

ARCHAEOLOGICAL IMPACT ASSESSMENT

**Basic Assessment for the Proposed Development of the
325MW Kudusberg Wind Energy Facility and associated
infrastructure, between Matjiesfontein and Sutherland in
the Western and Northern Cape Provinces: BA REPORT**

HWC Case Number: 18071105

DEA Number: To be confirmed

Report prepared for:

CSIR – Environmental Management Services

P O Box 320
Stellenbosch 7599
South Africa

Report prepared by:

Katie Smuts – Professional Heritage
Practitioner and Archaeological Consultant

PO Box 178
Stanford, Western Cape, 7210
South Africa

31 October 2018

EXECUTIVE SUMMARY

Site Name

The proposed development is the Kudusberg Wind Energy Facility.

Location

The development is proposed for an area straddling the border of the Western and Northern Cape Provinces to the west of the R345 that runs between Sutherland and Matjiesfontein. The project falls within the Witzenberg Municipality, Cape Winelands District within the Western Cape, and the Karoo Hoogland Municipality, Namakwa District in the Northern Cape.

The affected farm portions are:

Western Cape:

- Portion 1 of 156 Gats Rivier Farm;
- Portion 2 of 156 Gats Rivier Farm;
- Remainder of 156 Gats Rivier Farm;
- Portion 1 of 157 Riet Fontein Farm.
- Portion 1 of 158 Amandelboom Farm;
- Remainder of 158 Amandelboom Farm;
- Portion 1 of 159 Oliviers Berg Farm;
- Remainder of 159 Oliviers Berg Farm;
- Portion 2 of 157 Riet Fontein Farm;
- Remainder of 161 Muishond Rivier Farm; and
- Remainder of 395 Klipbanks Fontein Farm.

Northern Cape:

- Portion 4 of 193 Urias Gat Farm;
- Portion 6 of 193 Urias Gat Farm;
- Remainder of 193 Urias Gat Farm;
- Remainder of 194 Matjes Fontein Farm; and
- Remainder of 196 Karree Kloof Farm.

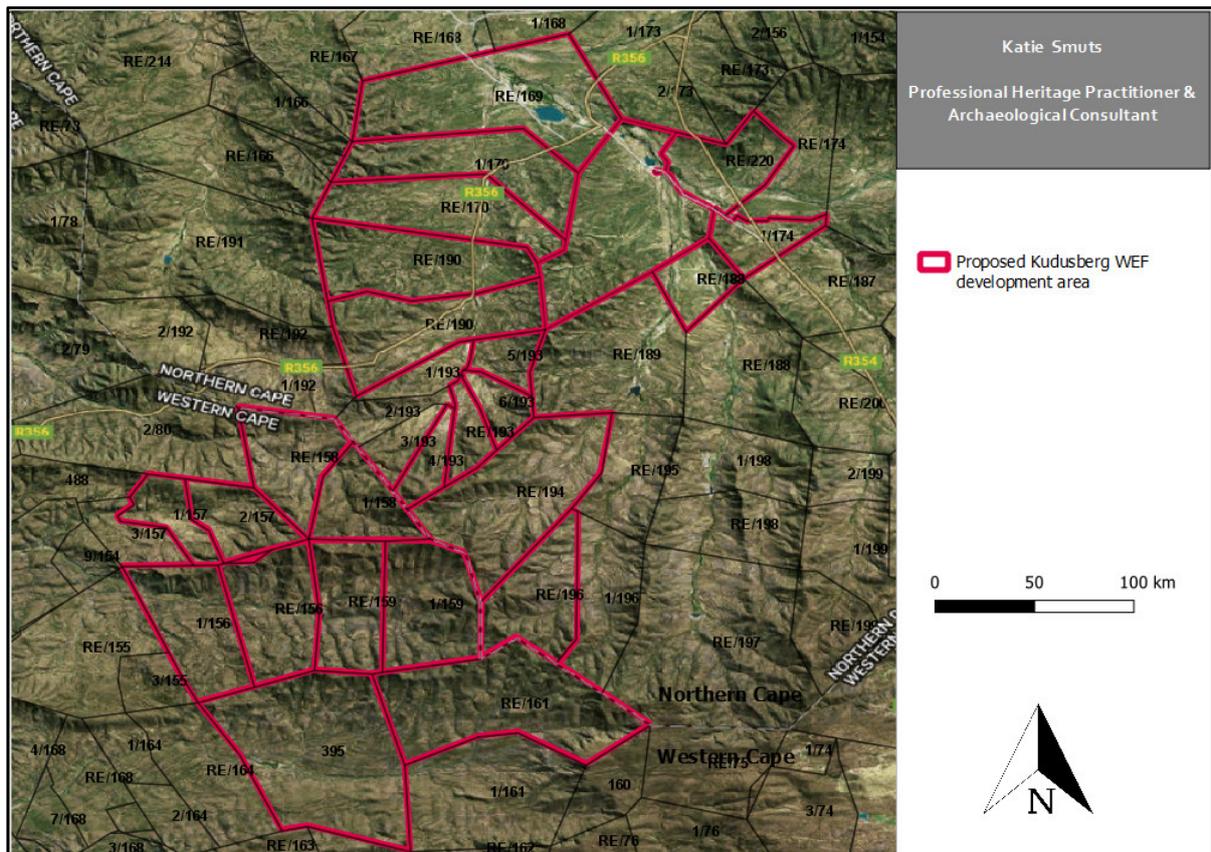
Properties affected by public access road:

- 169 Zeekoegat Farm;
- Portion 1 of 170 Roodeheuvel Farm;
- Remainder of 170 Roodeheuvel Farm;
- Remainder of 190 Wind Heuvel Farm;
- Portion 1 of 190 Wind Heuvel Farm;
- Portion 5 of 193 Urias Gat Farm;
- Remainder of 171 VinkeKuil Farm;
- Alkant Re/220 Farm; and
- Portion 1 of 174 Lange Huis Farm.

The central GPS co-ordinates for the proposed development are:

-32.8769836382S; 20.3214413375E

Locality Plan



Locality Plan showing proposed Kudusberg WEF development area.

Description of Proposed Development

The proposed Kudusberg WEF will have an energy generation capacity (at 132kV point of utility connection) of up to 325 megawatt (MW), and will include the following:

- Up to 56 wind turbines, each between 3 MW and 6.5 MW in nameplate capacity with a foundation of up to 30m in diameter and up to 5 m in depth.
- The hub height of each turbine will be up to 140 m and its rotor diameter up to 180m.
- Permanent compacted hardstanding laydown areas (also known as crane pads) for each wind turbine of 90mx50m (total footprint for 56 turbines = 25.2ha) during construction and for ongoing maintenance purposes for the lifetime of the turbines.
- Electrical transformers (690V/33kV) adjacent to each turbine (typical footprint of 2m x 2m but can be up to 10m x 10m at certain locations) to step up the voltage to 33kV.
- Underground 33kV cabling between turbines buried along access roads, where feasible, with overhead 33kV lines grouping turbines to crossing valleys and ridges outside of the road footprints to get to the onsite 33/132kV substation.
- Internal access roads up to 12m wide, including structures for stormwater control would be required to access each turbine and the substation, with a total footprint of about 82.44ha. Where possible, existing roads will be upgraded. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various turbine positions.
- One 33/132kV onsite substation. The 33kV footprint will need to be assessed in this wind farm basic assessment and the 132kV footprint in a separate basic assessment process as the current applicant will remain in control of the low voltage components of the 33/132kV substation, whereas the high voltage components of this substation will likely be ceded to Eskom shortly after the completion of construction. The total footprint of this onsite substation will be approximately 2.25 ha.
- Up to 4 x 140m tall (depending on the final hub height) wind measuring lattice masts strategically placed within the wind farm development footprint to collect data on wind conditions during the operational phase.
- Temporary infrastructure including a construction camp (~12.6ha) which

includes an on-site concrete batching plant for use during the construction phase and for offices, administration, operations and maintenance buildings during the operational phase.

- Fencing will be limited around the construction camp, substation and batching plant. The entire facility would not be fenced off. The height of fences around the construction camp is anticipated to be up to 4m.
- Temporary infrastructure to obtain water from available local sources/ new or existing boreholes including a potential temporary above ground pipeline (approximately 35cm diameter) to feed water to the on-site batching plant. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the Department of Water and Sanitation (DWS) will be applied for separately.

The proposed development site is located entirely within the Renewable Energy Development Zone 2 (REDZ 2) known as Komsberg, published in terms of Section 24(3) of the National Environmental Management Act (NEMA) (Act No. 107 of 1998) in Government Notice (GN) R. 114 of 16 February 2018. Considering this, a Basic Assessment (BA) Process as contemplated in terms of regulation 19 and 20 of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), is required for the authorisation of this large scale WEF.

Heritage Resources Identified

Identified heritage resources include archaeological and built environment features (Figures 5.1.1-5.1.5). Archaeological resources include scattered, isolated Middle and Later Stone Age artefacts, although these were very infrequent. A single cave with finger painted rock art, Later Stone Age artefactual material and a single sherd of thick-walled, highly burnished pot was also identified. Several stone-built kraals, either rounded or rectilinear in shape, and dry stacked or mortared, were recorded and are likely of historic age, although some could be pre-colonial. Ruined rectilinear dwellings and other disused farm buildings that are all likely over 100 years old were also recorded, usually in association with one or more kraals. Built environment features included farmsteads and associated outbuildings at several farms. At Wind Heuvel 1/156, Urias Gat 4/193 and Oliviers Berg Re/159 and 1/159 these structures are still inhabited, while at Gatsrivier Re/156 the cottages are used for tourist

accommodation; the farm buildings at Matjiesfontein Re/194 appear disused. Several stone cairns were found that were identified as likely burials; one area containing over ten cairns was clearly an informal graveyard (KDB072 – KDB076, comprising site complex KDBc11). In addition to these cairns a single, fenced grave with marble headstone was recorded (KDB057), a likely child's grave (KDB064) and a further graveyard containing about 12 graves with hand carved sandstone headstones and stone covered graves (KDB081).

Almost all features were found along valley bottoms or on open plains near watercourses, with no significant heritage resources of any kind identified at higher elevations.

Anticipated Impacts on Heritage Resources

With the ridges apparently devoid of artefactual material of any kind, impacts are likely only to occur at sites at lower elevations. These impacts will arise from the widening of existing roads, the construction of new access roads, the development of construction camps and the onsite substation. Impacts could be direct or indirect and include damage, destruction and degradation of sites, as well as loss of sense of place resulting in diminished significance of heritage resources.

The anticipated direct impacts of the turbines themselves on heritage resources are expected to be low. The originally proposed alignment of Access Alternative 1 would have resulted in impacts to sites including one stone cairn (KDB058), a U-shaped stone-built structure, several kraal structures and a three-roomed stone-built structure (KDBc7), and further kraals and a stone and mudbrick-built structure (KDBc8). Similarly, Common Access Road 1 would have bisected Wind Heuvel farmstead (KDB059), and passed directly adjacent to the graveyard located there (KDB081). Impacts to these sites would have been high to very high. The applicant has subsequently amended these layouts, reducing likely impacts to low or insignificant. Construction Camp Alternative 3 is proposed for construction on the site of the informal graveyard (KDBc6), posing a very high threat of impact to those sites – construction camp 2 is preferred. A moderate, indirect threat is posed to the stone-built features in the landscape, and a low threat to the rock art cave (KDB045) derived from the increase of people in the landscape who could accidentally or

intentionally damage or destroy features. Further indirect impacts are likely to the context of the region by the nature of the proposed development which will detract from the sense of place and degrade the cultural landscape. Cultural landscapes are addressed fully in a separate report (Rabe Bailey 2018) and in the full HIA (Smuts 2018).

Recommendations

- In summary, recommendations are as follow:
- Substation Alternative 1 is the recommended substation alternative, although Substation Alternatives 2 and 3 are not considered to be a no-go option;
- Construction Camp 2 is the recommended construction camp alternative, although Construction Camp 1 is likely to be an acceptable alternative. Construction Camp 3 should be considered a no-go option;
- The realignment of Access Road Alternative 1 renders it an acceptable choice, while Access Road Alternative 2 is likely to be an acceptable alternative. The proposed alignment for Access Road Alternative 2 should be subjected to a walkdown by an archaeologist prior to commencement of development to identify any areas or sites that require protection or mitigation, should it be selected;
- Common Access Road 1 has been realigned to the east to avoid Wind Heuvel farmstead and is considered an acceptable route. The road should not be widened or altered at this point and a proper fence should be erected around the Stadler graveyard (KDB081);
- The following buffers should be observed around identified heritage resources:
 - Graves: no development should be permitted within 50m of identified graves and cemeteries; existing roads within this buffer should not be altered or widened;
 - Cave site (KDB045): construction staff should not be permitted within 200m of the site;
 - Farmsteads: no turbines should be located within 500m of farmsteads;
 - Kraals, stone walling and ruins > 100 years: construction staff should not be permitted within 100m of these sites and no development should occur within 15m of these sites; and

- Archaeological finds: no buffers are recommended for the isolated artefacts identified in this survey.
- All site crew should be informed of the heritage significance of the resources in the study area, and those sites near development infrastructure, or easily reached (Table 1) should be inspected by the ECO during the construction phase to ensure they are being respected;
- If any archaeological material or human burials are uncovered during the course of development, then work in the immediate area should be halted. The find should be reported to the heritage authorities (SAHRA in the Northern Cape and HWC in the Western Cape) and may require inspection by an archaeologist to determine whether mitigation should take place and what form that mitigation should take.

Given the generally low significance of archaeological heritage resources in the study area, it is not anticipated that the proposed development will have significant impacts to heritage resources, and it is therefore recommended that the project be authorised, subject to implementation of the above recommendations. These recommendations should be included in the Environmental Management Programme (EMPr) and the Environmental Authorisation (EA).

Author/s and Date

31/10/2018

Katie Smuts – main author

MadelonTusenius and Emmylou Bailey – content contributors

SPECIALIST EXPERTISE

Katie Smuts holds an MPhil from UCT in Archaeology (History and Archaeology of the Western Cape; 2012), having specialised in archaeological analysis of historic built fabric and forms. Prior to that, her BA (Hons), obtained from UCT with distinction in 1999, was focused on analysis of depictions of human figures in the rock art of the Western Cape.

Katie has worked both as a commercial archaeologist and as a Heritage Officer for the national Heritage Agency, SAHRA, and later Manager of the National Inventory there, where she was responsible for the maintenance of the country's online heritage management platform and heritage resource database, SAHRIS (the South African Heritage Resources Information System). Katie currently works as a freelance heritage practitioner and archaeological consultant, drafting Heritage Impact Assessments, Archaeological Impact Assessments, Heritage Inventories, heritage scoping reports and heritage components for Strategic Environmental Assessments, Environmental Management Frameworks and similar planning initiatives.

EMPLOYMENT HISTORY

Period	Position	Employer
October 2017-Present	Archaeological Consultant & Heritage Practitioner	Self Employed
February 2017-September 2017	Heritage Specialist	CTS Heritage
October 2013-December 2016	Manager of the National Inventory	SAHRA
May 2012-September 2013	Heritage Officer, APM Unit	SAHRA
March 2009-May 2012	Archaeological Consultant	Self Employed
August 2006-September 2006	Section Manager: Butrint World Heritage Site	Institute of World Archaeology
February 2006-February 2009	Part-time contract archaeologist	ACO
October 2004-January 2006	Contract archaeologist	Various, UK
June 2003-March 2004	Part-time contract archaeologist	ACO
January 2000-December 2000	Co-Director	Clanwilliam Living Landscapes Project
January 1999-May 2000	Tutor and lecturer	Archaeology Department, UCT

QUALIFICATIONS

2012:	MPhil (Archaeology), UCT
09/10-11/10:	Architecture & Urban Conservation II: Skills Development (UCT)
04/10-06/10:	Architectural & Urban Conservation I: Theory & Development (UCT)
1999:	B.A. Honours Distinction (Historical Studies of Western Cape), UCT
1998:	B.A. 1st Class (Archaeology, Classics), UCT

AFFILIATIONS

2018-present:	Chair of Stanford Heritage Committee (SHC)
2017-present:	Vice-chair of Overstrand Heritage and Aesthetics Committee (OHAC)
2017-present:	Co-chair of Association of Southern African Professional Archaeologists (ASAPA) Cultural Resource Management (CRM) Committee
2015-present:	Member of Association of Professional Heritage Practitioners (APHP)
2015-present:	Treasurer of Heritage Association of Southern Africa (HASA)
2013-present:	Member of the South African Museums Association (SAMA)
2008-present:	ASAPA CRM accreditation in Rock Art, Coastal Shell Middens, Stone Age Archaeology and Grave Relocation

RELEVANT PROJECT EXPERIENCE

- Compilation of Heritage Impact Assessments, Archaeological Impact Assessments and Heritage Scoping Reports for:
 - Renewable energy applications
 - Mixed use developments
 - Mining applications and borrow pits
 - Roadworks
 - Infrastructural developments
- Compilation of Notifications of Intent to Develop in terms of Section 38 applications in the Western Cape
- Compilation of permit applications in terms of Sections 27, 34 and 35
- Heritage components of Environmental Management Frameworks
- Heritage surveys for inventory purposes
- Archaeological and heritage research projects

SPECIALIST DECLARATION

I, Katie Smuts, declare that –

- I act as the independent specialist 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 the specialist report relevant to this application, 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 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;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

N/A

Name of Company:

29/10/2018

Date

LIST OF ABBREVIATIONS

AIA	Archaeological Impact Assessment
BA	Basic Assessment
BAR	Basic Assessment Report
CSIR	Council for Scientific and Industrial Research
DEA	Department of Environmental Affairs
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LSA	Later Stone Age
M A.S.L.	Metres Above Sea Level
MSA	Middle Stone Age
MW	Mega Watts
NEMA	National Environmental Management Act
NCW	Not Conservation Worthy
NHRA	National Heritage Resources Act
OES	Ostrich Eggshell
PHRA	Provincial Heritage Resources Authority
REDZ	Renewable Energy Development Zone
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
WEF	Wind Energy Facility

GLOSSARY

Definitions	
<i>Asbos</i>	Local bush which is dried and used to build <i>skerms</i>
<i>Early Stone Age</i>	Stone Age period approximately 1.5 million years ago - 250 000 years ago
<i>Kookskerm</i>	Shelter built from dried bushes to provide protection from the wind for cooking activities
<i>Kommando</i>	Boer militia units
<i>Kraal</i>	Livestock enclosure common throughout the area.
<i>Krans</i>	Cliff
<i>Later Stone Age</i>	Stone Age period approximately last 30 000 years
<i>Legplaats</i>	Stockpost
<i>Matjieshuis</i>	Mat or reed house
<i>Middle Stone Age</i>	Stone Age period approximately 250 000 - 30 000 years
<i>Skerm</i>	Circular enclosures constructed out of dried bushes
<i>Trekboer</i>	Semi-nomadic subsistence farmers who moved out of the Cape Colony

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	Pp ix-x
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;	
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	P xi
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 3.1
(cA) an indication of the quality and age of base data used for the specialist report;	Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Sections 5.1, 5.2, 5.3, 5.4
d) the date, duration and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 3
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 5 and 6
g) an identification of any areas to be avoided, including buffers;	Section 5.3
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 5.4
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3.2
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;	Sections 5.2, 7.1, 7.2
k) any mitigation measures for inclusion in the EMPr;	Section 7.2
l) any conditions for inclusion in the environmental authorisation;	Section 7.2
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 7.2
n) a reasoned opinion-	Sections 7.1, 7.2
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;	
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 3
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A. Relevant comments received during the review of the DBAR will be incorporated into the HIA.
q) any other information requested by the competent authority.	Appendix1
2) Where a government notice <i>gazetted</i> by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

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1. BACKGROUND TO DEVELOPMENT PROPOSAL

Kudusberg wind farm (Pty) Ltd (hereafter “Kudusberg”) is proposing to develop the 325 MW Kudusberg Wind Energy Facility (WEF) at Kudusberg between Sutherland and Matjiesfontein in the Northern Cape and Western Cape Provinces. Katie Smuts was appointed by the CSIR to undertake the Archaeological Impact Assessment (AIA) for the proposed Kudusberg Wind Energy Facility (WEF) on behalf of the project applicant, Kudusberg Wind Farm (Pty) Ltd.

The proposed Kudusberg WEF will have an energy generation capacity (at 132kV point of utility connection) of up to 325 megawatt (MW), and will include the following:

- Up to 56 wind turbines, each between 3MW and 6.5MW in nameplate capacity with a foundation of up to 30m in diameter and up to 5m in depth.
- The hub height of each turbine will be up to 140m and its rotor diameter up to 180m.
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- Underground 33kV cabling between turbines buried along access roads, where feasible, with overhead 33kV lines grouping turbines to crossing valleys and ridges outside of the road footprints to get to the onsite 33/132kV substation.
- Internal access roads up to 12m wide, including structures for stormwater control would be required to access each turbine and the substation, with a total footprint of about 82.44ha. Where possible, existing roads will be upgraded. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various turbine positions.
- One 33/132kV onsite substation. The 33kV footprint will need to be assessed in this wind farm basic assessment and the 132kV footprint in a separate basic assessment process as the current applicant will remain in control of the low

voltage components of the 33/132kV substation, whereas the high voltage components of this substation will likely be ceded to Eskom shortly after the completion of construction. The total footprint of this onsite substation will be approximately 2.25 ha.

- Up to 4 x 140m tall (depending on the final hub height) wind measuring lattice masts strategically placed within the wind farm development footprint to collect data on wind conditions during the operational phase.
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- Fencing will be limited around the construction camp, batching plant and substation. The entire facility would not be fenced off. The height of fences is anticipated to be up to 4m.
- Temporary infrastructure to obtain water from available local sources/ new or existing boreholes including a potential temporary above ground pipeline (approximately 35cm diameter) to feed water to the on-site batching plant. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the Department of Waters and Sanitation (DWS) will be applied for separately.

The proposed facility is located entirely within the Komsberg Renewable Energy Development Zone (REDZ), one of the eight REDZ formally gazetted in South Africa for the purpose of development of solar and wind energy generation facilities. In line with the gazetted process for projects located within REDZ, the Kudusberg WEF is subject to a Basic Assessment (BA) process instead of a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended, EIA Regulations 2014 (as amended in 2017).

2. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The Kudusberg WEF is proposed for an area straddling the border of the Western and Northern Cape Provinces to the west of the R345 that runs between Sutherland

and Matjiesfontein (Figures 1-3). The project falls within the Witzenberg Local Municipality, Cape Winelands District in the Western Cape, and the Karoo Hoogland Local Municipality, Namakwa District in the Northern Cape. The central GPS co-ordinates for the proposed development are: -32.8769836382S; 20.3214413375E

The affected farm portions are:

Western Cape:

- Portion 1 of 156 Gats Rivier Farm;
- Portion 2 of 156 Gats Rivier;
- Remainder of 156 Gats Rivier Farm;
- Portion 1 of Farm 157 Riet Fontein.
- Portion 1 of 158 Amandelboom;
- Remainder of 158 Amandelboom;
- Portion 1 of 159 Oliviers Berg;
- Remainder of 159 Oliviers Berg;
- Portion 2 of 157 Riet Fontein;
- Remainder of 161 Muishondrivier; and
- Remainder of 395 KlipbanksFontein;

Northern Cape:

- Portion 4 of 193 Urias Gat;
- Portion 6 of 193 Urias Gat;
- Remainder of 193 Urias Gat;
- Remainder of 194 Matjiesfontein; and
- Remainder of 196 Karree Kloof;
- Properties affected by public access road:
 - 169 Zeekoegat
 - Portion 1 of 170 Roodeheuvel
 - Remainder of 170 Roodeheuvel
 - Remainder of 170 Roodeheuvel
 - Remainder of 190 Wind Heuvel

- Portion 1 of 190 Wind Heuvel
- Portion 5 of 193 Urias Gat
- Remainder of 171 VinkeKuיל
- Farm 220
- Portion 1 of 174 Lange Huis
- Portion 1 of 188 Brakwater

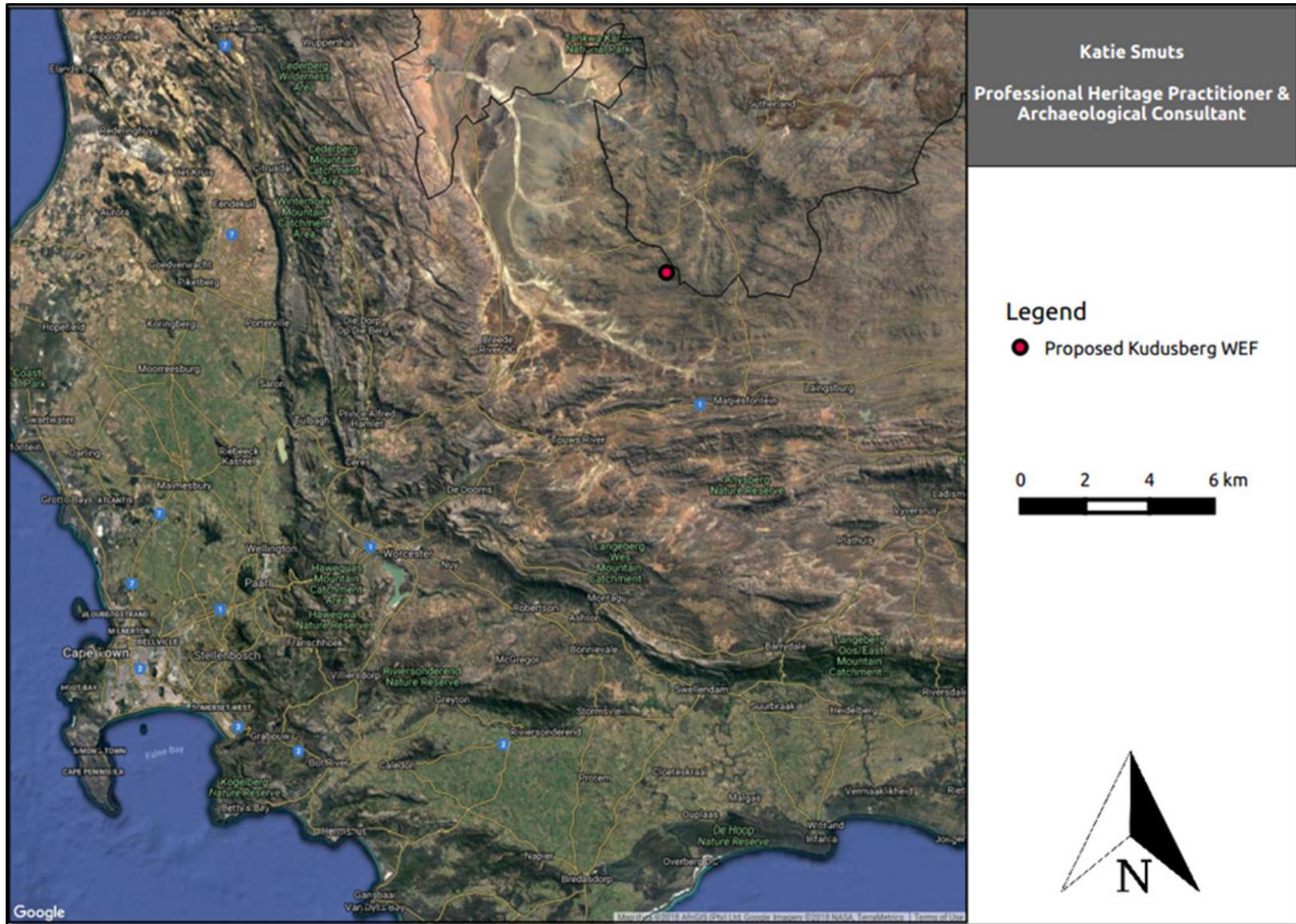


Figure 1: Location of the proposed Kudusberg WEF (centroid)

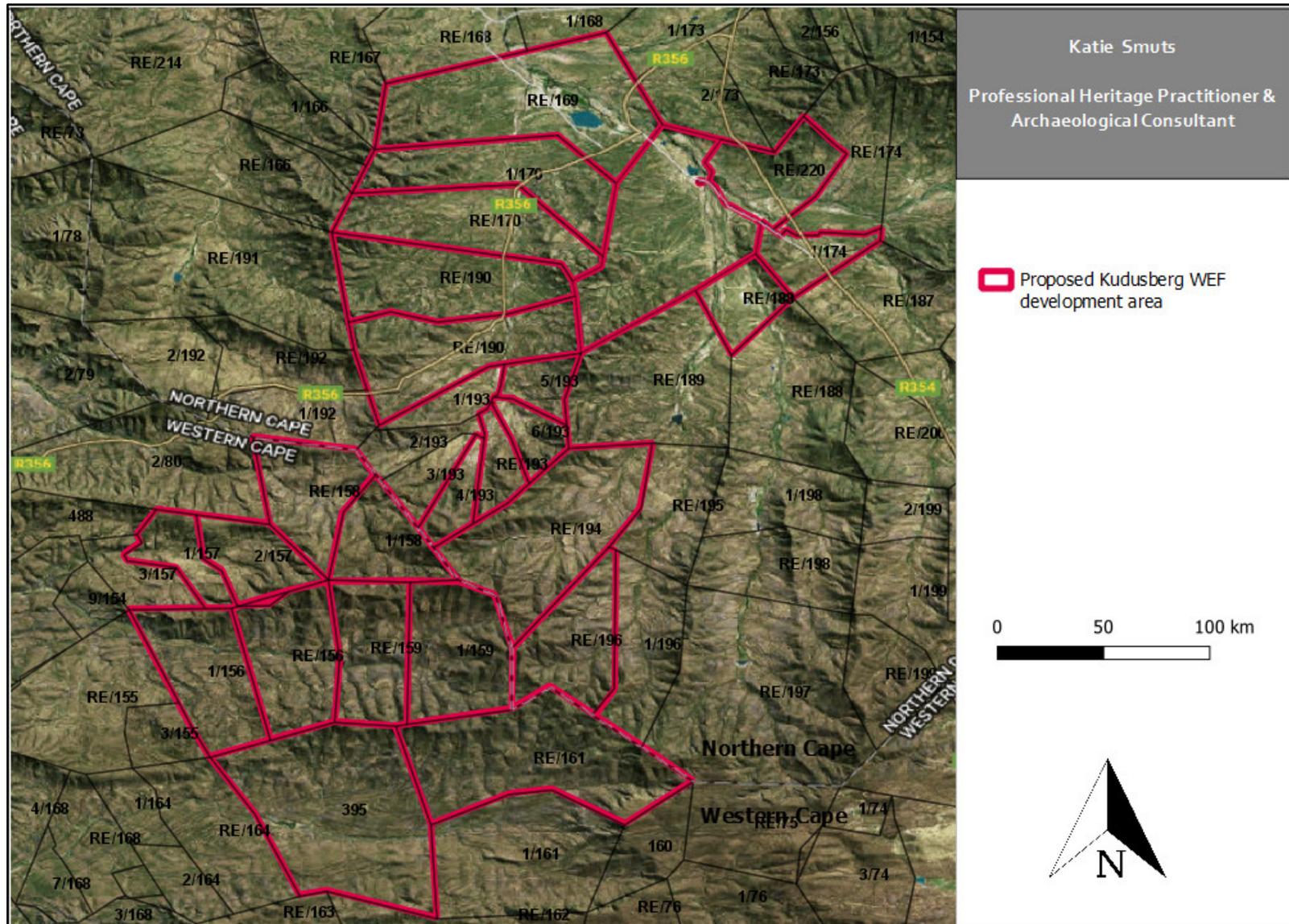


Figure 2.1. Proposed Kudusberg WEF development area showing portions in Western and Northern Cape.

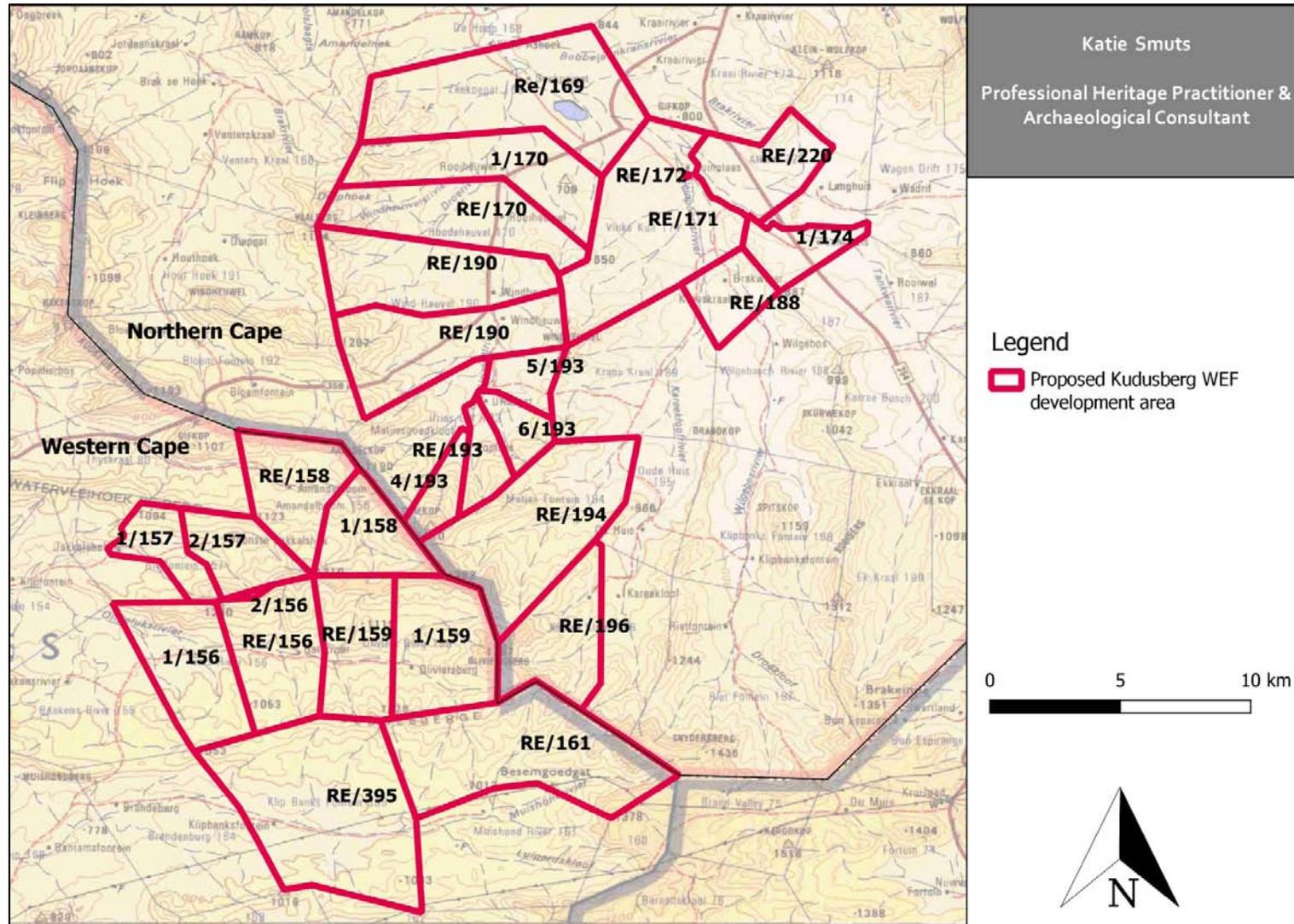


Figure 2.2. Topographical map showing proposed layout of Kudusberg WEF. (1:250k map 3220 Sutherland, courtesy of the Office of the Chief Surveyor General)

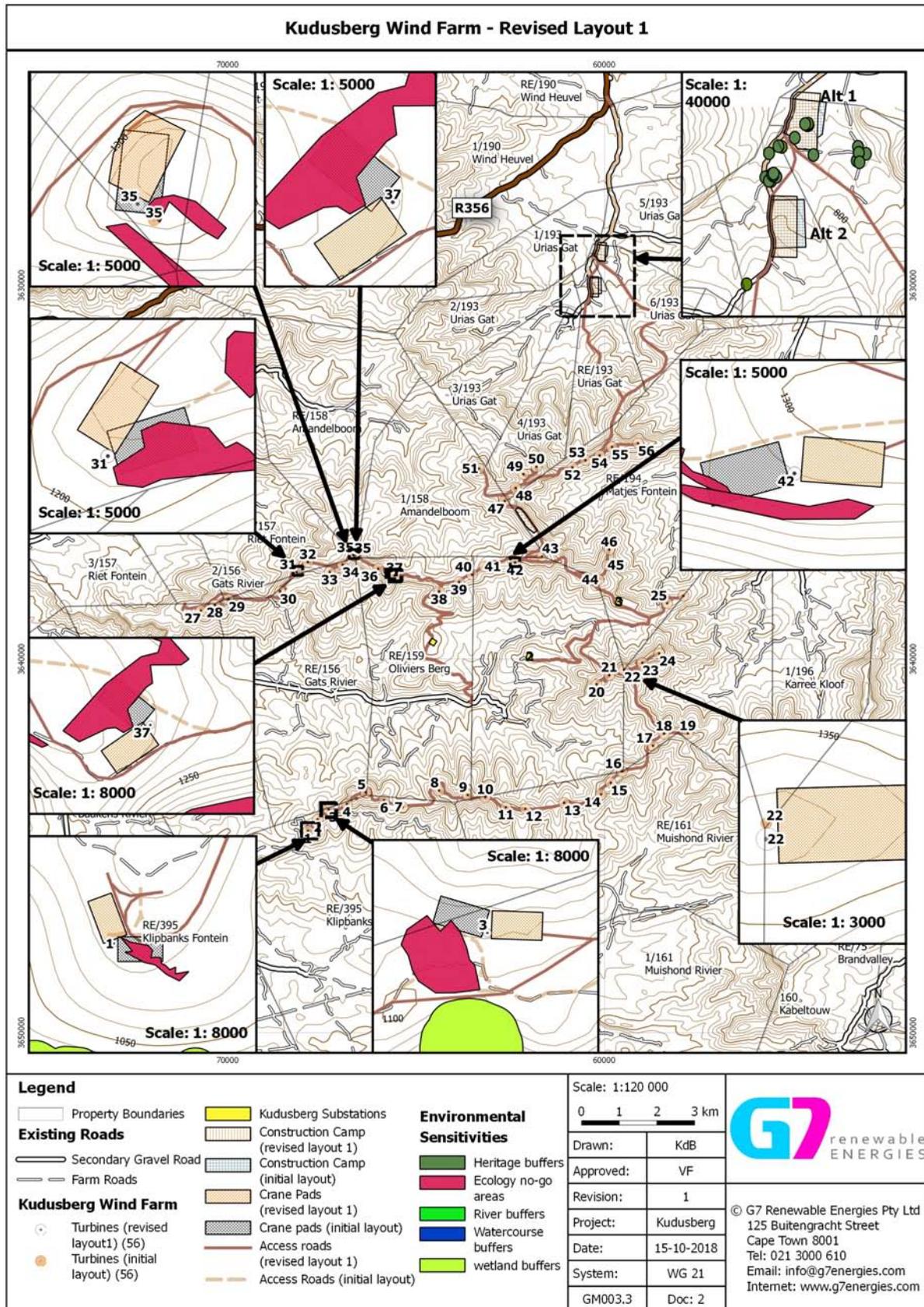


Figure 3.Revised infrastructure layout for Kudusberg WEF.

The proposed development area is located towards the southwest of the main Karoo region, with the centre of the study area some 11km south of the R356 and 22km west of the R354, the Sutherland-Matjiesfontein road. The area is on the border of the summer and winter rainfall regions and receives some snow and precipitation in winter as well as summer thunderstorms, although precipitation is limited and the region is semi-arid. The vegetation is characteristic of the Succulent Karoo biome in the low-lying areas and the Karoo Renosterveld Fynbos in the high-lying portions (Mucina and Rutherford 2006). The development area lies within the foothills of the Great Escarpment, and is characterised by valleys located between long ridges, and flat plains surrounded by hills and mountains. The ridges are largely undeveloped, while the valleys and plains contain several farmsteads comprising varying numbers of buildings. There are local roads and tracks servicing the area, some of which lead up to the hilltops, with recently created tracks servicing the wind masts scattered across peaks in the region. Together with farm infrastructure such as wire fenced stock camps and farm boundaries, wind pumps and reservoirs, these are the predominant features in an otherwise undeveloped, natural environment.

Several of the affected farms are no longer engaged in active agriculture, have changed hands in recent times and are owned by absentee landlords. Many of the farms are now relying solely on tourist accommodation for income, and high levels of predation is making sheep farming unsustainable.

3. DESCRIPTION OF METHODOLOGY

This study was commissioned as part of a Basic Assessment process as the development is located within the Komsberg REDZ. The site visit was conducted from 17-20 July 2018, with between 30- and 35-hours' survey conducted within this period. The survey team consisted of two archaeologists, a palaeontologist and an assistant. The survey was conducted in a 4x4 vehicle as well as on foot, with existing roads and farm tracks utilised for vehicular access. Heritage resources identified in the field were recorded, mapped and photographed where appropriate. Tracks and waypoints were recorded on a handheld GPS device (Garmin Etrex) and photographs were taken with a digital camera. 1:50k and 1:250k maps were obtained from the Directorate for Surveys and Mapping for use in the field. Maps and overlays

were created for the report using Google Earth and QGIS.

To ensure the survey was adequate for the purpose, given the hilly terrain and extensive infrastructure proposed, a strategic decision was adopted to sample landforms rather than try to focus narrowly on the footprint. This strategy involved conducting a survey of one ridge top, some of the ridge slopes, three caves, several river valleys and one open plain. The palaeontologist and his assistant accessed further ridge tops and areas and contributed waypoints to the study where they encountered heritage resources other than palaeontology. This meant that a sample of turbine footprints was assessed, all three substation alternatives, two of the three construction camp alternatives and some of the road alignments. Vegetation was relatively sparse, making visibility good, although the banks of the rivers were crowded in places with acacias and karee trees, impeding visibility there. The season did not affect visibility or the success of the survey. The extent of the site visit is considered sufficient to inform this process.

Background research was conducted by reviewing Heritage Impact Assessments (HIAs) conducted in the immediate area. These reports are freely accessible on the South African Heritage Resources Information System (SAHRIS) and covered work done in the area between 2010 and 2017. This information is, therefore, recent and up to date. While some reports are more comprehensive than others, all were found to be of very high quality.

Public consultation will be undertaken as part of the BA process, and in accordance with HWC's regulations pertaining to Public Participation Processes (PPP) for heritage, and the results of that will be incorporated into the final HIA.

In addition to the Archaeological Impact Assessment (AIA), a Palaeontological Desktop Report and Palaeontological Impact Assessment (PIA; Almond 2018) were compiled in addition to the Archaeological Impact Assessment (AIA; Smuts 2018). These together with a cultural landscape assessment study (Appendix 4; Rabe Bailey 2018) have been integrated into the HIA and are available as appendices to that report.

3.1 Scope of Works

This AIA considers the potential impacts of the proposed construction of a WEF on the several properties in the Komsberg REDZ on the border of the Western and Northern Cape Provinces.

The AIA achieves the following:

- Describe and map the heritage features of the site and surrounding area. This is based on desk-top reviews, fieldwork, available databases, findings of the Wind and Solar SEA (CSIR, 2015) and findings from other heritage studies in the area, where relevant. Reference to the grade of heritage feature and any heritage status the feature may have been awarded has been included.
- Assess the impacts and provide mitigation measures to be included in the EMP.
- Map heritage sensitivity for the site. Clearly show any “no-go” areas in terms of heritage (i.e. “very high” sensitivity), and provide recommended buffers or set-back distances.
- Identify and assess potential impacts from the project on the archaeology, as required by heritage legislation.
- Liaise with the relevant authority in order to obtain a final comment in terms of section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), including Regulations issued hereunder, as necessary. It is critical that the report follows the specific format required by Heritage Western Cape (HWC).
- Load the relevant documents on SAHRIS.

3.2 Restrictions and limitations

- The vast area and hilly terrain, as well as the expansive layout of the proposed development meant that an exhaustive survey was not possible. Strategic sampling of the landscape was employed to characterise the project area;
- Areas between spot checks conducted from the vehicle were not surveyed and could contain archaeological heritage resources;
- Farm roads were in variable condition, which made progress across the study area slow and limited the time available for foot survey;

- The survey can only account for artefacts and archaeological features visible on the ground, and sub-surface heritage could be present.

3.3 Gradings

The grading of sites is stipulated in Section 7 of the NHRA in order that the appropriate level of management can be accorded to sites. SAHRA is the managing authority for all Grade I national sites, the Provincial Heritage Resources Agencies (PHRAs) are the managing authorities for all Grade II or provincial sites, while Grade III or local sites are intended for management by the local authorities.

Significant to this project, which straddles the Western and Northern Cape, is the different grading systems implemented by HWC (2016a) and the SAHRA (2007). To regulate grading in the Western Cape, HWC has proposed a model that divides sites of local significance, that is Grade III sites, into:

- Grades IIIa – high local significance;
- Grade IIIb – medium local significance;
- Grade IIIc – low local significance; and
- Not Conservation Worthy (NCW) – little to no significance and not requiring mitigation.

In the absence of a fully competent PHRA in the Northern Cape, SAHRA's grading system should be employed there; SAHRA the term field rating to describe gradings assigned as part of Section 38 processes, while grading is reserved for official significance as designated by authorities. This system grades locally important sites as follows:

- Field Rating/Grade IIIa - high local significance that should be preserved in their entirety;
- Field Rating/Grade IIIb – medium local significance that can be mitigated and preserved in part;
- Field Rating/Grade IIIc sites are recorded as:
 - Field Rating/Grade IVa – high or medium significance requiring mitigation;
 - Field Rating/Grade IVb – medium significance requiring recording; and
 - Field Rating/Grade IVc – low significance not requiring mitigation

For the purposes of this report, sites within the Western Cape have been graded in terms of the HWC system, while those in the Northern Cape have been graded according to the SAHRA system. As the SAHRA system is only intended for application to archaeological heritage, not built environment, for the purposes of this report, the HWC system (Grades IIIa, IIIb and IIIc) have been retained for built environment (i.e. buildings, not including stone walling and structures – these terms are used to indicate archaeological built forms) in the Northern Cape.

4. BACKGROUND TO AND CONTEXT OF ARCHAEOLOGY COMPONENTS

Until recently, this region was fairly poorly understood from an archaeological perspective. This, however, is no longer strictly true, given the creation of the Komsberg REDZ, and the ensuing applications for WEFs in this area (Fourie et al 2015). Several HIAs, all of them with archaeological components have, as a result, been conducted within the area. Little research work, which is generally more thorough and comprehensive, has been done, however, so that while we have a broad understanding of the heritage character of the region, more specific conclusions cannot be derived.

Over 10 HIAs have been compiled near the study area, all with respect to windfarms and their associated infrastructure, and the findings of these reports are largely congruent. The reports identified surprisingly little pre-colonial or stone age archaeology (Booth 2012, 2015a and 2015b; Hart and Webley 2013; Hart and Kendrick 2014; Hart 2015; van der Walt 2016), with the little that has been identified in the form of scatters located on the flat floodplains up to the foothills of the mountains, and within river valleys along watercourses (Booth 2016a and 2016b). The dry, fairly desolate ridges, which are subject to high winds and, therefore the proposed locations for the turbines, are generally entirely devoid of Stone Age archaeological remains (Webley and Halkett 2017). These findings were also supported by the Heritage Scoping Assessment Report (Fourie et al 2015) compiled as part of the Department of Environmental Affairs' (2015) Strategic Environmental Assessment wind and solar energy developments. A mitigation phase excavation (Evans et al. 1985) has been undertaken at two small rock shelters in the grounds of

the South African Astronomical Observatory near Sutherland in the early 1980s. More recently, changing farming methods as represented by the distribution and variety of stone-built features (walls and kraals) was assessed as part of a Master's thesis (Regensberg 2016).

The area is known to have been inhabited since the Early Stone Age (ESA), with some surface scatters identified on a survey west of Matjiesfontein (Hart and Miller 2011) and a well-preserved ESA site with complete and well-formed bifaces south of Sutherland (Hart et al. 2010). Middle Stone Age (MSA) material is also present, and most often found in the form of occasional flakes and rare open sites (Hart et al. 2010). Later Stone Age (LSA) scatters have also been documented throughout the region, although at remarkably low density (Booth 2012, 2016a and 2016b; Hart and Webley 2013; Hart and Kendrick 2014; Hart 2015; van der Walt 2015). Rescue excavations conducted at two shelters near Sutherland, however, yielded significant LSA cultural material including various stone artefacts such as cores, utilized flakes, blades and chunks, and formal tools such as scrapers, adzes, backed blades, points and miscellaneous retouched pieces. Fragments of ostrich eggshell (OES) and ostrich eggshell beads, faunal remains and fresh water molluscs were also recorded (Evan et al. 1985). This archaeological signature represents the earliest inhabitants of this region, and, by the time of the LSA, these people constitute the antecedents of the San hunter gatherers who occupied the landscape in the last 10 000 years. Most tools are made on hornfels, quartzite and chert, while quartz and Karoo shale were also utilised (Hart et al. 2010).

Within the last 2 000 years, pastoralists, the Khoekhoen, arrived in the area, bringing with them livestock, thin-walled ceramics and new social and economic systems. In this area, there is extensive evidence for the presence of these groups in the landscape. This evidence comes in the form of circular, stone-built enclosures constructed of piled stone up to half a metre high and from 3m to 4m to 9 m in diameter (Hart et al. 2010). These enclosures represent living spaces, which contained grass huts or Matjieshuise (mat covered houses) and kraals. The kraals are generally situated on the leeward slopes of low ridges and likely date to between 300 and 1 000 years ago (Hart et al. 2010). The kraals sometimes form complexes of

as many as 13 interlocking enclosures, often with adjoining 'lammerkraals' (lamb pens). These sites can be found with fine, red burnished pottery and OES fragments. Other evidence for herders in this area has been identified in the form of open camps situated along dry river beds in valley bottoms. These sites are large, measuring 80m x 80m, and are associated with fine, thin walled Cape Coastal pottery, frequent informal stone tools, stone features, grinding surfaces, ash middens, animal bone and several graves with broken grindstones atop them; colonial period artefacts have also been found in association with these sites (Ibid.).

Rock art, which can be attributed to the San hunter gatherers or the pastoralists, is known within the region, although it's not commonly identified, and more concentrated in the Cape Fold Mountains to the south of the project area (Booth 2016a and 2016b; van der Walt 2015). These paintings tend to be of the fine line tradition, attributed to hunter gatherers, or finger painting, which is attributed to the herders.

Early *Trekboere* entered the region in the late 1700s, moving their livestock down into the valleys and plains of the Karoo from the better watered escarpment to escape the harsh winters there. As a result of this pattern of seasonal movement of flocks the *Trekboere* usually had a loan farm on the plateau, and a stockpost (*legplaats*) in the Karoo. The itinerant *trekboere* initially lived much like the pre-colonial herders, travelling with grass huts or *Matjieshuise* that could be easily erected where necessary (Hart and Kendrick 2014). The early arrival of these *trekboere* was initially met with resistance from the San, initially with the result that settlement of the area was impeded (Schoeman 1986). In retaliation against their stock losses, and the killing of Khoisan herders and slaves, the settlers established the *Kommando* system, which resulted in officially sanctioned hunting of the San by the late 1770s (Hart and Webley 2011). These massacres are recorded archivally and in placenames in the area, such as the farm Oorlogskloof near Sutherland where more than 30 stone cairn burials are to be found. Further mass graves might be found on Gunstfontein Farm, while there is purportedly also a cave where the San made a last stand against the *kommandos* (Ibid.).

Increasingly, as exploitation of the area became better established, and particularly after the Great Trek of the 1830s, their structures and imprint on the landscape became more permanent. The evidence for this early inhabitation of the region is to be found in historic farmhouses and associated buildings, stone cairns, stone walling, farm infrastructure such as reservoirs and, more recent wind pumps. Artefactual material from this period includes European ceramics, glass and iron fragments. The stone walling and kraals of this period are distinguished from the pre-colonial kraals as they are usually rectilinear and are faced on two sides with infill between the faces and are often mortared using local materials.

The area was witness to a further period of military action during the South African War, with some skirmishes near Skietfontein in the Komsberg Mountains (Hart and Webley 2011). The threat of Boer guerrilla activities also prompted the British to build several defensive structures in the region, including redoubts, gun platforms and blockhouses (van der Walt 2015; Hart and Webley 2011; Orton and Halkett 2011).

Some 79 sites are known and mapped within 30km of the development area (Table 1, Figures 4.1-4.2). These sites have largely been identified through impact assessment surveys conducted in this vicinity. More sites occur in the area but have not, as yet, been mapped on SAHRIS.

Table 1: Known sites in vicinity of project area

Site ID	Site number	Site name	Site Type	Grading
94454	KSW2	KSW2	Archaeological, Stone walling	Ungraded
94455	KSW3	KSW3	Archaeological, Stone walling	Ungraded
35648	GK125	Gamma Kappa 125	Artefacts	IIIa
35526	GK078	Gamma Kappa 078	Artefacts	IIIb
35555	GK041	Gamma Kappa 041	Artefacts	IIIb
35564	GK042	Gamma Kappa 042	Artefacts	IIIb
35568	GK046	Gamma Kappa 046	Artefacts	IIIb
35578	GK056	Gamma Kappa 056	Artefacts	IIIb
35131	ROG001	Roggeveld 001	Artefacts	IIIc
35132	ROG002	Roggeveld 002	Artefacts	IIIc
35541	GK032	Gamma Kappa 032	Artefacts	IIIc
35543	GK034	Gamma Kappa 034	Artefacts	IIIc

Site ID	Site number	Site name	Site Type	Grading
35544	GK035	Gamma Kappa 035	Artefacts	IIIc
35545	GK036	Gamma Kappa 036	Artefacts	IIIc
35574	GK052	Gamma Kappa 052	Artefacts	IIIc
35202	ROG028	Roggeveld 028	Artefacts	IIIc
35228	ROG040	Roggeveld 040	Artefacts	IIIc
35661	GK126	Gamma Kappa 126	Artefacts	IIIc
35571	GK049	Gamma Kappa 049	Building	IIIa
35240	ROG045	Roggeveld 045	Building	IIIa
35214	ROG032	Roggeveld 032	Building	IIIb
35753	ROG050	Roggeveld 050	Building	IIIb
35135	ROG005	Roggeveld 005	Building	IIIc
35140	ROG009	Roggeveld 009	Building	IIIc
35141	ROG010	Roggeveld 010	Building	IIIc
35152	ROG012	Roggeveld 012	Building	IIIc
35159	ROG015	Roggeveld 015	Building	IIIc
35216	ROG034	Roggeveld 034	Building	IIIc
35222	ROG037	Roggeveld 037	Building	Ungraded
35542	GK033	Gamma Kappa 033	Burial Grounds & Graves	IIIa
35547	GK037	Gamma Kappa 037	Burial Grounds & Graves	IIIa
35552	GK040	Gamma Kappa 040	Burial Grounds & Graves	IIIa
35565	GK043	Gamma Kappa 043	Burial Grounds & Graves	IIIa
35570	GK048	Gamma Kappa 048	Burial Grounds & Graves	IIIa
35185	ROG023	Roggeveld 023	Burial Grounds & Graves	IIIa
35219	HDV001	Hidden Valley 01	Burial Grounds & Graves	IIIa
35226	ROG038	Roggeveld 038	Burial Grounds & Graves	IIIa
35645	GK122	Gamma Kappa 122	Burial Grounds & Graves	IIIa
35646	GK123	Gamma Kappa 123	Burial Grounds & Graves	IIIa
35229	ROG041	Roggeveld 041	Burial Grounds & Graves	IIIa
35650	GK124	Gamma Kappa 124	Burial Grounds & Graves	IIIa
35239	ROG044	Roggeveld 044	Burial Grounds & Graves	IIIa
35241	ROG046	Roggeveld 046	Burial Grounds & Graves	IIIa
35243	ROG048	Roggeveld 048	Burial Grounds & Graves	IIIa
35512	GK015	Gamma Kappa 015	Burial Grounds & Graves	IIIc
35513	GK016	Gamma Kappa 016	Burial Grounds & Graves	IIIc
35514	GK017	Gamma Kappa 017	Burial Grounds & Graves	IIIc
35540	GK031	Gamma Kappa 031	Burial Grounds & Graves	IIIc
35137	ROG007	Roggeveld 007	Burial Grounds & Graves	IIIc
35201	ROG027	Roggeveld 027	Burial Grounds & Graves	IIIc

Site ID	Site number	Site name	Site Type	Grading
35178	ROG022	Roggeveld 022	Conservation Area	IIIc
35204	ROG029	Roggeveld 029	Cultural Landscape	IIIc
35215	ROG033	Roggeveld 033	Cultural Landscape	IIIc
29518	GEO044	Geosite: Ashoek intertributary sandstone and mudstone	Geological	IIIb
24901	Onder Karoo Road (Plant 1)	Onder Karoo Road (Plant 1)	Palaeontological	
24902	Onder Karoo Road (Plant 2)	Onder Karoo Road (Plant 2)	Palaeontological	
35191	ROG025	Roggeveld 025	Ruin > 100 years, Artefacts	IIIc
35188	ROG024	Roggeveld 024	Ruin > 100 years	IIIb
35217	ROG035	Roggeveld 035	Ruin > 100 years	IIIc
35569	GK047	Gamma Kappa 047	Stone walling	IIIb
35220	HDV002	Hidden Valley 02	Stone walling	IIIb
35224	HDV003	Hidden Valley 03	Stone walling	IIIb
35515	GK018	Gamma Kappa 018	Stone walling	IIIc
35138	ROG008	Roggeveld 008	Stone walling	IIIc
35550	GK038	Gamma Kappa 038	Stone walling	IIIc
35551	GK039	Gamma Kappa 039	Stone walling	IIIc
35154	ROG013	Roggeveld 013	Stone walling	IIIc
35566	GK044	Gamma Kappa 044	Stone walling	IIIc
35567	GK045	Gamma Kappa 045	Stone walling	IIIc
35576	GK054	Gamma Kappa 054	Stone walling	IIIc
35171	ROG016	Roggeveld 016	Stone walling	IIIc
35172	ROG017	Roggeveld 017	Stone walling	IIIc
35174	ROG019	Roggeveld 019	Stone walling	IIIc
35175	ROG020	Roggeveld 020	Stone walling	IIIc
35177	ROG021	Roggeveld 021	Stone walling	IIIc
35208	ROG030	Roggeveld 030	Stone walling	IIIc
35218	ROG036	Roggeveld 036	Stone walling	IIIc
35238	ROG043	Roggeveld 043	Stone walling	IIIc
35157	ROG014	Roggeveld 014	Transport infrastructure	IIIc

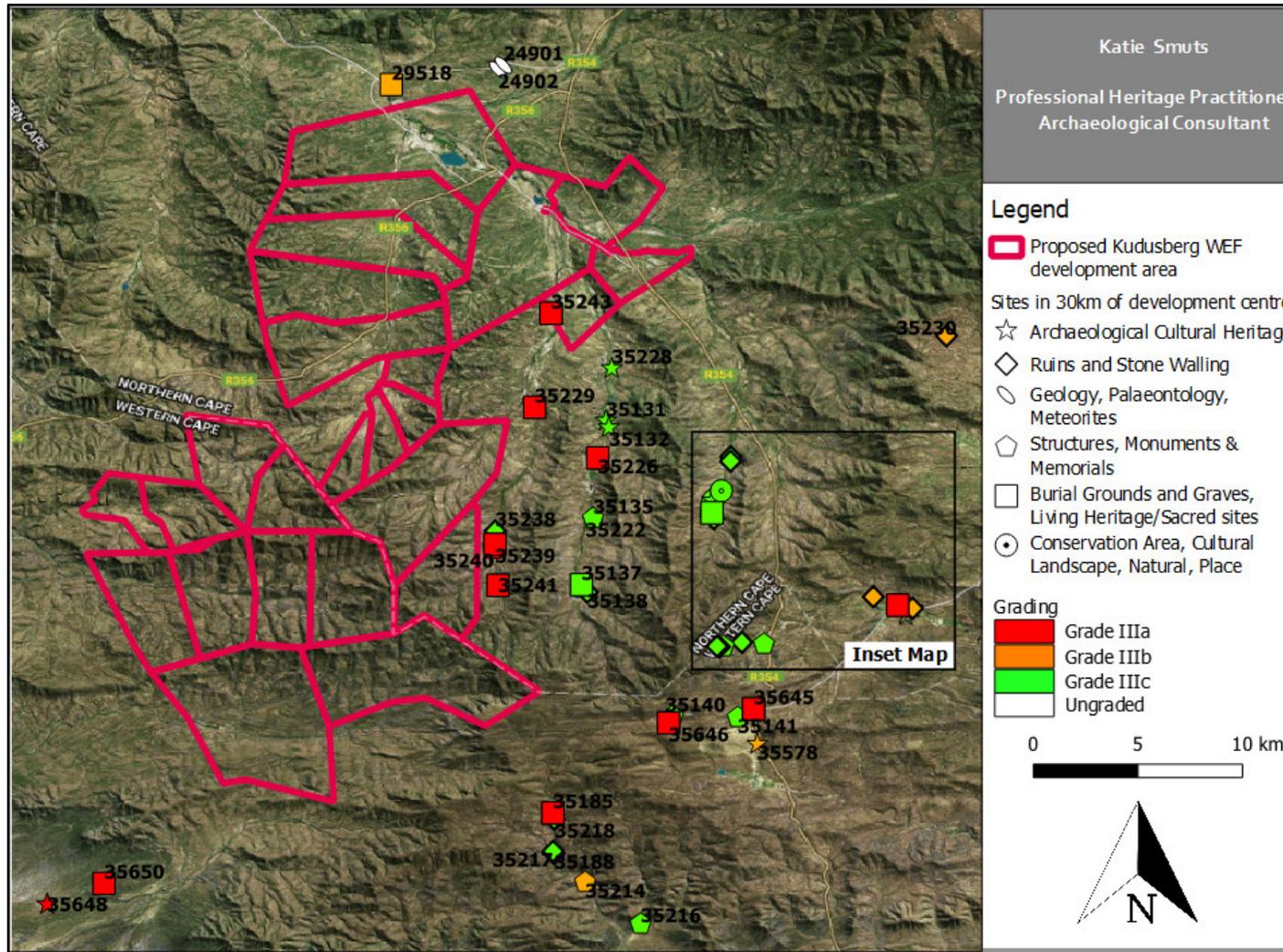


Figure 4.1. All known sites within 30 kms of the proposed development, as recorded on SAHRIS (Site IDs provided. See Table 1).

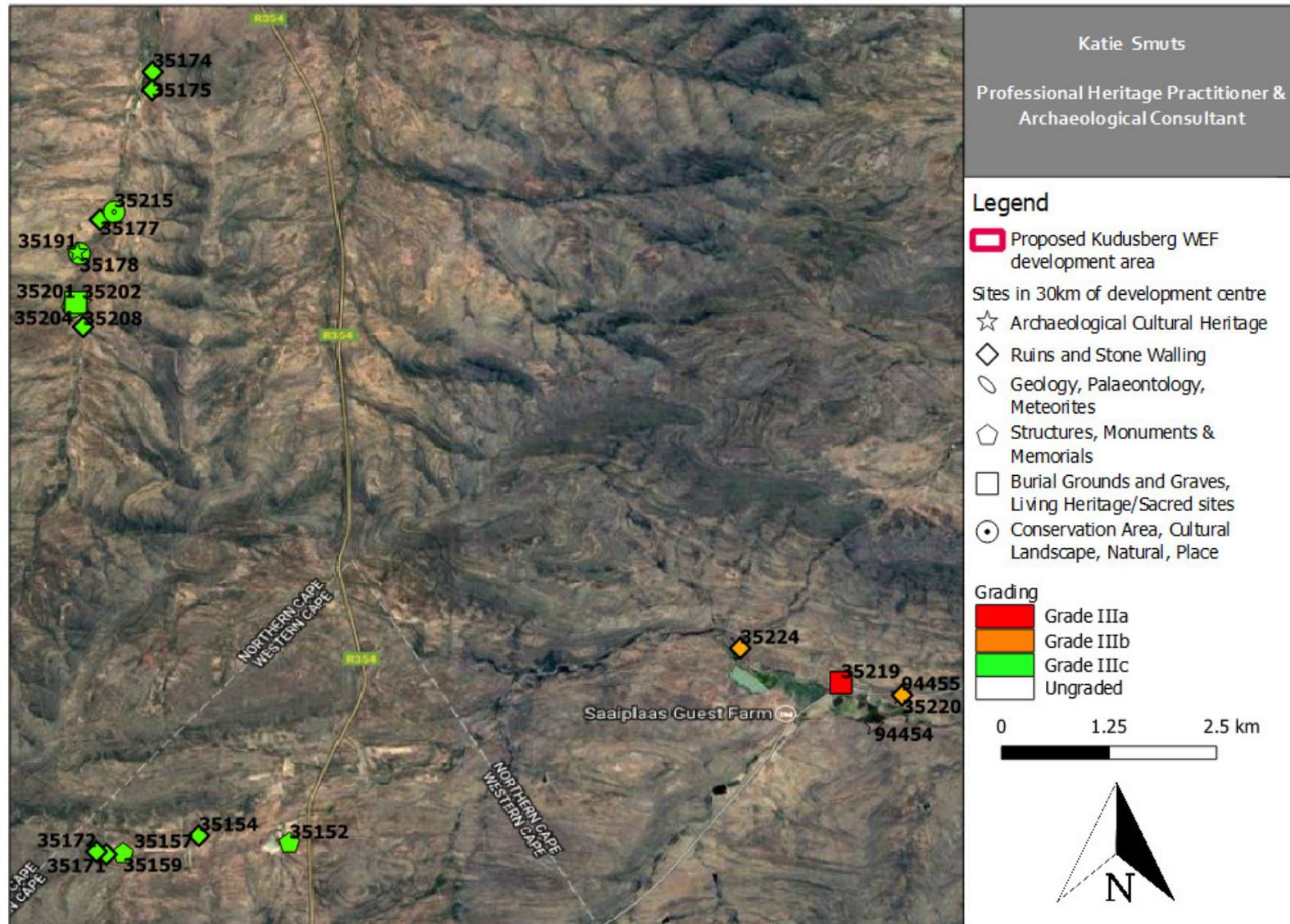


Figure 4.2. Inset Map

5. DESCRIPTION OF HERITAGE RESOURCES / PROJECT RESULTS

As indicated in section 3.1, exhaustive survey of the infrastructure footprint was impeded by various restrictions including the hilly terrain and the expansive proposed footprint (Figures 2.1, 2.2 and 3). As such, it was decided to sample the various landforms present in the study area to determine the heritage character of the ridges, slopes, plains and valleys (Figure 5.1.1). This approach was considered sufficient to inform this study, particularly in light of the findings of other specialists who have worked in the area.

The survey yielded sites of various types, including Stone Age artefacts, rock art, stone-built ruins and walling as well as built environment. The final heritage resource to be considered is that of the cultural landscape, which is addressed in the HIA; this report only considers impacts to physical, tangible heritage resources.

All recorded sites are listed in Table 2, while only selected sites are discussed in the text below. Where stone-built features can be identified as kraals, their site type has been recorded as structures, while alignments of stone walling have been recorded simply as stone walling where the nature of the structure was not clear. Ruined dwellings have been recorded as ruins > 100 years. These site types are all considered archaeological, and their grading (in the Northern Cape in terms of the SAHRA 2007 guidelines) reflects this. Built structures that are still in use but older than 60 years have been recorded as buildings, and the SAHRA grading system has not been applied to them where they occur in the Northern Cape.

Table 2. Sites identified during field survey

Site No.	Site Complex ¹	Site Description	Site Type	Grading/ Field Rating	Co-ordinates	
					South	East
Western Cape						
KDB001	KDBc1	OES and European ceramics and glass near historic reservoir	Artefacts	NCW	-32.8858888888889	20.2684444444444
KDB002	KDBc1	Red brick rubble, possible demolished historic storage space	N/A	NCW	-32.8858888888889	20.2683888888889
KDB003	KDBc1	Cobble stone and brick-built reservoir with wind pump	Structure	IIIc	-32.8860833333333	20.2683333333333
KDB004	KDBc1	Stone embankment behind reservoir	Stone walling	IIIc	-32.88625	20.2685277777778
KDB005		Irrigation sluice built on river bed to control flow for irrigation	Structure	IIIc	-32.8885555555556	20.2706111111111
KDB006		Eastern extent of long low wall below krans	Stone walling	IIIc	-32.8897777777778	20.2769166666667
KDB006a		Western extent of long low wall below krans	Stone walling	IIIc	-32.8898946103	20.2762558591
KDB007		Small stone wall	Stone walling	IIIc	-32.8899166666667	20.2788611111111
KDB008	KDBc10	Ruined stone-built structure with three rooms, 1 cobbled	Ruin > 100 years	IIIc	-32.8905555555556	20.2811111111111
KDB008a	KDBc10	Gatsrivier cottage 1, stone built, altered	Structure	IIIc	-32.8905763699688	20.2823636047795
KDB008b	KDBc10	Gatsrivier cottage 2, stone built, altered	Structure	IIIc	-32.889609748582	20.2832680656306
KDB008c	KDBc10	Gatsrivier cottage 3, stone built, altered	Structure	IIIc	-32.8894716589515	20.2842821581
KDB045		Cave with finger painted panels, flakes and cores	Rock art, deposit, artefacts	IIIa	-32.8681111111111	20.3350277777778
KDB084		Stone tools, likely MSA	Artefacts	IIIc	-32.8865833	20.3154166666667
KDB085		Circular cobble-built structure, piled stone, likely hut or shelter	Structure	IIIc	-32.8640556	20.3087777777778
KDB086	KDBc9	Stone walling	Stone walling	IIIc	-32.8939013695344	20.2965307608247
KDB087		Ruined rectangular stone-built structure	Ruin > 100 years	IIIc	-32.8877769577183	20.2639240035513
KDB088		Ruined rectangular stone-built structure	Ruin > 100 years	IIIc	-32.8885448496193	20.2265530985055
KDB089		Stone walling	Stone walling	IIIc	-32.8906986024231	20.2781007159501
KDB091		Oliviersberg farmstead, stone-built farmstead, two cottages, dam	Building	IIIc	-32.8957041237057	20.3301189820295
KDB092	KDBc9	Large rectilinear kraal	Structure	IIIc	-32.8928339083084	20.302446154276

1 Where individual sites were clustered sufficiently to read as a single complex, they have been assigned site complex numbers in addition to their individual site numbers.

Site No.	Site Complex ¹	Site Description	Site Type	Grading/ Field Rating	Co-ordinates	
					South	East
KDB093		Lime-rich cement brick in linear arrangement / drying stack	Artefacts	IIIc	-32.8949576569721	20.3308689035475
KDB094	KDBc9	Small circular kraal, piled cobbles	Structure	IIIc	-32.8934335789827	20.3005910722216
KDB095	KDBc9	Large rectangular kraal, faced stone, mortar	Structure	IIIc	-32.894773130506	20.3028470266098
KDB096		Large rectangular kraal, faced stone, mortar	Structure	IIIc	-32.8868089802563	20.3257718682289
Northern Cape						
KDB011		Stone-built embankment for old road	Transport infrastructure	IVc	-32.8660277777778	20.3749722222222
KDB012	KDBc3	Matjiesfontein Farm	Building	IIIc	-32.8335551028335	20.3960914659395
KDB014	KDBc2	Stone-built curved tower structure built against low kran	Stone walling	IIIb	-32.8483611111111	20.3785833333333
KDB015	KDBc2	Southernmost stone tower against kran	Stone walling	IIIb	-32.8484166666667	20.3784166666667
KDB016	KDBc2	Northernmost stone tower against kran	Stone walling	IIIb	-32.8483333333333	20.3786111111111
KDB017a	KDBc2	Southernmost collapsed stone tower	Stone walling	IIIb	-32.8483333333333	20.3786111111111
KDB017b	KDBc2	Northernmost collapsed stone tower	Stone walling	IIIb	-32.8481944444444	20.3786944444444
KDB018		Heaped rocks representing possible ruined stone-built structure	Ruin > 100 years	IVc	-32.8399444444444	20.3823055555556
KDB019		Old Road alignment with stone embankment	Transport infrastructure	IVc	-32.8395277777778	20.38275
KDB020	KDBc3	Large circular cobble-built structure infilled with broken rock fragments; likely old reservoir	Structure	IVb	-32.8334722222222	20.3955
KDB021	KDBc3	Three roomed stone-built ruin	Ruin > 100 years	IVb	-32.8331111111111	20.3963055555556
KDB022	KDBc3	Large rectilinear kraal	Structure	IVb	-32.8324722222222	20.39575
KDB023	KDBc3	Historic dump associated with Matjiesfontein farmstead; glass, ceramics, metal, bone	Artefacts, deposit	IVb	-32.8335277777778	20.3966388888889
KDB024	KDBc3	Threshing floor	Structure	IVb	-32.8337222222222	20.3961944444444
KDB025	KDBc3	Kraal with lammerhok	Structure	IVb	-32.8345277777778	20.3961666666667
KDB026	KDBc3	Large rectilinear kraal	Structure	IVb	-32.8342777777778	20.3958888888889
KDB027	KDBc3	Stone alignment	Stone walling	IVb	-32.8341666666667	20.3961944444444
KDB028	KDBc4	Circular kraal with piled rocks, no mortar	Structure	IVb	-32.8248055555556	20.4028888888889
KDB029	KDBc4	Small rectilinear ruined structure with mortared stone walls	Ruin > 100 years	IVb	-32.8248333333333	20.4029444444444
KDB030	KDBc4	Rectilinear ruined dwelling of dressed stone with mortar	Ruin > 100 years	IVb	-32.8246944444444	20.4032222222222

Site No.	Site Complex ¹	Site Description	Site Type	Grading/ Field Rating	Co-ordinates	
					South	East
KDB031	KDBc4	Historic dump associated with nearby structures; glass, ceramics, metal, bone	Artefacts, deposit	IVb	-32.8246111111111	20.4030555555556
KDB032	KDBc4	Piled stone cairn; possible burial	Burial Grounds & Graves	IIIa	-32.8248888888889	20.4026666666667
KDB033		Kranskraal historic farmstead with farmhouse, stone-built outbuildings	Building	IIIc	-32.7661111111111	20.4349166666667
KDB034	KDBc5	Large sub-rectilinear kraal, northern wall; piled cobbles, no mortar	Structures	IVb	-32.8168055555556	20.4016666666667
KDB035	KDBc5	Large sub-rectilinear kraal, southern wall	Structures	IVb	-32.8169722222222	20.4015277777778
KDB036	KDBc5	Large sub-rectilinear kraal, eastern wall	Structures	IVb	-32.8170833333333	20.4016111111111
KDB037	KDBc5	Large sub-rectilinear kraal robbed return wall	Structures	IVb	-32.8170833333333	20.4016944444444
KDB038	KDBc5	Ruined rectangular structure of dressed stone with mortar	Ruin > 100 years	IVb	-32.8182222222222	20.4019444444444
KDB039	KDBc5	2mx2m stone-built hut; dressed stone with mortar	Ruin > 100 years	IVb	-32.8185555555556	20.4017222222222
KDB040	KDBc5	5mx5m Oblong stone-built kraal dressed stone with mortar	Structures	IVb	-32.8182777777778	20.4017222222222
KDB041	KDBc5	5mx4m stone-built dwelling, dressed stone with mortar	Ruin > 100 years	IVb	-32.8181111111111	20.4025555555556
KDB042	KDBc5	Circular stone structure, piled dry stone build	Structures	IVb	-32.8181944444444	20.4026944444444
KDB043		Overhang	Natural	N/A	-32.8546111111111	20.3731666666667
KDB044		Waterfall Cave	Natural	N/A	-32.8576666666667	20.3674166666667
KDB050	KDBc7	U-shaped structure. Stone built with three phases of construction, faced stone and mortar	Structure	IVa	-32.7896666666667	20.3548611111111
KDB051		Stone built 20 th Century farm store	Building	IIIc	-32.80375	20.3501111111111
KDB052	KDBc8	Horseshoe shaped dry wall cobble-built kraal	Structure	IVa	-32.8028888888889	20.3505555555556
KDB053	KDBc8	4mx5m dwelling, dressed stone, mortar, gum pole roof structure	Ruin > 100 years	IVa	-32.8026388888889	20.3505833333333
KDB054	KDBc8	Lammerkraal, piled circular stone	Structure	IVa	-32.8024166666667	20.3506111111111
KDB055	KDBc8	Large rectilinear kraal with large faced stone blocks with infill	Ruin > 100 years	IVa	-32.8021666666667	20.3500555555556
KDB056	KDBc8	Stone dwelling, mud and grass plaster, rietdak with mud cap, mudbrick and breeze block extension	Ruin > 100 years	IVa	-32.8025833333333	20.3493611111111
KDB057	KDBc8	Single gravestone in fenced cemetery; EM Fourie, mother (b. 1873 d. 1937) JO Fourie, father (b. 1878 d. 1944)	Burial Grounds & Graves	IIIa	-32.8014444444444	20.3497222222222

Basic Assessment for the Proposed Development of the 325MW Kudusberg Wind Energy Facility and associated infrastructure, between Matjiesfontein and Sutherland in the Western and Northern Cape Provinces

Site No.	Site Complex ¹	Site Description	Site Type	Grading/ Field Rating	Co-ordinates	
					South	East
KDB058		Stone cairn, possible grave	Burial Grounds &Graves	IIIa	-32.7981666666667	20.3530555555556
KDB059	KDBc11	Wind Heuvel historic farmhouse and asbos skerm	Building, living heritage	IIIb	-32.7535412146123	20.3641834094368
KDB060	KDBc11	Wind Heuvel kraal complex	Structures	IIIb	-32.7521407016719	20.36389594526
KDB061	KDBc7	3-roomed structure 12mx5m; faced stone and mortar	Ruin > 100 years	IVa	-32.7899722222222	20.3553888888889
KDB062	KDBc7	Stone-built weir in dry river bed, mortared	Stone walling	IVb	-32.7899444444444	20.3551944444444
KDB063	KDBc7	Kraal with pen, drywall cobble built	Structure	IVa	-32.7894722222222	20.3555555555556
KDB064		65cmx50cm metal enclosed feature, likely grave	Burial Grounds & Graves	IIIa	-32.78725	20.3564166666667
KDB065		1930s farm House in werf	Building	IIIc	-32.7871944444444	20.3561111111111
KDB066		Large rectangular kraal	Structure	IVa	-32.78775	20.3552222222222
KDB068		Core, likely LSA	Artefacts	IVc	-32.7896111111111	20.3565277777778
KDB069		Reservoir and leivoor	Structures	IVb	-32.7865277777778	20.3576388888889
KDB071	KDBc6	Cairn 1, likely grave	Burial Grounds & Graves	IIIa	-32.7855555555556	20.3588333333333
KDB072	KDBc6	Cairn 2, likely grave	Burial Grounds & Graves	IIIa	-32.7852777777778	20.3589166666667
KDB073	KDBc6	Cairn 3, likely grave	Burial Grounds & Graves	IIIa	-32.7855	20.3588888888889
KDB074	KDBc6	Cairn 4, likely grave	Burial Grounds & Graves	IIIa	-32.7855	20.3588611111111
KDB075	KDBc6	Cairn 5, likely grave	Burial Grounds & Graves	IIIa	-32.7854444444444	20.3588611111111
KDB076	KDBc6	Cairn 6, likely grave	Burial Grounds & Graves	IIIa	-32.7854166666667	20.3588888888889
KDB077	KDBc6	Stone alignment	Stone walling	IVc	-32.7854444444444	20.3586111111111
KDB080	KDBc11	Temporary accommodation and asboskookskerms on Wind Heuvel farmstead	Living heritage	IIIb	-32.7572777777778	20.3641388888889
KDB081	KDBc11	Stadler cemetery. 10 graves with sandstone headstones at roadside. No fence	Burial Grounds & Graves	IIIa	-32.7527777777778	20.3630555555556
KDB082		Rooiheuvel farmstead with asbos skerm	Building, living heritage	IIIb	-32.7118611111111	20.3635
KDB083		Church with grave	Building, living	IIIa	-32.6946944444444	20.4398611111111

Site No.	Site Complex ¹	Site Description	Site Type	Grading/ Field Rating	Co-ordinates	
					South	East
			heritage, burial grounds and graves			
KDB097		Flake	Artefacts	IVc	-32.77161111111111	20.36205555555556
KDB098		MSA point	Artefacts	IVc	-32.79208333333333	20.35533333333333
KDB099	KDBc7	Large rectangular kraal, northern end	Structure	IVa	-32.7893640753	20.3556328174
KDB100	KDBc7	Large rectangular kraal lammerkraal	Structure	IVa	-32.7894111816	20.3554938454
KDB101	KDBc7	Large rectangular kraal southern end	Structure	IVa	-32.7895218227	20.3555905726
KDB102	KDBc7	Curved walling near large kraal, eastern extent	Structure	IVa	-32.7896312065	20.3558908124
KDB103	KDBc7	Large rectangular kraal eastern end	Structure	IVa	-32.789486954	20.3557243478
KDB104	KDBc7	Curved walling near large kraal, western extent	Structure	IVa	-32.7895038016	20.3557919059
KDB105	KDBc7	Large rectangular kraal western end	Structure	IVa	-32.7894045599	20.3555516806
KDB106		Irregular kraal structure (identified from Google Earth)	Structure	IVc	-32.7879034636563	20.3593715749197
KDB107	KDBc12	Large, circular kraal structure (identified from Google Earth)	Structure	IVa	-32.7883836195093	20.3634164044642
KDB108	KDBc12	Small circular kraal structure (identified from Google Earth)	StructureIIIb	IVa	-32.7872744836467	20.3635366471262
KDB109	KDBc12	Large kraal with lammerhok (identified from Google Earth)	Structure	IVa	-32.7878388810924	20.3642781435414
KDB110	KDBc12	Multi-roomed structure (identified from Google Earth)	Ruin > 100 years	IVa	-32.7877602587774	20.3636101287529
KDB111	KDBc12	Two-roomed structure (identified from Google Earth)	Ruin > 100 years	IVa	-32.7885127837993	20.3636669100099

5.1 Resources identified

5.1.1 Stone Age archaeology

Very little Stone Age material was identified during the course of the survey, and what was recorded comprised isolated stone artefacts. In general these were made on predominantly locally derived stones, including Karoo sandstone and greywacke, as well as hornfels and chert. While some material appeared MSA in type, with so few artefacts identified, it was generally not possible to ascribe age to them (Plates 1-3).

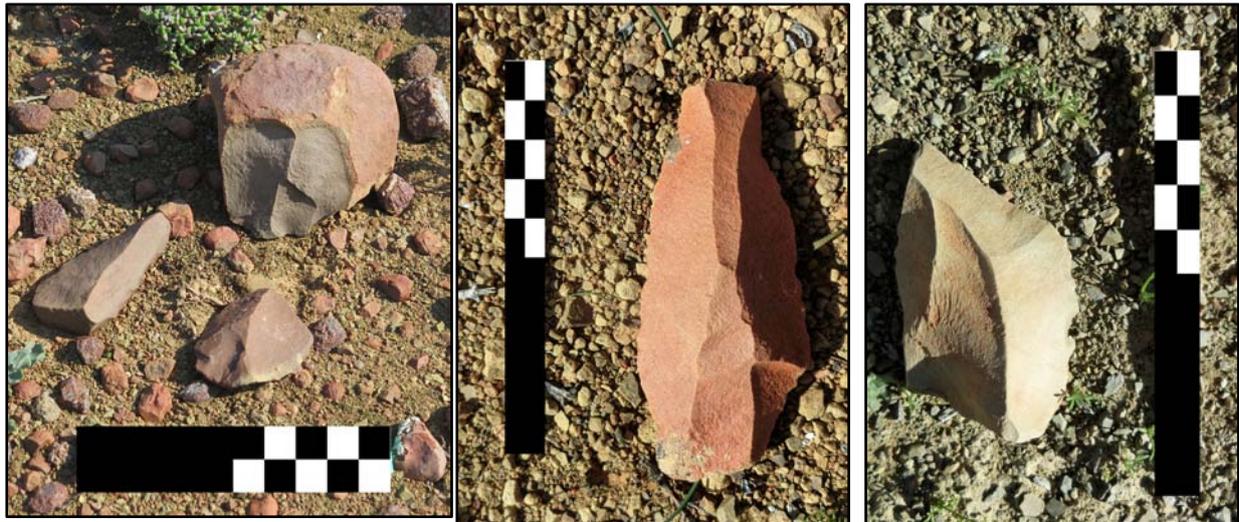


Plate 1. Stone tools KDB084

Plate 2. Stone tool KDB098

Plate 3. Stone tool KDB097

Most of the stone tools identified were found on the flat, open plain in the northern extent of the development footprint, while the three artefacts observed at KDB084 (Figure 5.1.2) represent the only artefacts identified on higher lying ground, at some 300m above the lower lying areas (Plate 1). None of the artefacts identified were considered significant, and no artefactual remains were found on the ridges.

The only significant archaeological site was identified some distance from any proposed infrastructure, but its presence in the study area is significant in terms of determining the heritage character of the area. KDB045 is a large south west facing rock shelter that was identified at the apex of a low lying kloof at approximately 1124m a.s.l. (Plate 4; Figure 5.1.2 and 5.1.3). This site contained rock art, stone artefacts, tortoise bone and ostrich eggshell as well as a single piece of thick walled, highly burnished ceramic with a glossy red exterior (Plates 5 and 6). Although the cave floor was thickly covered with sheep dung, and fairly churned, it is likely that there is anthropogenic deposit at the site. The site also contained several panels with finger painted rock art in vibrant red ochre, with some apparent animal and human shapes discernible as well as finger daubs (Plate 7). Faint traces of apparent eland-type shapes could indicate the presence of earlier fine line imagery at the site (Plate 8). This site is of high significance.



Plate 4. Rock shelter. KDB045



Plate 5. Artefacts from KDB045, including a core, broken blade and backed piece



Plate 6. Burnished ceramic at KDB045



Plate 7. Possible human figures



Plate 8. Possible fineline eland torsos

A ubiquitous feature in the landscape is the stone-built kraal. While determining relative age of such structures from a survey such as this, is not always feasible, it is useful to consider that prehistoric kraals tend to be built of piled cobbles and are usually round, while historic kraals are often rectilinear and built from packed stone, sometimes dressed, faced and infilled with smaller stones or built with mortar. Very few of the many identified kraals and stone walls conformed to this pre-colonial building method, although several small, circular kraals were identified that were built of piled stone rather than packed stone that could represent pre-colonial herder activity in the region (Plate 9).

5.1.2 Historical archaeology

The most predominant type of archaeological material identified in the landscape was historical ruins. These ranged from packed stone walling, some with drystone walling, and some with mortar, to stone-built kraals displaying a variety of construction methods, ruined huts and rectilinear dwellings, one abandoned farmhouse (KDB056 at KDBc8) and one abandoned structure that was possibly an old school (KDB050 at KDBc7) (Plates 9-13; Figure 5.1.4). These structures were concentrated along valley floors and on open plains in the north of the project area near watercourses. Individually, they are of little significance, but collectively serve as significant traces of long-term occupation of this landscape, and multiple expressions of the same economic activities, i.e. sheep farming.

An interesting feature of the stone structures is an apparent reuse of favoured areas for consecutive periods of use and occupation. This reuse is expressed in newer kraals built adjacent to, and even within the footprint of earlier kraals, where the phasing of these structures is evident in the changing styles of construction. Rounded kraals are often found in close association with well-built rectilinear structures that have been interpreted as dwellings (KDBc3, KDBc5, KDBc7, KDBc8; KDBc12 Figures 5.1.3 and 5.1.4). These clustered sites often, then, comprise one or two large kraals with either lammerhokke attached or freestanding small stone kraals, a rectangular dwelling of between one and three rooms, and a smaller rectangular or square hut.

The most significant complexes, comprising these clusters of stone walling, kraals, huts and ruins are on *Boplaaswerf* on Urias Gat 4/193 (KDBc8; Figure 5.1.4), which is located along the proposed Access Road Alternative 1 from the north, and the Matjiesfontein farmstead (KDBc3; Figure 5.1.3) which is not at direct risk of impact from the development.



Plate 9. Small stone kraal (KDB042), possibly precolonial



Plate 10. Large kraal (KDB026) at Matjiesfontein Farm 194 (KDBc3)



Plate 11a. U-shaped structure (KDB050), view to northeast (KDBc7)



Plate 11b. U-shaped structure (KDB050), view to west



Plate 12. Packed stone kraal wall (KDB055), with ruined cottage (KDB056) and repurposed reservoir currently occupied by migrant labourers to rear on Boplaas (KDBc8)



Plate 13. Oblong kraal cobble-built structure (KDB040) in foreground, with rectilinear faced stone dwelling (KDB041) to rear; both built with mortared stone (KDBc5)

A single stone circle built with sub rectangular stones and filled with brush was identified on a relatively high altitude, KDB085 at 1220m a.s.l., and constitutes the highest lying feature encountered (Plate 14; Figure 5.1.1). It was not possible to determine the age of this structure which was identified as a possible shelter or shepherd's hut, and it is likely that it dates to the recent historic period. No cultural material or evidence of associated deposit was noticed near the site. This site is considered to have low-medium significance and does not warrant further mitigation.



Plate 14. Possible shepherd's hut KDB085

One of the more enigmatic features was located along a low rocky outcrop in a wide bottomed valley on Matjiesfontein Farm 194 (KDBc2, comprising KDB14-17b; Figure

5.1.3). The feature consisted of at least 5 conical stone-built structures backing onto the krans, with two of those five collapsed, and possibly more (Plates 15-18). The stone work was neat and coursed, and the centre of each “tower” was filled with small irregular stone fragments (Plate 18). There was no other artefactual material, nor any other walling in the area or between the towers. The regularity of the feature, and the very orderly style of build suggests a defensive, military origin, but this could not be established. Due to the uniqueness of this structure and its fine method of construction, it is deemed to be of medium-high significance.



Plate 15. View of krans with conical stone features (KDBc2) built against it



Plate 16. Southernmost tower (KDB015)



Plate 17. Northernmost tower (KDB016)



Plate 18. Northernmost tower (KDB016) showing infill

5.1.3 Built Environment

Several historic farmhouses, workers’ cottages and related built structures occur within the project area. Many of these structures are currently unoccupied, and several structures are falling to ruin, including at Boplaaswerf on Urias Gat 4/193 (KDBc8; Figure 5.1.4); Matjiesfontein 194 (KDBc3; Figure 5.1.3) and Urias Gat 4/193 and Re/193 (KDB065; Figure 5.1.4), all located in the Northern Cape. These structures include buildings sufficiently old to have been recorded as ruins > 100

years, and are dealt with above, while others have been recorded as structures in terms of Section 34 of the NHRA. As with most of the archaeological features, these structures are all located on valley floors and on the open plains close to watercourses. As many of the farms are no longer actively engaged in sheep farming anymore, some of these dwellings have been repurposed as guest accommodation, such as GatsrivierRe/156. It was not always possible to determine whether some of the more derelict cottages, for instance at Gatsrivier1/156 and Re/156, OliviersBerg1/159 and Re/ and on Urias Gat 4/193, were in use by labourers, either permanently or seasonally.



Plate 19. Oliviersberg dwelling with double chimney and unsympathetic redevelopment

Of the farmsteads that are likely to be affected by the proposed WEF, the most likely to be impacted are Oliviersberg1/159 (KDB091) and Gatsrivier1/156 and Re/156 (KDB008-KDB008c) in the Western Cape, which lie between several ridges proposed for turbine placement (Figure 5.1.2). In the Northern Cape, Wind Heuvel Re/190 (KDB059 at KDBc11; Figure 5.1.5), which lies along the proposed access route from the north, will be impacted, while the turbines will be visible from Matjiesfontein 194 (KDB012). The three cottages at Gatsrivier Re/156 have been altered to accommodate tourists and are of little intrinsic heritage significance. The original dwelling at Oliviersberg 1/159 has been much altered by the owner, to the detriment of any heritage value, but retains some interesting architectural features (Plate 19). The Wind Heuvel Re/190 farmhouse looks to be a 1930s or 1940s structure, although it likely has a much older core, and older elements exist in and around the

werf, such as stone walling and kraals (KDB060). It is not clear whether the Matjiesfontein farmstead is still in use, and the werf appears unused in recent times. Again, although none of these structures is of high significance in and of themselves, where they constitute significant cultural landscapes and temporal layering of the area, they hold cultural significant that is of higher heritage value than the separate constituent elements.

5.1.4 Burial grounds and graves

One single grave with two burials (KDB057 at KDBc8; Figure 5.1.4) and one burial ground were identified (KDB081 at KDBc11; Figure 5.1.5), and one likely child burial (KDB064; Figure 5.1.4). Several stone cairns were also noted as likely graves, including one isolated cairn (KDB058) and one group of more than 10 cairns (KDBc6) (Figure 5.1.4). All the graves identified were located within the Northern Cape.

The single grave (KDB057) was located on Boplaaswerf on Urias Gat 4/193 (Plates 20 and 21). The inscribed marble headstone of this grave records the death of E.M. Fourie, mother (b. 1873 d. 1937) and J.O. Fourie, father (b. 1878 d. 1944). The grave is within a fenced area and is some 350m west of Access Alternative 1. The isolated stone cairn (KDB058) while not positively identifiable as a grave, should be considered a possible grave, and is located beyond 50m from Access Road Alternative 1. The likely child burial (KDB064) is located on Uria's Gat (KDB065) and is a small, low, rectangular metal railing edged with stone and cement that measures 650mm long by 500mm wide (Plate 22). It is located equidistant from Access Road Alternatives 1 and 2, and the farm fence lies between the grave and Access Road Alternative 2.



Plate 20. Fourie grave (KDB057) with fenced camp



Plate 21. Fourie headstone



Plate 22. Likely child's grave (KDB064) at Urias Gat (KDB065)

The group of stone cairns (KDBc6) is located 300m northeast of the Urias Gat farmhouse (Plates 23 and 24). These cairns vary in size from just over 1m in length to approximately 1.8m. It is likely, given the uniformity of appearance and the grouping of these features that they do represent graves. These cairns lie approximately 165m east of Common Access Road 1 from the north, 190m northeast of the fork between Access Road Alternatives 1 and 2.



Plate 23. Small cairn at KDBc6 (KDB072)



Plate 24. Large cairn at KDBc6 (KDB071)



Plate 25. Stadler graveyard (KDB081) at Wind Heuvel farmstead (KDBc11)

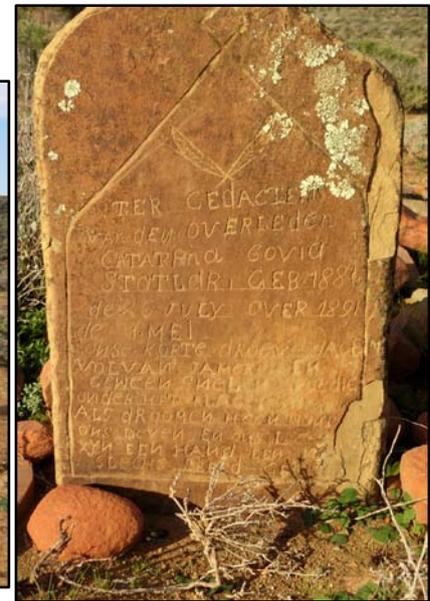


Plate 26. Stadler headstone at KDBc11

The other graves encountered (KDB081) were directly adjacent, 12m east, to Common Access Road 1 where it passes Wind Heuvel Farm (KDB059). This graveyard consists of some 10-12 graves (Plate 25), with hand inscribed sandstone headstones, and is the family graveyard of the historic – and present – owners of Wind Heuvel, the Stadlers, and most graves date to the late nineteenth and early twentieth centuries (Plate 26). Most of the graves are marked with stone cairns, while some have rectangular stone edging. The graveyard is not fenced, although its perimeter is demarcated by a small furrow that encloses the graves.

5.1.5 Cultural landscapes and Living heritage

While cultural landscape will be dealt with fully in the HIA, certain aspects are worth mentioning here due to the material expression of longstanding, continuous traditions. Wind Heuvel farmstead (KDBc11), which is located on the proposed access road from the north, comprises an historic structure that appears much altered from the exterior (KDB059), a large rectilinear kraal complex (KDB060), and a farm cemetery (KDB081) that lies directly adjacent to the existing farm road. In addition to these heritage resources, the farm displays examples of living heritage and continuity of traditional practices. While the seasonal farm labourers are housed in shipping containers – the workers travel down from the escarpment with the farmer in the winter – there are several *asboskookskerms* erected either freestanding or adjacent to the containers (KDB080; Plate 27). Adjacent to the main house there is a further large *asbosenclosure* that stands at least 6m high (Plate 28).



Plate 27. Kookskerm at Wind Heuvel



Plate 28. Freestanding asbos skerm

5.2 Impacts to heritage resources

Due to the survey method employed – i.e. to sample as many landforms as possible to define the area's heritage character given that accessing all footprint areas was not possible – not all resources identified in the field are likely to be impacted. Similarly, however, not all areas where impacts will likely result were assessed.

The table below (Table 3) provides the details and co-ordinates of all heritage resources that will be directly impacted, and those likely to experience high levels of

indirect impact. Resources are listed by province and degree of significance.

Table 3. Table of sites liable to direct and/or indirect impacts from WEF

Site No.	Site Complex	Site Description	Site Type	Grading/ Field Rating	Coordinates
Western Cape					
KDB045		Cave with finger painted panels, flakes and cores	Rock art, artefacts, deposit	IIIa	-32°52'5.2" ; 20°20'6.1"
KDB084		Stone tools, likely MSA	Artefacts	IIIc	-32°53'11.70" ; 20°18'55.50"
KDB085		Circular cobble-built structure, piled stone, likely hut or shelter	Structure	IIIc	-32°51'50.60" ; 20°18'31.60"
KDB091		Oliviers Berg farmstead, stone-built farmstead, two cottages, dam	Building	IIIc	-32°53'44.53" ; 20°19'48.43"
KDB093		Lime-rich cement brick in linear arrangement / drying stack	Artefacts	IIIc	-32°53'41.85" ; 20°19'51.13"
KDB096		Large rectangular kraal, faced stone, mortar	Structure	IIIc	-32°53'12.51" ; 20°19'32.78"
Northern Cape					
KDB057	KDBc8	Single gravestone in fenced cemetery; EM Fourie, mother (b. 1873 d. 1937) JO Fourie, father (b. 1878 d. 1944)	Burial Grounds & Graves	IIIa	-32°48'5.2" ; 20°20'59"
KDB058		Stone cairn, possible grave	Burial Grounds & Graves	IIIa	-32°47'53.4" ; 20°21'11"
KDB060	KDBc11	Wind Heuvel kraal complex	Structures	IIIb	-32°45'7.71" ; 20°21'50.03"
KDB064		65cmx50cm metal enclosed feature, likely grave	Burial Grounds & Graves	IIIa	-32°47'14.1" ; 20°21'23.1"
KDB071	KDBc6	Cairn 1, likely grave	Burial Grounds & Graves	IIIa	-32°47'8" ; 20°21'31.8"
KDB072	KDBc6	Cairn 2, likely grave	Burial Grounds & Graves	IIIa	-32°47'7.9" ; 20°21'32.1"
KDB073	KDBc6	Cairn 3, likely grave	Burial Grounds & Graves	IIIa	-32°47'7.8" ; 20°21'32"
KDB074	KDBc6	Cairn 4, likely grave	Burial Grounds & Graves	IIIa	-32°47'7.8" ; 20°21'31.9"
KDB075	KDBc6	Cairn 5, likely grave	Burial Grounds & Graves	IIIa	-32°47'7.6" ; 20°21'31.9"
KDB076	KDBc6	Cairn 6, likely grave	Burial Grounds	IIIa	-32°47'7.5" ; 20°21'32"

Site No.	Site Complex	Site Description	Site Type	Grading/ Field Rating	Coordinates
			&Graves		
KDB081	KDBc11	Stadler cemetery. 10 graves with sandstone headstones at roadside. No fence	Burial Grounds & Graves	IIIa	-32°45'10" ; 20°21'47"
KDB083		Church with grave	Building, living heritage, Burial Grounds & Graves	IIIa	-32°41'40.9" ; 20°26'23.5"
KDB059	KDBc11	Wind Heuvel historic farmhouse and asbos skerm	Building, living heritage	IIIb	-32°45'9.7" ; 20°21'46.4"
KDB080	KDBc11	Temporary accommodation and asboskookskerms on Wind Heuvel farmstead	Living heritage	IIIb	-32°45'26.2" ; 20°21'50.9"
KDB082		Rooiheuvel farmstead with asbos skerm	Building	IIIb	-32°42'42.7" ; 20°21'48.6"
KDB050	KDBc7	U-shaped structure. Stone built with three phases of construction, faced stone and mortar	Ruin > 100 years	IVa	-32°47'22.8" ; 20°21'17.5"
KDB052	KDBc8	Horseshoe shaped dry wall cobble-built kraal	Structure	IVa	-32°48'10.4" ; 20°21'2"
KDB053	KDBc8	4mx5m dwelling, dressed stone, mortar, gum pole roof structure	Ruin > 100 years	IVa	-32°48'9.5" ; 20°21'2.1"
KDB054	KDBc8	Lammerkraal, piled circular stone	Structure	IVa	-32°48'8.7" ; 20°21'2.2"
KDB055	KDBc8	Large rectilinear kraal with large faced stone blocks with infill	Structure	IVa	-32°48'7.8" ; 20°21'0.2"
KDB056	KDBc8	Stone dwelling, mud and grass plaster, rietdak with mud cap, mudbrick and breeze block extension	Ruin > 100 years	IVa	-32°48'9.3" ; 20°20'57.7"
KDB061	KDBc7	3-roomed structure 12mx5m; faced stone and mortar	Ruin > 100 years	IVa	-32°47'23.9" ; 20°21'19.4"
KDB063	KDBc7	Kraal with pen, drywall cobble built	Structure	IVa	-32°47'22.1" ; 20°21'20"
KDB066		Large rectangular kraal	Structure	IVa	-32°47'15.9" ; 20°21'18.8"
KDB099	KDBc7	Large rectangular kraal, northern end	Structure	IVa	-32°47'21.71" ; 20°21'20.28"
KDB100	KDBc7	Large rectangular kraal lammerkraal	Structure	IVa	-32°47'21.88" ; 20°21'19.78"
KDB101	KDBc7	Large rectangular kraal southern end	Structure	IVa	-32°47'22.28" ; 20°21'20.13"
KDB102	KDBc7	Curved walling near large kraal, eastern extent	Structure	IVa	-32°47'22.67" ; 20°21'21.21"
KDB103	KDBc7	Large rectangular kraal eastern end	Structure	IVa	-32°47'22.15" ; 20°21'20.61"

Site No.	Site Complex	Site Description	Site Type	Grading/ Field Rating	Coordinates
KDB104	KDBc7	Curved walling near large kraal, western extent	Structure	IVa	-32°47'22.21" ; 20°21'20.85"
KDB105	KDBc7	Large rectangular kraal western end	Structure	IVa	-32°47'21.86" ; 20°21'19.99"
KDB107	KDBc12	Large, circular kraal structure (identified from Google Earth)	Structure	IVa	-32°47'18.18" ; 20°21'48.30"
KDB108	KDBc12	Small circular kraal structure (identified from Google Earth)	Structure	IVa	-32°47'14.19" ; 20°21'48.73"
KDB109	KDBc12	Large kraal with lammerhok (identified from Google Earth)	Structure	IVa	-32°47'16.22" ; 20°21'51.40"
KDB110	KDBc12	Multi-roomed structure (identified from Google Earth)	Ruin > 100 years	IVa	-32°47'15.94" ; 20°21'49.0"
KDB111	KDBc12	Two-roomed structure (identified from Google Earth)	Ruin > 100 years	IVa	-32°47'18.65" ; 20°21'49.20"
KDB062	KDBc7	Stone-built weir in dry river bed, mortared	Stone walling	IVb	-32°47'23.8" ; 20°21'18.7"
KDB069		Reservoir and leivoor	Structure	IVb	-32°47'11.5" ; 20°21'27.5"
KDB011		Stone-built embankment for old road	Transport infrastructure	IVc	-32°51'57.7" ; 20°22'29.9"
KDB068		Core, likely LSA	Artefacts	IVc	-32°47'22.6" ; 20°21'23.5"
KDB077	KDBc6	Stone alignment	Stone walling	IVc	-32°47'7.6" ; 20°21'31"
KDB097		Flake	Artefacts	IVc	-32°46'17.8" ; 20°21'43.4"
KDB098		MSA point	Artefacts	IVc	-32°47'31.5" ; 20°21'19.2"
KDB065		1930s farmhouse in werf	Building	IIIc	-32°47'13.9" ; 20°21'22"
KDB051		Stone built 20 th Century farm store	Building	IIIc	-32°48'13.5" ; 20°21'0.4"
KDB106		Irregular kraal structure (identified from Google Earth)	Structure	IVc	-32°47'16.45" ; 20°21'33.74"

5.2.1 Direct Impacts

5.2.1.1 Construction Phase

Direct impacts to **archaeological resources**, burial grounds and graves, and built environment may result from construction vehicles in the study area, the building of roads, clearing of land, earthmoving, and similar activities related to construction. Stone Age archaeology is very sparse in this area, with only a very few, isolated artefacts found in the development footprint (KDB068, KDB084, KDB097, KDB098). As a result, the impact significance to Stone Age archaeology is likely to be **low**

before mitigation. The preponderance of archaeological remains in the study area are the remains of built structures, likely of historic age, but some possibly pre-colonial. These structures are predominantly easy to identify and fairly robust, but several were located in very close proximity to access roads. These roads were subsequently realigned. The vulnerable sites included KDBc6 and KDBc7 and a kraal at KDB066 (Figure 5.2.1). The realignment of Access Road Alternative 1 to avoid these sites reduces the likely impacts to them from **high** to **low**, and, as such, no mitigation is required. Should Access Road Alternative 2 be chosen as the preferred option, the likelihood of impacts to these sites is also likely to be **low**. Farming infrastructure is located at KDB069 and a kraal at KDB106 (Figure 5.1.3), which are fairly close to Access Road Alternative 2, but the alignment is beyond the recommended buffers for these sites (Figure 5.2.1). As such, Access Road Alternative 2 remains an acceptable alternative choice.

Burial grounds and graves at risk during the construction phase are likely to be subject to **very high** direct impacts without mitigation. Revised Layout 1 has taken this into account, and avoids Grave 057 and possible grave KDB058 as well as the graveyard at KDB081 (Figure 5.1.5) by adequate buffers. The group of stone cairns at KDBc6 is located on the proposed site for Construction Camp 3 (Figure 5.2.2) and is a **no-go option**; Construction Camp 2 is the preferred alternative. The design of Revised Layout 1 reduces, the significance of impacts to these sites to **very low**.

The significance of the **built environment** is very low in this area, and it is likely that the significance of impacts to the built environment will be **low** without mitigation. If structures are avoided sufficiently not to cause structural damage to them, mitigation will result in impacts of **very low** significance to built-environment structures.

Sites of moderately high cultural significance in the study area include the Wind Heuvel farmstead (KDBc11), with its evidence for **living heritage** in the form of *asboskookskerms* and other *skerm* structures (Figure 5.1.5). The originally proposed Common Access Road 1 from the north passed through the farmstead with likely impacts of **moderate** significance to this resource. This portion of the road has been

moved west sufficiently that it doesn't intrude on the farmstead. It is, therefore, anticipated that the significance of impacts to the cultural significance of this site will be **low**. The other sites with living heritage aspects are unlikely to be affected, due in the case of Rooiheuvel (KDB082) to their distance from the road, and in the case of the Tuinplaas Church and Graveyard (KDB083) due to the unlikelihood of significant changes to the road at that point (Figure 5.1.5).

5.2.1.2 Operational Phase

Impacts to **archaeological resources, burial grounds and graves and built environment** are unlikely during the operational phase, as no new areas will be disturbed through operational activities. The significance of impacts without mitigation would, therefore be **very low**. Mitigation should only be to ensure that existing roads are used and no previously undisturbed areas subject to disturbance. With mitigation, impacts will remain of **very low** significance. The realignment proposed for Common Access Road 1 further ensures that the Stadler graveyard at KDB081 (Figure 5.2.2) is avoided by an appropriate buffer. This realignment ensures that impacts from heavy vehicle traffic for maintenance of turbine locations and roads are unlikely to cause impacts to the graveyard, and the likelihood of significant impacts is **very low**.

Impacts to sites of **living heritage** will be continuous throughout the operational phase as a result of vehicles and personnel on site for maintenance, and the presence of roads, turbines and associated infrastructure in the landscape. Should the mitigation measures recommended above be implemented, the significance of these impacts will, however, remain **low**.

5.2.1.3 Decommissioning Phase

Impacts to **archaeological resources, burial grounds and graves and built environment** are unlikely during the decommissioning phase, as no new areas will be disturbed through decommissioning activities. The significance of impacts without mitigation would, therefore be **very low**. Mitigation should only be to ensure that existing roads are used and no previously undisturbed areas should be subject to disturbance. With mitigation, impacts will remain **very low**.

Impacts to sites of **living heritage** will be continuous throughout the decommissioning phase as a result of vehicles and personnel on site for turbine dismantling and removal, and the remnants of access roads, and locations of turbines and associated infrastructure in the landscape. It should be noted, however, that any resulting impacts will be of a short duration. Should the mitigation measures recommended above be implemented, the significance these impacts will, however, remain **low**.

5.2.2 Cumulative Impacts

There are currently multiple applications being made for the development of WEFs in the area surrounding the Kudusberg proposed WEF development site (within a radius of 50 km). Three of these have been approved to commence construction in early 2019 (see Table 4 for a list of these projects, and Figure 6 for the map of their distribution).

Due to the likely low impacts to the sparse, low density StoneAge **archaeological heritage** anticipated in this region, the significance of cumulative impacts is similarly expected to be **low**. Cumulative impacts to archaeological built heritage, in the form of stone walling, kraals and ruined stone-built structures, however, is anticipated to be **high** without mitigation. Mitigation, which should include protection and avoidance of these features, can be easily implemented across the wider REDZ and, should that occur, direct cumulative impacts to these features will likely be **very low**.

Burial grounds and graves can occur throughout this region, and are not always easily recognised as graves, making possible impacts to them from cumulative developments **very high**. These features, both formal graves and stone cairns should be avoided where they are encountered in the landscape, such that the need for relocation does not arise. Should this mitigatory approach be adopted throughout the REDZ, the significance of cumulative impacts to graves will be **low**.

Where significant **built environment** features do occur, these should be avoided, with buffers implemented to protect them from encroachment and impact from roads, infrastructure and turbines which will result in **very high** impacts. No turbines should

be placed within 500m of farmsteads. Despite these mitigatory measures, the significance of cumulative impacts to these structures, which are often the only structures in the landscape for many kilometres, will remain **moderate to high**.

Similarly, cumulative impacts to **living heritage** sites will be unavoidably **high** without mitigation, with losses including to physical expressions of cultural heritage as well as to sense of place and cultural landscapes. While mitigation in the form of avoidance and protection of these sites can go some way to reducing cumulative impacts, these are likely to remain **moderate to high**.

Table 4: Cumulative projects within 50kms

DEA REFERENCE NUMBER	EIA PROCESS	APPLICANT	PROJECT TITLE	EAP	TECHNOLOGY	MW	STATUS
WIND PROJECTS							
14/12/16/3/3/2/967	Scoping and EIA	Biotherm Energy (Pty) Ltd	Proposed 140 MW Esizayo Wind Energy Facility and its associated infrastructure near Laingsburg within the Laingsburg Local Municipality in the Western Cape	WSP / Parsons Brinckerhoff	Wind	140 MW	Approved
East -14/12/16/3/3/2/962 West- 14/12/16/3/3/2/693	Scoping and EIA	Biotherm Energy (Pty) Ltd	<p>East: Proposed 140 MW Maralla West Wind Energy Facility on the remainder of the farm Welgemoed 268, the remainder of the farm Schalkwykskraal 204 and the remainder of the farm DrieRoodeHeuvels 180 north of the town of Laingsburg within the Laingsburg and Karoo Hoodland Local Municipalities in the Western and Northern Cape Provinces</p> <p>West: Proposed 140 MW Maralla West Wind Energy Facility on the remainder of the Farm DrieRoodeHeuvels 180, the remainder of the farm Annex DrieRoodeHeuvels 181, portion 1 of the farm Wolven Hoek 182 and portion 2 of the farm Wolven Hoek 182 north of the town of Laingsburg within the Karoo Hoodland Local Municipality in the Northern Cape Province</p>	WSP / Parsons Brinckerhoff	Wind	140 MW	Approved
12/12/20/1966/AM5	Amendment	Witberg Wind Power (Pty) Ltd	Proposed establishment of the WitbergWind Energy Facility, Laingsburg Local Municipality, Western Cape Province	Environmental Resource Management (Pty) Ltd / Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Approved
12/12/20/1783/2/AM1	Scoping and EIA	South Africa Mainstream Renewable Power Perdekraal	Proposed development of a Renewable Energy Facility (Wind) at the Perdekraal Site 2, Western Cape Province	Environmental Resource Management (Pty) Ltd	Wind	110 MW	Under construction

DEA REFERENCE NUMBER	EIA PROCESS	APPLICANT	PROJECT TITLE	EAP	TECHNOLOGY	MW	STATUS
		West (Pty) Ltd					
12/12/20/1783/1	Scoping and EIA	South Africa Mainstream Renewable Power Perdekraal East (Pty) Ltd	Proposed development of a Renewable Energy Facility (Wind) at the Perdekraal Site 2, Western Cape Province	Savannah Environmental Consultants (Pty) Ltd	Wind	150 MW	Approved
14/12/16/3/3/2/899	Scoping and EIA	Rietkloof Wind Farm (Pty) Ltd	Proposed Rietkloof Wind Energy (36 MW) Facility within the Laingsburg Local Municipality in the Western Cape Province	EOH Coastal & Environmental Services	Wind	36 MW	Approved
TBC	BA		Proposed Rietkloof Wind Energy Facility, Western Cape, South Africa	WSP	Wind	140 MW	In progress
14/12/16/3/3/2/826	Scoping and EIA	Gunstfontein Wind Farm (Pty) Ltd	Proposed 200 MW Gunstfontein Wind Energy Facility on the Remainder of Farm Gunstfontein 131 south of the town of Sutherland within the Karoo Hooglands Local Municipality in the Northern Cape Province, south of Sutherland.	Savannah Environmental Consultants (Pty) Ltd	Wind	200 W	Approved
12/12/20/1782/AM2	Scoping and EIA	Mainstream Power Sutherland	Proposed development of 140 MW Sutherland Wind Energy Facility, Sutherland, Northern and Western Cape Provinces	CSIR	Wind	140 MW	Approved
Karusa - 12/12/20/2370/1 Soetwater - 12/12/20/2370/2	Scoping and EIA	African Clean Energy Developments Hidden Valley (Pty) Ltd	Proposed Hidden Valley Wind Energy Facility on a site south of Sutherland, Northern Cape Provinces (Karusa&Soetwater)	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW each	Preferred bidders. Construction to commence in 2019
12/12/20/2370/3	Scoping and EIA	African Clean Energy Developments Renewables Hidden Valley (Pty) Ltd	Proposed Hidden Valley Wind Energy Facility on a site south of Sutherland, Northern Cape Provinces (Greater Karoo))	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Approved
West -14/12/16/3/3/2/856 East - 14/12/16/3/3/2/857	Scoping and EIA	Komsberg Wind Farm (Pty) Ltd	Proposed 275 MW Komsberg West Wind Energy Facility near Sutherland within the Northern and Western Cape Provinces	Savannah Environmental Consultants	Wind	140 MW each	Approved

DEA REFERENCE NUMBER	EIA PROCESS	APPLICANT	PROJECT TITLE	EAP	TECHNOLOGY	MW	STATUS
			Proposed 275 MW Komsberg East Wind Energy Facility near Sutherland within the Northern and Western Cape Provinces	(Pty) Ltd			
12/12/20/1988/1/AM1	Amendment	Roggeveld Wind Power (Pty) Ltd	Proposed Construction of the 140 MW Roggeveld Wind Farm within the Karoo Hoogland Local Municipality and the Laingsburg Local Municipality in the Western and Northern Cape Provinces	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Preferred bidders. Construction to commence in 2019.
14/12/16/3/3/2/807/AM1	Scoping and EIA Amendment	Karreebosch Wind Farm (Pty) Ltd	Proposed Karreebosch Wind Farm (Roggeveld Phase 2) and its associated infrastructure within the Karoo Hoogland and Laingsburg Local Municipalities in the Northern and Western Cape Provinces	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Approved
14/12/16/3/3/2/900	Scoping and EIA	Brandvalley Wind Farm (Pty) Ltd	Proposed 147 MW Brandvalley Wind Energy Facility North of the Town of Matjiesfontein within the Karoo Hoogland, Witzenberg and Laingsburg Local Municipalities in the Northern and Western Cape Provinces	EOH Coastal & Environmental Services	Wind	140 MW	Approved
TBA	Scoping and EIA	Rondekop Wind Farm (Pty) Ltd	Proposed establishment of the Rondekop WEF, south-west of Sutherland in the Northern Cape	SiVEST SA (Pty) Ltd	Wind	325 MW	In process
West 14/12/16/3/3/2/856 East 14/12/16/3/3/2/857	Scoping and EIA	Komsberg Wind Farms (Pty) Ltd	Komsberg East and West WEF	Arcus Consulting Services (pty) Ltd	Wind	140 MW each	
TBC	BA	ENERTRAG SA (Pty) Ltd	Proposed Development of the Tooverberg Wind Energy Facility and the associated grid connection near Touws River, Western Cape Province)	SiVEST SA (Pty) Ltd	Wind	140 MW	In process
SOLAR PROJECTS							
12/12/20/2235	BA	Inca Sutherland Solar (Pty) Ltd	Proposed Photovoltaic (PV) Solar Energy Facility on A Site South Of Sutherland, Within The Karoo Hoogland Municipality Of The Namakwa District Municipality, Northern Cape Province	CSIR	Solar	10 MW	Approved

5.2.3 Indirect Impacts

Indirect impacts occur through contextual impacts arising from the intrusion of incompatible structures in the area that can lead to loss of sense of place and negative impacts to the rural cultural landscape and heritage resources within it. These contextual impacts will be experienced during all phases but are most problematic during the operational phase. These contextual impacts can only be mitigated through sensitive placement of turbines, roads and infrastructure, as noted above for direct impacts. While the impacts are unavoidable, with mitigation, these impacts can be reduced to **low to moderate**.

The presence of people and vehicles in the landscape during any of these phases can also pose an indirect impact to resources through intentional and/or accidental damage and disturbance. Rock art sites are highly vulnerable to damage through graffiti, the lighting of fires and similar activities, while stone-built features in the landscape can attract attention from people who are ignorant of their heritage significance. The rock art cave (KDB045) is sufficiently far from likely areas of high traffic and activity that the likelihood of impacts to it is **low**. The kraals and ruins in the development area are, however, at **moderate** risk of impacts. To prevent such indirect impacts, all site crew need to be informed of the heritage sensitivity of features in the landscape, and any vulnerable sites adjacent to road alignments or construction areas – camps, substations or turbine placements – should be cordoned off and indicated as no-go area. If these measures are implemented, impacts can be reduced to **very low**.

5.3 Buffers

The following buffers should be observed around identified heritage resources (Figures 5.3.1 to 5.3.4):

- Graves: no development should be permitted within 50m of graves and cemeteries; existing roads within this buffer should not be altered or widened
- Cave site (KDB045): construction staff should not be permitted within 200m of the site;
- Farmsteads: no turbines should be located within 500m of farmsteads;
- Kraals, stone walling and ruins > 100 years: construction staff should not be

permitted within 50m of these sites and no development should take place within 15m;

- Archaeological finds: no buffers are recommended for the isolated artefacts identified in this survey.

5.4 Mapping of resources

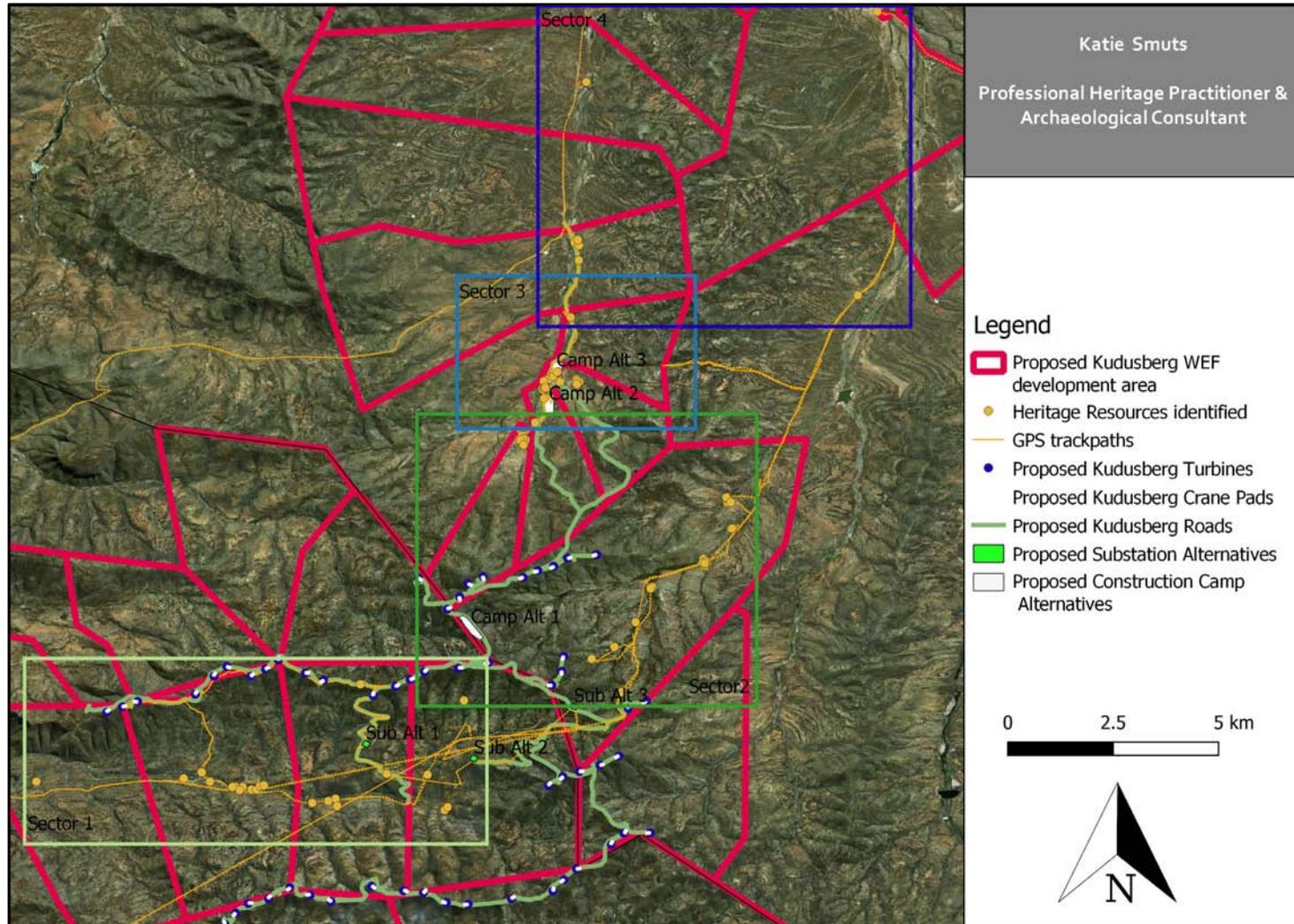


Figure 5.1.1. Overview of revised layout indicating trackpaths and identified heritage resources

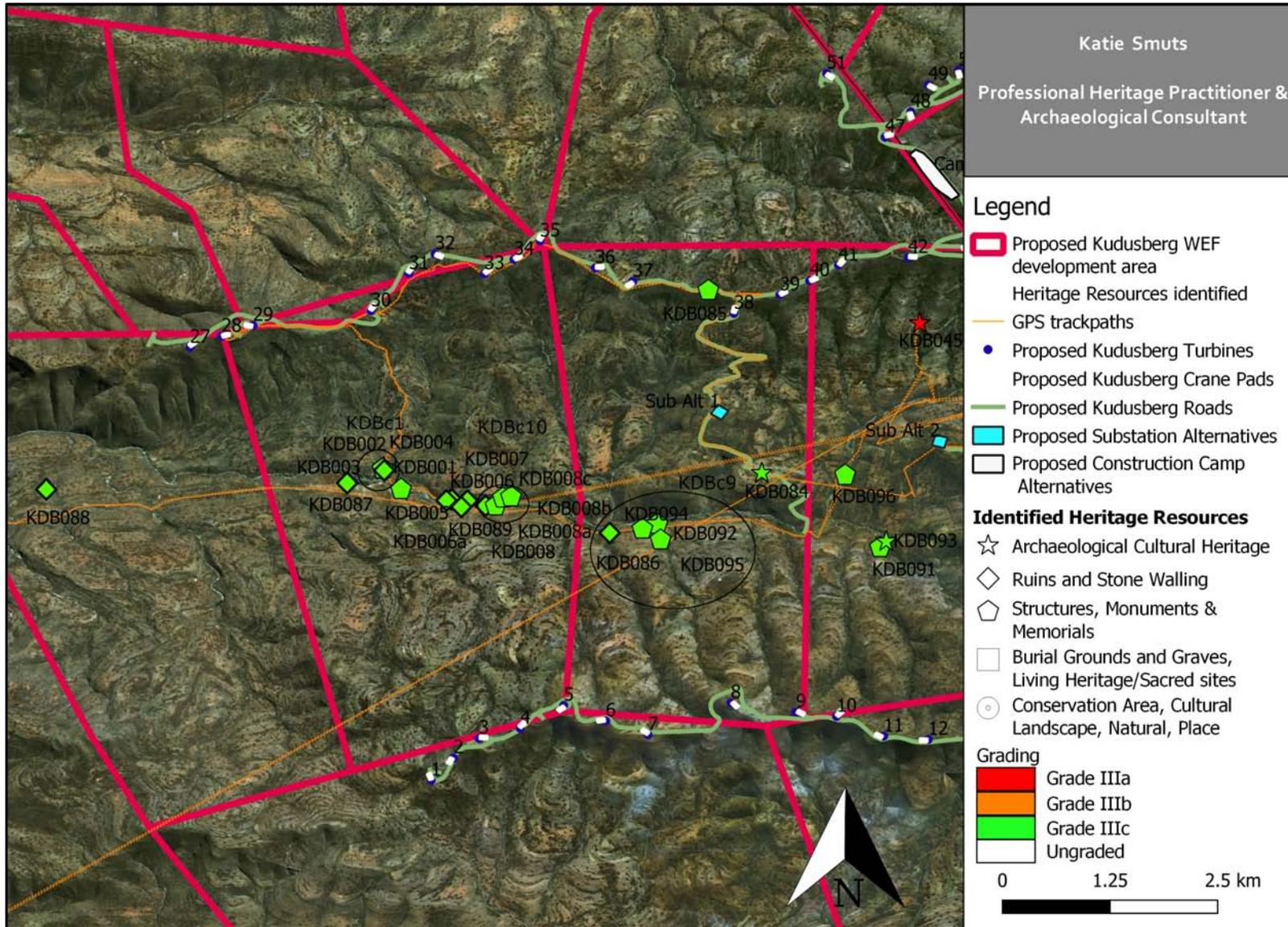


Figure 5.1.2. Heritage resources identified in Sector 1

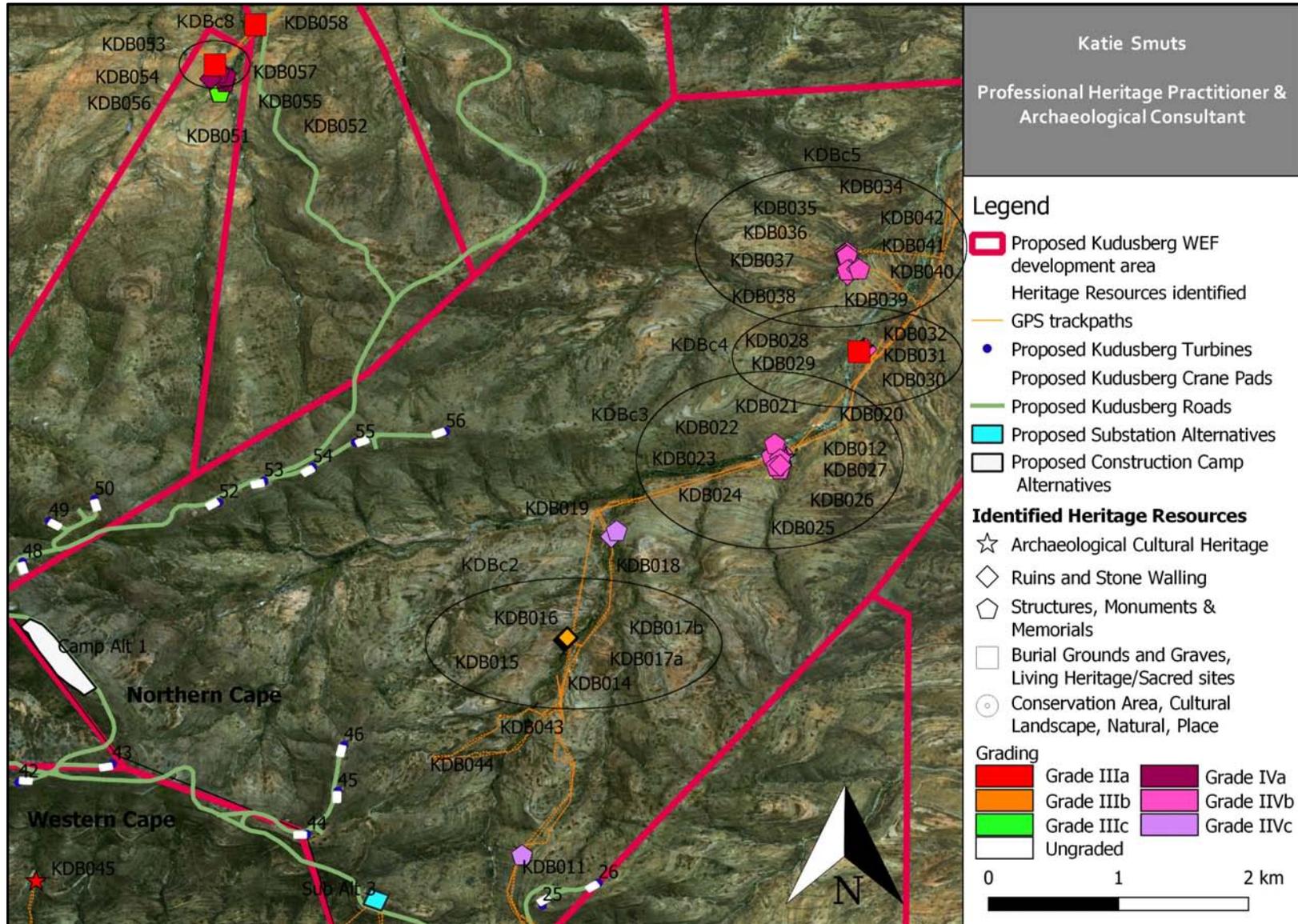


Figure 5.1.3. Heritage resources identified in Sector 2

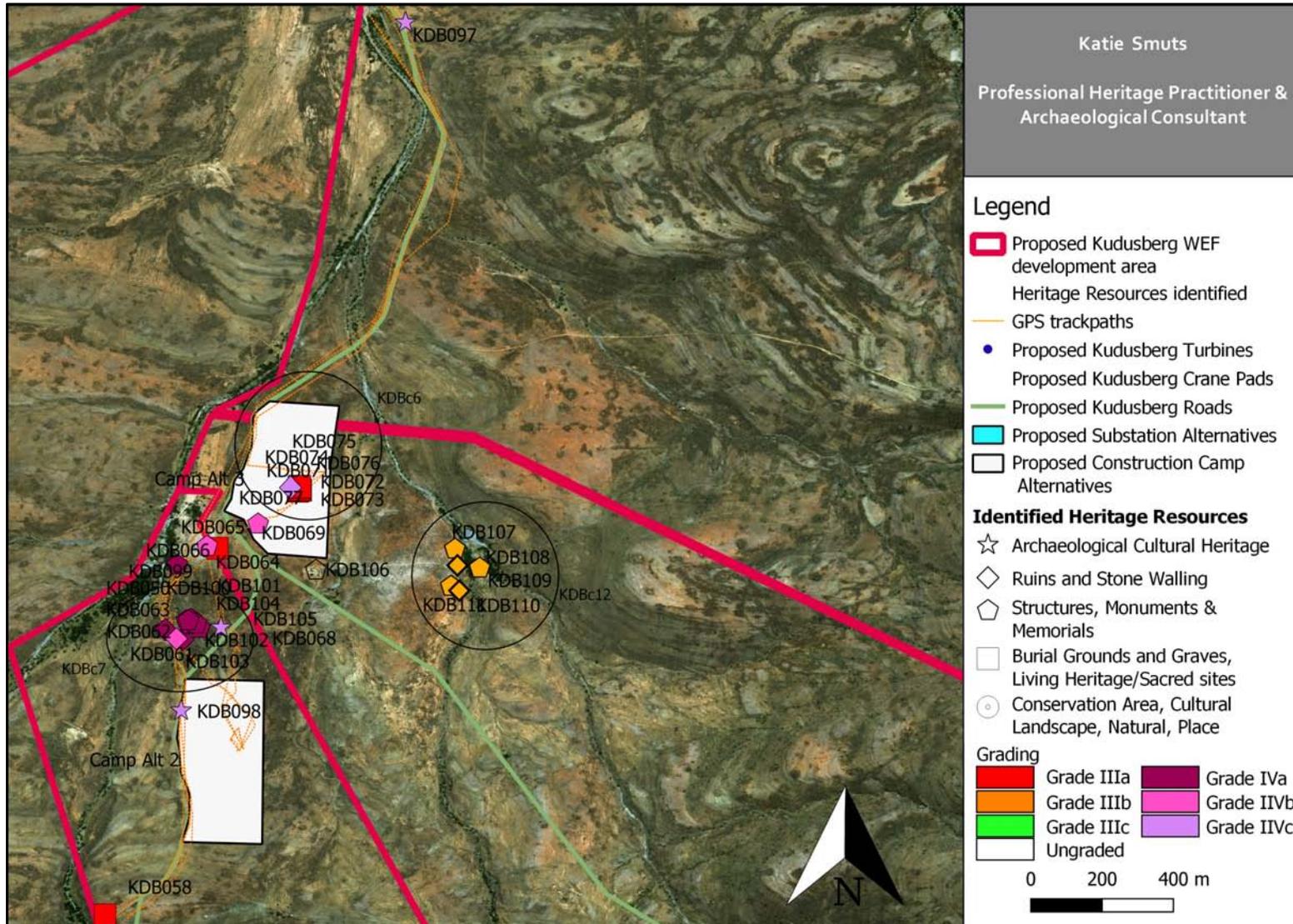


Figure 5.1.4. Heritage resources identified in Sector 3.

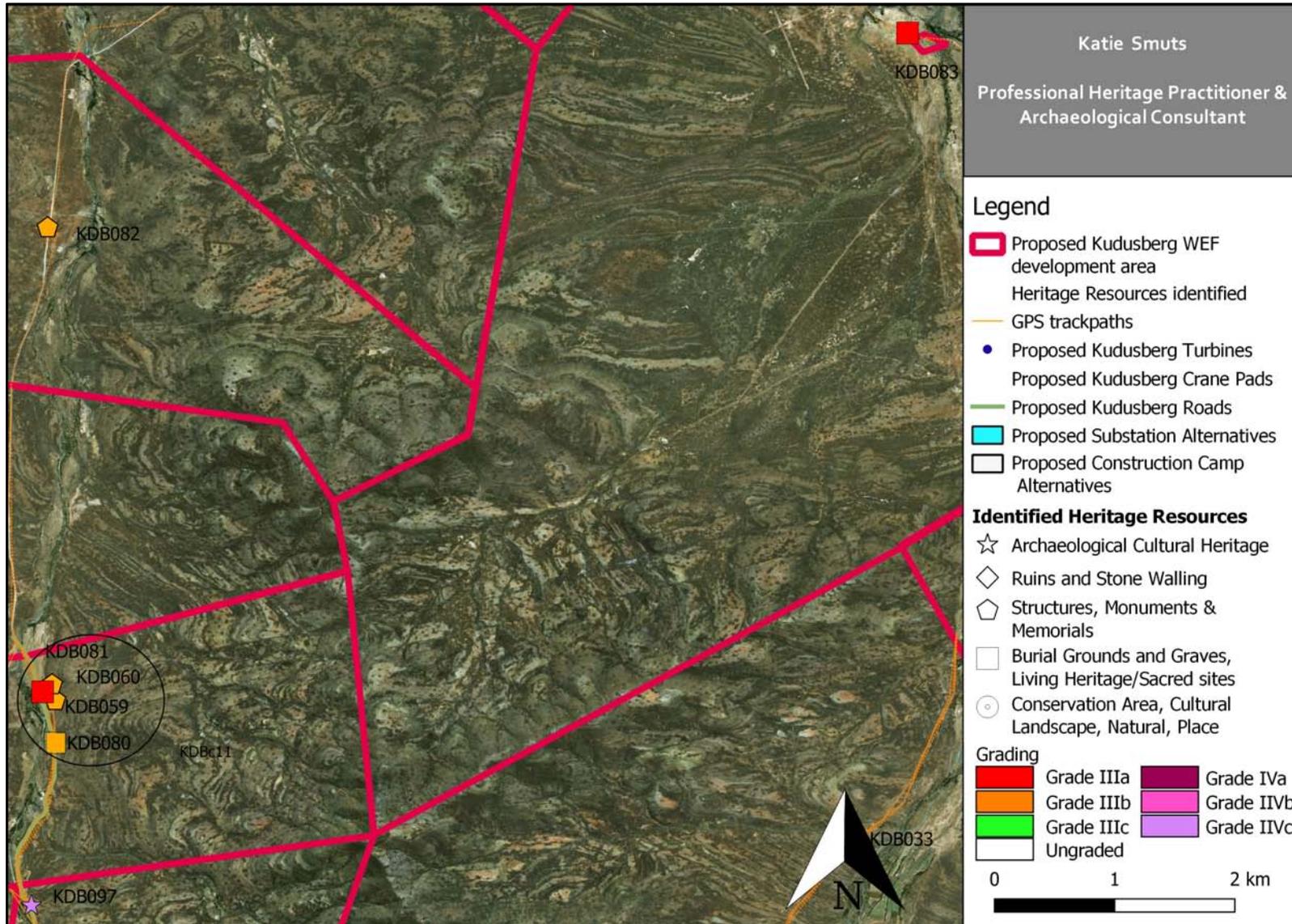


Figure 5.1.5. Heritage resources identified in Sector 4

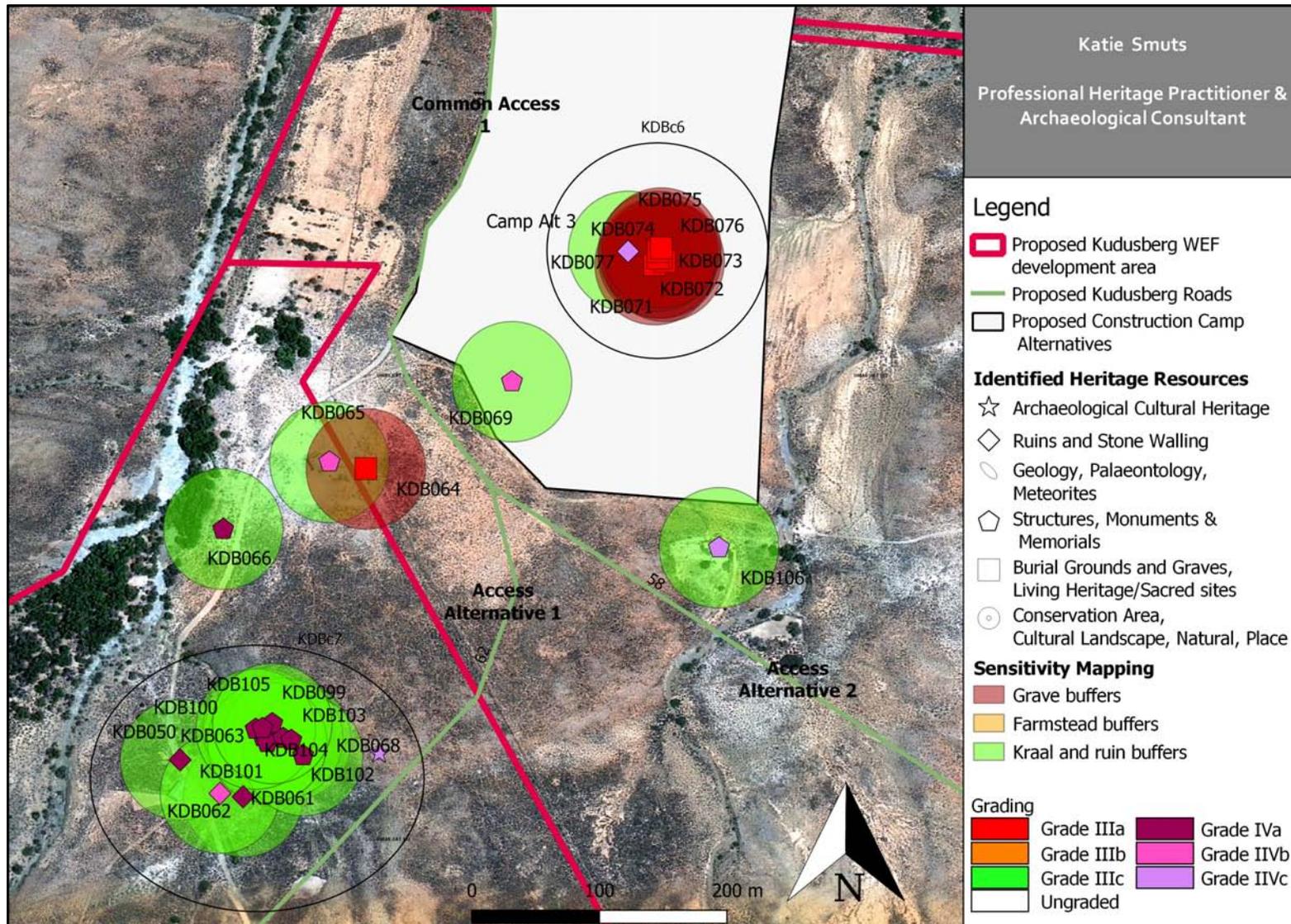


Figure 5.2.1. Sites in and near site complexes KDBc6 and KDBc7 relative to revised alignment (Sector 3)

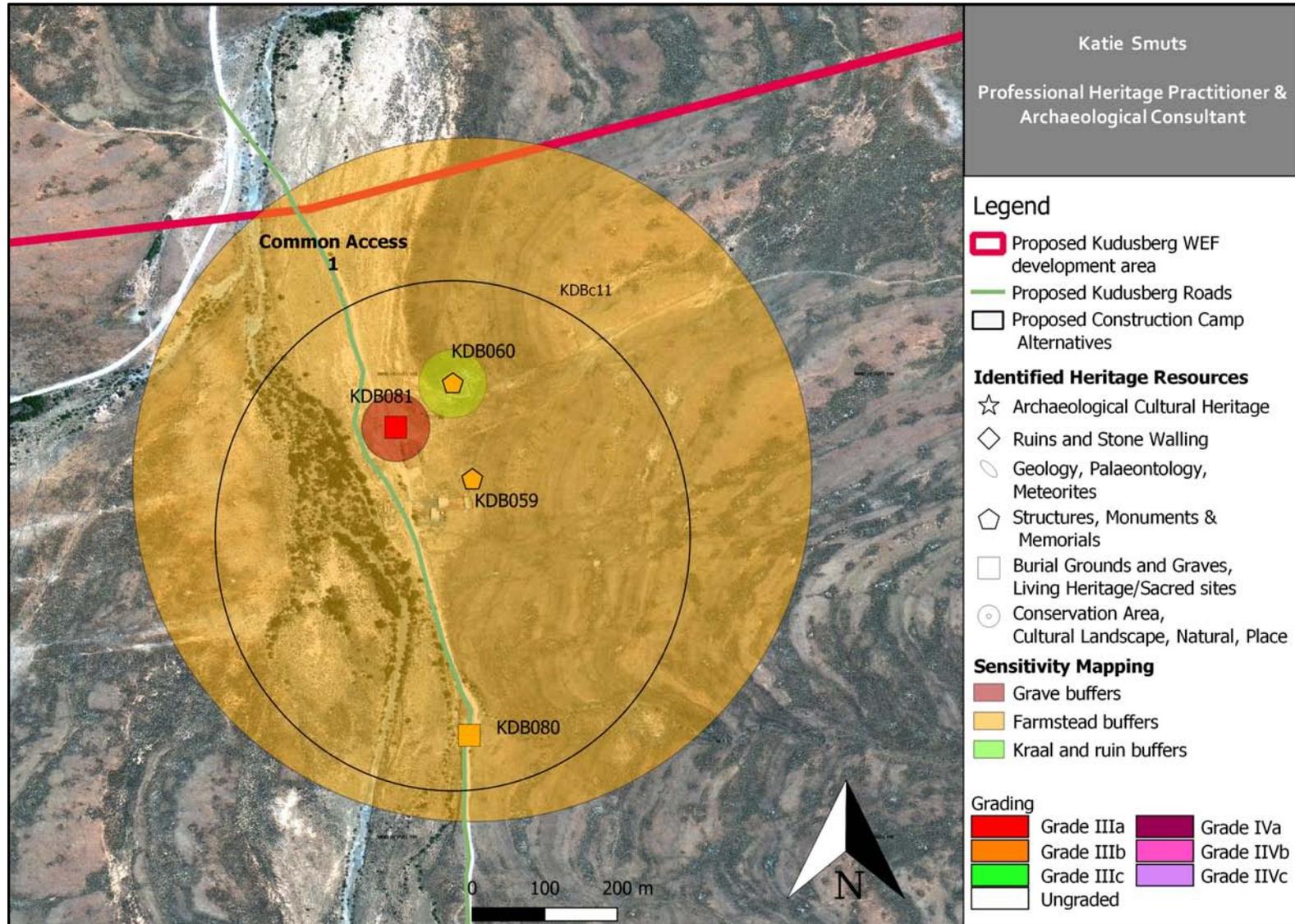


Figure 5.2.2. Sites in and near site complex KDBc11 relative to revised alignment (Sector 4)

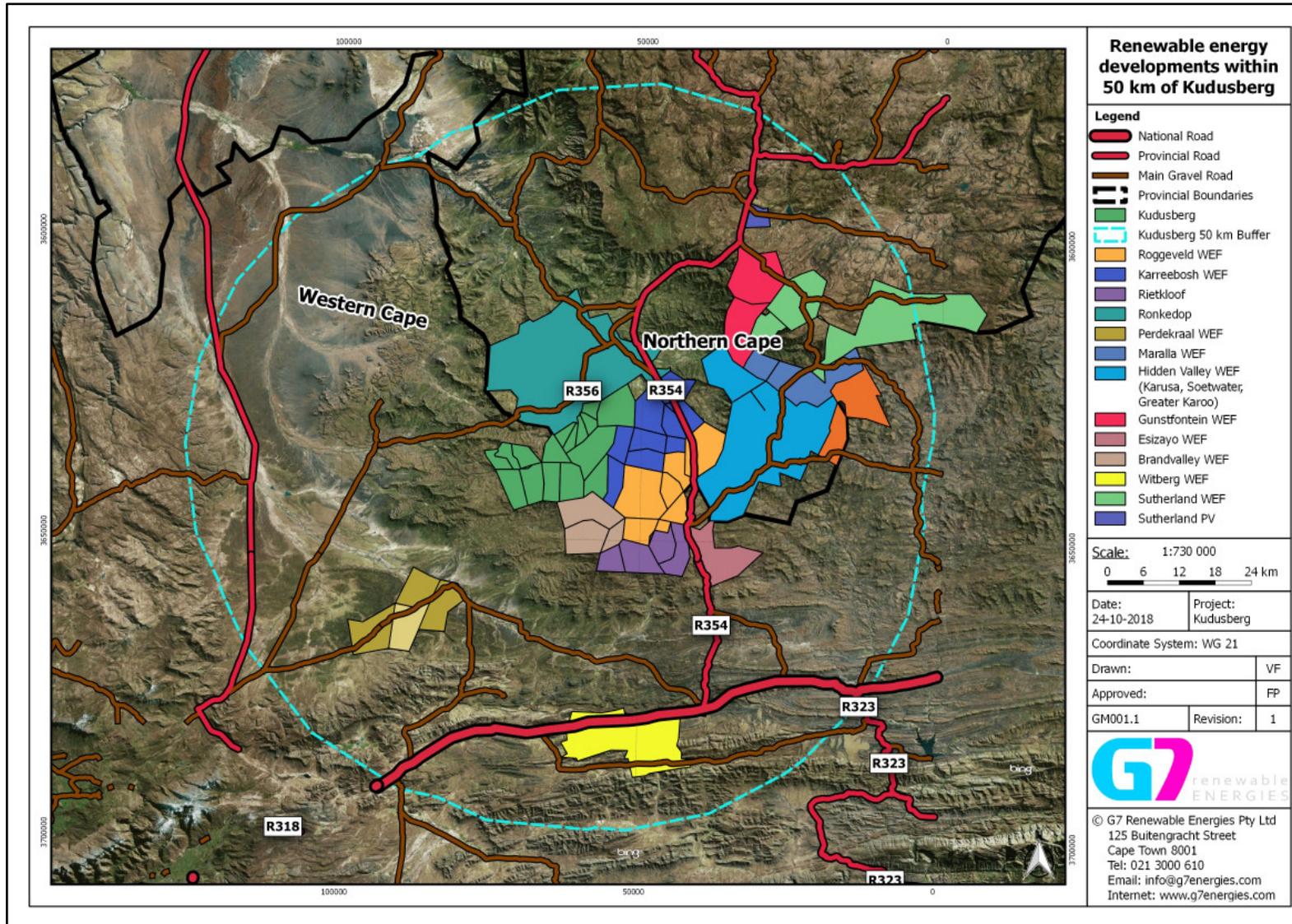


Figure 6. Cumulative WEFs proposed for the Komsberg REDZ relative to Kudusberg.

5.5 Impact Assessment tables

Table 5. Impact assessment summary for the Construction Phase

Impact pathway	Nature of potential impact/risk	Status	Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Significance of impact/risk= consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/impact(after mitigation)	Ranking of impact/risk	Confidence level
HERITAGE															
CONSTRUCTION PHASE															
Direct Impacts															
Construction of access roads, construction camp, substation and turbines	Destruction of archaeological remains, graves and built environment features	Negative	Local	Permanent	Moderate	Very likely	Non-reversible	High	Low	No	Yes	<ul style="list-style-type: none"> Revised Layout 1 makes Access Alternative 1 preferred choice and Common Access 1 acceptable Use Construction Camp 2 	Low	4	Medium
Indirect Impacts															
<ul style="list-style-type: none"> Contextual impacts; Accidental/deliberate damage by people or vehicles 	<ul style="list-style-type: none"> Loss of heritage significance; Destruction of archaeological remains, graves and built environment 	Negative	Local	Permanent	Moderate	Likely	Non-reversible	High	Low	No	Yes	<ul style="list-style-type: none"> Placement of turbines and associated infrastructure to observe buffers Inform site crew of heritage sensitivity of landscape Cordon off vulnerable sites as no-go areas 	Low	4	Medium

Table 6. Impact assessment summary for the Operational Phase

Impact pathway	Nature of potential impact/risk	Status	Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk= consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ Impact(after mitigation)	Ranking of impact/ risk	Confidence level
HERITAGE															
OPERATIONAL PHASE															
Direct Impacts															
Construction of access roads, construction camp, substation and turbines	Destruction of archaeological remains, graves and built environment features	Negative	Local	Permanent	Slight	Unlikely	Non-reversible	High	Very low	Yes	Yes	<ul style="list-style-type: none"> • Use existing roads • Do not disturb new areas outside of the development footprint 	Very low	5	High
Indirect Impacts															
<ul style="list-style-type: none"> • Contextual impacts; • Accidental/deliberate damage by people or vehicles 	<ul style="list-style-type: none"> • Loss of heritage significance; • Destruction of archaeological remains, graves and built environment 	Negative	Local	Permanent	Slight	Unlikely	Non-reversible	High	Low	No	Yes	<ul style="list-style-type: none"> • Keep site crew informed of heritage sensitivity of landscape 	Low	4	High

Table 7. Impact assessment summary for the Decommissioning Phase

Impact pathway	Nature of potential impact/risk	Status	Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk= consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ Impact (after mitigation)	Ranking of impact/ risk	Confidence level
HERITAGE															
DECOMMISSIONING PHASE															
Direct Impacts															
Decommissioning of substation and turbines	Destruction of archaeological remains, graves and built environment features	Negative	Local	Permanent	Moderate	Unlikely	Non-reversible	High	Low	Yes	Yes	<ul style="list-style-type: none"> Use existing roads Do not disturb new areas outside of the development footprint 	Very low	5	High
Indirect Impacts															
<ul style="list-style-type: none"> Contextual impacts; Accidental/deliberate damage by people or vehicles 	<ul style="list-style-type: none"> Loss of heritage significance; Destruction of archaeological remains, graves and built environment 	Negative	Local	Permanent	Moderate	Unlikely	Non-reversible	High	Low	No	Yes	<ul style="list-style-type: none"> Keep site crew informed of heritage sensitivity of landscape Keep vulnerable sites cordoned off as no-go areas 	Low	4	High

Table 8. Cumulative impact assessment summary table

Impact pathway	Nature of potential impact/risk	Status	Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/ resource	Significance of impact/risk= consequence x probability (before mitigation)	Can impact be avoided?	Can impact be managed or mitigated?	Potential mitigation measures	Significance of residual risk/ Impact (after mitigation)	Ranking of impact/ risk	Confidence level
HERITAGE															
CUMULATIVE IMPACTS															
<ul style="list-style-type: none"> • Construction of access roads, construction camp, substation and turbines • Contextual impacts; • Accidental/deliberate damage by people or vehicles 	<ul style="list-style-type: none"> • Destruction of archaeological remains, graves and built environment features • Loss of heritage significance; 	Negative	Local	Permanent	Severe	Very likely	Non-reversible	High	High	No	Yes	<ul style="list-style-type: none"> • Protect and avoid archaeological sites wherever possible • Avoid graves and graveyards • Keep turbines >500m from homesteads 	Low	4	Medium

6. STATEMENT OF SIGNIFICANCE

Section 38(3)b of the NHRA (no. 25 of 1999) requires an assessment of the significance of heritage resources identified in surveys such as this. This task is mediated by the s. 2(vi) of the NHRA, as well as by HWC (2016a, 2016b) and SAHRA (2007) guidelines. Significance, or, more accurately, cultural significance in terms of s. 2(vi) of the NHRA should be assessed with regard to the “aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance” of a resource.

While most of the heritage resources identified in this survey are of low intrinsic heritage significance, that is IIIc in terms of the HWC grading system, or Iva, IVb or IVc in terms of the SAHRA system, several sites are worthy of higher grading. All **burialsites** – and in this case, likely burials have been included in this category – have been graded IIIa for their very high cultural significance. Further to this, although it is not likely to be impacted by this development, the shelter with **rock art** and **artefacts** at KDB045 has been graded IIIa for its likely scientific importance as a possible research site.

Little of the **built environment** of this region survives in intact form, and most of the historic structures of interest are in ruins – i.e. archaeological resources, rather than built environment ones. As such, the built environment significance of the study area is also low. Where these elements show evidence for continuing living heritage, as in the case of Wind Heuvel Re/190 (KDBc11) and Rooiheuvel 170 (KDB082) farmsteads with their *asboskookskerms* incorporated into the current farming traditions, these have been graded as Grade IIIb features. Grade IIIb grading has also been proposed for the stone-built towers at KDBc2. These are unusual features that exhibit a high degree of technological significance due to their careful, meticulous construction. This fact, together with their uncertain use and origins supports a grading that is sufficiently high to ensure their protection.

The **cultural and natural landscape** has high significance – Grade IIIa – in this area. Despite increasing development of WEFs in the wider Komsberg REDZ, the hilly nature of this environment currently excludes much of this other infrastructure

from view. This factor serves to retain the landscape as a wilderness landscape with some layering of historic and recent agricultural activities and related infrastructure. With three windfarms approved for development in early 2019, it is likely that this grading would need to be reviewed for those areas within close proximity to these facilities, and therefore experiencing high visual impacts from them.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

This assessment has shown that while there are few significant heritage resources in the study area, the presence of clusters of related structures and features within the landscape holds relatively high significance in some instances.

Of the infrastructural elements surveyed, it is recommended that **Construction Camp Alternative 2 be selected**, as there are no significant heritage resources on that site. **Construction Camp Alternative 3** will have high impacts on an informal graveyard (KDBc6) and should be considered a **no-go option**. Construction Camp Alternative 1 is at elevation – approximately 1 300m a.s.l. – and is therefore it is unlikely to pose an impact to significant heritage resources; this alternative was not supported by the Visual Assessment, however (Gibb 2018).

Of the three substation alternatives, none was found to contain any heritage resources, and the recommendations of the other specialists should be implemented.

The realignment of Access Road Alternative 1 reduces the previously high impacts on several sites and site clusters, including KDBc6, KDBc7 and KDBc8. These sites are now avoided entirely, and the advised buffers have been adopted to inform the alignment of the proposed roads. As such, **Access Road Alternative 1** is the **preferred access** route. Access Road Alternative 2 is would appear to be devoid of any significant heritage resources, and this route could be used as a viable alternative.

The study area is largely devoid of heritage resources at elevation, and entirely devoid of significant heritage resources above 1200masl (where most

infrastructure are proposed). As such, it is not anticipated that turbines located on ridges will negatively impact on heritage resources, This applies to other high lying infrastructure, such as Construction Camp Alternative 1, any of the substations, and access roads at altitudes above that height.

7.2 Recommendations

In summary, then, recommendations are as follow:

- **Substation Alternative 1** is the **recommended** substation alternative, although Substation Alternatives 2 and 3 are not considered to be a no-go option;
- **Construction Camp 2** is the **recommended** construction camp alternative, although Construction Camp 1 is likely to be an acceptable alternative. **Construction Camp 3 should be considered a no-go option;**
- The realignment of **Access Road Alternative 1** renders it an **acceptable** choice, while Access Road Alternative 2 is likely to be an acceptable alternative. The proposed alignment for Access Road Alternative 2 should be subjected to a walkdown by an archaeologist prior to commencement of development to identify any areas or sites that require protection or mitigation, should it be selected;
- **Common Access Road 1** has been realigned to the east to avoid Wind Heuvel farmstead and is considered an **acceptable** route. The road should not be widened or altered at this point and a proper fence should be erected around the Stadler graveyard (KDB081);
- The following buffers should be observed around identified heritage resources:
 - Graves: no development should be permitted within 50m of identified graves and cemeteries; existing roads within this buffer should not be altered or widened;
 - Cave site (KDB045): construction staff should not be permitted within 200m of the site;
 - Farmsteads: no turbines should be located within 500m of farmsteads;
 - Kraals, stone walling and ruins > 100 years: construction staff should not be permitted within 100m of these sites and no development should occur within 15m of these sites; and
 - Archaeological finds: no buffers are recommended for the isolated artefacts identified in this survey.

- All site crew should be informed of the heritage significance of the resources in the study area, and those sites near development infrastructure, or easily reached (Table 1) should be inspected by the ECO during the construction phase to ensure they are being respected;
- If any archaeological material or human burials are uncovered during development, then work in the immediate area should be halted. The find should be reported to the relevant heritage authorities (SAHRA in the Northern Cape and HWC in the Western Cape) and may require inspection by an archaeologist to determine whether mitigation should take place and what form that mitigation should take.

Given the generally low significance of heritage resources in the study area, it is not anticipated that the proposed development will have significant impacts to heritage resources, and it is therefore recommended that the project be authorised, subject to implementation of the above recommendations. These recommendations should be included in the EMP(r) and the EA)

8. REFERENCES

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9. APPENDICES

9.1 Appendix 1 HWC Response to NID: 13 September 2018

Our Ref: HM/CENTRAL KAROO/LAINGSBURG/PORCION 1 OF 156 GATS RIVIER FARM, REMAINDER OF 156 GATS RIVIER FARM, REMAINDER OF 159 OLIVIERSBERG, PORTION 1 OF 159 OLIVIERSBERG, REMAINDER OF 161 MUIHONDRIVIER, REMAINDER OF 395 KLIPBANKS FONTEIN, PORTION 1 OF 158 AMANDELBOOM, REMAINDER OF 158 AMANDELBOOM, PORTION 2 OF 156 GATS RIVIER; AND PORTION 1 OF FARM 157 RIET FONTEIN

Case No.: 18071105AS0904E
Enquiries: Andrew September
E-mail: andrew.september@westerncape.gov.za
Tel: 021 483 9543
Date: 13 September 2018

Katie Smuts
34 Caledon Street
Stanford
7210
katie.smuts@gmail.com



RESPONSE TO NOTIFICATION OF INTENT TO DEVELOP: HIA REQUIRED
In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

NOTIFICATION OF INTENT TO DEVELOP: PROPOSED KUDUSBERG WIND ENERGY FARM ON PORTION 1 OF 156 GATS RIVIER FARM, REMAINDER OF 156 GATS RIVIER FARM, REMAINDER OF 159 OLIVIERSBERG, PORTION 1 OF 159 OLIVIERSBERG, REMAINDER OF 161 MUIHONDRIVIER, REMAINDER OF 395 KLIPBANKS FONTEIN, PORTION 1 OF 158 AMANDELBOOM, REMAINDER OF 158 AMANDELBOOM, PORTION 2 OF 156 GATS RIVIER AND PORTION 1 OF FARM 157 RIET FONTEIN, LAINGSBURG, CENTRAL KAROO, SUBMITTED IN TERMS OF SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

CASE NUMBER: 18071105AS0904E

The matter above has reference.

Heritage Western Cape is in receipt of your application for the above matter received on 04 September 2018. This matter was discussed at the Heritage Officers meeting held on 10 September 2018.

You are hereby notified that, since there is reason to believe that the proposed development will impact on heritage resources, HWC requires that a Heritage Impact Assessment (HIA) that satisfies the provisions of section 38(3) of the NHRA be submitted. This HIA must have specific reference to the following:

- Impacts to archaeological heritage resources
- Impacts to palaeontological heritage resources
- Visual impacts to the cultural landscape

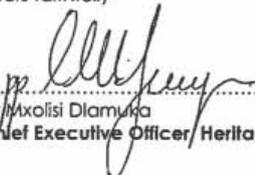
The required HIA must have an integrated set of recommendations.

The comments of relevant registered conservation bodies and the relevant Municipality must be requested and included in the HIA where provided. Proof of these requests must be supplied.

HWC reserves the right to request additional information as required.

Should you have any further queries, please contact the official above and quote the case number.

Yours faithfully


.....
Dr. Axolisi Dlamuka
Chief Executive Officer, Heritage Western Cape

www.westerncape.gov.za/cas

Street Address: Heritage Assessment Building, Grand Market Square, Cape Town, 8000 • **Postal Address:** Private Bag 20097, Cape Town
• **Tel:** +27 (0)21 483 3050 • **E-mail:** cas@westerncape.gov.za

Straatadres: Heritage Assessmentgebou, Grandmarkplein, Kaapstad, 8000 • **Posadres:** Privatebak, 20097, Kaapstad, 8001