relocation process for site KO-09 is recommended as a mitigation and management measure.		

Figure 74: View of KO-09

Figure 75: Another view of KO-09

9. IDENTIFICATION AND ASSESSMENT OF IMPACTS

The fieldwork findings have shown that the study area is characterised by find spots, several structures, graves, burial grounds and possible graves. From the proposed location of the WEF and associated infrastructure, it is clear that 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 provided that efforts are made to preserve or mitigate heritage resources in the study footprint, prior to and during the construction phase of the development. For this reason, four development scenarios, informed by EIA constraints are considered in this study, including the no-development / no-go option.

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. The assessment of the impact of the proposed WEF and the associated grid infrastructure will be addressed separately. 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. These sites are the archaeological site (**KO_18)**, findspots (**KO_10 - KO_17**) and 3 structures (**KO-02; KO-01; KO-04**).
- Two grave and burial grounds (**KO-07** and **KO-08)** and one structure (**KO-03**) are located more than 100m away from the proposed road area. As a result, no impact is expected from the proposed development on these sites. This means that no impact assessment will be undertaken for the sites.

- Two grave and burial grounds (**KO-06 and KO-09**) and one structure (**KO-05**) of medium heritage significance, were located less than 100m from the proposed development areas. As a result, an impact is expected 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 Construction and Operational Phases. 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 tables are based on the proposed WEF and associated grid infrastructure 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
Pre-Construction Phase																				
Damage to 2 sites containing graves (**KO-06** and **KO-09)**	The graves and burial grounds are mostly localised near farm roads within the proposed development area. The expansion of existing farm roads may impact these sites.	2	3	4	4	4	2	34	-	Medium	1. Demarcate sites as no-go areas (50m buffer) 2. Demarcate and fence during construction if construction activities area to happened within 50 meters from a site. 3. 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.	2	1	4	4	4	1	15	-	Low
Damage to one historical structure (**KO-05**)	One structure (KO-05) is located near farm roads within	2	2	4	4	4	2	32	-	Medium	1. Demarcate sites as no-go areas (30m buffer)	2	1	4	4	4	1	15	-	Low

	the proposed development area. The expansion of existing farm roads may impact the site.										2. Demarcate and fence during construction if construction activities area to happened within 30 meters from a site. 3. 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.									
Unidentified heritage resources	Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	1	3	4	2	4	2	28	-	Medium	1. 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.	1	3	4	2	4	1	14	-	Low

Table 10: Assessment of the Impact of Proposed Grid Infrastructure 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
Pre-Construction Phase																				
Unidentified heritage resources	Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	1	3	4	2	4	2	28	-	Medium	1. 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.	1	3	4	2	4	1	14	-	Low

9.3 Cumulative Impacts

This section evaluates the possible cumulative impacts (IC) on heritage resources with the addition of the Koup 1 WEF and associated grid infrastructure. The CI on heritage resources evaluated a 35-kilometer radius (**Figure 76**).

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.

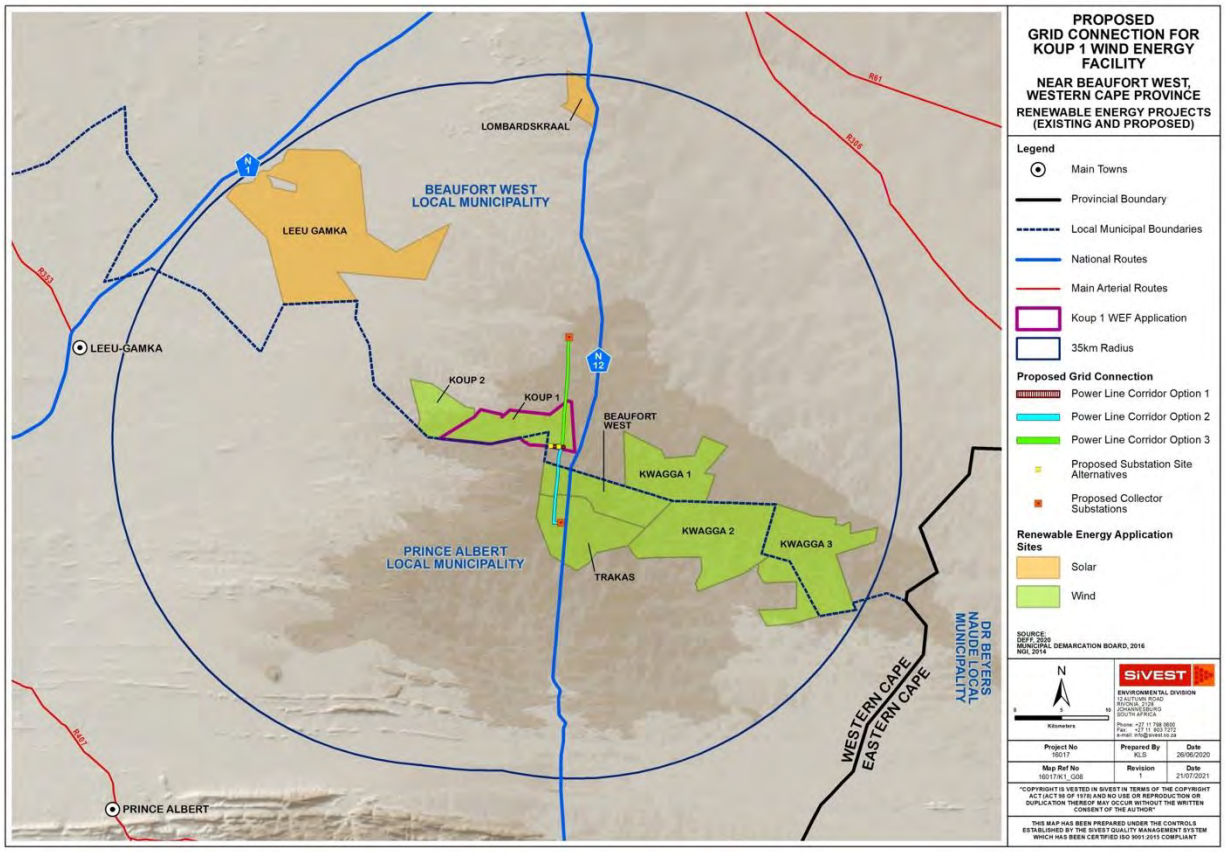


Figure 76: Renewable energy facilities proposed within a 35km radius of the proposed development (provided by SiVEST).

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
Cumulative Phase																				
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

9.1 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 more accurate.

10. COMPARATIVE ASSESSMENT OF ALTERNATIVES

Two alternatives were provided for the laydown area, substation sites and 2 grid corridors.

An assessment of the options for the substation and laydown areas shows that there will not be an impact on heritage resources. Therefore, no preference for substation and laydown areas exists. The grid corridor options 1A, 1B, 2A and 2B will not impact on heritage resources, but the grid corridor option 3A and option 3B may impact on heritage resources.

Key

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

Alternative	Preference	Reasons
SUBSTATION		
Koup 1 Substation site Option 1	**NO PREFERENCE**	No impact on heritage resources
Koup 1 Substation site Option 2	**NO PREFERENCE**	No impact on heritage resources
LAYDOWN AREA		
Koup 1 Laydown area Option 1	**NO PREFERENCE**	No impact on heritage resources
Koup 1 Laydown area Option 2	**NO PREFERENCE**	No impact on heritage resources
GRID CORRIDOR		
Koup 1 Grid Corridor Option 1A	**NO PREFERENCE**	No impact on heritage resources
Koup 1 Grid Corridor Option 1B	**NO PREFERENCE**	No impact on heritage resources
Koup 1 Grid Corridor Option 2A	**NO PREFERENCE**	No impact on heritage resources
Koup 1 Grid Corridor Option 2B	**NO PREFERENCE**	No impact on heritage resources
Koup 1 Grid Corridor Option 3A	**NO PREFERENCE**	The impact on heritage resources will be the same
Koup 1 Grid Corridor Option 3B	**NO PREFERENCE**	The impact on heritage resources will be the same

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.

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.
- 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.

- 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 some sort of 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
- 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	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and HWC	3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and HWC	2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, HWC, local government and provincial government	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)
General project area	• Implement chance find procedures in case where possible heritage finds are uncovered.	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
Graves and Burial grounds (KO-06 and KO-07)	• The sites should be demarcated with a 50-meter no-go-buffer-zone and the graves should be avoided and left in situ. • A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by HWC. • 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 consultation and public participation process before grave relocation permits can be applied for with the HWC under the NHRA and National Health Act regulations.	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)
Possible graves (KO-08 and KO-09)	• The site should be demarcated with a 50-meter buffer and the grave should be avoided if any construction is to happen close to it.	Construction through to Operational	During Construction and Operation	Applicant ECO Environmental Control Officer (ECO) Heritage specialist	Monthly	Ensure compliance with relevant legislation and recommendations from HWC under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
Historical Structures that were rated as NCW (**KO-01** and **KO-04**)	• No mitigation required	Pre-construction	Pre-construction and during construction	Applicant ECO Archaeologist	None	Ensure compliance with relevant legislation and recommendations from HWC under Section 36 and 38 of NHRA	ECO Monthly checklist/report
Historical Structures that were rated as low and medium heritage significance (**KO-02 and KO-03**) but don't fall within proposed development area.	• As KO-02 and KO-03 are located more than 100m adjacent to an existing farm road, it is unlikely that it will be impacted.	Pre-construction	Pre-construction and during construction	Applicant ECO Archaeologist	None	Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA	ECO Monthly checklist/report
Historical Farmsteads that were rated as medium heritage significance (**KO-05**)	• In terms of general conservation of the historical farmsteads, a 30m no-go buffer zone is recommended. • If development occurs within 30m of the farmsteads, the buildings will need to be satisfactorily studied and recorded before impact occurs. • Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b)	Pre-construction	Pre-construction	Applicant ECO Archaeologist	None	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)
	photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings.						
Archaeological site that was rated as low heritage significance (**KO_018**)	• No mitigation required	Pre-construction	Pre-construction	Applicant ECO Archaeologist	None	Ensure compliance with relevant legislation and recommendations from HWC under Section 36 and 38 of NHRA	ECO Monthly checklist/report

12. CONCLUSIONS AND RECOMMENDATIONS

PGS has been appointed by SiVEST on behalf of Genesis, to undertake the assessment of the proposed construction of the Koup 1 WEF and associated grid connection infrastructure near Beaufort West in the Western Cape Province of South Africa.

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

The fieldwork conducted for the evaluation of the possible impact of the new Koup 1 WEF and associated grid connection infrastructure has revealed the presence of 18 heritage resources. One archaeological site (**KO_18**) was rated as having low heritage significance. Four graves, burial grounds and possible graves (**KO-06 – KO-09**) were rated as having high heritage significance. Two structures (**KO-03**, **KO-05**) were rated as having medium heritage significance, 1 structure (**KO-02**) was rated as having low heritage significance and 2 structures (**KO-01; KO-04**) were rated as having no heritage significance.

Eight find spots (**KO_10 – KO_17**) comprise several low-density Stone Age surface artefact scatters and were rated as having low heritage significance. These are primarily from the MSA, although both LSA and earlier ESA material was identified. All of the artefact assemblages (**including KO-18**) 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.

Conclusion

The calculated impact as summarised in **Section 9** of this report confirms the impact of the new Koup 1 WEF and associated grid connection infrastructure will be reduced from negative medium to negative low 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.

The finalised layout has considered the sensitivities identified during the field assessment. By selecting the Grid Option 2, the possible pre-construction impacts calculated on the tangible cultural heritage resources is overall reduced to a **LOW NEGATIVE** impact after the recommendations have been implemented.

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.

The following mitigation measures will be required:

- 50m buffer zones around grave sites
- 30m buffer zone around farmsteads
- 30m buffer zone around historical structures
- Monitor find spot areas if construction is going to take place through them.
- A management plan, after a walkdown of the final layout, for the heritage resources then needs to be compiled and approved for implementation during construction and operations.

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 Koup 1 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 authorised.

13. REFERENCES

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.

Dreyer, C. (2005) Archaeological and historical investigation of the proposed residential developments at the farms Grootfontein 180 & Bushmanskop 302, Beaufort West, south-western Cape.

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.

Godwin, L. (2011). The application of assessment of cumulative impacts in cultural heritage management: A critique. Australian Archaeology, Vol. 73 No 1: 88-97.

Guelke & Shell,(1992) Landscape of Conquest: Water Alienation and Khoi Strategies of Survival, 1652-1780. Journal of Southern African Studies Vol. 18 No 4: 803- 824.

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.

Kaplan, J. (2007) An archaeological investigation of nineteen borrow pits for the proposed regraveliing of four trunk and divisional road sectons in the Beaufort West area in the Central Karoo Western Cape Province. Unpublished report prepared for CCA Environmental. Riebeek West: Agency for Cultural Resource Management.

Kaplan, J. (2006) Phase 1 archaeological impact assessment proposed Klawervlei powerline Karoo National Park. Unpublished report prepared for EnviroAfrica. Riebeek West: Agency for Cultural Resource Management.

Kinahan, J. (2008) Archaeological Baseline Survey of the Proposed Ryst Kuil Uranium Project.

Morris, D. (2008) Archaeological and Heritage Impact Assessment on Remainder of Carter Block 458, near Lime Acres, Northern Cape. McGregor Museum.

Nilssen, P. (2011) Archaeological Impact Assessment. Proposed Beaufort West Photovoltaic (Solar) Park: southern portion of properties; 2/158 Lemoenkloof, RE 9/161 Kuilspoort, RE 162 Suid-lemoensfontein and RE 1/163 Bulskop, Beaufort West, Western Province.

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.

Orton, J. (2010) Heritage assessment of the proposed upgrade to the N1 between Beaufort West and Three Sisters, Beaufort West and Victoria West Magisterial District, Western and Northern Cape. Unpublished report for Aurecon South Africa (Pty) Ltd. University of Cape Town: Archaeology Contracts Office.

Palmer, A.R. & Hoffman, M.T. (1997) Nama-karoo. In Cowling, R., Richardson, D. & Pierce, S. eds Vegetation of southern Africa. Cambridge Univeristy Press, 167-188.

Parkington, J., Morris, D. and Rusch, N. (2008) Karoo rock engravings. Cape Town: Krakadouw Trust.

Watson, R.L. (1990) The Slave Question. Liberty and Property in South Africa. Witwatersrand University Press. Johannesburg

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, L. & Hart, T. (2010a) Scoping Archaeological Impact Assessment: Proposed prospecting on Rietfontein 241, Farm 236 Remainder and Matjies Kloof 235 (Site 22), Beaufort West District, Western Cape. Unpublished report for Tasman Pacific Limited.

Webley, L. & Hart, T. (2010b). Scoping Impact Assessment: Proposed prospecting on Quaggasfontein 166 and Oude Volks Kraal 164 (Site 29), Beaufort West District, Western Cape. Unpublished report for Tasman Pacific Limited.

Webley, L. & Lanham, J. (2011) Heritage Assessment of the Proposed upgrade to the stormwater retention facilities at Beaufort West, Western Cape.

Vidamemoria Heritage Consultants. (2015) Heritage Impact Assessment: DR 2403 Central Karoo, Beaufort West – Central Karoo District Municipality, Western Cape.

Vidamemoria Heritage Consultants. (2012) Heritage Impact Assessment: DR 2308 Central Karoo, Beaufort West – Central Karoo District Municipality, Western Cape.

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
- 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

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
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).		
EXTENT (E)		
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
PROBABILITY (P)		
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).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION (D)		
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).
INTENSITY / MAGNITUDE (I / M)		
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.
SIGNIFICANCE (S)		
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: **Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.**		

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

Genesis Enertrag Koup 1 Wind (Pty) Ltd is proposing to construct the Koup 1 WEF, comprising twenty-eight wind turbines with a maximum total energy generation capacity of up to 140MW, 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 and grid project areas are in the Great Karoo region approximately 55 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 Koup 1 WEF and associated grid connection is based on:

- A desktop review of (a) the relevant 1:50 000 scale topographic map 3222DC and 3222CD - Current and historical editions (1965), (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 three-day field assessment of the Koup 1 WEF project area by the author and field archaeologists during the period 9 to 10 June 2021 and 23rd July 2021. Accessible portions of the proposed grid connection area were also surveyed within the study area.

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 and historical structures of heritage significance warrant conservation.

4. National Environmental Screening Tool

The Archaeological and Cultural Heritage Sensitivity Map for the Koup 1 WEF project area prepared using the DFFE screening tool indicates a **Low Sensitivity** rating for the study area (**Figure 13**). 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 and historical structures of heritage significance that warrant conservation.

Therefore, the DFFE screening tool sensitivity map in **Figure 13** is not fully supported based on the findings of this fieldwork.

5. Conclusion

The Archaeological and Cultural Heritage sensitivity of the Koup 1 WEF and associated grid connection project areas has been evaluated, based on desktop studies and a 3-day 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.