HERITAGE IMPACT ASSESSMENT:
PROPOSED MULILO KAROO WIND POWER 2 WIND ENERGY FACILITY, BEAUORT WEST MAGISTERIAL DISTRICT, WESTERN CAPE

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999)

HWC Case No.: HWC24050904CSI0524

Report for:

Sharples Environmental Services cc
P.O. Box 443, Milnerton, 7435
Email: betsy@sescc.net

On behalf of:

Mulilo Karoo Wind Power 2 (Pty) Ltd

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1st draft: 11 July 2024
Final report: 16 July 2024

SUMMARY

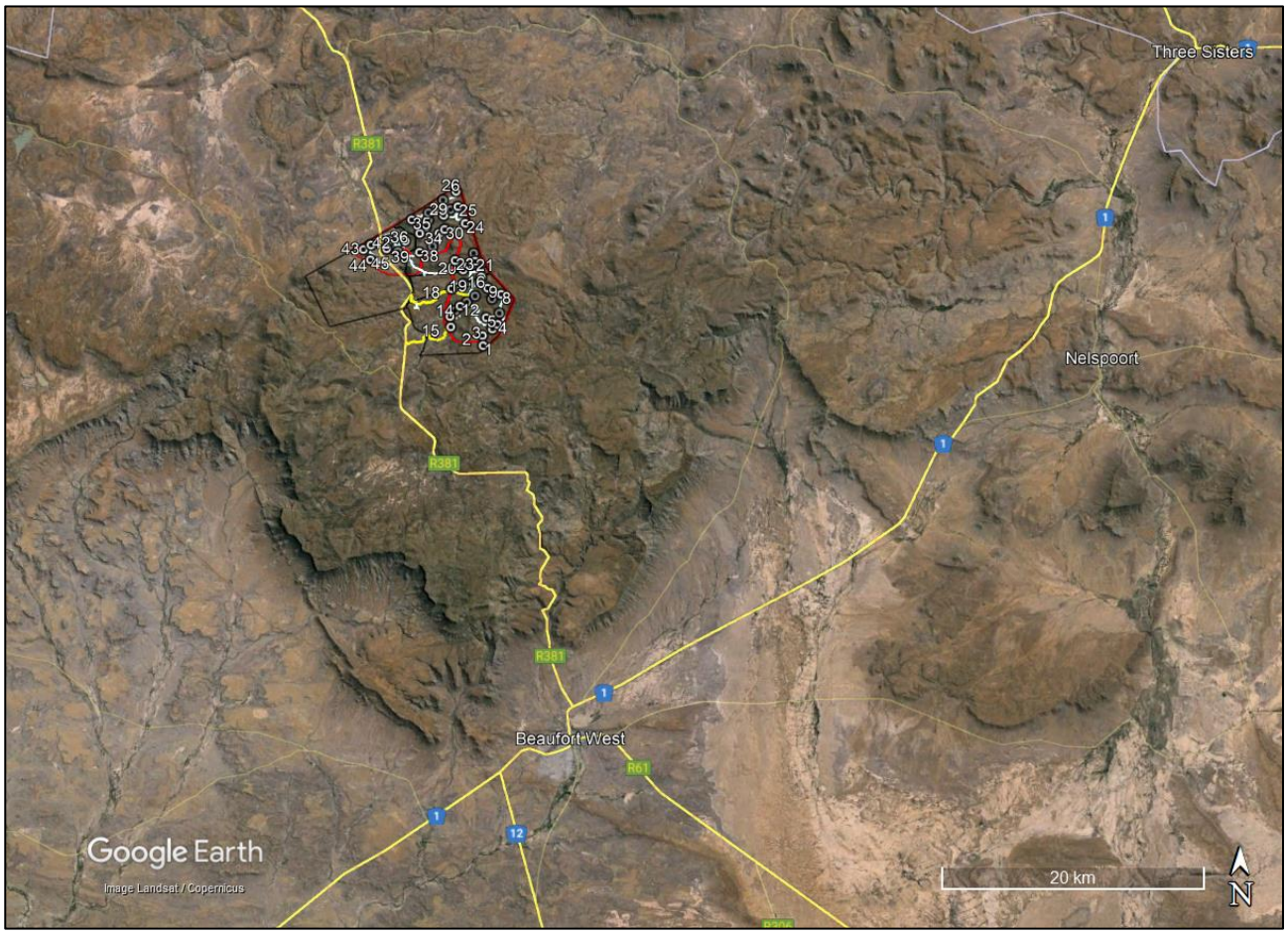
1. Site Name

Mulilo Karoo Wind Power 2 Wind Energy Facility

2. Location

Off R381
Remainder and Portions 1 and 3 of Waterval 101 and the Remainder of Middle Kraal 98, Beaufort West
Centre point at S32° 02' 16.0" E22° 28' 08.0".

3. Locality Plan



4. Description of Proposed Development

Mulilo Karoo Wind Power 2 (Pty) Ltd is proposing the development of a wind energy facility with the following:

- Up to 45 wind turbines (up to 160 m high with up to 200 m rotor diameter);
- Access roads;
- Powerlines;
- Substation, fuel storage area and control building;
- Temporary laydown area, batching plant and construction yard.

5. Heritage Resources Identified

The study found a number of archaeological sites with most being historical features. Stone Age resources were rare, but one large LSA scatter was found. Rock art was found in the form of scratched lines and both fine-line and geometric paintings. The historical materials comprised of stone-walled features related to old farm complexes and occasionally some associated glass, ceramic and metal artefacts. The cultural landscape was the most important heritage resource identified and includes the Karoo National Park, the escarpment edge, the Molteno and Roseberg Passes, the various rural landscapes around the farmsteads as well as the wider natural landscape of the Nuweveld Mountains.

6. Anticipated Impacts on Heritage Resources

The developer has designed the facility to avoid the vast majority of resources. Two sites occur within the footprint. One is a low significance scratched rock (waypoint 221) whose destruction is acceptable, and the other is a very long stone wall already penetrated by an existing road at waypoint 486 and whose partial destruction for road widening is acceptable. Another site similar to that at waypoint 221 with far more lines occurs within 10 m of the footprint on the same hill at waypoint 1872. The alternative access road runs very close to a number of archaeological sites but, because it follows an existing farm road, it does avoid all of them.

The preferred access road will result in considerable scarring of the hillside directly above the Roseberg Pass which runs through a scenic valley. For this reason, and despite the proximity of the alternative access road to a number of archaeological resources, the latter road is preferred from a heritage point of view.

Overall, negative impacts to the landscape are considered to be of high significance in the HIA and generally high to very high significance in the VIA. Importantly, however, impacts to the KNP will be of low significance.

7. Recommendations

It is recommended that the proposed Mulilo Karoo Wind Power 2 WEF be authorised, but subject to the following recommendations which should be included as conditions of authorisation:

- The final layout must be considered by a palaeontologist to determine whether any areas still require consideration in the field prior to construction;
- The Fossil Chance Finds Procedure must be included in the project EMPr;
- No stones may be removed from any archaeological sites;
- No-Go signage must be placed at identified sensitive locations and the sites must be monitored. These are waypoints 1838-1844, 1870, 1872, 222, and 268;
- If waypoint 1872 (which lies within 10 m of the footprint) cannot be avoided, then it must be recorded in detail prior to destruction;
- Destruction of the site at waypoint 221 and partial destruction of the walling at waypoint 486 are acceptable;
- The powerline may pass over the wall at waypoint 486 on either side of the road, but damage to the wall must be limited to hat is required for road widening (no service track may penetrate the wall beneath the powerline);

- If the alternative access road is used, and any sites are likely to be impacted, then an appropriate course of action must be determined with an archaeologist prior to construction;
- Signage on public roads should be of modest proportions;
- An early warning system must be used to ensure that red navigation lights stay off until needed;
- Buildings and substation must be sited in low visibility areas and painted in earthy tones (where feasible);
- Cuts and fills and landscape scarring in general must be minimised through careful design;
- Rehabilitation of all areas not needed during operation must be carried out; and
- 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 would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

8. Author/s and Date

Heritage Impact Assessment: Jayson Orton, ASHA Consulting (Pty) Ltd, 16 June 2024
Archaeological specialist study: Jayson Orton, ASHA Consulting (Pty) Ltd, 16 June 2024
Palaeontological specialist study: John Almond, Natura Viva cc, June 2024
Visual Impact Assessment: Lourens du Plessis, LOGIS, July 2024

Glossary

Background scatter: Artefacts whose spatial position is conditioned more by natural forces than by human agency.

Early Stone Age: Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

Holocene: The geological period spanning the last approximately 10-12 000 years.

Hominid: a group consisting of all modern and extinct great apes (i.e. gorillas, chimpanzees, orangutans and humans) and their ancestors.

Later Stone Age: Period of the Stone Age extending over the last approximately 20 000 years.

Middle Stone Age: Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

Patina: The weathered surface of an artefact which has changed colour and/or texture (patinated, patination).

Pleistocene: The geological period beginning approximately 2.5 million years ago and preceding the Holocene.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

CRM: Cultural Resources Management

DFFE: Department of Forestry, Fisheries and the Environment

EA: Environmental Authorisation

EAP: Environmental Assessment Practitioner

ECO: Environmental Control Officer

EGI: Electricity Grid Infrastructure

EIA: Environmental Impact Assessment

EMPr: Environmental Management Program

ESA: Early Stone Age

GPS: global positioning system

HIA: Heritage Impact Assessment

HWC: Heritage Western Cape

LSA: Later Stone Age

MSA: Middle Stone Age

NCW: Not Conservation Worthy

NEMA: National Environmental Management Act (No. 107 of 1998)

NHRA: National Heritage Resources Act (No. 25 of 1999)

NID: Notification of Intent to Develop

PPP: Public Participation Process

REDZ: Renewable Energy Development Zone

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

Contents

1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by Sharples Environmental Services cc to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of a wind energy facility on the Remainder and Portions 1 and 3 of Waterval 101 and the Remainder of Middle Kraal 98 off the R381, north of Beaufort West (Figures 1 & 2). A centre point for the proposed development is at S32° 02' 16.0" E22° 28' 08.0".

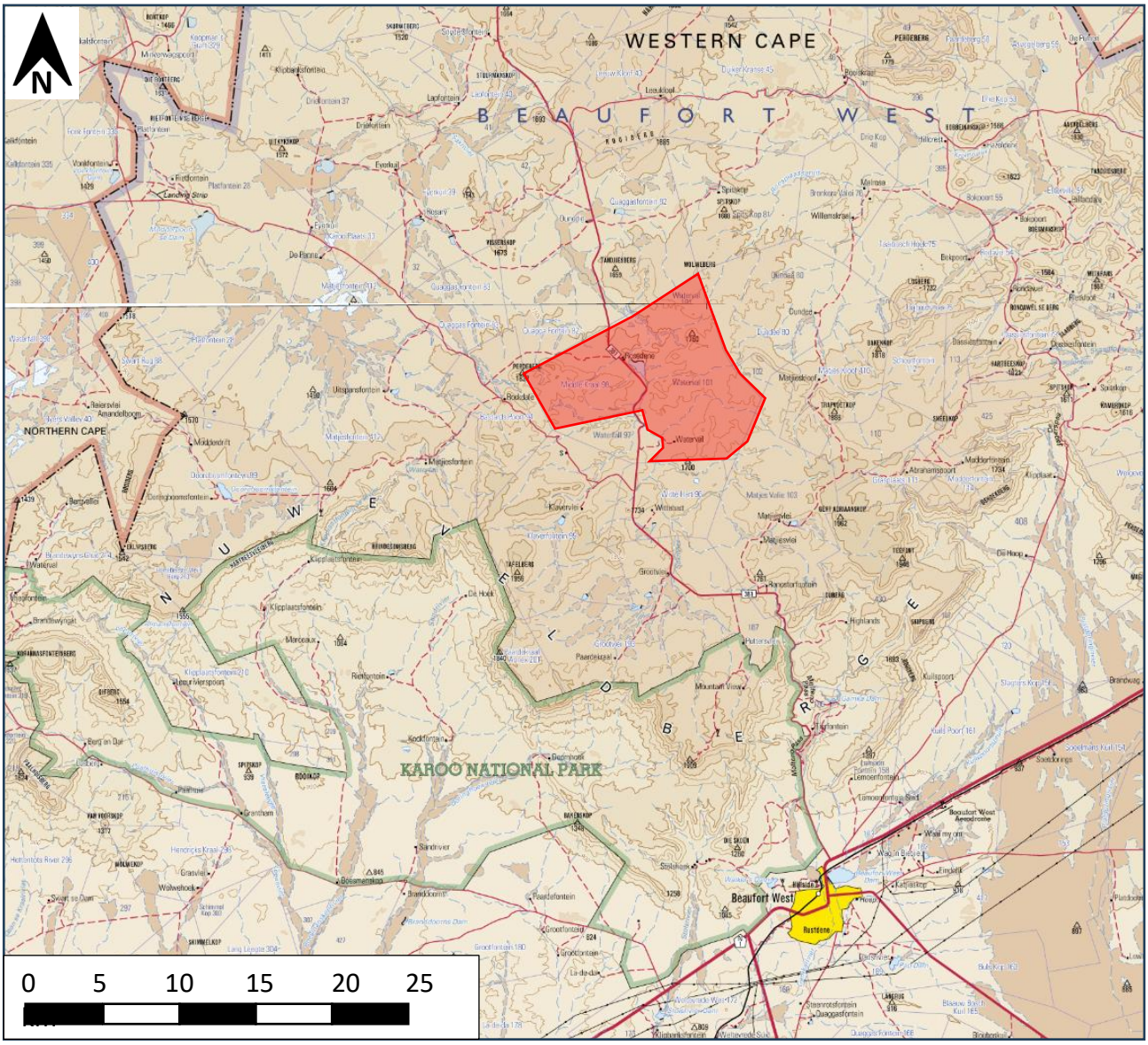


Figure 1: *Extract from 1:250 000 mapsheets 3221 and 3222 showing the location of the site (red shaded polygon) relative to Beaufort West and the Karoo National Park (note that although the KNP boundary has changed since this map, the northern section nearest the project is correct).*

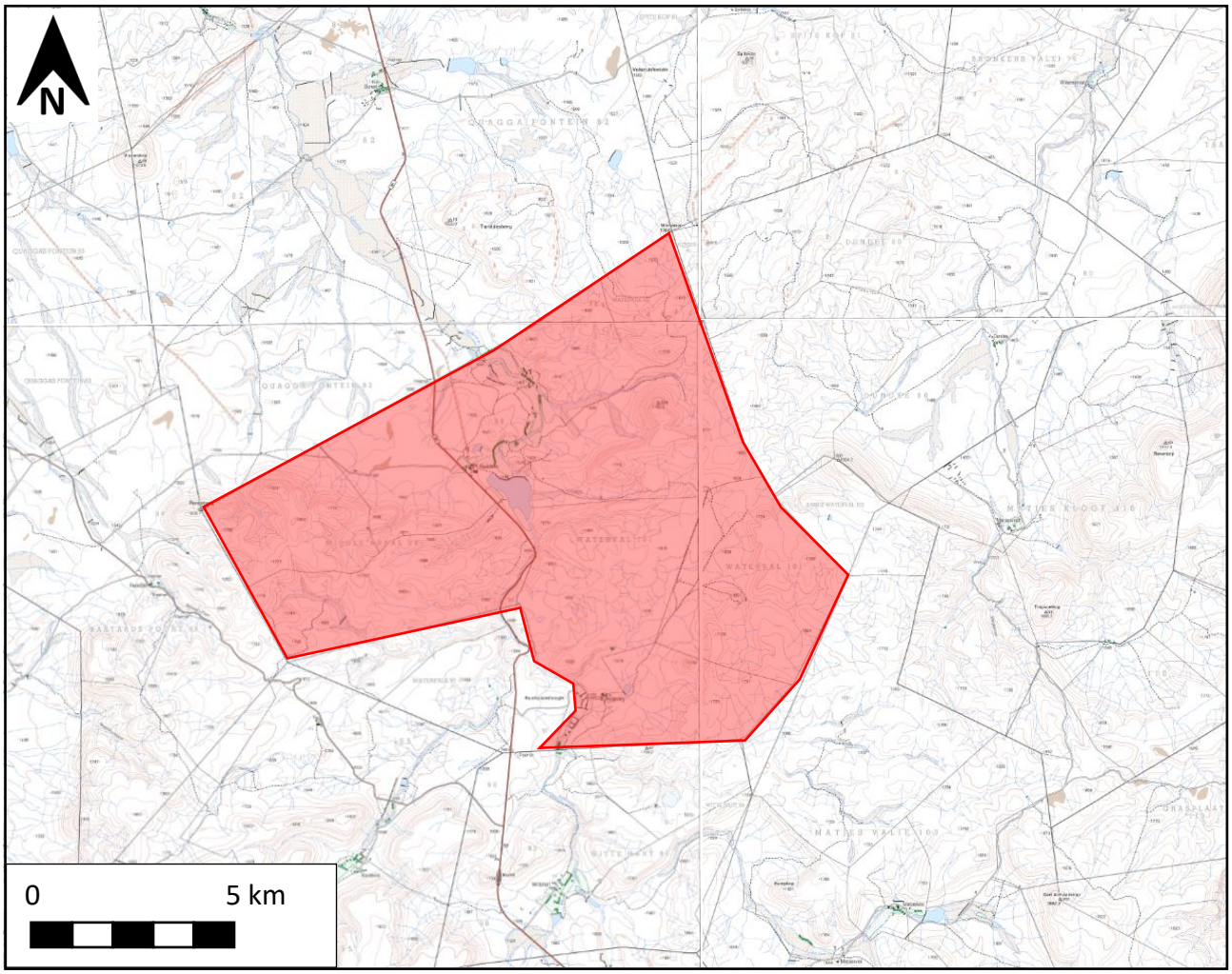


Figure 2: *Extract from 1:50 000 mapsheets 3122CD, 3122DC, 3222AB and 3222BA showing the location of the site (red shaded polygon). Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.*

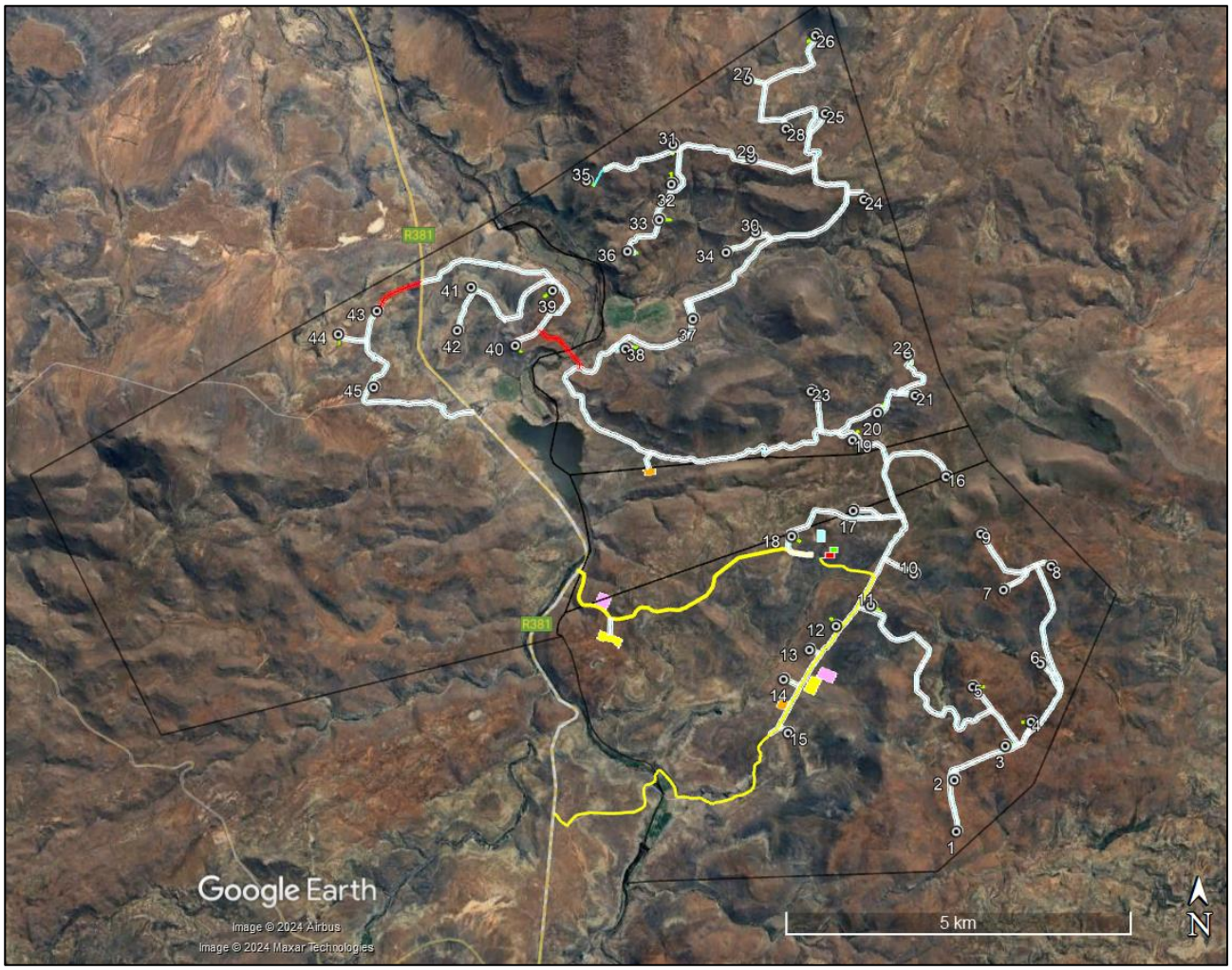


Figure 3: *Aerial view of the study area (red shaded polygons) showing the rugged topography. The project roads, turbines and associated infrastructure (including alternatives for some components) are indicated by the small, coloured polygons. The yellow lines are the alternatives for the proposed main access road to the facility.*

1.1. The proposed project

1.1.1. Project description

Mulilo Karoo Wind Power 2 (Pty) Ltd is proposing the development of a wind energy facility on the remainder of Farm Middle Kraal 98 and portions 1, 3 and the remaining extent of the Farm Waterval 101, near Beaufort West, Beaufort West Local Municipality, Central Karoo District Municipality, Western Cape.

The proposed development will have total output capacity of 382.5 MW and the total Area of Influence associated with the proposed development will be up to 5 567 ha. The proposed development will consist of the following components:

- Wind Turbines – The total generation output capacity was based on the establishment of up to 45 wind turbines and has been modelled through the use of a number of wind turbine models.

- The generation capacity of each turbine will be up to 8.5 MW. The anticipated hub height associated with the turbines will be up to 160 m, the rotor diameter will be up to 200 m, and the blade length will be up to 82.5 m. The turbine permanent hardstand areas will be up to 0.8 ha per turbine, with the reinforced concrete foundation will have an area of up to 0.07 ha per turbine. During the construction phase of the proposed development.
- During the construction phase, each turbine will have an associated component laydown and installation area of up to 1.2 ha. This laydown area will serve as the crane platform and hardstand area.

- Proposed road infrastructure:
  - The main access roads leading through the development will, where possible, make use of existing farm roads that will be upgraded and maintained for the life of the WEF. The existing roads to be upgraded will be expanded to a final width of up to 9 m, with the maximum access road servitude having a width of up to 15 m and will include the stormwater infrastructure (V-drains running on both sides of the road). New roads will be constructed (in areas where there are no existing roads) with a final width of up to 9 m to the IPP substation and laydown areas. In certain areas of steep slopes, the constructed road will require cut and fill which will extend the final 12m total width of the road during operations.
  - The internal access roads connecting the turbine positions will where possible make use of existing farm roads that will be upgraded and maintained for the life of the plant. The existing roads to be upgraded will be expanded to a width of up to 6 m. In areas where no existing internal roads are present, new roads with a width of up to 6 m will be constructed. All internal roads will have V-drains aligned on both sides of the road. The total servitude width of the internal road network will be 12 m. In certain areas of steep slopes, the constructed road will require cut and fill which will extend the final 9m total width of the road during operations.
  - The roads will be comprised of a combination of fractured stone, sand and fine particles with binding characteristics to form a smooth, firm surface.
- Internal electrical reticulation:
  - The transmission capacity of the internal reticulation will be up to 33kV. The proposed development will make use of a combination of 33 kV overhead lines and 33 kV underground cable (where technically feasible) and will be aligned along the internal road network connecting the respective WTG locations to the IPP substation.
  - The 33kV overhead powerlines will be equipped with pylons up to 20m high.
  - According to the site development plan provided for the proposed development, the servitude width of the internal reticulation will be up to 25 m on either side of the internal roads. The site layout plan makes provision for the internal electrical reticulation to be on either side of the internal road network, depending on the technical feasibility at the time of construction.
- The following components will also include a WTG Component Laydown area with an extent of up to 4 ha, a temporary construction office/yard with an extent of up to 4 ha, a temporary on-site batching plant with an extent of up to 1 ha, a temporary stockpiling area with an extent of up to 2 ha, and an Operational and Maintenance area with an extent of up to 2 ha.

The facility will have a bunded fuel and lubricant storage facility which will house fixed tanks. The capacity of these storage areas will not exceed a capacity of 80 m^3.

- The Operations and Maintenance (O&M) buildings will include infrastructure such as parking, 2.8 m high fencing, stormwater channels and culverts, ablutions, water storage tanks, septic tanks and boreholes. The O&M Area will have a footprint of up to 1.53 ha.
- The IPP Substation will be a 33 kV to 132 kV collector substation to receive, convert and step-up electricity from the WEF to the 132 kV grid suitable supply. The substation's maximum height will be the Lightning Mast up to 25 m high. The facility will house control rooms and grid control yards for both Eskom and the IPP.
- The Eskom Substation will be the 132 kV collector of the electricity leading from the IPP Substation and will transmit the electricity to the main National Grid Distribution substation, which will either be the Droerivier Eskom Main Transmission Substation (MTS) west of Beaufort West, or the MTS located on a previously approved development towards the north of the proposed development.

1.1.2. Identification of alternatives

No location or layout alternatives are being assessed because the layout has been designed after all specialists provided spatial sensitivity data. However, two alternative sites have been proposed for each of the three temporary aspects of the development: the laydown area, the construction yard and the batching plant. Two alternative main site access roads have also been proposed. These alternative locations are assessed in this report.

1.1.3. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant, since excavations for foundations and/or services may impact on archaeological and/or palaeontological remains, while all above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

1.2. Terms of reference

ASHA Consulting was asked to:

- Describe regional and local features of the receiving environment;
- Conduct desktop research;
- Conduct a field survey to search for sensitive areas and sites of heritage significance;
- Map sensitive features and provide spatial data to inform the final project layout;
- Assess the potential impacts on identified heritage resources within a Heritage Impact Assessment (HIA) report that complied with the requirements of both the NHRA and Appendix 6 of the NEMA EIA regulations;
- Identify relevant legislation and legal requirements; and
- Provide recommendations on possible mitigation measures and management guidelines.

A Notification of Intent to Develop (NID) was submitted to Heritage Western Cape (HWC). They responded on 4th June 2024 with the following request:

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 DEVELOPMENT OF 45 WIND TURBINES, INTERNAL AND MAIN ACCESS ROADS, OVERHEAD POWERLINES AND ASSOCIATED INFRASTRUCTURE SUBMITTED IN TERMS OF SECTION 38(1) / SECTION 34(1) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

The matter above has reference.

Heritage Western Cape is in receipt of your application for the above matter received. This matter was discussed at the Heritage Officers Meeting held on the 3rd of June 2024.

You are hereby notified that, since there is reason to believe that the proposed development of 45 wind turbines, internal and main access roads, overhead powerlines and associated infrastructure located in Portions 1 and 3 of Farm 101 and the Remainder of Farm 98 in Beaufort West, 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. Section 38(3) of the NHRA provides

(3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): ***Provided that the following must be included:***

(a) The identification and mapping of all heritage resources in the area affected;
(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;
(c) an assessment of the impact of the development on such heritage resources;
(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
(f) if heritage resources will be adversely affected by the proposed development, The consideration of alternatives; and
(g) plans for mitigation of any adverse effects during and after the completion of the proposed development.

(Our emphasis)
This HIA must in addition have specific reference to the following:
Archaeological Impact Assessment, Palaeontological Impact Assessment, and Visual Impact Assessment on the cultural landscape

The HIA must have an overall assessment of the impacts to heritage resources which are not limited to the specific studies referenced above.

The required HIA must have an integrated set of recommendations.

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

1.3. Scope and purpose of the report

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue negative impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued by them for consideration by the National Department of Forestry, Fisheries and the Environment (DFFE) who will review the Basic Assessment (BA) and grant or refuse authorisation. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

1.4. The author

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting Heritage Impact Assessments and archaeological specialist studies in South Africa (primarily in the Western Cape and Northern Cape provinces) since 2004 (please see curriculum vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is an accredited heritage practitioner with the Association of Professional Heritage Practitioners (APHP; Member #43) and also holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

1.5. Declaration of independence

ASHA Consulting (Pty) Ltd and its consultants have no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

2. LEGISLATIVE CONTEXT

2.1. National Heritage Resources Act (NHRA) No. 25 of 1999

The NHRA protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: “any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith”;
- Palaeontological material: “any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace”;
- Archaeological material: a) “material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures”; b) “rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation”; c) “wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of

1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation"; and d) "features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found";

- Grave: "means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place"; and
- Public monuments and memorials: "all monuments and memorials a) "erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government"; or b) "which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual."

Section 3(3) describes the types of cultural significance that a place or object might have in order to be considered part of the national estate. These are as follows:

a) its importance in the community, or pattern of South Africa's history;
b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
i) sites of significance relating to the history of slavery in South Africa.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list "historical settlements and townscapes" and "landscapes and natural features of cultural significance" as part of the National Estate. Furthermore, some of the points in Section 3(3) speak directly to cultural landscapes.

2.2. Approvals and permits

2.2.1. Assessment Phase

Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA then it must include a heritage component that satisfies the requirements of S.38(3). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to a BA. The present

report provides the heritage component. HWC is required to provide comment on the proposed project in order to facilitate final decision making by the DFFE.

2.2.2. Construction Phase

If archaeological or palaeontological mitigation is required prior to construction, then the appointed archaeologist or palaeontologist would need to obtain a workplan approval from HWC. This would be issued in their name. This is so that the heritage authority can ensure that the appointed practitioner has proposed an appropriate methodology that will result in the mitigation being undertaken properly.

2.3. Guidelines

HWC have issued minimum standards documents for HIAs and specialist studies. There is also a Western Cape Provincial guideline for heritage specialists working in an EIA context and which is generally useful. The reporting has been prepared in accordance with these guidelines. The relevant documents are as follows:

- Heritage Western Cape. 2016. Grading: purpose and management implications.
- Heritage Western Cape. 2019. Public consultation guidelines.
- Heritage Western Cape. 2021. Guide for Minimum Standards for Archaeology and Palaeontology reports submitted to Heritage Western Cape.
- Heritage Western Cape. 2021. Notification of Intent to Develop, Heritage Impact Assessment, (Pre-Application) Basic Assessment Reports, Scoping Reports and Environmental Impact Assessments, Guidelines for submission to Heritage Western Cape.
- Winter, S. & Baumann, N. 2005. Guideline for involving heritage specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 E. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

2.4. Application timeline

The application to DFFE under NEMA is currently in the application phase with submission estimated to be around the end of August.

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources used in this report are presented in Table 1 with relevant dates of each source referenced in the text as needed. Data were also collected via a field survey. The data quality is suitable for the purpose of informing this report.

Table 1: *Information sources used in this assessment.*

Data / Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography of the study area and immediate surrounds
Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
Cadastral data	CapeFarmMapper (http://gis.elsenburg.com/apps/cfm/#)	Current	Spatial	Cadastral boundaries, extents and aerial photography
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Palaeontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing palaeontological sensitivity and required actions based on the sensitivity.
Background data	Books, journals, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.
Screening Tool maps	DFFE	Current	Spatial	Potential sensitivity of the study area

3.2. Field survey

The sites for three related WEF projects were subjected to foot surveys as follows:

4th and 5th December 2023	Jayson Orton and Anja Huisamen
6th and 7th December 2023	Anja Huisamen
14th, 15th and 17th May 2024	Jayson Orton
20th to 24th May 2024	Anja Huisamen

These were during summer and autumn but, in this fairly dry area, the season makes no meaningful difference to vegetation covering and hence the ground visibility for the archaeological survey. Other heritage resources are not affected by seasonality. During the survey the positions of finds and survey tracks were recorded on a hand-held Garmin Global Positioning System (GPS) receiver set to the WGS84 datum (Figure 4). Photographs were taken at times in order to capture

representative samples of both the affected heritage and the landscape setting of the proposed development.

It should be noted that the amount of time between the dates of the field inspection and final report do not materially affect the outcome of the report.

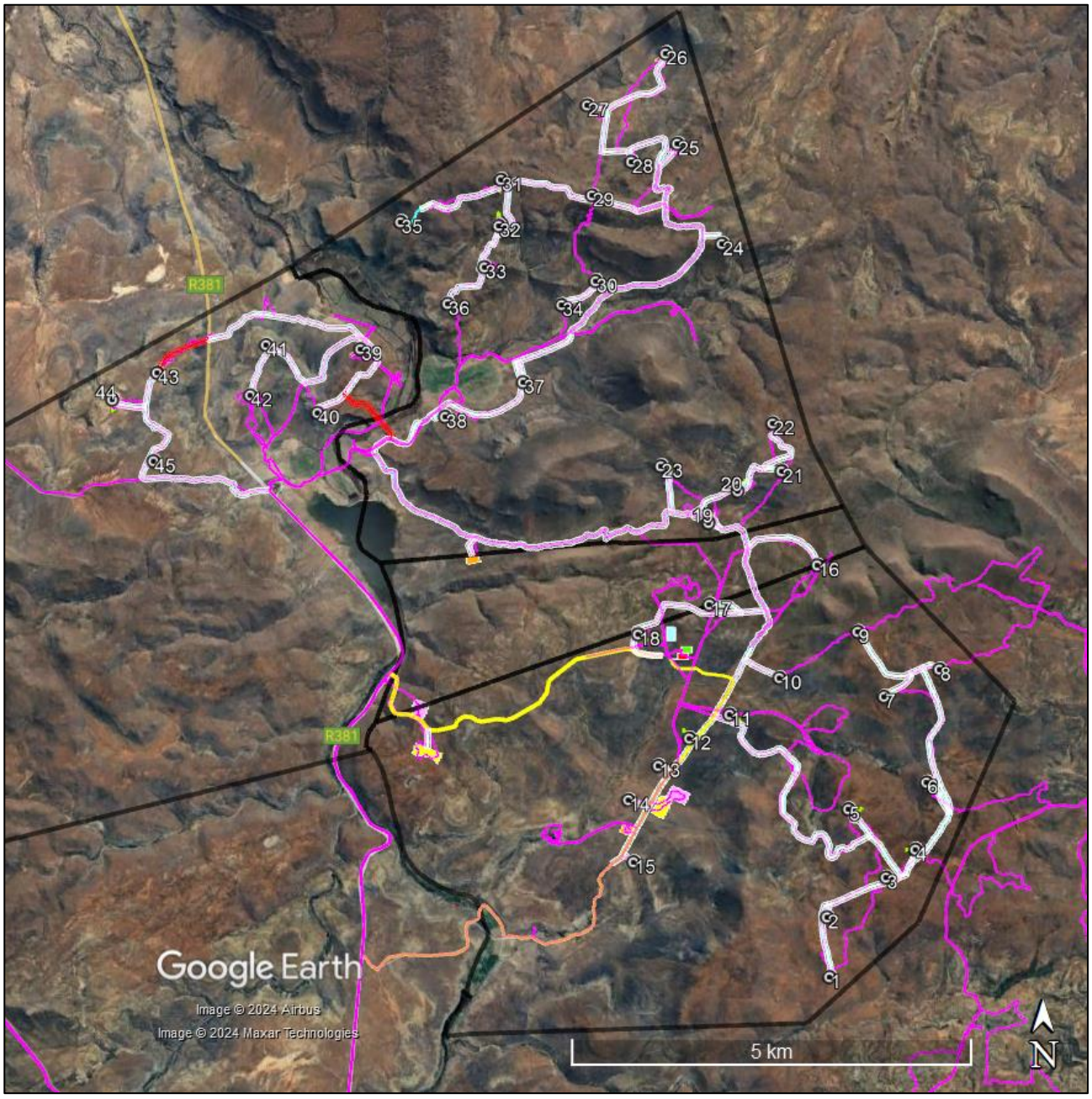


Figure 3: *Aerial view of the study area (black polygons) showing the survey tracks (pink lines).*

3.3. Specialist studies

As per the HWC requirement, specialist studies of archaeology, palaeontology and visual impacts were conducted. The archaeological work was done by the author and is contained within this HIA. The other two studies are appended.

3.4. Impact assessment

For consistency among specialist studies, the impact assessment was conducted through application of a methodology supplied by SES.

3.5. Grading

S.7(1) of the NHRA provides for the grading of heritage resources into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade I and II resources are intended to be managed by the national and provincial heritage resources authorities respectively, while Grade III resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended under S.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. Heritage Western Cape (2016), however, uses a system in which resources of local significance are divided into Grade IIIA, IIIB and IIIC. These approximately equate to high, medium and low local significance, while sites of very low or no significance (and generally not requiring mitigation or other interventions) are referred to as Not Conservation Worthy (NCW).

3.6. Consultation

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of a BA which includes a public participation process (PPP), no dedicated consultation was undertaken as part of the HIA. However, the heritage consultant ensured that the required parties were included in the list of people and organisations consulted. Interested and affected parties would have the opportunity to provide comment on the heritage aspects of the project during the PPP.

3.7. Assumptions and limitations

The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. The site was large, but the survey attempted to (1) identify all obvious heritage resources, (2) cover as much of the provided layouts as possible, and (3) determine the relationship between heritage resources and landscape features. It is assumed that the findings would be indicative of the overall pattern on the landscape. It is assumed that the information provided for the assessment is an accurate reflection of the development proposal.

Cumulative impacts are difficult to assess due to the variable site conditions that would have been experienced in different areas and in different seasons. Survey quality is thus likely to be variable. As such, some assumptions need to be made in terms of what and how much heritage might be impacted by other developments in the broader area.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The wind farm site is located in a rural/natural context used for livestock (sheep and cattle) and game rearing, although small patches of land either are cultivated or have been cultivated at some point in the last several decades. Most local roads are gravel but a section of the R381 is tarred. Farm complexes are few and far between. Human modification of the environment, aside from roads and occasional farm complexes, some of which have associated agricultural lands, is limited to wind pumps, reservoirs, dams and farm fences.

The site is within the recently gazetted Beaufort West Renewable Energy Development Zone (REDZ) and the Central Electricity Grid Infrastructure (EGI) corridor (**Error! Reference source not found.**4). The Karoo National Park (KNP) lies to the south of the study area.

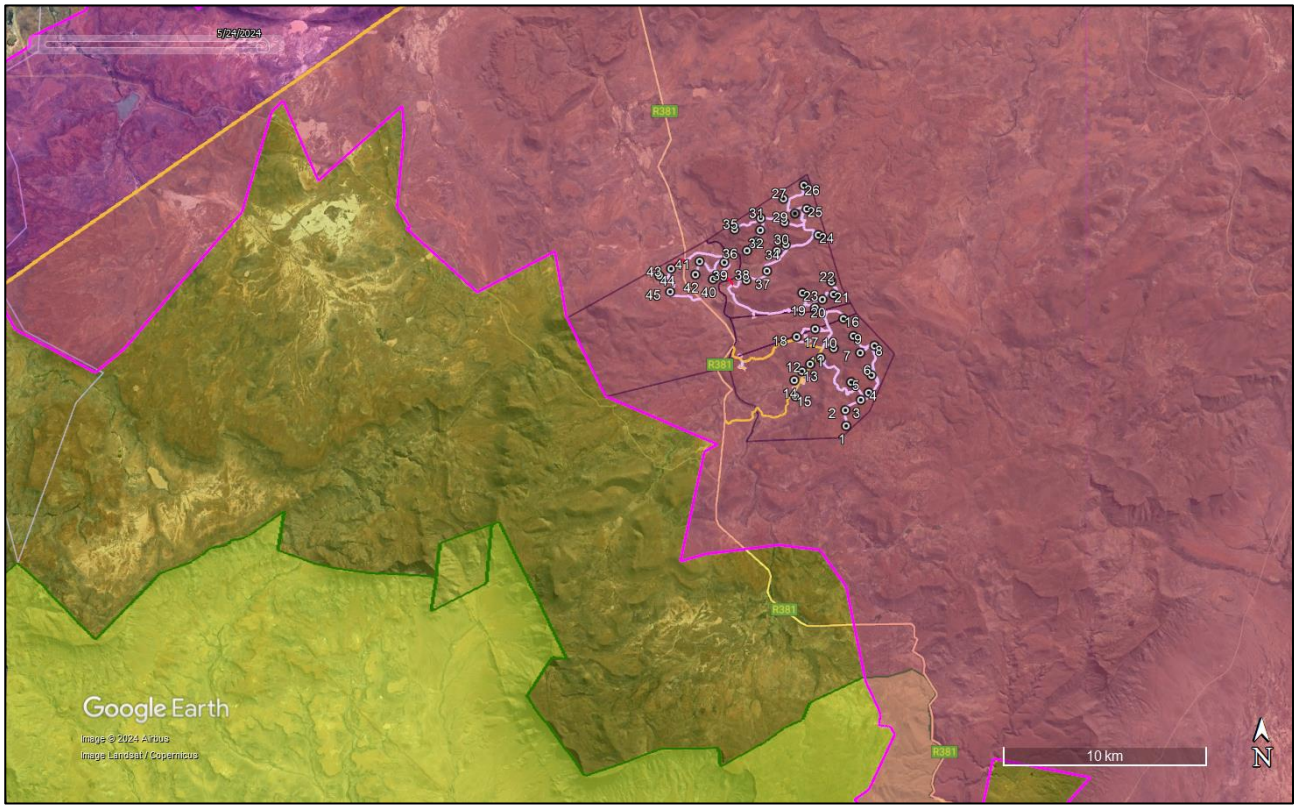


Figure 4: *Aerial view showing the location of the study area within the Beaufort West REDZ (pink shading) and central EGI Corridor (yellow shading). The KNP is marked by green polygons.*

4.2. Site description

The study area lies in the southern part of the Nuweveld Mountains, a short distance north of the escarpment. It is comprised of undulating hills with rocky koppies, ridges and bushy plains. Low scarps occur in many areas and most of the substrate is rocky. Figures 5 to 12 illustrate the general nature of the study area.

Figure 5: *View south from near the northern end of the study area. Wind mast in view.*

Figure 6: *View north in the northern part of the study area.*

Figure 7: *View south towards the central part of the study area.*

Figure 8: *View north in the central part of the study area.*

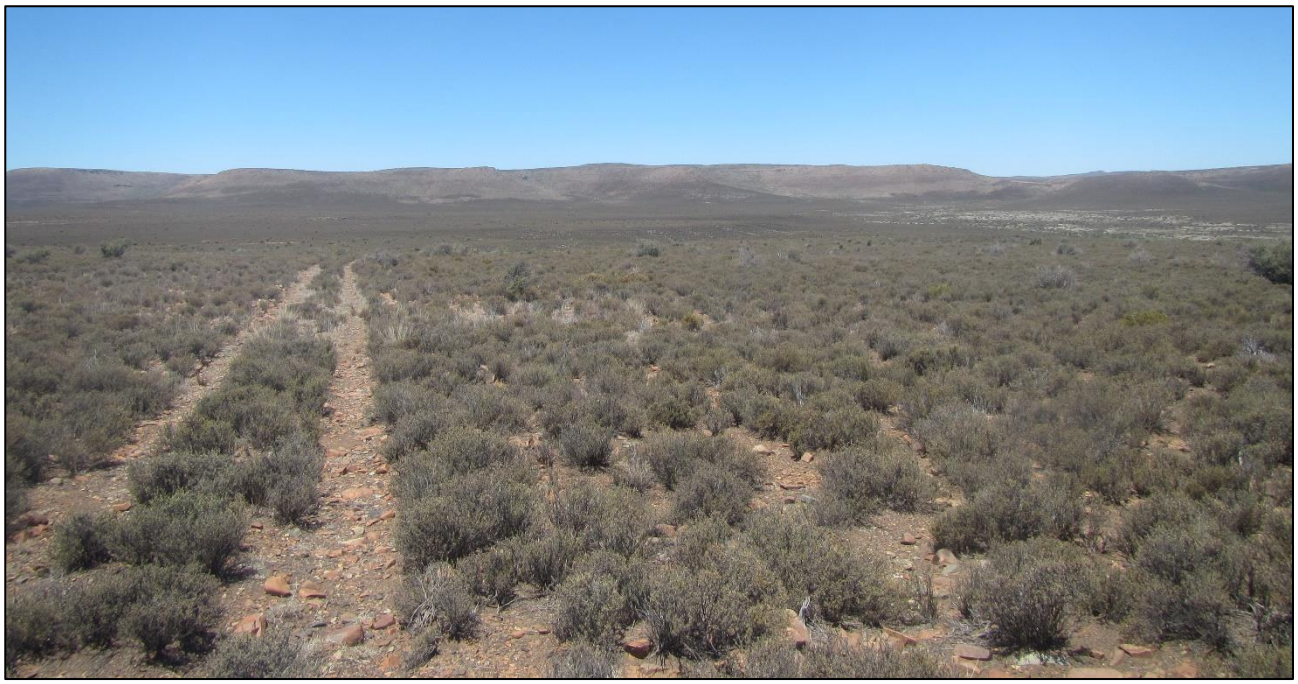


Figure 9: *View east in the central part of the study area.*

Figure 10: *View east in the southern part of the study area.*

Figure 11: *View northeast across the Sak River in the central part of the study area.*

Figure 12: *View west in the western part of the study area.*

5. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project. A full list of finds is contained in Appendix 2 and detailed mapping in Appendix 3.

5.1. Palaeontology

The SAHRIS Palaeosensitivity Map shows the site to be of largely very high sensitivity (Figure 13). Almond (2024) noted that the study was underlain largely by the Teekloof Formation (Lower Beaufort Group, Karoo Supergroup) which is known to be fossiliferous. He surveyed the project area and found that there were relatively poor levels of bedrock exposure, and many areas were covered by superficial sediments lacking fossils. Nevertheless, he still found many fossils, with most being from bedrock exposures along drainage lines. The vast majority were of very low scientific significance. The fossils included bones and burrows, but well-preserved plant fossils appeared to be absent. Almond (2024) concludes that the project is acceptable, but subject to a desktop examination of the final layout to determine whether any further work may be needed prior to construction.

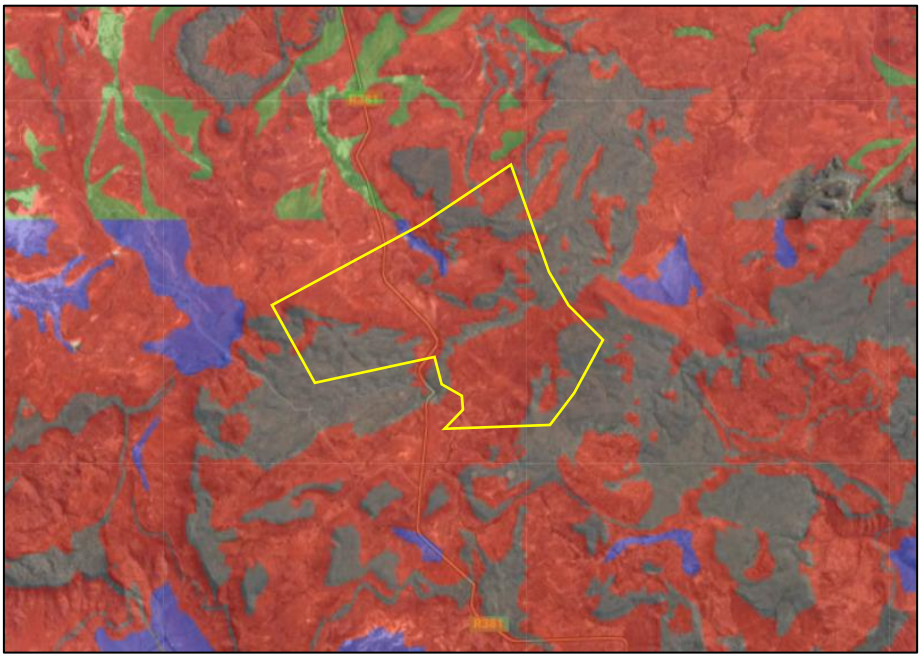


Figure 13: *Extract from the SAHRIS Palaeosensitivity map showing the study area to be of largely very high (red shading) and zero (grey shading) palaeontological sensitivity but with a small area of low sensitivity (blue shading).*

5.2. Archaeology

5.2.1. Desktop study

The broader Karoo region generally contains sparse archaeological traces from the Early (ESA), Middle (MSA) and Later Stone Ages (LSA). The vast majority of material tends to be what is referred to as background scatter. This can be defined as “widespread isolated artefacts whose distribution results from either primary or secondary causes” (Orton 2016:121). Other work in the Nuweveld

shows that such older artefacts are rarely encountered and always in extremely low densities. In this dry landscape, LSA archaeological sites are well-known to be focused most strongly on water sources. This pattern has been well demonstrated locally by Orton (2021a, 2021b, 2021c, 2021d, 2022a, 2022b, 2022c, 2022d, 2022e), but the overall density of sites found was quite low. These sites are usually scatters of stone artefacts, often accompanied by ostrich eggshell fragments and sometimes pottery, but may also include fragments of bone and even subsurface archaeological deposits (the latter are unknown from the Nuweveld area though).

Rock art sites occur in low density through the wider area, with three painted 'geometric tradition' sites and three engraved 'fine line' tradition sites on record from the Nuweveld (Orton 2021a, 2021b, 2021c, 2021d). Geometric tradition art is thought to have been produced by the Khoekhoen and the new records expand the known distribution of this tradition in the area (Figure 14). Parkington *et al.* (2008) have documented many engravings in the wider Karoo region. They do not map their work but do provide a historical map of engraving distribution which shows the densest concentration being to the northeast around the Kimberley region.

Figure 14: *Extract from a map showing the distribution of geometric tradition rock art. Source: Smith & Ouzman (2004: fig. 9). The present study area is in the red circle, while Hart's (2016) observation lies to the east of the circle.*

An interesting aspect of Karoo archaeology, and which may be relevant here, is rock gongs. These are (usually) dolerite rocks that are naturally perched in such a way that when struck they release a ringing musical note. The gongs are identified by heavily worn patches where they have been repeatedly struck. Parkington *et al.* (2008) have studied a number of gongs from Nelspoort and Vosburg, some 45 km to the east and 160 km to the north of the present study area respectively, but Orton (2021b) recorded two further examples in the Nuweveld, both of which were surrounded by extensive stone artefact scatters indicating occupation of the area.

Until Orton's (2021a, 2021b, 2021c, 2021d, 2022a, 2022b, 2022c, 2022d, 2022e) recent surveys in the area, historical archaeological resources, too, were little known from the Nuweveld area. These surveys showed that 19th century occupation of the area was widespread with many small abandoned and ruined stone-walled farmsteads scattered along the water courses of the area. The

structures included houses (both formal rectangular flat roofed houses and lobed dwellings that might have had temporary roofs), kraals, and various small outbuildings of unknown function but likely including storage spaces and chicken coops. In some small valleys with a reasonable amount of unconsolidated sediment cover, stone walls were constructed within small valleys in order enclose spaces that could be planted with vegetables. The walls kept livestock out. At the southern end of the Nuweveld Mountains, in the Karoo National Park (KNP), Kaplan (2005, 2006) recorded several small, ruined stone structures which were said to be kraals, a homestead and shepherd's huts. One of them had a small scatter of late 19th to early 20th century historical artefacts associated with it. A stone-built lime kiln and some animal traps are also on record there (SANParks 2017). Other stone walled ruins are known from the KNP and, according to Anonymous (2016) some were demolished in order to reuse the stone to build the Klipspringer Pass. This pass was built from 1986 to 1992 (Goetze 1993).

These early packed stone structures are invariably collapsed reducing them to archaeological sites in terms of the NHRA definitions. While some with taller walls may have had a formal or informal and/or temporary roof over them, others may have been hartebeeshuise with A-frame-type roofs made of branches and reeds placed above low stone or mud walls. Governor van Plettenberg, during his travels east to inspect the Colony, noted near the Sneeuwberg Mountains that the houses of the colonists consisted only of one room structures with low walls and straw roofs (Theal 1896-1911 cited in Böeseken 1975). In 1811 William Burchell illustrated a trekboer farmhouse (Van Zyl 1975), while Schoeman (2013) shows an image of such a historical stone dwelling still in use in the early 20th century (Figures 15 & 16).

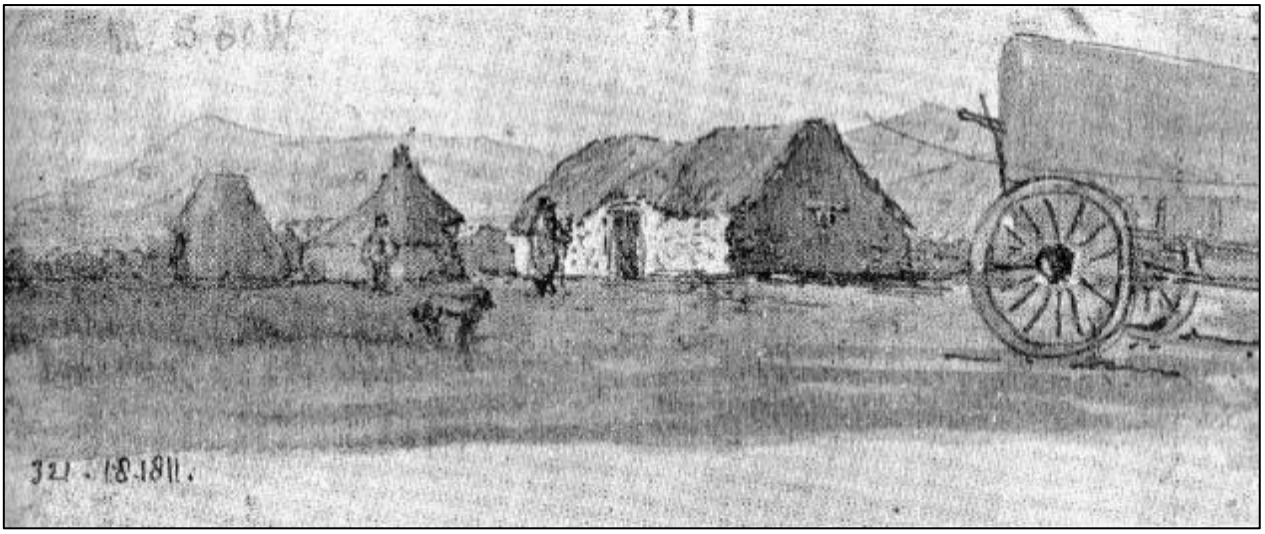


Figure 15: *Drawing of an early 19th century trekboer farmhouse by William Burchell. Source: Van Zyl (1975:103).*

Figure 16: *A shepherd's hut photographed near Beaufort West in the early 20th century. Note the low, narrow doorway and informal roof structure. Source: Schoeman (2013:48).*

The engraving tradition in the Karoo continued beyond the Stone Age as testified to by the many recent 'scratched' engravings that are known to occur. Horses are an extremely common subject in these recent engravings and are filled with various engraved/scratched patterns (Figures 17 & 18). Morris (1988) has reviewed the historical engravings of the Karoo and notes that they have been attributed by Battiss (1948) to Europeans and Griquas and by Fock (1979) to 'Hottentots'. Morris (1988) suggests that some were almost certainly made by early Baster and Trekboer immigrants and that the tradition continued into the 20th century. He also notes the inclusion of wagons and human figures in western clothing. This late date for some of these engravings is attested to by the engraving of a Morris Minor car in an area just to the northwest of the current study area (Orton 2022b). This engraving was found within an area with vast numbers of historical engravings that included many horses, a number of wagons (including an identifiable Cape Cart) and several Nine Man's Morris game boards.

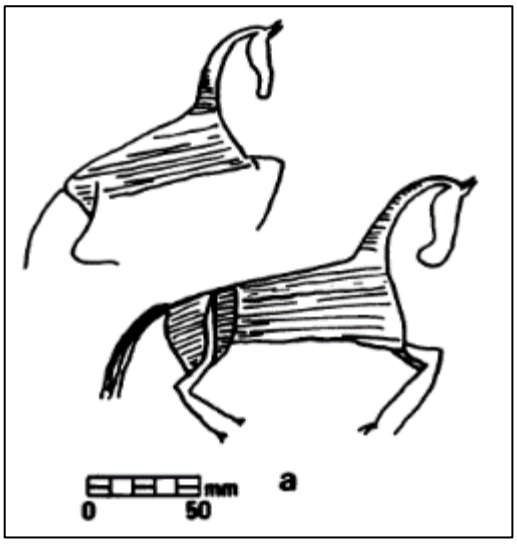


Figure 17: *Horse engravings from the Beaufort West area. Source: Morris (1988: fig. 3a).*

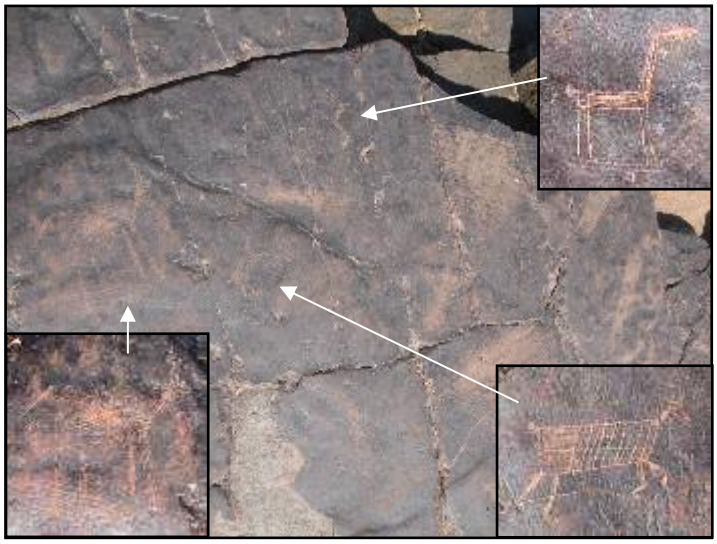


Figure 18: *Horse engravings from east of Beaufort West. Source: Orton (2010: fig. 44).*

The Karoo has been a highly contested landscape at various times in the past. The Khoekhoen first migrated into South Africa about 2000 years ago. That they lived in the Karoo in precolonial times is testified to by the presence of geometric tradition rock art and precolonial kraals, while many historical records of their presence also exist. The only study to attempt to date the Khoekhoe occupation was by Sampson (2010) in the Seacow River valley about 160 km east-northeast of the present study area. Through dating potsherds associated with kraals he determined that the kraals – and by implication herding – dated to between about AD 1000 and AD 1750, shortly before the arrival of the Trekboers. Sampson (2010:847) suggests that there would have been tension between the indigenous San and the incoming Khoekhoen but considers that their interactions resulted in "a millennium of (probably uneasy) space-sharing with the locals." Note that precolonial kraals have yet to be located in the Nuweveld but are fairly common in the Roggeveld Mountains.

5.2.2. Site visit

The finds from the survey did not reveal anything entirely unexpected. Background scatter artefacts were rare, but some were seen at waypoint 475 (Figure 19). Only one artefact scatter that could be seen as a site was located. This was at waypoints 4689 to 4691. The scatter was at least 80 m by 35 m but was not fully mapped due to time constraints and that it was not located in the disturbance footprint. The artefacts are from the LSA (Figures 20 & 21). An important Stone Age find was some rock paintings. These were located in the small kloof with a waterfall where the original homestead of the farm Waterval was constructed (see waypoints 1848 to 1856). The rock paintings lie at waypoints 1857 and 1858 and are at the base of the cliff over which the waterfall plunges. One painting is a fineline painting at waypoint 1857 (Figure 22), while the second, located just a few meters away at waypoint 1858, seems like it might be a geometric painting (Figure 23).

Figure 19: *Background scatter artefacts at waypoint 475. Scale in cm.*

Figure 20: *LSA artefacts at waypoints 4689-4691. Scale in 1 and 5 cm intervals.*

Figure 21: *LSA artefacts at waypoints 4689-4691. Scale in 1 and 5 cm intervals.*

A category of rock art that is not understood is scratched rocks. A number of such rocks were found in the study area. Figure 24 shows a typical example. Whether these are historical or LSA is unknown but the latter may be more likely. Other historical materials are stone-walled features. These are residential as well as farm structures like kraals, chicken coops and other walls (Figures 25 to 27). Outside some residential ruins historical debris can be found. This is sometimes in the form of an ash and rubbish dump or, more often, a lighter scatter of artefacts. The artefacts include glass, ceramic and metal items (Figures 28 & 29). These historical materials are typical of the 19th century.

Figure 22: *Fineline painting showing an eland torso and other smaller motifs at waypoint 1857. Scale in 1 and 5 cm intervals.*

Figure 23: *Geometric paintings at waypoint 1858. Scale in 1 and 5 cm intervals.*

Figure 24: *Scratched 'engravings' at waypoint 472. Scale in cm.*

Figure 25: *Stone-walled ruin at waypoint 1851.*

Figure 26: *Stone-walled ruin at waypoint 1853.*

Figure 27: *Stone walling at waypoint 484.*

Figure 28: *Historical artefacts from waypoint 266.*

Figure 29: *Historical artefacts from waypoint 266.*

5.3. Graves

Graves are often found at ruined or current farmsteads. However, none were located in the present study area. It is still possible, however, that some could be present as they are easily overlooked in bushy areas.

5.4. Historical aspects and the Built environment

5.4.1. Desktop study

For various reasons including changes to the structure of the Cape Colony, and the desire to seek new grazing and independence from Dutch East India Company (VoC) rule, farmers started to leave

the Cape Colony during the 18th century. This process ultimately had its beginnings with the creation of a class of farmers referred to as free burghers who moved into the region surrounding Cape Town (e.g. Wellington, Paarl, Stellenbosch and Franschhoek). Willem Adriaan van der Stel, governor of the Colony from 1699 to 1707, abused his power as governor by favouring his own farming activities when supplying ships with food, thereby making the free burgher farmers unhappy. The Colonists were also initially not allowed to trade with the Khoekhoen, but this rule was changed in February 1700. Around this time Van der Stel gave grazing licences further from the Colony in order to increase pastoral production (Penn 2005). These factors were the ultimate start of Colonial expansion after the Colony had remained confined to the Cape Town area for the first several decades, and in fact perpetuated it during the following decades.

The colonists soon realised that the best way to survive in the relatively arid interior was to be as close to the year-round rainfall zone as possible. This allowed for seasonal movement into the summer rainfall region to the northeast or the winter rainfall region to the southwest. In this way they could maximise the availability of water and grazing for their livestock. The mountains lying within this zone – essentially the escarpment edge – were also better watered due to their elevated rainfall and more frequent permanent springs. Between about 1740 and 1770 there was a rapid expansion into this zone which extended from the Kamiesberg of Namaqualand, through the Onder Bokkeveld and the Hantam, to the Roggeveld Mountains, but possibly not yet as far northeast as the Hoogland study area (Figure). This, then, along with the Nuweveld Mountains just east of the Roggeveld constituted the mid-18th century northern frontier zone. The Nuweveld saw 75 farms being granted in this 30 year period (Penn 2005). According to Botha (1926), the Nuweveld was so named because it was a new area to be colonised. Note also that the limits of the area under discussion are unknown. It seems likely, though, that it did not extend very much beyond (north of) the crest of the escarpment. Walker (1928) maps the 1798 colonial boundary as being just north of the crest of the escarpment (Figure).

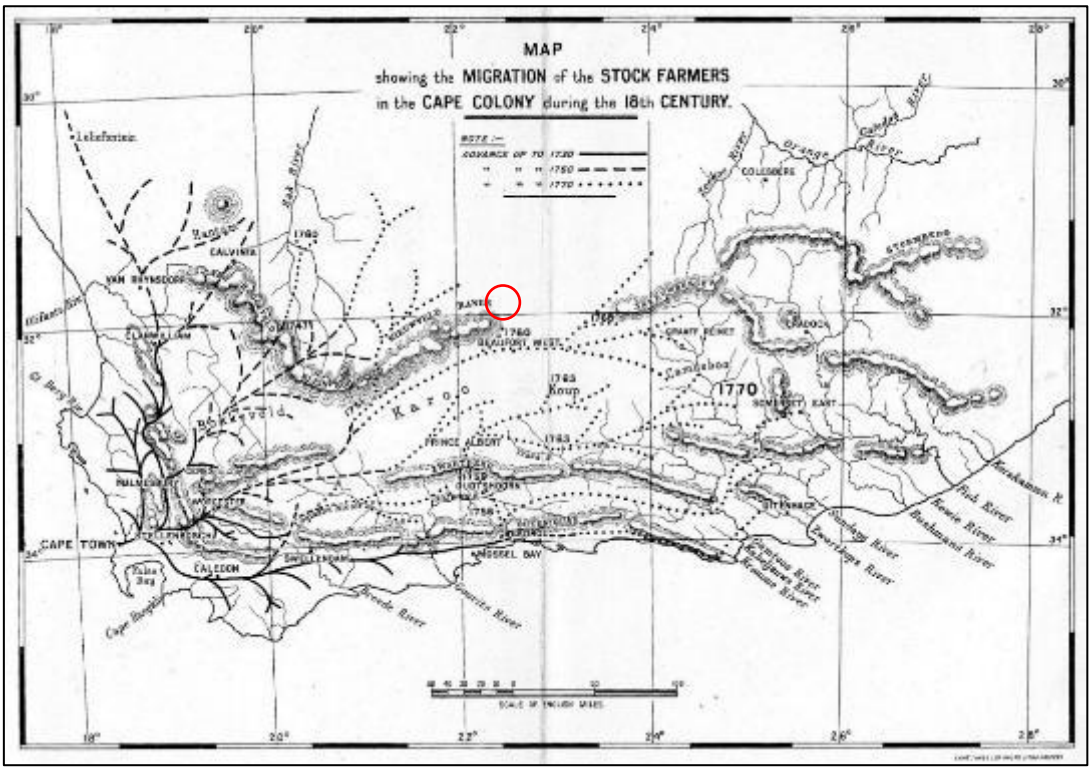


Figure 30: *Map showing the mid-18th century trekboer expansion in the Karoo. Source: Botha (1926: opposite preface). The wind farm study area is indicated by the red circle.*

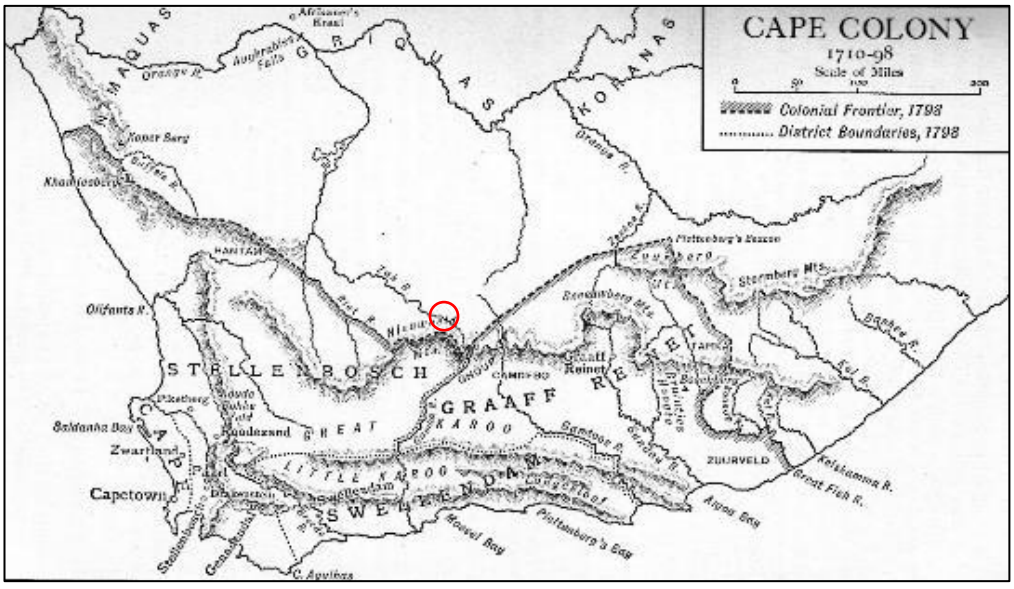


Figure 31: *Map showing the extent of the Cape Colony by 1798. Source: Walker (1928:201). The wind farm study area is indicated by the red circle.*

The Nuweveld Mountains are actually within the summer rainfall area which made occupation slightly more tenuous because trekking west into the winter rainfall Roggeveld Mountains meant moving into areas already occupied by other trekboers. The Nuweveld area was thus never properly occupied by colonists during the 18th century with the local San and Khoekhoen frequently stealing livestock from the colonists. A series of robberies in December 1775 and January 1776 in the Camdeboo and Swartruggens areas (some 200 km southeast of the present study area) resulted in

a vicious commando being led against the San and Khoekhoen. Forty-five people were killed and thirty-six prisoners taken by the commando. This attack resulted in the passing of a resolution by the landdrost that no further commandos be undertaken without his express permission. Soon afterwards, many hostile San and Khoekhoen began assembling in the Koup, Sak River and Nuweveld areas, protecting themselves in fortified rock shelters. Although a request was made to mount a commando, the Nuweveld farmers could not await the outcome but found their small commando to be too weak to make any impact. A commando from the Sneeuwberg came to their assistance and the two together killed 111 San and Khoekhoen. Despite this success, many farmers vacated the Nuweveld area (Penn 2005).

In July of 1779 a group of twelve farmers decided to risk moving back into the Nuweveld area. The result was an increased intensity of San raids and commando activity that resulted in many deaths. This fighting continued and by September 1781 the farmers had too few cattle left to be able to sell to the VoC butchers. Commando activity also ceased because of a shortage of ammunition. By 1786 drought and San resistance resulted in the colonists once again vacating the Nuweveld and leaving it almost completely free of trekboers until 1793 (Penn 2005).

In June 1792 a large group of about 300 people – described as San by the colonists – attacked the Van Reenen brothers (who had the contract to deliver livestock to Cape Town) and stole about 600 sheep and 253 cattle. This act finally prompted the Government to take more serious action and two very well organised commandos were raised under the direction of two proven local leaders (N. Smit & J. van der Walt) and sent to the Nuweveld region where they killed more than 500 San. Owing to the lack of surface water, the area was still seen as marginal and could not support sufficient farmers to withstand or expel the San and/or Khoekhoen. In 1793 Van der Walt was permitted to move into the Nuweveld and was given two farms rent-free and the power to send out commandos as he saw fit (Penn 2005).

By the time the British took control of the Cape, the trekboers “had already acquired the characteristics of an embryo nation” (Van Zyl 1975:125). This was because the VoC had largely left them to look after themselves which resulted in them becoming quite independent of the Company and its rather weak rule. Due to various changes implemented under British rule, a growing unease developed amongst the colonists and this eventually led to a large-scale migration of farmers further north and east, beyond the borders of the Colony; this was the so-called ‘Great Trek’ of 1834 to 1854 (Muller 1975). Walker (1928), however, comments that this event could actually be seen merely as an acceleration of a process that had long been underway. The Cape Colony meanwhile expanded as shown in Figure 32 with the study area fully incorporated by 1825.

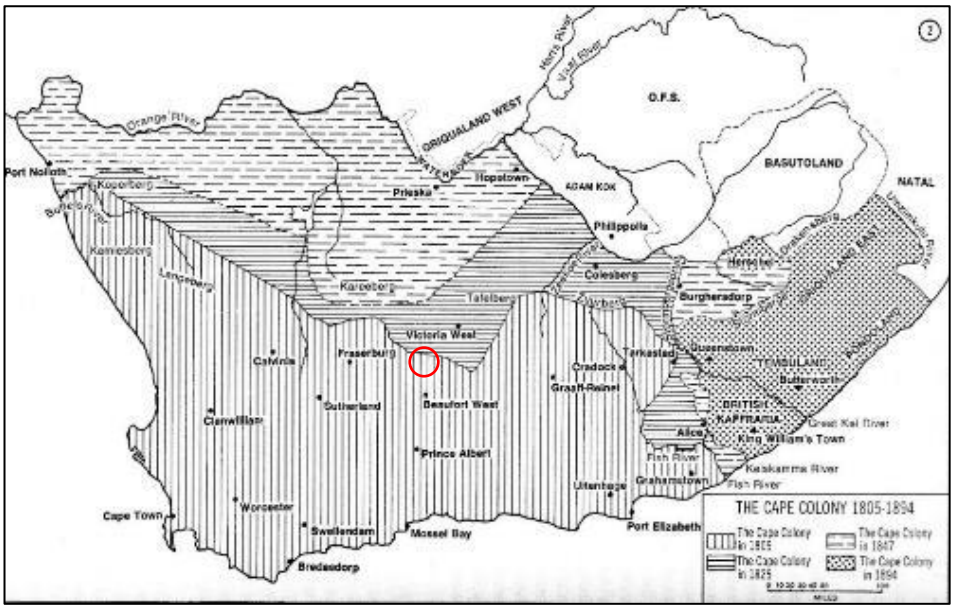


Figure 32: *Map showing the expanding boundaries of the Cape Colony under British Rule. Source: Van Zyl (1975:102). The wind farm study area is indicated by the red circle.*

There appears to have been limited action in the Nuweveld area during the Second South African War (Anglo-Boer War). Lieutenant-Colonel EMS Crabbe made use of a farm called Waterval along the R381 and just north of the crest of the escarpment. On 5th February 1902 he moved west to join Major H.W.G. Crofton at Uitspannen but found that Crofton had been killed by the Boers and his force captured (Watt 2013). This action occurred some 20 km southwest of the study area.

Historical buildings occur widely across the Karoo with most dating to the 19th century. *Orton et al.* (2016:15-8) noted the following:

> "In the harsh, resource-scarce Karoo environment with its restricted range of materials, necessity often was the mother of invention when it came to constructing shelter, resulting in a unique regional vernacular building tradition that displays the creative and technical achievement required to fashion an existence there. This relied on both traditional and conventional artisanal skills since buildings were hand-crafted from sun-baked bricks, locally occurring timber and quarried or collected stone. The result was a variety of local styles that we refer to collectively as Karoo vernacular."

This varied architecture is evident not only in the towns but also in remote areas. Two building traditions are unique to the Karoo. Corbelled buildings, which mainly occur to the north and west of the present study area and date between about 1813 and 1870, evolved from the need to build roofs without wooden beams (Kramer 2012). Two isolated examples are mapped within 20 km of the study area, but none are known from within it. The second tradition is known as Karoostyle and has been described by Marincowitz (2006). These buildings are typically simple rectangular structures with flat roofs and parapets. Flat roofs were often of the type referred to as 'brakdak' which consists of beams overlaid by sticks, reeds and then mud mixed with other materials such as manure or vegetation (Fagan 2008). These were made when corrugated iron was not available.

In rural areas buildings tend to be clustered into farm complexes with relatively few isolated structures. The complexes can include a variety of styles, while isolated structures are often small Karoostyle labourer's cottages. Due to the consolidation of farms into larger holdings in order to

increase commercial viability, there are far fewer occupied farmsteads today than would have been the case in the past.

The Molteno Pass, which lies along the R381 between Beaufort West and Loxton, serves as the primary access to the area above the escarpment. It was built by Thomas Bain from 1875 to 1880. Another section through a steep valley – also built by Bain – is referred to as the Roseberg Pass. Molteno Pass lies to the south of the study area, while Roseberg Pass lies to the north. The route is known to have been in use since 1830 when it was just a path. In 1837 local farmers improved the route to allow for the passage of wagons (Willis 1994 cited in Ross 2013). Storrar (1984) suggests that the entire route was originally called Rose's Berg Pass. The R381 has had a number of sections realigned during modern upgrades but the steepest section through the Molteno Pass is almost unchanged – just one obvious short realignment is evident. De Jager's Pass lies along the DR2311 further to the east. It too was built by Thomas Bain with completion in 1880 and was known as Wagenaar's Kloof until 1899 when it was reconstructed and renamed. It had its origins in an early wagon track into the interior, also dating back to about 1830 (Ross 2013).

5.4.2. Site visit

Historical resources were quite rare. Along the Sak River there were a number of earth berms with sluice gates used to trap flood waters and allow for flood irrigation of crops planted on the Sak River floodplain (waypoints 1838 to 1842; Figure 33). Such features are commonly encountered on wide floodplains along Karoo Rivers. The only other historical features recorded were a pair of mid-20th century houses at waypoint 1842. One is a traditional Karoostyle house, but it bears a date of 1954 and the arrangement of its façade openings bears testimony to the newer date. It is likely that historical structures also occur at Rosedene but this farmstead was not examined.

Figure 33: *Irrigations berm along the Sak River at waypoint 1839.*

Figure 34: *Historical house dating to 1954 at waypoint 1842.*

5.5. Cultural landscapes and scenic routes

Cultural landscapes are the product of the interactions between humans and nature in a particular area. Sauer (1925) defined them thus: "The cultural landscape is fashioned from a natural landscape by a cultural group. Culture is the agent, the natural area is the medium, the cultural landscape the result". Cultural landscapes are thus areas containing multiple 'sites' and which have been shaped by the interaction of natural processes and anthropogenic activities such as construction and agriculture. Scenic routes are well-travelled roads that pass through natural or cultural landscapes with aesthetic value and that often have iconic or visually attractive views.

The oldest landscape is the largely natural landscape inhabited by the indigenous Bushmen hunter-gatherers and later Khoekhoen who left little trace of their passing but did mark the landscape with engravings, paintings and rock gongs. Although of these three only paintings are known to occur in the study area, the other two are present within the Nuweveld. This landscape is essentially a natural or primeval landscape whose components are considered under archaeology.

The second aspect is the Trekboer landscape which includes somewhat more permanent traces in the form of stone-built residential and farming structures (now in ruin) along with related features like threshing floors and graves. The historical engravings of the area are also a component of this landscape, although it seems that an unknown proportion of them are less than 100 years old. They nonetheless demonstrate the continuity of the engraving tradition in the area. These early farmers also fitted into the natural landscape but created small enclaves of "domesticated space" where they chose to place their farm complexes. Some of these complexes, or at least their agricultural lands, are surrounded by stone walls. The earliest trekboers probably left very little trace at all since they would have lived in their ox wagons before eventually settling down and building the stone structures that characterise this aspect of the cultural landscape. Some of these farm complexes are marked by the presence of small forests of grey poplar (*Populus x canescens*). These fast-growing trees were grown for their branches which were used for poles in construction. Once more, this landscape is essentially archaeological and its components have been discussed under archaeology.

The third aspect is the modern cultural landscape of agriculture, livestock and game farming, although in many places the agricultural component is largely disused as a result of the reduction in rainfall that has occurred over several decades. This landscape is comprised of widely spaced farm complexes, and a network of farm fences and tracks. The modern farm complexes are generally marked by the presence of many trees and some agricultural lands (Figure 35). They often contain different layers of heritage and can be thought of as areas of higher density of heritage resources. Only one occupied farmstead occurs in the study area, on the farm Rosedene, while another farmstead at Waterval seems as though it may see occasional – perhaps seasonal – use. Older, ruined, farmsteads typically agricultural lands and sometimes also trees, but the original Waterval farmstead has a large grove of poplars (Figure 36).

Figure 35: *Aerial view of the farmstead at Rosedene showing the trees around the complex.*

Figure 36: *Aerial view of the historical (and now entirely archaeological) farmstead at Waterval showing the trees to the northeast of the remnant stone-walled features.*

Part of all the above is the relatively undisturbed wilderness atmosphere that pervades the region – this includes the darkness of the night-time sky. Driving its main roads, in this case the R381 which passes through the wider study area, leaves one marvelling at the tremendous sense of wide open space and, away from the hills of the escarpment, the endless Karoo plains. Winter and Oberholzer (2013) have rated the Molteno Pass section of the R381 which goes up the escarpment as being a locally significant route. This rating can certainly be extended to the rest of this road for its scenic value, including the section known as Roseberg Pass which is directly adjacent to the study area, although it must be noted that parts of the R381 pass through the Beaufort West REDZ and seven other wind farms have been approved by HWC in the area. The KNP lies some 12 km south of the southernmost turbine in the project layout. It is a significant landscape and offers formal protection to a section of the highly scenic escarpment. Although the wind farm might be visible in the distance, the KNP and escarpment are both too far south to be significantly affected by the proposed project. In addition, a ridge forms much of the northern boundary of the KNP offering screening to much of the area of the park (see Section 5.6).

5.6. Visual impact assessment

Du Plessis (2024) compiled a viewshed map for the project. This map is shown in Figure 37 and indicates that the turbines would be quite widely visible. Very importantly, however, the vast majority of the Karoo National Park (KNP) would be visually screened by topography. The primary concern with regards to the cultural landscape is the views of the Nuweveld landscape from the R381. This road would be highly exposed to the development. The mapping suggests that turbines would be visible for some 25 km to 30 km of the road length. This includes the Roseberg Pass section which is adjacent to the study area, but excludes the Molteno Pass section from which no turbines

would be visible. The VIA proposed a 500 m buffer along the R381 and a 5 km buffer around the KNP for turbines. Both buffers have been respected by the final layout.

The VIA notes that the wind turbine structures would contrast markedly with the rural landscape. Different types of viewers are identified. Central to the present report are visitors to areas or places where views of the landscape are an important component of the visitor experience. Such viewers are determined to be highly or very highly sensitive. Landscape character sensitivity was also determined and in the present study area and surrounds, the KNP would be described as very high sensitivity, while the remaining land outside the park would be high sensitivity due to its almost entirely natural state. Visual absorption capacity is rated low because vegetation cover is very low with taller elements restricted to only very places. A series of five photo simulations have been prepared by Du Plessis (2024: figs 17 to 39) but two of them are shown here in Figures 38 and 39.

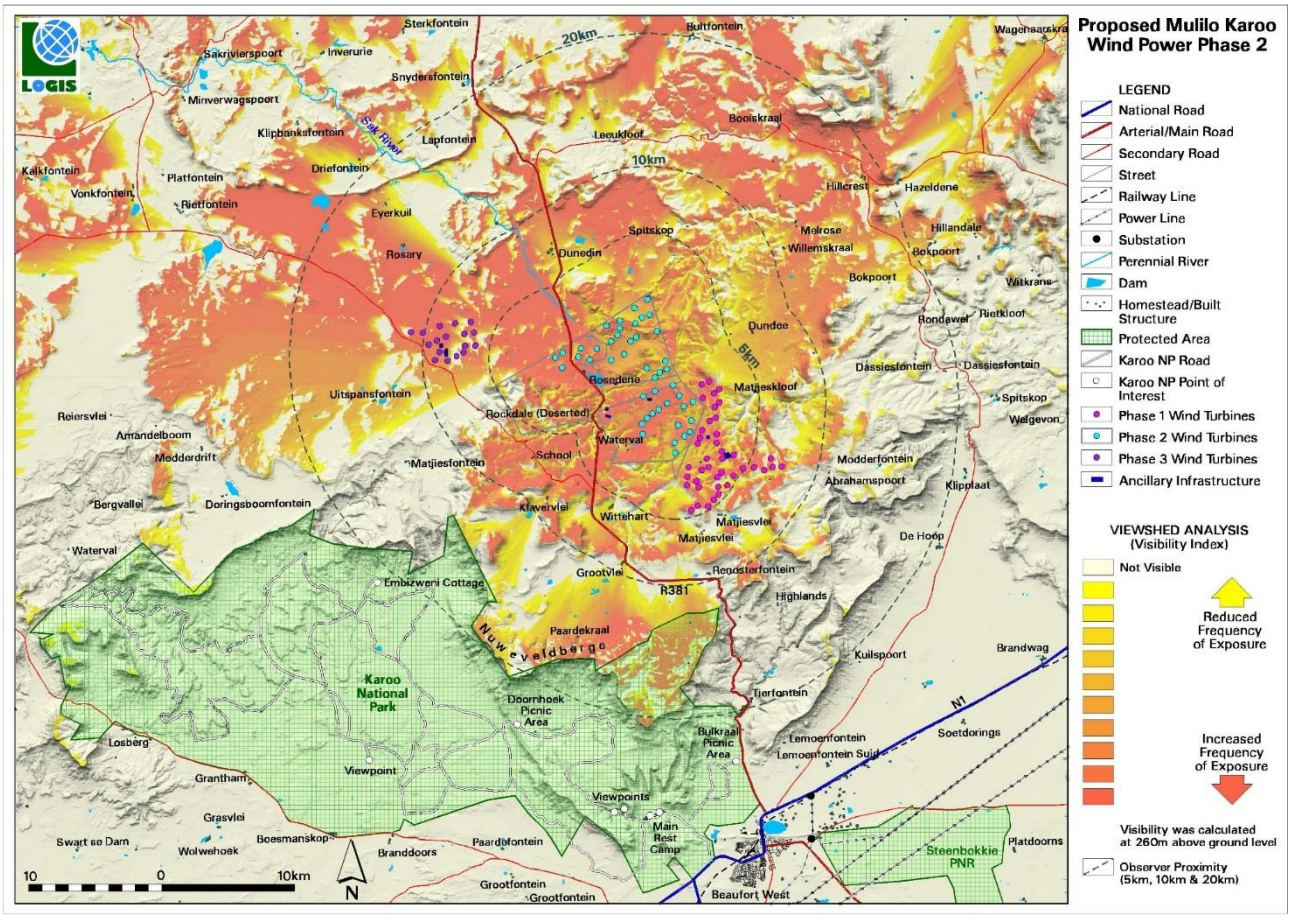


Figure 37: *Viewshed map. Source: Du Plessis (2024: map 3).*

Figure 38: *Simulated view of the proposed facility taken from a point on the R381 to the south of the study area where the nearest turbine is 4.5 km away.*

Figure 39: *Simulated view of the proposed facility taken from a point on the R381 to the north of the study area where the nearest turbine is 1.5 km away.*

5.7. Statement of significance and provisional grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), ‘‘cultural significance’’ means aesthetic, architectural, historical, scientific,

social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA (see Section 2 above).

The archaeological resources are deemed to have generally low cultural significance at the local level for their scientific value and most can be graded IIIC. However, two patches of scratched dolerite rocks are rated IIIB, largely because the meaning and age of these scratches remains unknown.

Graves, if present, are deemed to have high cultural significance at the local level for their social value. They would be allocated a grade of IIIA.

The only structures recorded were deemed to have low cultural significance at the local level for their architectural, historical and social values.

The wider cultural landscape is largely a natural landscape with aesthetic value and is rated as having medium cultural significance at the local level. It can be graded IIIB. Specific rural landscapes at the various farmsteads have also been rated IIIB. However, the KNP, located more than 11 km from the nearest turbines, and the escarpment edge, located a minimum of 15 km from the nearest turbine, are considered of high local to regional significance and are graded IIIA. Likewise, the Molteno and Roseberg Passes are graded IIIA.

Figures 40 and 41 provide mapping of the heritage resources by grade.

5.8. Summary of heritage indicators

- Uncontrolled damage to fossils should be minimised as far as possible.
- Significant palaeontological resources should be protected with a buffer of at least 30 m. Reusing of existing roads through the buffers is allowed but any widening must take place away from the fossil exposure.
- Uncontrolled damage to as yet unknown archaeological resources should be minimised as far as possible.
- If they cannot be avoided, significant archaeological resources should not be damaged or destroyed without appropriate further study.
- Significant archaeological sites should be protected with a buffer of at least 30 m. Reusing of existing roads through the buffers is allowed but any widening must take place away from the site.
- If they cannot be avoided, significant archaeological resources should not be damaged or destroyed without appropriate further study.
- Graves should be avoided with a buffer of at least 30 m.
- Built heritage resources should be protected from all aspects of the development with a buffer of at least 30 m as far as possible. Reusing an existing road through a buffer is allowed but any widening must take place away from the structure.
- Highly significant historical structures should be avoided by at least 500 m, but roads and/or powerlines may pass closer.
- The facility should not dominate views from multiple publicly accessible locations.
- Specific cultural landscape features (e.g. tree lines, agricultural lands) should be protected with a buffer of at least 30 m as far as possible. Reusing an existing road through a buffer is allowed but any widening must take place away from the feature.

- The escarpment skyline should not be broken by wind turbines when viewed from the south.
- The KNP should not be significantly negatively affected. Preferably, the KNP should have given approval for the project location.

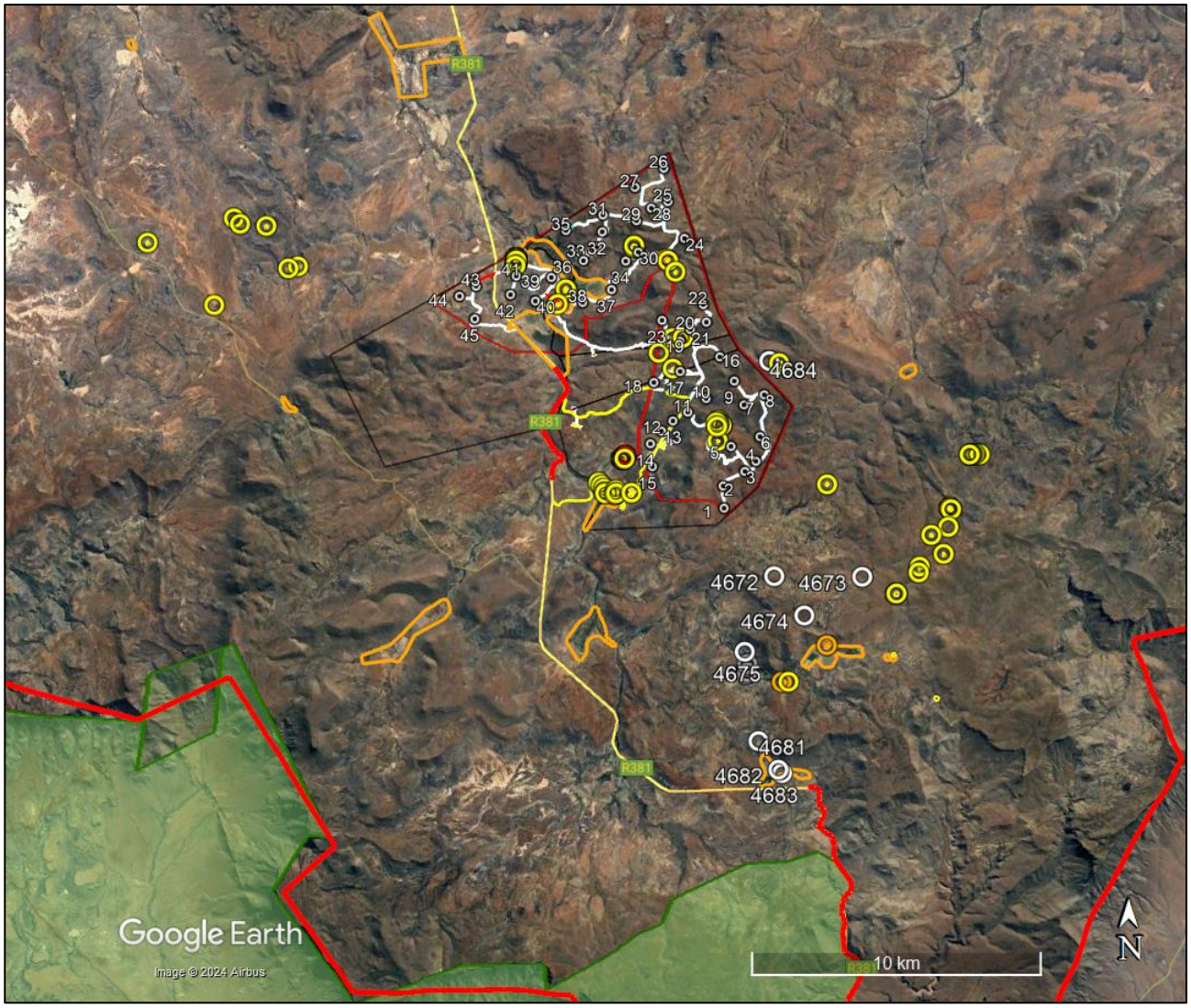


Figure 40: *Aerial view showing the location of the KNP (green shading), escarpment edge (red line running west to east), and Molteno and Roseberg Passes (red lines running north to south) relative to the project layout. Orange polygons indicate cultural landscapes, red symbols are Grade IIIA sites, orange are IIIB, yellow are IIIC and white are NCW.*

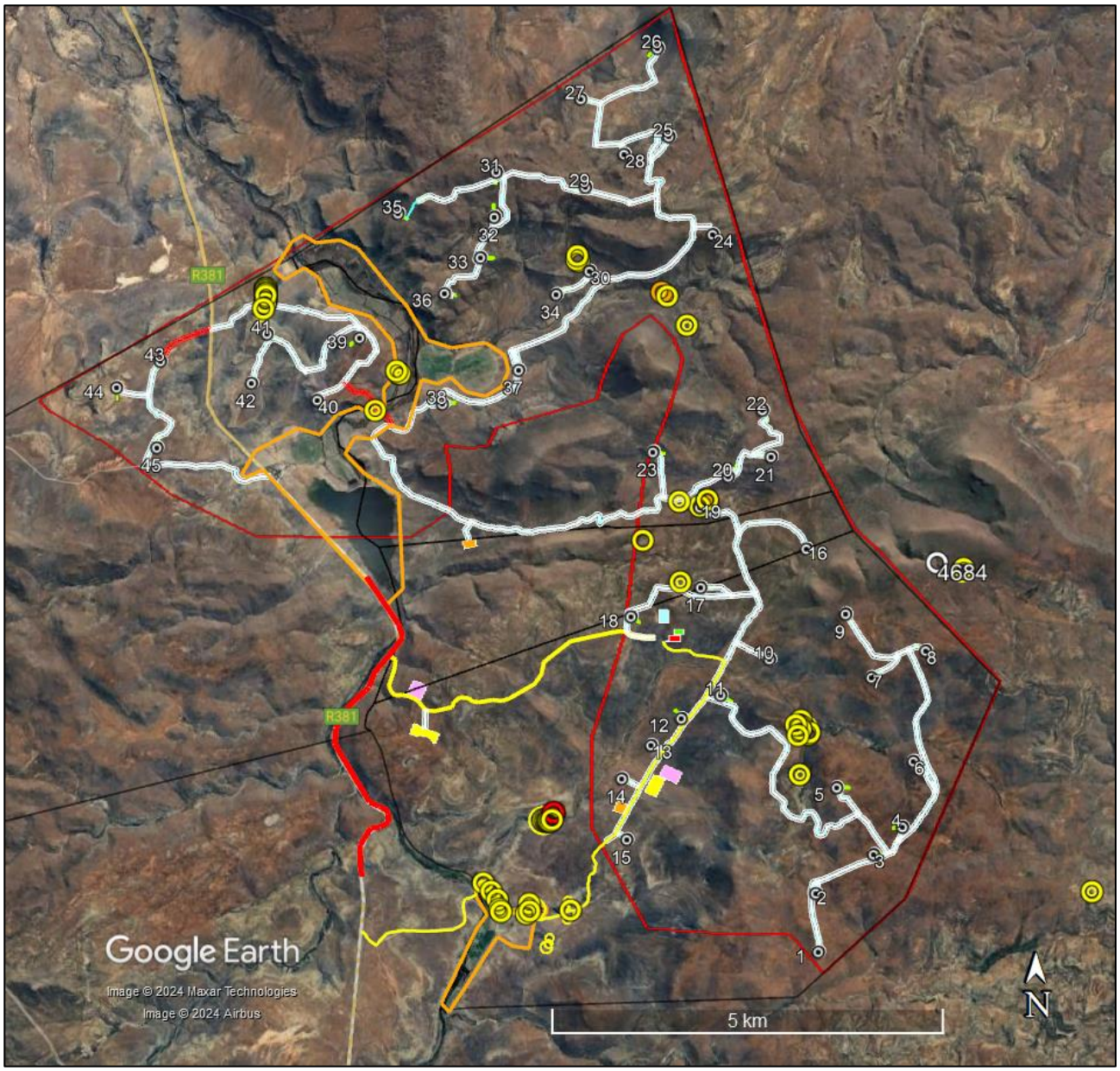


Figure 41: *Aerial view with key as per Figure 40.*

6. ASSESSMENT OF IMPACTS

The impacts identified for this project are:

- *Construction phase:*
  - Impacts to palaeontology
  - Impacts to archaeology
  - Impacts to the cultural landscape
- *Operation phase:*
  - Impacts to the cultural landscape
- *Decommissioning phase:*
  - Impacts to the cultural landscape

While palaeontological heritage is assessed in the separate specialist study, all the other impacts are considered here. Impacts to graves and built environment resources are not assessed further as it was found that no impacts to these types of heritage will occur.

6.1. Construction Phase

6.1.1. Impacts to archaeological resources

Direct impacts to archaeological resources would occur during the construction phase when grubbing and excavations begin. The layout has been almost entirely surveyed and only two low significance sites are known from within the footprint and a second site with medium cultural significance is very close to the footprint. The probability of impacts is thus high. The significance before mitigation is rated **medium negative** (Table 2). One archaeological site within the footprint (scratched rock at waypoint 221, Grade IIIC) is neither worthy of mitigation nor mandatory avoidance. The stone wall at waypoint 486 will likely only be slightly damaged when the existing road is widened. Because there are sites close to the footprint, No-Go signage will need to be placed at identified sensitive locations and these will need to be monitored. On the current layout, these are at waypoints 1838-1844, 1870, 1872, 222 and 268. It is noted that waypoint 1872 lies very close to the project footprint (within 10 m) and, if it cannot be avoided, then it needs to be recorded in detail prior to destruction. The only other measure proposed is for the construction team to protect from harm and report (to HWC and/or an archaeologist) any chance finds made during construction. The significance rating is **low negative** after mitigation.

The preferred primary site access road, temporary laydown area and temporary construction yard are preferred from an archaeological point of view, but all sites close to the alternative road have been avoided which means that both options are assessed as having the same impact significance. The alternative road would require more careful monitoring, however. The alternative laydown area, construction yard and batching plant make no difference to the assessment and either alternative is acceptable in each case.

There are no fatal flaws in terms of construction phase impacts to archaeology.

Table 2: *Assessment of construction phase archaeological impacts.*

Potential impact and risk:	**Archaeological impact:**

	Archaeological heritage resources may be negatively affected by the construction work.	
Nature of impact:	Negative	No-Go alternative: No impact expected (neutral).
Extent and duration of impact:	Site specific and Permanent	
Intensity:	High	
Probability of occurrence:	Probable	
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss of resource	
Degree to which the impact can be reversed:	Irreversible	
Indirect impacts:	None identified	
Cumulative impact prior to mitigation:	Low	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	
Degree to which the impact can be avoided:	High	
Degree to which the impact can be managed:	High (Can be managed)	
Degree to which the impact can be mitigated:	High (Can be mitigated)	
Proposed mitigation:	• Place No-Go signage at identified sensitive locations. These are waypoints 1838-1844, 1870, 1872, 222, 268. • If waypoint 1872 cannot be avoided, then detailed recording will be required. • Protect from impacts and report any chance finds made during construction to HWC and/or an archaeologist.	
Residual impacts:	None	
Cumulative impact post mitigation:	Low	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	No-Go alternative: No impact expected (neutral).

6.1.2. Impacts to the cultural landscape

The archaeological aspects of the cultural landscape are considered under archaeological impacts in Section 6.1.1. Direct impacts to the cultural landscape would occur during the construction phase when equipment arrives on site and work gets underway. The impact relates to the alteration of the landscape as well as all the activity that would occur in what is otherwise a quiet, rural area. Also, the proposed main access road from the Roseberg Pass will prominently scar the landscape in this scenic valley due to the steep slope it traverses. It is anticipated that substantial cut and fill work will be required to enable the extremely long vehicles and heavy loads to reach the top of the hill there. The impact is rated **high negative** before mitigation (Table 3). Mitigation would entail minimising surface disturbance and cut and fills (including very careful design of the access road from Roseberg Pass, if a better route cannot be found), ensuring effective rehabilitation of areas not needed during operation and minimising the duration of the construction period. These measures are not expected to reduce the impact significance and a rating of **high negative** also applies post-mitigation. Note that impacts on the KNP do not feature prominently here because the project would only be visible from a very small fraction of the total park area. The VIA finds impact significance to be very high and high negative before and after mitigation for farmsteads and high and medium negative before and after mitigation for users of local roads (Du Plessis 2024).

The alternative primary site access road, temporary laydown area and temporary construction yard are preferred from a cultural landscape point of view because that road option will result in less landscape scarring than the applicant's preferred alternative which traverses a steep hill and the alternative temporary areas are located further from the public eye. However, the road will pass through a rural cultural landscape (Waterval farmstead and associated lands) with many other

heritage resources. These resources all lie to the side of the alternative access road and should be successfully avoided. The overall impact of the project, however, means that the impact significance will remain unchanged for these two alternatives.

There are no fatal flaws in terms of construction phase impacts to the cultural landscape. However, it must be noted that no public road access routes to the site have been assessed and that significant alteration of the historic Molteno and Roseburg Passes is unlikely to be tolerated. The Molteno Pass, in particular, cannot accommodate large vehicles and altering it to make this possible would be considered a fatal flaw. The road geometry on the Roseberg Pass suggests that it would be able to accommodate such vehicles, but this is not formally assessed here as it has not been included in the project description for the proposed development.

Table 3: *Assessment of construction phase impacts to the cultural landscape.*

Potential impact and risk:	**Cultural landscape impact:** The rural landscape may be negatively affected by the construction work.	
Nature of impact:	Negative	No-Go alternative: No impact expected (neutral).
Extent and duration of impact:	Regional and temporary	
Intensity:	High	
Probability of occurrence:	Definite	
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss of resource	
Degree to which the impact can be reversed:	Partly Reversible	
Indirect impacts:	None identified	
Cumulative impact prior to mitigation:	Very high (-)	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (-)	
Degree to which the impact can be avoided:	Low (unavoidable)	
Degree to which the impact can be managed:	Medium (Can be partially managed)	
Degree to which the impact can be mitigated:	Medium (Can be partially mitigated)	
Proposed mitigation:	• Clearance of natural vegetation must be minimised. • Cuts and fills and landscape scarring in general must be minimised. • All disturbed areas not needed during operation of the facility must be rehabilitated. • Minimise the duration of construction.	
Residual impacts:	None	
Cumulative impact post mitigation:	High (-)	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (-)	No-Go alternative: No impact expected (neutral).

6.2. Operation Phase

6.2.1. Impacts to the cultural landscape

Direct impacts to the cultural landscape would occur during the operation phase due to the presence of the facility in the rural/natural landscape. Nighttime impacts are likely to also be of concern and relate to lighting impacts, especially from the red navigation lights atop the turbines. Impact significance is likely to be **high negative** due to the long duration (Table 4). Mitigation will generally not make very much difference due to the prominence of the turbines and impossibility of screening them. The biggest effect on significance, however, will be achieved at night if the red

navigation lights are not permanently blinking. As a result, the significance rating after mitigation is rated as **medium-high negative**. Note that impacts on the KNP do not feature prominently here because the project would only be visible from a very small fraction of the total park area. The VIA finds all impacts within 10 km of the study area to be either very high or high before and after mitigation. Only beyond 10 km do the significance rating drop to medium. Impacts on KNP are rated as of low significance both before and after mitigation. Negative visual impacts to sense of place are considered to be of very high significance and they cannot be mitigated (Du Plessis 2024).

As with the construction phase, the alternative primary site access is preferred but, ultimately, the impact significance assessment remains unchanged.

There are no fatal flaws in terms of operation phase impacts to the cultural landscape.

Table 4: *Assessment of operation phase impacts to the cultural landscape.*

Potential impact and risk:	**Cultural landscape impact:** The rural landscape may be negatively affected by the construction work.	
Nature of impact:	Negative	No-Go alternative: No impact expected (neutral).
Extent and duration of impact:	Local and Long term	
Intensity:	Medium.	
Probability of occurrence:	Definite	
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss of resource	
Degree to which the impact can be reversed:	Mostly Reversible	
Indirect impacts:	None identified	
Cumulative impact prior to mitigation:	High	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (-)	
Degree to which the impact can be avoided:	Low	
Degree to which the impact can be managed:	Medium (Can be partially managed)	
Degree to which the impact can be mitigated:	Medium (Can be partially mitigated)	
Proposed mitigation:	• All operational activities must remain within authorised footprint. • An early warning system must be used to ensure that red navigation lights stay off until needed. • Buildings and substation must be sited in low visibility areas and painted in earthy tones (where feasible). • Signage on public roads must be of modest proportions.	
Residual impacts:	None	
Cumulative impact post mitigation:	Medium-High (-)	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	No-Go alternative: No impact expected (neutral).

6.3. Decommissioning Phase

6.3.1. Impacts to the cultural landscape

The archaeological aspects of the cultural landscape are considered under archaeological impacts in Section 6.1.1. Direct impacts to the cultural landscape would occur during the decommissioning phase when equipment arrives on site and work gets underway. The impact relates to the alteration of the landscape as well as all the activity that would occur in what is otherwise a quiet, rural area.

The impact is rated **medium-high negative** before mitigation (Table 5). Mitigation would entail ensuring effective rehabilitation of areas not needed after decommissioning, removing all infrastructure from the site and minimising the duration of the decommissioning period. These measures are not expected to reduce the impact significance by much and a rating of **medium negative** applies post-mitigation. Note that impacts on the KNP do not feature prominently here because the project would only be visible from a very small fraction of the total park area. The VIA does not specifically assess decommissioning phase impacts.

As with the construction phase, the alternative primary site access is preferred because rehabilitation will be easier but, ultimately, the impact significance assessment remains unchanged.

There are no fatal flaws in terms of decommissioning phase impacts to the cultural landscape.

Table 5: *Assessment of decommissioning phase impacts to the cultural landscape.*

Potential impact and risk:	**Cultural landscape impact:** The rural landscape may be negatively affected by the decommissioning work.	
Nature of impact:	Negative	No-Go alternative: No impact expected (neutral).
Extent and duration of impact:	Regional and temporary	
Intensity:	High	
Probability of occurrence:	Definite	
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss of resource	
Degree to which the impact can be reversed:	Partly Reversible	
Indirect impacts:	None identified	
Cumulative impact prior to mitigation:	Medium-High (-)	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-high (-)	
Degree to which the impact can be avoided:	Low (unavoidable)	
Degree to which the impact can be managed:	Medium (Can be partially managed)	
Degree to which the impact can be mitigated:	Medium (Can be partially mitigated)	
Proposed mitigation:	• Rehabilitation of all areas not needed for post-decommissioning land use must be implemented. • All materials related to the project must be removed from the site. • Minimise the duration of decommissioning.	
Residual impacts:	None	
Cumulative impact post mitigation:	Medium (-)	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	No-Go alternative: No impact expected (neutral).

6.4. Existing impacts to heritage resources

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect rock art and archaeological materials. Trampling from grazing animals and/or farm/other vehicles could also occur. These impacts would be of **negligible negative** significance. The cultural landscape is difficult to assess for existing impacts because it is constantly evolving and changing through the addition of new layers. In this instance the rural landscape is dominant spatially and visually and existing development (roads, powerlines, farm infrastructure, etc) have very limited impact on the overall landscape character. The significance of these impacts is considered to be **low negative**.

6.5. Cumulative impacts

In relation to an activity, cumulative impact "means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may be significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities" (NEMA EIA Reg GN R982 of 2014).

Figure 42 shows a map of other approved renewable energy facilities in the wider area. However, any other changes in the environment are also relevant to cumulative impacts. In this instance there is little to no other anthropogenic activity besides the ongoing farming which is a long-established part of the cultural landscape. The renewable energy facilities thus form the bulk, if not all, of developments considered here.

There are many more archaeological sites further north in the Nuweveld where the topography is less steep, and elevations are lower. As such, impacts in those areas would likely be greater. This means that the presently proposed project would result in a very small contribution to cumulative impacts to archaeology and the significance is rated **low negative**.

Cumulative impacts to the cultural landscape are the greatest concern. There is a potential for hundreds of turbines to be present and this would massively alter the cultural landscape and sense of place of the Nuweveld Mountains. Due to natural topographical screening, the effects on the KNP would not be as marked as other parts of the Nuweveld. It is acknowledged that the area is within a REDZ, but. With no WEF development having yet taken place, it is still a relatively undisturbed rural/natural environment. Cumulative impact significance during construction could be **very high negative** before mitigation due to the large amount of activity in the landscape coupled with the presence of existing turbines (the order in which project could be constructed is not known). Mitigation (as listed above) would only very slightly reduce such impacts to **high negative**. Operation phase impacts would be slightly less significant because the projects would be passively present in the landscape. The red navigation lights would be visually disruptive to the nighttime landscape. Operation phase cumulative impacts would drop from **high negative** to **medium-high negative** after mitigation (as listed above). During decommissioning the cumulative impact significance is expected to be **medium-high negative**, largely because of all the activity and would drop to **medium negative** with the application of mitigation as listed above. Key here is successful rehabilitation of the site.

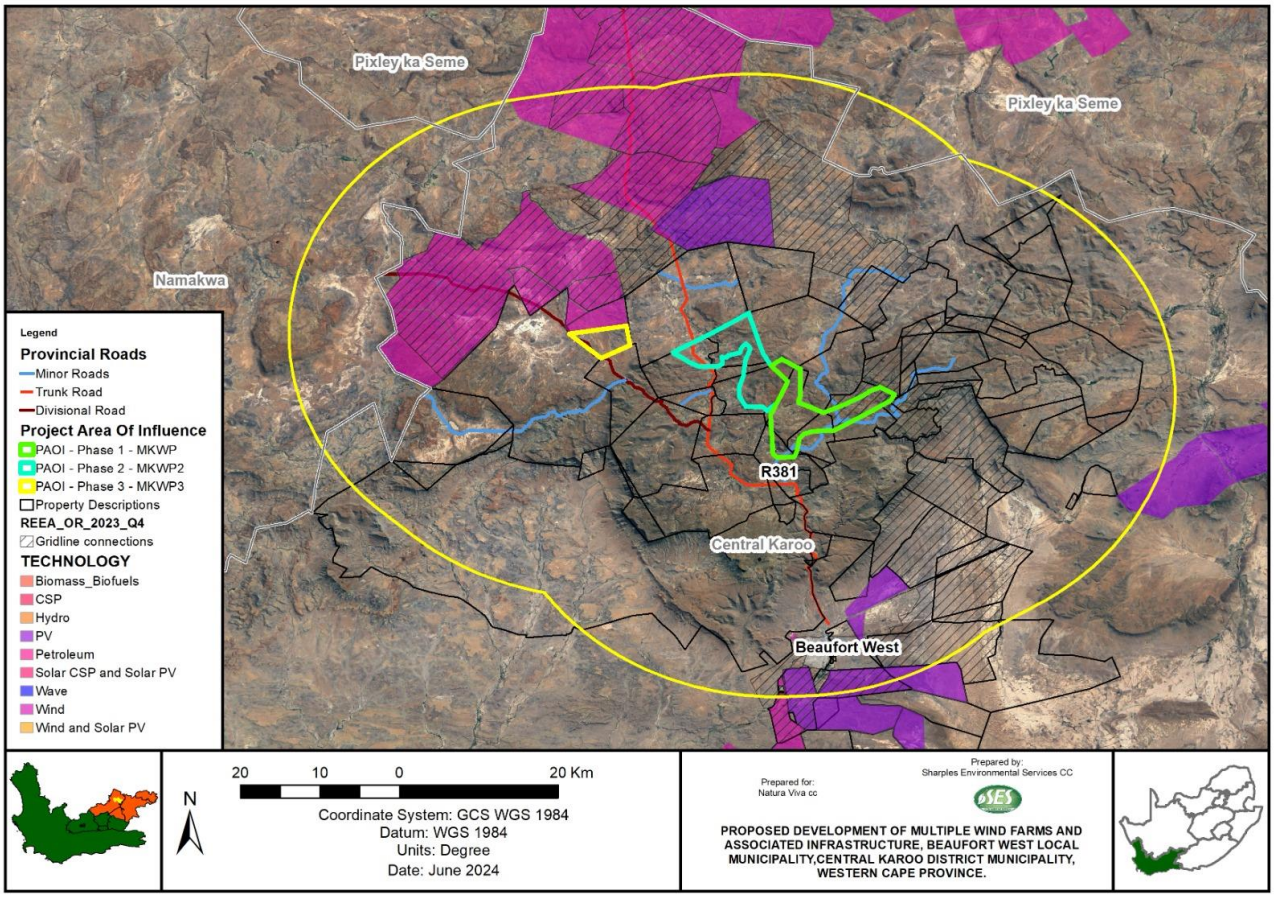


Figure 42: *Map showing the locations of other approved renewable energy facilities in the area.*

6.6. Evaluation of impacts relative to sustainable social and economic benefits

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development.

The project aims to generate electricity and feed it into the National Electricity Grid. South Africa has had historical problems with electricity supply and thus any new generation capacity would help with stabilising the supply which, in turn, promotes economic development and job creation. In addition, the project would result in both construction phase and operational phase jobs. These are clear economic and social benefits and, if mitigation is applied as suggested above, then the socio-economic benefits likely outweigh the residual impacts. This is not clear-cut, however, since the project will result in fairly highly significant visual impacts to the cultural landscape which could be avoided by locating the project elsewhere.

6.7. The No-Go alternative

If the project were not implemented then the site would stay as it currently is (impact significance of **neutral**). Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is slightly more significant and suggests that the No-Go option is slightly less desirable in heritage terms.

6.8. Levels of acceptable change

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many publicly accessible vantage points is undesirable. Because of the height of the majority of the proposed development and its location on hilltops and ridges, such an impact to the landscape is envisaged, but with a focus on views from the R381 (including the Roseberg Pass section), it is not deemed entirely unacceptable. It is, however, acknowledged that due to the steep slopes and scenic mountain views, the site is not ideally suited to the proposed development.

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAMME

The actions recorded in Table 6 should be included in the environmental management programme (EMPr) for the project.

Table 6: *Heritage considerations for inclusion in the EMPr.*

Impact	Mitigation / management objectives & outcomes	Mitigation / management actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
Impacts to archaeology and graves					
Damage or destruction of archaeological sites or graves	Rescue information, artefacts or burials before extensive damage occurs	Construction Phase: Reporting chance finds as early as possible to HWC or an archaeologist, protect in situ and stop work in immediate area	Inform staff to be vigilant and carry out inspections of new excavations	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly during construction period only)	ECO
Damage or destruction of any known sites	Avoid impacts	Construction Phase: Place No-Go signage at identified sensitive locations. These are waypoints 1838-1844, 1870, 1872, 222, 268. If the alternative access road is used and impacts are considered likely, then a way forward must be discussed with an archaeologist (i.e. determine archaeological monitoring and/or mitigation requirements). Waypoint 221 is in the footprint but does not warrant protection unless it can be avoided (avoidance is not considered necessary).	Monitoring of No-Go areas adjacent to project roads (construction period only)	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly)	ECO
Impacts to the cultural landscape					
Visible landscape scarring	Minimise landscape scarring	Construction Phase: Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.	Monitoring of surface clearance relative to approved layout	Ongoing basis	Construction Manager or Contractor
				As required	ECO
Intrusion into cultural landscape	Minimise visual intrusion	Operation Phase: Ensure that all maintenance vehicles and operational activities stay within designated areas.	Undertake visual inspections and report non-compliance	As required	Environmental Manager
Intrusion into cultural landscape	Minimise contrast and light pollution	Operation Phase: Paint buildings in earthy colours to reduce contrast. Make use of motion detectors and downlighting to reduce night-time light pollution.	Monitor that this has been considered in the design and operation of the facility	Once off	Project Developer

Intrusion into cultural landscape	Minimise contrast and light pollution	Operation Phase: Make use of early warning system to allow red aircraft navigation lights to remain off at night.	Monitor that this has been considered in the design and operation of the facility	Once off	Project Developer
Visible landscape scarring	Minimise landscape scarring	Decommissioning Phase: Ensure all areas not needed after decommissioning are rehabilitated following specialist rehabilitation plan.	Monitor compliance and success of rehabilitation	As required	ECO
Intrusion into cultural landscape	Minimise visual intrusion	All Phases: Signage on public roads to be of modest size.	Monitor compliance	As required	ECO

8. CONSULTATION WITH HERITAGE CONSERVATION BODIES

As required by HWC in their response to the NID, the report was sent to the municipality and registered (with HWC) conservation bodies for comment as part of the public participation process (PPP) conducted under NEMA. Any heritage-related responses will be communicated to HWC.

9. CONCLUSIONS

The primary heritage concern for this project is impacts to the cultural landscape. The wider landscape has been rated as of medium cultural significance (Grade IIIB) but the KNP, escarpment edge and Molteno and Roseberg Passes are of high cultural significance (Grade IIIA). The KNP will only be minimally impacted with turbines visible more than 12 km away and only from a very small area of the park. The escarpment edge is appreciated from the south and no turbines will be visible from there. The Molteno Pass is fully protected from visual impacts, but the Roseberg Pass lies adjacent to the study area and will be impacted. If the project goes ahead this impact is unavoidable, but the alternative access road, which would result in less landscape scarring, could be used to avoid impacts directly within the scenic valley through which the pass runs. The alternative road would have a greater chance of impacting on archaeology but with No-Go signage and monitoring this road would be acceptable despite its proximity to the archaeological sites.

Overall, due to the steep slopes and scenic mountain views, the project site is not ideally suited to the proposed development from a heritage point of view. The impacts are, however, not regarded as fatal flaws, because three of the four most important areas of the landscape will experience no or very little impact. Additionally, with use of the alternative access road, impacts to the Roseberg Pass could be further reduced.

Table 7 lists the heritage indicators and how these have been responded to, either through project design or within the recommendations.

Table 7: *Heritage indicators and project responses.*

Indicator	Project Response
Uncontrolled damage to fossils should be minimised as far as possible.	Almond (2024) has determined that most fossils are of low significance and tend to be located along water courses. A desktop examination of the final layout should be undertaken prior to construction to determine whether further work is required.
Significant palaeontological resources should be protected with a buffer of at least 30 m. Reusing of existing roads through the buffers is allowed but any widening must take place away from the fossil exposure.	Almond (2024) has determined that no known fossil sites require protection. Only one falls within 20 m of the project footprint.
Uncontrolled damage to as yet unknown archaeological resources should be minimised as far as possible.	The survey found the density of archaeology to be extremely low throughout the majority of

	the study area and further sites are not expected to be found.
If they cannot be avoided, significant archaeological resources should not be damaged or destroyed without appropriate further study.	Only two sites of Grade IIIC fall within the footprint. That at waypoint 221 may be destroyed as mitigation will achieve nothing. The stone walling at waypoint 486 will only be slightly damaged by road widening which is acceptable. A Grade IIIB site (waypoint 1872) lies very close to the footprint and will require protection or detailed recording if it cannot be avoided.
Significant archaeological sites should be protected with a buffer of at least 30 m. Reusing of existing roads through the buffers is allowed but any widening must take place away from the site.	Most sites have been avoided by turbines. Only waypoints 221 and 486 (both in footprint) and 1872 (<10 m from footprint) are within 30 m of a turbine hard stand footprint or access road. Roads and a powerline will pass within 30m of a number of other sites, but these should all be avoidable with No-Go signage and monitoring.
If they cannot be avoided, significant archaeological resources should not be damaged or destroyed without appropriate further study.	This applies only to waypoint 1872 if it proves impossible to avoid. It will require detailed recording prior to construction if it is determined that it will be impacted.
Graves should be avoided with a buffer of at least 30 m.	No graves are known from within the project area.
Built heritage resources should be protected from all aspects of the development with a buffer of at least 30 m as far as possible. Reusing an existing road through a buffer is allowed but any widening must take place away from the structure.	This has been achieved.
Highly significant historical structures should be avoided by at least 500 m, but roads and/or powerlines may pass closer.	No highly significant structures are present.
The facility should not dominate views from multiple publicly accessible locations.	The facility will be central to views from the R381 over a number of kilometres. This is unavoidable. The project will only be visible from a very small part of the KNP.
Specific cultural landscape features (e.g. tree lines, agricultural lands) should be protected with a buffer of at least 30 m as far as possible. Reusing an existing road through a buffer is allowed but any widening must take place away from the feature.	Only roads and powerlines will pass through these areas, and this will be minimal. This is acceptable.
The escarpment skyline should not be broken by wind turbines when viewed from the south.	This has been achieved.
The KNP should not be significantly negatively affected. Preferably, the KNP should have given approval for the project location.	The project will only be visible from a very small part of the KNP. The KNP has given verbal

	approval for the layout during preliminary consultation with the developer.

Figures 43 to 46 show the four areas of concern. The primary access road will access the site from the Roseberg Pass and will create a visual scar on the hill in this scenic valley (Figure 43). The alternative access road passes through the buffers of a number of archaeological sites, but all should be avoidable by the placement of No-Go signage and monitoring of construction activities if this alternative is used (Figure 44). The only site expected to be directly impacted is at waypoint 221, and possibly also waypoint 1872 (Figure 45). While waypoint 221, despite being graded IIIC, does not merit mitigation. Waypoint 1872, however, is graded IIIB and will require mitigation if it cannot be avoided. The stone wall at waypoints 477 to 487 is already penetrated by an existing farm road which would be slightly widened. This will result in a small impact of little concern (Figure 46). The road was made after the wall and stones have been pushed to the side to create the opening. This is thus the best place for the project road to pass through.

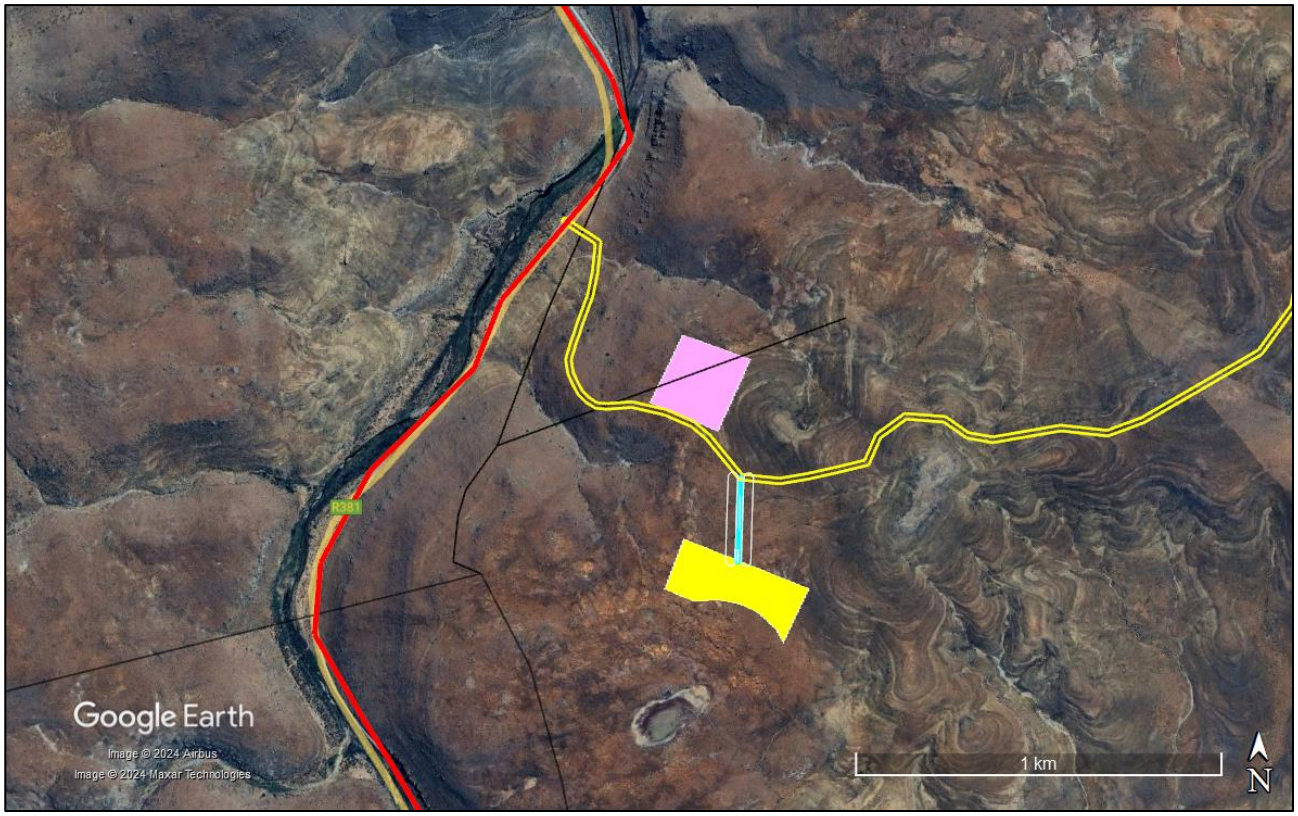


Figure 43: *Aerial view showing the preferred access road (yellow line) and preferred temporary laydown area (yellow) and temporary construction yard (pink). The red line is the Roseberg Pass.*

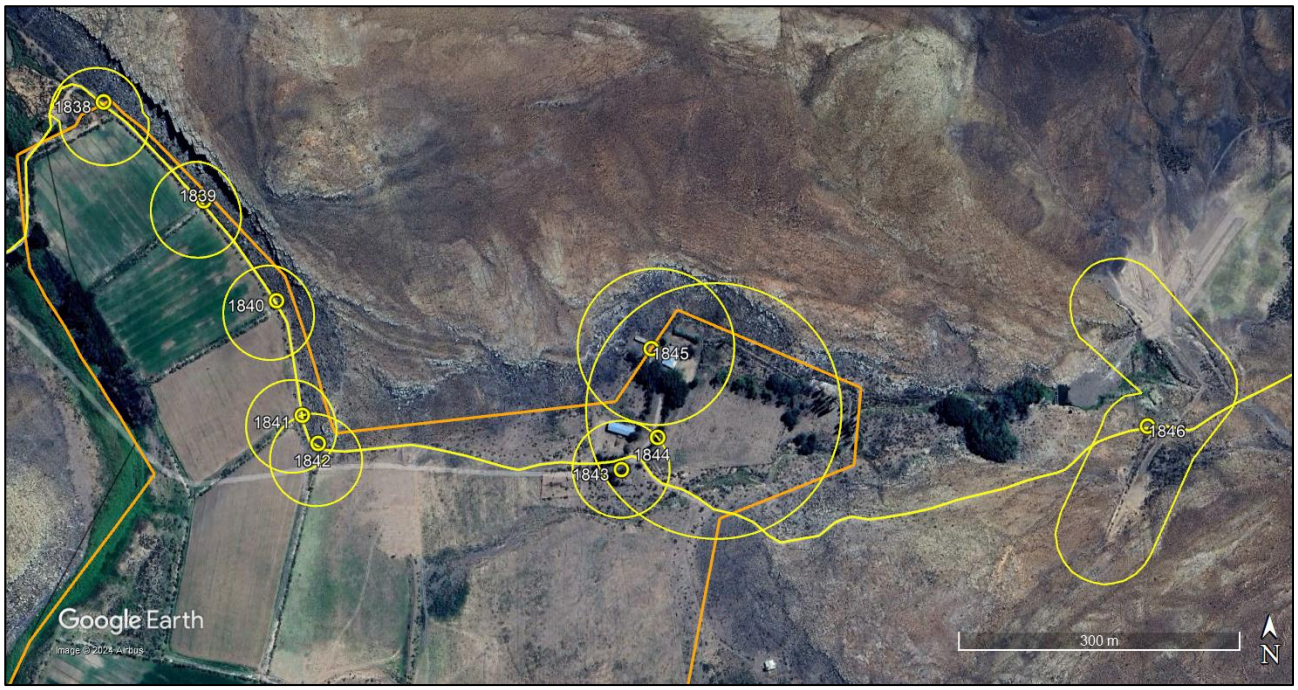


Figure 44: *The yellow line is the alternative access road, while the orange polygon is a cultural landscape, and yellow polygons/circles are Grade IIIC resources with 50 m buffers. Note that waypoints 1838 to 1842 represent the built sluice gates along the flood irrigation berms and are thus away from the road.*

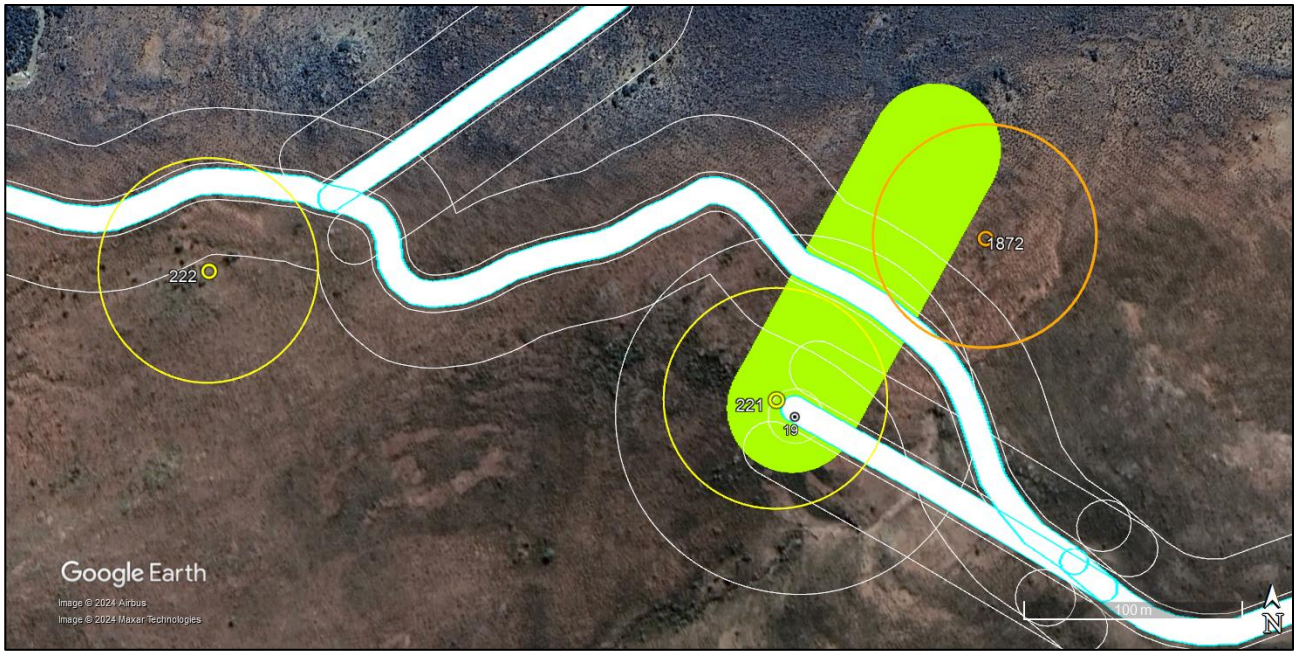


Figure 45: *Archaeological sites near Turbine 19. Orange is Grade IIIB with 50 m buffer, yellow is Grade IIIC with 50 m buffer.*

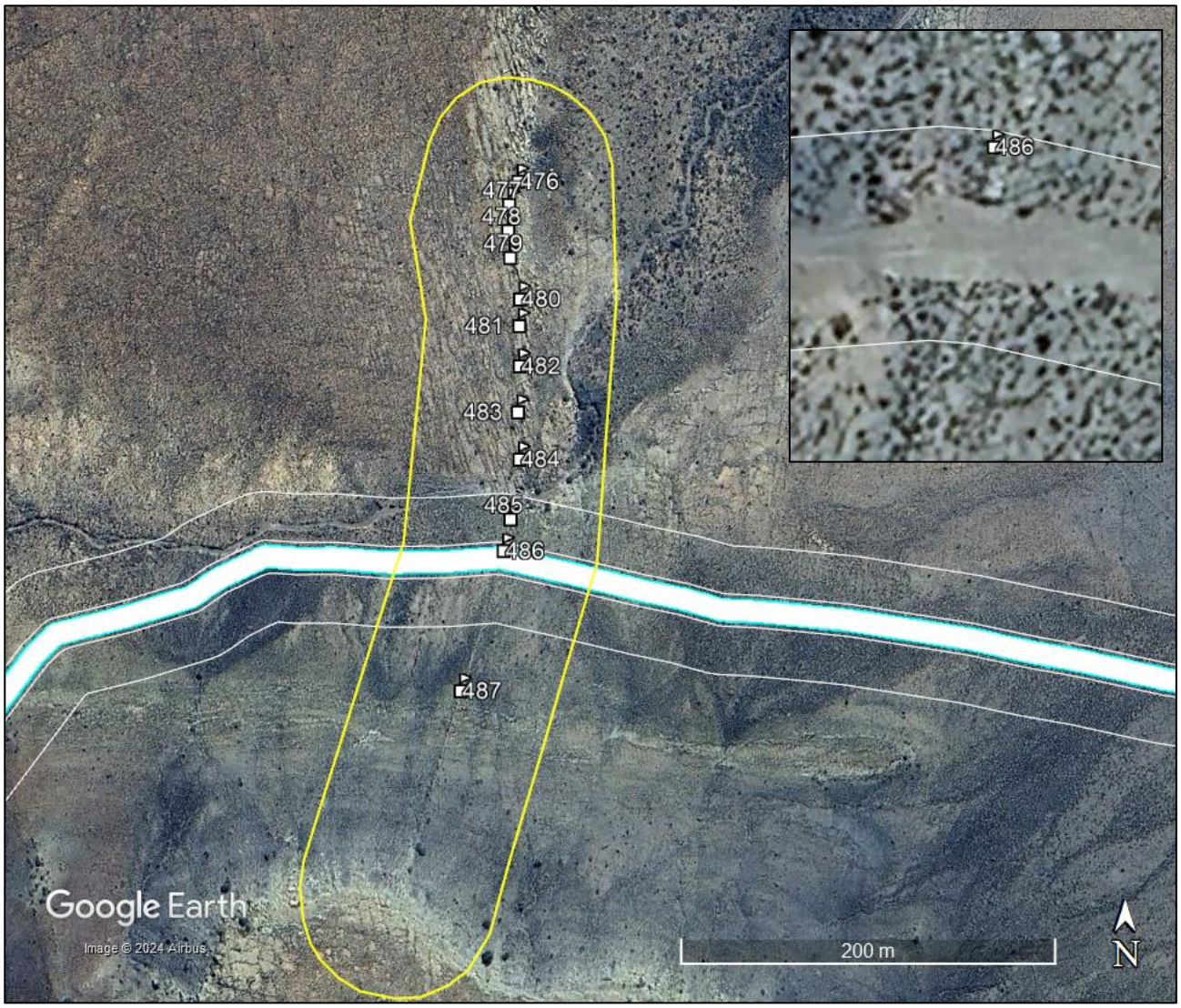


Figure 46: *Stone wall crossed by a project road and powerline north of Turbine 41. The inset shows the existing farm road at the crossing point without the project road indicated.*

While the preferred access road would impact on the Roseberg Pass, the alternative access road would pass close to a number of archaeological sites. If those sites are avoided, and even if some were not fully avoided, then the alternative access is preferred in order to avoid the landscape scarring that would occur along the preferred access road.

Three turbines have been placed to the west of the R381. Ideally all turbines should be located to the east of the R381 in order to avoid the situation of driving through the WEF and to allow one side of the road to appear as an undisturbed landscape. Should it be possible to eliminate turbines at the time of construction, then those to the west of the R381 should be prioritised.

9.1. Reasoned opinion of the specialist

This project will result in some landscape impacts, but these are not unacceptable. The most significant landscape elements have largely been avoided but the Roseberg Pass would still experience impacts. The project may be authorised in full using either access road, but with the

alternative access road and associated temporary laydown area, construction yard and batching plant being preferred.

10. RECOMMENDATIONS

It is recommended that the proposed Mulilo Karoo Wind Power 2 WEF be authorised, but subject to the following recommendations which should be included as conditions of authorisation:

- The final layout must be considered by a palaeontologist to determine whether any areas still require consideration in the field prior to construction;
- The Fossil Chance Finds Procedure must be included in the project EMPr;
- No stones may be removed from any archaeological sites;
- No-Go signage must be placed at identified sensitive locations and the sites must be monitored. These are waypoints 1838-1844, 1870, 1872, 222, and 268;
- If waypoint 1872 (which lies within 10 m of the footprint of the Turbine 19 hard stand) cannot be avoided, then it must be recorded in detail prior to destruction;
- Destruction of the site at waypoint 221 and partial destruction of the walling at waypoint 486 are acceptable;
- The powerline may pass over the wall at waypoint 486 on either side of the road, but damage to the wall must be limited to hat is required for road widening (no service track may penetrate the wall beneath the powerline);
- If the alternative access road is used, and any sites are likely to be impacted, then an appropriate course of action must be determined with an archaeologist prior to construction;
- Signage on public roads should be of modest proportions;
- An early warning system must be used to ensure that red navigation lights stay off until needed;
- Buildings and substation must be sited in low visibility areas and painted in earthy tones (where feasible);
- Cuts and fills and landscape scarring in general must be minimised through careful design;
- Rehabilitation of all areas not needed during operation must be carried out; and
- 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 would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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APPENDIX 1 – Curriculum Vitae

Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 40 Brassie Street, Lakeside, 7945
Telephone: (021) 788 1025
Cell Phone: 083 272 3225
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Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code EB
Marital Status: Married to Carol Orton
Languages spoken: English, Afrikaans, basic French

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science)	1997
University of Cape Town	B.A. (Honours) (Archaeology) [First Class]	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

- Association of Southern African Professional Archaeologists (ASAPA) membership number: 233
- ASAPA CRM Section member with the following accreditation:
  - Principal Investigator: Coastal shell middens (awarded 2007)
    Stone Age archaeology (awarded 2007)
    Grave relocation (awarded 2014)
  - Field Director: Rock art (awarded 2007)
    Colonial period archaeology (awarded 2007)
- Association of Professional Heritage Practitioners (APHP) membership number: 43
  - Accredited Professional Heritage Practitioner

Memberships and affiliations:

➢ South African Archaeological Society Council member	2004 – 2016
➢ Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
➢ UCT Department of Archaeology Research Associate	2013 – 2017
➢ Heritage Western Cape APM Committee member	2013 – 2023
➢ UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
➢ Fish Hoek Valley Historical Association	2014 –
➢ Kalk Bay Historical Association	2016 –
➢ Association of Professional Heritage Practitioners member (CRM Section)	2016 –
➢ Southern African Field Archaeology section editor	2021 –

Fieldwork and project experience:

I have extensive experience as Field Director and Principal Investigator throughout Western and Northern Cape, and the western Free State and Eastern Cape. I also work in the eastern part of South Africa through partnership with an Iron Age accredited colleague.

Feasibility studies:
Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- ➢ Project types
  - o Notification of Intent to Develop applications
  - o Heritage Impact Assessments
    - o Self-standing assessments under Section 38(1) of the NHRA
    - o Assessments under NEMA and Section 38(8) of the NHRA
  - o Archaeological specialist studies
  - o Strategic assessments
  - o Phase 1 archaeological test excavations in historical and prehistoric sites
    - o Archaeological research projects
- ➢ Development types
  - o Mining and borrow pits
  - o Roads (new and upgrades)
  - o Residential, commercial and industrial development
  - o Agricultural developments
  - o Dams and pipe lines
  - o Power lines and substations
  - o Renewable energy facilities (wind, solar and hydro-electric)

Phase 2 mitigation and research excavations:

➢ ESA open sites	o Duinefontein, Gouda, Namaqualand
➢ MSA rock shelters	o Fish Hoek, Yzerfontein, Cederberg, Namaqualand
➢ MSA open sites	o Swartland, Bushmanland, Namaqualand
➢ LSA rock shelters	o Cederberg, Namaqualand, Knersvlakte, Bushmanland
➢ LSA open sites (inland)	o Swartland, Franschhoek, Namaqualand, Bushmanland, De Aar
➢ LSA coastal shell middens	o Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand coast, Knersvlakte
➢ LSA burials	o Melkbosstrand, Saldanha Bay, Namaqualand coast, Knysna
➢ Historical sites	o Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
➢ Historic burial grounds	o Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl, Beaufort West, Franschhoek (farmstead and well), Paarl, De Aar

➢ ***Awards:***

1998: Frank Schweitzer memorial book prize for an outstanding student.
2015/2016: Western Cape Government Cultural Affairs Awards: Best Heritage Project.

APPENDIX 2 – List of finds

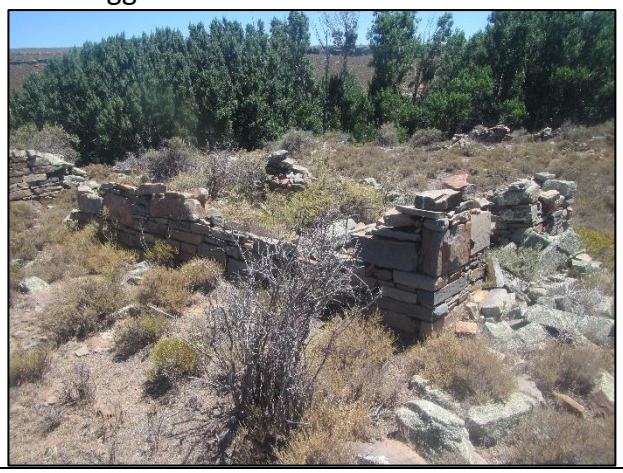
Way-point	Location	Description	Significance Grade
1838	S32 04 47.8 E22 28 07.5	One of several earth berms with stone and cement weirs and sluices used for flood irrigation on the floodplain of the Sak River. According to the topographic maps, these features appear to have been built after 1987, but they do appear on the 2003 aerial photography. 	Low IIIC
1839	S32 04 51.2 E22 28 11.3	As for waypoint 1838. 	Low IIIC
1840	S32 04 54.7 E22 28 14.3	As for waypoint 1838. 	Low IIIC
1841	S32 04 58.7 E22 28 15.4	As for waypoint 1838. The original access road to the farmstead passed through this area and is shown on the 1987 topographic map. The modern access is shown on the 2005 map.	Low IIIC

Way-point	Location	Description	Significance Grade
			
1842	S32 04 59.7 E22 28 16.1	As for waypoint 1838. 	Low IIIC
1843	S32 05 00.6 E22 28 28.6	The ruin of a brick house that was built with mud mortar between the bricks but plastered with cement outside. The ruin is very overgrown and only one small section of walling is still standing. Age unknown, but possibly early 20th century. It sits at the southern end of the present Waterval Farmstead. Aerial photography shows that the house was still roofed in 2003. 	Low IIIC

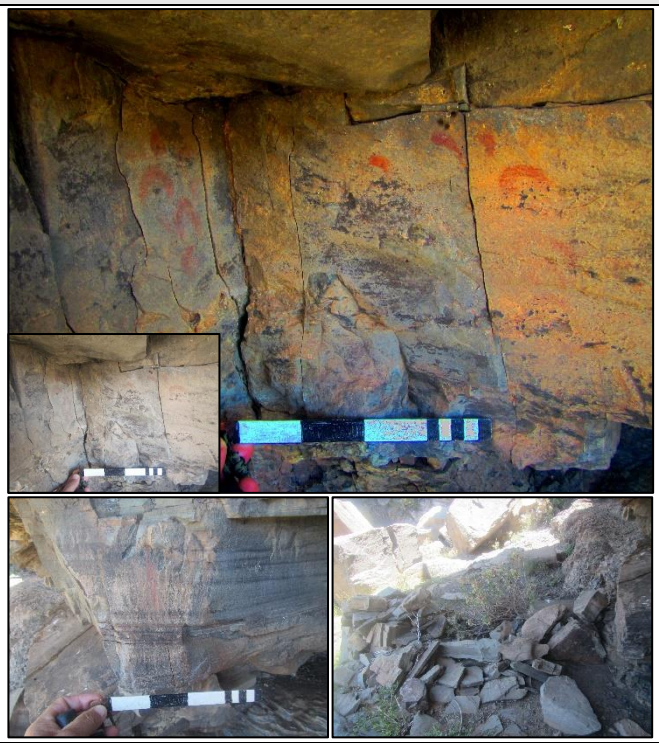
Way-point	Location	Description	Significance Grade
1844	S32 04 59.5 E22 28 30.1	A stone wall encloses an agricultural field. The wall is tumbled in places. This is at the present Waterval Farmstead. 	Low IIIC
1845	S32 04 56.4 E22 28 29.9	There are three structures at the present Waterval Farmstead. One is a modern metal shed. The other two are a flat roofed Karoostyle cottage with the inscription "b1954" on its pediment, while the other is a modern farmhouse that likely dates to the 1950s. It is thus possible that both were built in 1954 to replace the ailing structure at waypoint 1843. Both of these older structures are indicted on the 1st edition topographic map of the area from 1969 and on the 1965 aerial photography.  	Low IIIC
1846	S32 04 59.1 E22 28 50.2	There are a pair of stone-lined dam walls to the north and south of the road here. The northern one (pictured below) functioned as a dam wall across the valley bottom and, when full, would have deviated water towards the southern one which, in turn, captured a smaller stream and deviated the water towards the southwest to the arable lands there.	Low IIIC

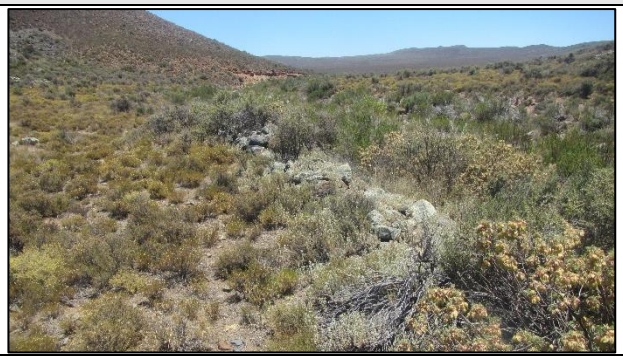
Way-point	Location	Description	Significance Grade
		Both features are present on the 1969 topographic map. 	
1847	S32 04 43.0 E22 29 02.4	This is a rock outcrop that has been quarried to obtain sandstone slabs for building.	Very low NCW
1848	S32 04 21.3 E22 28 41.1	Waypoints 1848 to 1856 are all part of the (presumably) original Waterval Farmstead. The site is entirely in ruin and is now archaeological in nature. Nothing is visible on the 1945 aerial photography indicating that it was already then long in disuse. There are a large number of stone-walled features present and, given their state of collapse, it is generally difficult to tell what they might have functioned as. At this waypoint is a large enclosure that was presumably a kraal. 	Low IIIC
1849	S32 04 21.9 E22 28 40.4	This is a smaller ruin of unknown function. 	Low IIIC
1850	S32 04 21.9 E22 28 39.7	This appears to be a small ruin of aout 2 m by 4 m that may have been residential or else might have served a storage function. A second smaller feature of 1 m by 1 m lies adjacent to it (visible in the background of the first	Low IIIC

Way-point	Location	Description	Significance Grade
		photograph below and pictured in the second). A few items of domestic refuse were present. Hese included the base of a black glass case bottle and three refined white earthenware fragments, one of which was hand-painted ware.   	

Way-point	Location	Description	Significance Grade
1851	S32 04 21.7 E22 28 39.3	This ruin was almost certainly a house and measured 3 m by  6 m.	Low IIIC
1852	S32 04 21.5 E22 28 39.0	A non-descript and poorly preserved stone-walled ruin of about 3 m by 4 m.	Low IIIC
1853	S32 04 22.2 E22 28 39.0	Although this ruin was smaller at about 6 m by 3 m, its more formal construction with carefully placed and dressed slabs suggests a residential function. 	Low IIIC
1854	S32 04 21.9 E22 28 38.5	This is a larger stone-walled ruin with a few rooms and an irregular shape. The overall footprint is about 5 m by 10 m. It was most likely a house. 	Low IIIC

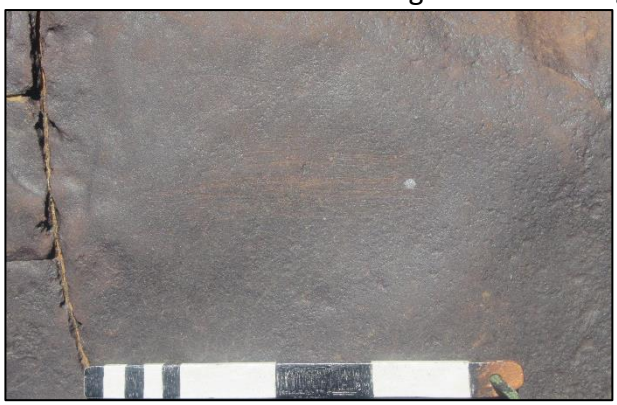
Way-point	Location	Description	Significance Grade
1855	S32 04 21.4 E22 28 38.1	A kraal complex was built up against a low scarp immediately northwest of the other ruins described above. 	Low IIIC
1856	S32 04 21.5 E22 28 36.9	Ephemeral stone walling extends towards the southwest along the lip of the low scarp.	Low IIIC
1857	S32 04 18.5 E22 28 41.8	Immediately south of the west-facing waterfall is an overhanging cliff. Two spots have rock art. At this waypoint there is a large indeterminate red shape and two smaller red shapes. A darker red shape overlies the large shape, and some possibly crayon-drawn red V-shapes occur in a line above the largest shape. The main image below has been manipulated to emphasise the art, while the inset shows its original appearance. 	High IIIA
1858	S32 04 18.4 E22 28 42.0	This is the second painted spot. The main panel contains a number of fat, arc-shaped motifs as well as a few teardrop-shapes, all of them in red (main photograph below). To the left is a single vertical red stripe (lower left photograph). There is also a section of stone walling in this part of the rock shelter.	High IIIA

Way-point	Location	Description	Significance Grade
			
1859	S32 03 40.0 E22 30 42.6	Waypoints 1859 to 1866 are part of a ruined farmstead which is now totally archaeological. It lies in a narrow valley with most features being to the south of the river with just the kraal at this waypoint being to the north. The kraal is about 18 m by 9 m and is badly tumbled (background in the photograph). Another section of walling occurs to the south of it (foreground in the photograph), but the preservation is too poor to determine its function. 	Low IIIC
1860	S32 03 42.5 E22 30 43.1	Waypoints 1860, 1861, 1863 and 1864 are the corners of a large stone-walled enclosure that was no doubt a vegetable garden on the river floodplain. The eastern corner of the walling (at waypoint 1864) has been washed away by flooding of the river. Waypoint 1860 is the northern corner of the walling.	Low IIIC

Way-point	Location	Description	Significance Grade
			
1861	S32 03 43.7 E22 30 42.3	See waypoint 1860. Waypoint 1861 is the western corner of the walling.	Low IIIC
1862	S32 03 45.3 E22 30 45.7	This is a small enclosure of about 3 m by 5 m built along the inside of the larger wall. It is very badly collapsed, no doubt due to theft of the stones for reuse elsewhere. Although no dump was seen, it was noted that fragments of glass, ceramics and bone occurred commonly in this area but were very well-dispersed. 	Low IIIC
1863	S32 03 45.7 E22 30 46.2	See waypoint 1860. Waypoint 1863 is the southern corner of the walling.	Low IIIC
1864	S32 03 44.9 E22 30 46.6	See waypoint 1860. Waypoint 1864 is the eastern corner of the walling.	Low IIIC

Way-point	Location	Description	Significance Grade
1865	S32 03 42.6 E22 30 41.9	This is a house ruin located just west of the arable land. It measures about 3 m by 4 m. 	Low IIIC
1866	S32 03 41.8 E22 30 39.9	At this point was a larger stone-walled kraal of piled boulders. It is better preserved than any of the other features and its unusual shape was clearly visible on aerial photography. The main kraal is about 15 m by 23 m with a straight northern end and a curved southern end. An east-west wall divides it into two enclosures and an entrance faces eastwards. A smaller enclosure of about 5 m by 5m was added to the northern end of the west side.  	Low IIIC
1867	S32 03 46.1 E22 30 40.9	This point was recorded only from aerial photography and is a large stone-walled enclosure of some 30 m by 32 m. Three corners appear to be square, but the north-eastern corner is a long curve. Although not visited, the site is assumed to be a kraal. Another possible feature lies some 140 m to the west. It looks like a square feature of about 14 m by 14 m.	Low IIIC

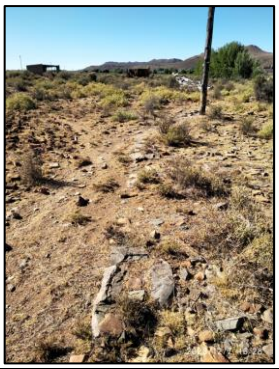
Way-point	Location	Description	Significance Grade
1868	S32 04 01.3 E22 30 41.0	This point is located 480 m up the valley to the south of the farmstead described under waypoints 1859 to 1867. At this point there was a very poorly preserved stone-walled kraal of about 10 m by 10 m.	Very low NCW
1869	S32 04 02.2 E22 30 41.4	Very close to the kraal at waypoint 1868 is a stone-lined dam wall which has been breached.  	Low IIIC
1870	S32 02 42.5 E22 29 43.7	This is an isolated oval stone-walled feature of about 2 m by 3 m and with an entrance facing west. It was likely a shepherd's hut. 	Low IIIC

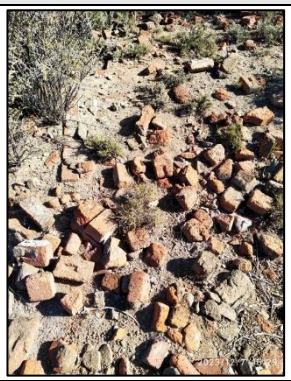
Way-point	Location	Description	Significance Grade
1871	S32 02 27.9 E22 30 49.6	This is an isolated alignment of stones some 8 m long. Its function is completely unknown. 	Very low NCW
1872	S32 02 08.7 E22 29 56.6	A dolerite outcrop with some hard, black patinated surfaces had been scratched in a number of places. Such scratches are not generally significant but because there are many scratches the site has been assigned medium significance.  	Medium IIIB

Way-point	Location	Description	Significance Grade
		 	
1873	S32 00 43.6 E22 29 38.0	The remains of a stone-lined dam lie across the valley at this point. The total length of the wall was once about 65 m but a section of about 22 m has washed away in the centre where the dam was breached. This breach is visible on the 1945 aerial photography. 	Low IIIC
1874	S32 00 42.0 E22 29 35.3	Here there is a black-patinated dolerite rock with extensive scratching on its surface.	Medium IIIB

Way-point	Location	Description	Significance Grade
			
221	S32 02 11.1 E22 29 53.0	Faint, poorly preserved, indeterminate engravings on dolerite rock.	Low IIIC
222	S32 02 09.2 E22 29 43.0	Small circular stone-walled structure about 2 m in diameter. 	Low IIIC
223	S32 00 55.9 E22 29 47.4	Small circular stone structure bout 3 m in diameter. 	Low IIIC

Way-point	Location	Description	Significance Grade
256	S32 01 41.3 E22 26 22.3	A dam wall lined with stones. 	Very low NCW
257	S32 01 19.4 E22 26 08.2	Isolated fragments of thick glass, possibly from a codd bottle. 	Very low NCW
258	S32 01 10.9 E22 27 23.1	Waypoints 258-266 are a ruined farm complex which is not visible on the 1945 aerial photograph. There are some older stone features which would not show up if already demolished but it is very clear that the large brick and cement structures had yet to be built and are thus not heritage. The features are placed on record though. A pile of red bricks and a cement foundation. This is not heritage. 	n/a
259	S32 01 12.7 E22 27 24.5	See note at waypoint 258. An old stable or animal shelter built with red bricks and cement on a stone foundation. This is not heritage.  	n/a
260	S32 01 11.8 E22 27 25.2	See note at waypoint 258. A house of red bricks and cement on a stone foundation. In front of the house are two red brick and cement dams. This is not heritage.	n/a

Way-point	Location	Description	Significance Grade
		  	
261	S32 01 12.1 E22 27 26.6	See note at waypoint 258. An earth dam wall with a brick and cement spillway. It looks as though the earthen dam was there in 1945 which would make it heritage but likely had the spillway added later. 	Very low NCW
262	S32 01 14.1 E22 27 25.9	See note at waypoint 258. The vague remains of a double walled structure of stone with a few bricks in between. The age of this feature is unknown, but it is graded for precautionary reasons.  	Very low NCW

Way-point	Location	Description	Significance Grade
263	S32 01 14.9 E22 27 26.0	See note at waypoint 258. The remains of a demolished red brick structure. This is not heritage. 	n/a
264	S32 01 15.6 E22 27 26.8	See note at waypoint 258. A double skinned stone structure alongside a canal leading into the earthen dam. It is partly obscured by reeds. It may relate to flood irrigation. 	Low IIIC
265	S32 01 15.6 E22 27 26.2	See note at waypoint 258. The remains of a stone structure of indeterminate function. 	Low IIIC
266	S32 01 14.6 E22 27 25.3	See note at waypoint 258. The remains of a stone structure. An ash and rubbish midden is located approximately 15m north-west of waypoint 266. It contains metal fragments, glass fragments of blue, brown, greens, purple and translucent, and ceramics. They seem typical of 19th century material. 	Low IIIC

Way-point	Location	Description	Significance Grade
		 	
267	S32 01 34.2 E22 26 58.2	A small stone and cement structure about 3m long close to the river. It looks like the end of an earthen dam wall with the wall no longer present. 	Very low NCW
268	S32 01 30.9 E22 27 14.7	The remains of a rectangular stone structure. 	Low IIIC
4685	S31 59 55.0 E22 28 41.9	An ephemeral scatter of hornfels flakes in a sandy area on a dolerite ridge.  	Very low NCW

Way-point	Location	Description	Significance Grade
4686	S32 00 04.3 E22 27 48.9	This is a heavily scratched/abraded dolerite rock located on top of a high mountain ridge. 	Very low NCW
4687	S32 00 00.1 E22 28 53.8	A fairly extensive scatter of ostrich eggshell fragments was found in a sandy area on top of a high dolerite mountain ridge. Although there were many fragments, they are likely still less than half an eggshell altogether. No stone artefacts or other materials could be found associated. 	Very low NCW
4688	S31 59 42.1 E22 29 36.9	This area is located on top of a high dolerite mountain ridge. Some light scratches were noted on two slabs.	Very low NCW

Way-point	Location	Description	Significance Grade
		 	
4689	S32 00 03.4 E22 29 10.9	This is a large scatter of LSA stone artefacts (flakes and cores) in hornfels and tuff. The photographs were taken at waypoint 4689. The site extends at least 80 m north to south and 35 m west to east, but it is likely far larger. There is no landscape feature or other obvious reason for the location of the site and no other associated materials were seen.	Low IIIC
4690	S32 00 26.9 E22 28 53.9		
4691	S32 00 28.5 E22 28 53.5		

Way-point	Location	Description	Significance Grade
		  	
4692	S32 00 29.1 E22 28 54.5	Waypoints 4692 and 4693 are adjacent to one another and part of one site. At this point is a poorly preserved rectangular enclosure about 3 m by 2 m in size. The stone wall at waypoint 4693 lies in the background of the photograph (yellow arrow). There are no associated artefacts. 	Very low NCW
4693	S32 01 29.2 E22 28 02.4	Waypoints 4692 and 4693 are adjacent to one another and part of one site. This is a low piled stone wall running up the slope towards the top of the small scarp. A small enclosure is built against the scarp (yellow arrow). The feature at waypoint 4692 lies just to the right of this view. There are no associated artefacts.	Very low NCW

Way-point	Location	Description	Significance Grade
			
4694	S32 01 29.5 E22 28 02.3	This is a small circular stone enclosure of piled dolerite cobbles. It is just over 1 m in diameter with walls only about 0.3 m high. 	Very low NCW
4695	S32 03 18.5 E22 27 23.1	A dolerite slab with an area of concentrated scratches (visible to the left in the photograph) and a number of other, finer scratches to the right. 	Very low NCW
472	S32 02 08.6 E22 29 56.8	Scratched lines engraved on four different dolerite rocks.	Low IIIC

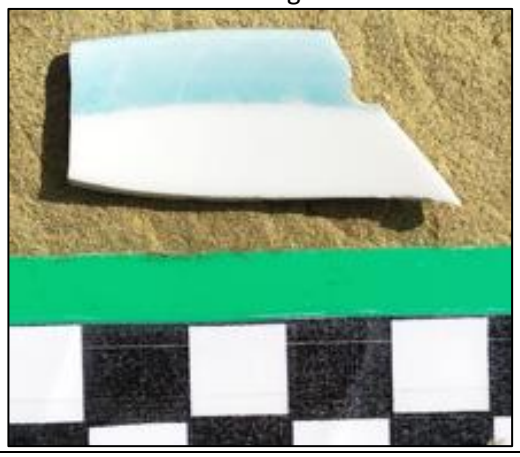
Way-point	Location	Description	Significance Grade
		  	

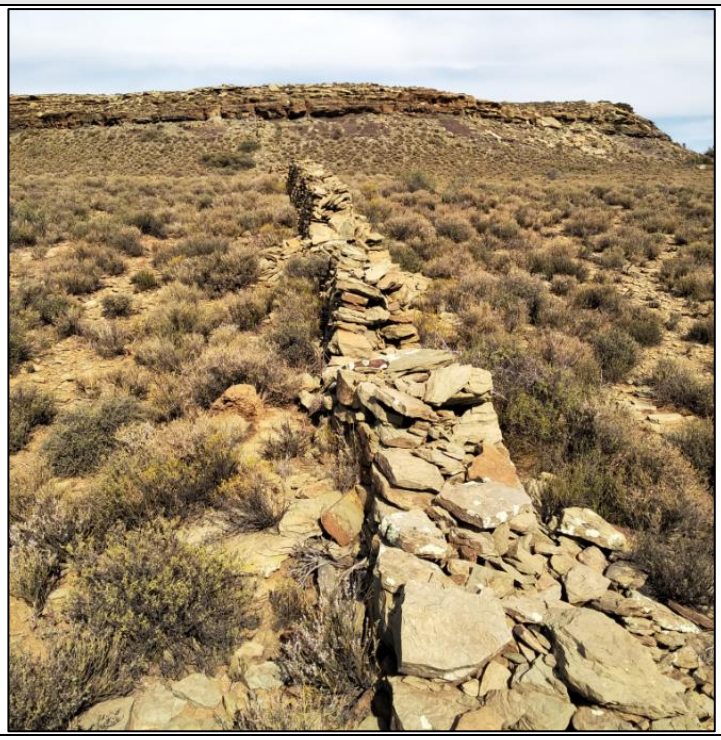
Way-point	Location	Description	Significance Grade
			
473	S32 01 50.3 E22 30 26.7	Possible percussion marks on dolerite. 	Very low NCW
474	S32 02 25.3 E22 29 25.4	A stone kraal of about 26 m x 28 m on the south side of a river. 	Low IIIC
475	S32 01 03.7 E22 26 21.1	Light background scatter of flakes.	Very low NCW

Way-point	Location	Description	Significance Grade
			
476	S32 00 39.8 E22 26 20.9	Waypoints 476 to 487 belong together and represent a stone wall of about 350 m long. The stone walling runs along the edge of a ridge and extends to about 1m high in some places. The wall continues southwards up to the base of a higher ridge to the south.  	Low IIIC
477	S32 00 40.2 E22 26 20.7	Waypoints 476 to 487 belong together. Stone walling along the edge of a ridge. 	Low IIIC

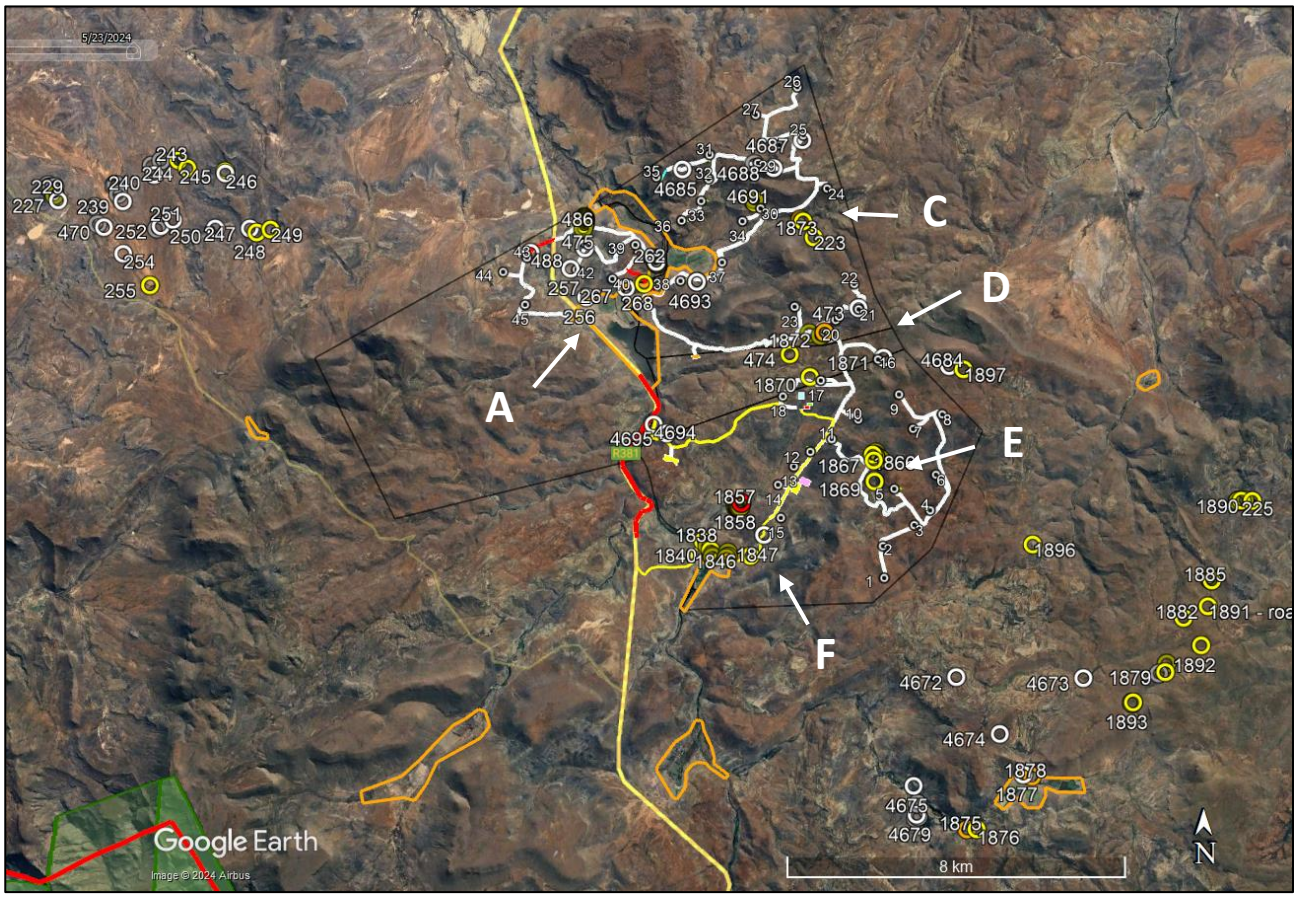
Way-point	Location	Description	Significance Grade
478	S32 00 40.7 E22 26 20.7	Waypoints 476 to 487 belong together. Stone walling along the edge of a ridge. 	Low IIIC
479	S32 00 41.1 E22 26 20.7	Waypoints 476 to 487 belong together. Stone walling along the edge of a ridge.	Low IIIC
480	S32 00 41.8 E22 26 20.9	Waypoints 476 to 487 belong together. Stone walling along the edge of a ridge.	Low IIIC
481	S32 00 42.3 E22 26 20.9	Waypoints 476 to 487 belong together. Stone walling along the edge of a ridge.	Low IIIC
482	S32 00 43.0 E22 26 20.9	Waypoints 476 to 487 belong together. Stone walling along the edge of a ridge.	Low IIIC
483	S32 00 43.7 E22 26 20.9	Waypoints 476 to 487 belong together. Stone walling along the edge of a ridge. 	Low IIIC

Way-point	Location	Description	Significance Grade
			
484	S32 00 44.5 E22 26 20.9	Waypoints 476 to 487 belong together. Stone walling along the edge of a ridge. Just south of waypoint 184 is a stream bed. The walling continues on the southern side of the stream bed. 	Low IIIC
485	S32 00 45.6 E22 26 20.7	Waypoints 476 to 487 belong together. The stone walling continues south across the floodplain up until a higher ridge. It was not followed all the way to its southern end but it looks from historical and current aerial photography as though it does not extend onto that southern ridge but ends at its foot. It is evident that the farm road at this point was made later as there are stones pushed to the side of the road.	Low IIIC

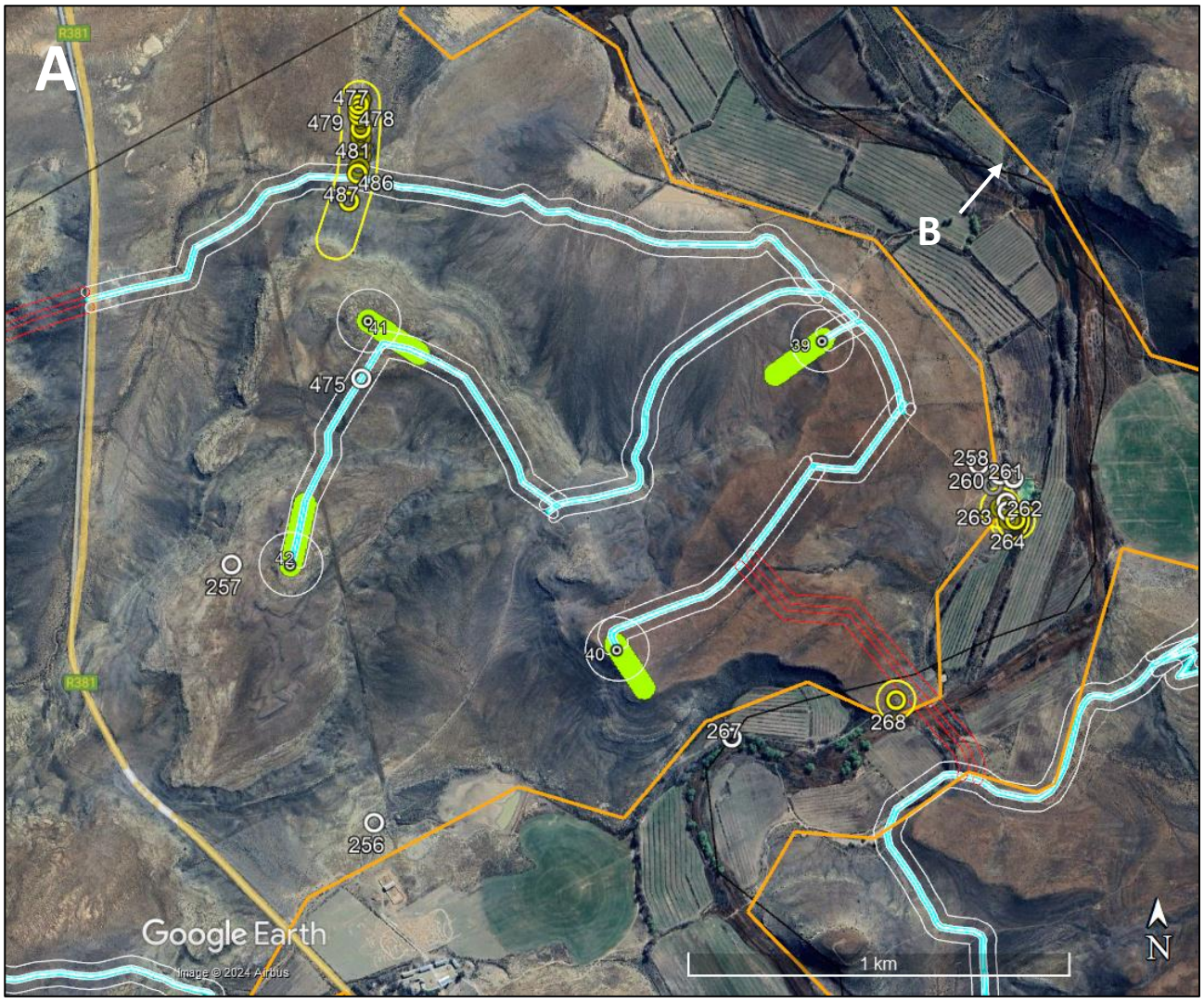
Way-point	Location	Description	Significance Grade
			
486	S32 00 46.1 E22 26 20.6	Waypoints 476 to 487 belong together. Very dark olive green glass fragments next to the stone walling. 	Low IIIC
487	S32 00 48.5 E22 26 19.7	Waypoints 476 to 487 belong together. A fragment of slipware next to the stone walling. 	Low IIIC

Way-point	Location	Description	Significance Grade
			
488	S32 01 07.1 E22 25 32.1	A pan with an ephemeral scatter of flakes and cores, half a horseshoe and a .432 Winchester rifle cartridge. 	Very low NCW

APPENDIX 3 – Mapping



Aerial view of the wider project area showing all finds recorded at all three phases of the project. Only the finds within the present study area are included in Appendix 2 and mapped below. Red symbols = Grade IIIA, Orange = Grade IIIB, Yellow = Grade IIIC, White = NCW. The red line along the R381 is the Roseberg Pass (Grade IIIA), the red line in the southwest is the escarpment edge (Grade IIIA) and the green polygon in the southwest is the KNP (Grade IIIA). The locations of the enlargements below are indicated by white letters and arrows.


A
B
R381
R381
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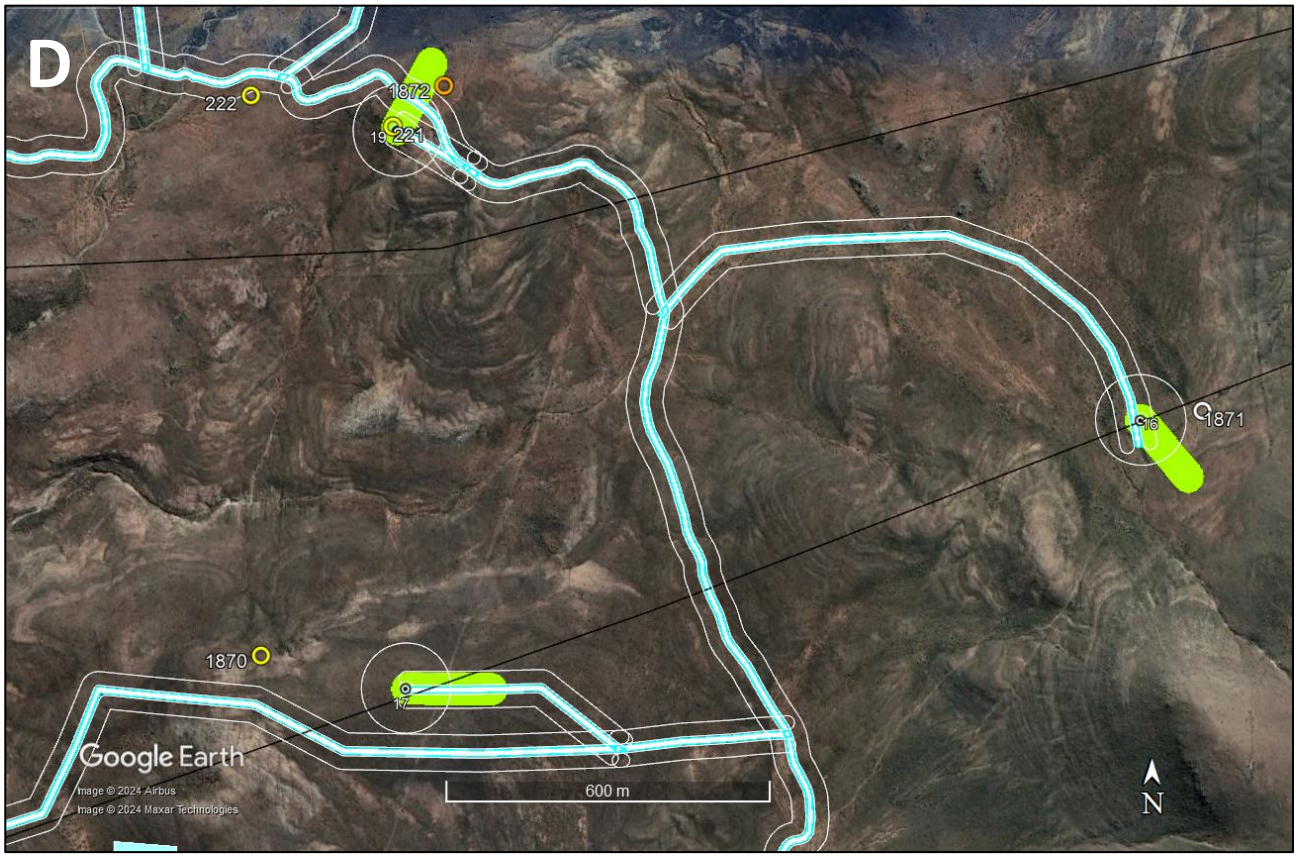
479
478
481
486
487
41
475
39
258
260
261
263
262
264
42
257
40
268
267
256
Google Earth
Image © 2024 Airbus
1 km
N


B
258
260
261
259
262
266
263
265
264
Google Earth
Image © 2024 Airbus
100 m
N


C
4689
4690
4691
30
34
1874
1873
223
Google Earth
Image © 2024 Airbus
600 m
N


D
222
1872
19
221
1871
16
1870
17
Google Earth
Image © 2024 Airbus
Image © 2024 Maxar Technologies
600 m
N


E
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1863
1867
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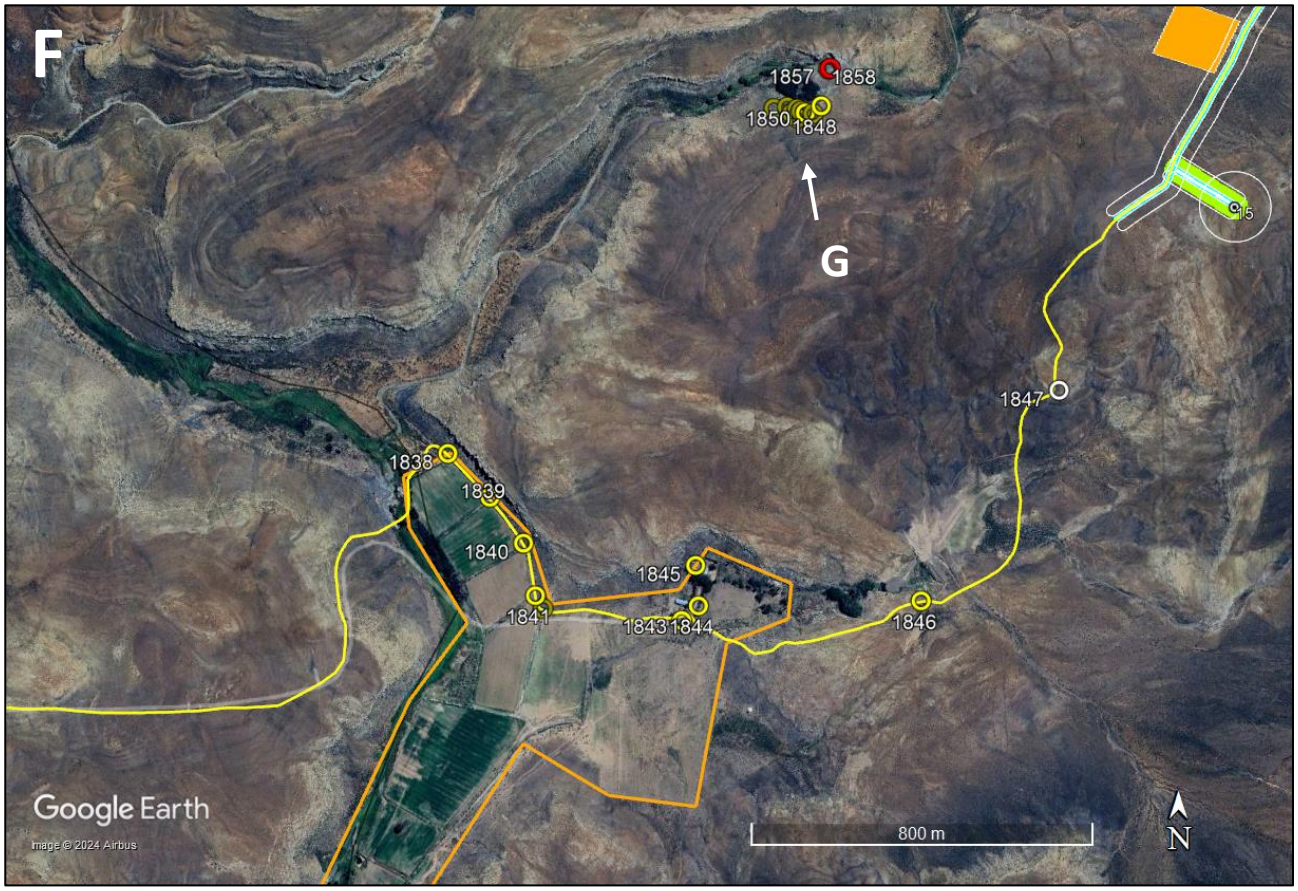
1869
Google Earth
Image © 2024 Airbus
300 m
N


F
1857
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1850
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15
1847
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1839
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Google Earth
Image © 2024 Airbus
800 m
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5/17/2024
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1853
Google Earth
Image © 2024 Airbus
60 m
N

APPENDIX 4 – Site Sensitivity Verification

As required in Part A of the Government Gazette 43110, GN 320, a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool. The details of the site sensitivity verification are noted below:

Date of Site Visit	4 & 7 Dec 2023, 15, 17, 22, 23 May 2024
Specialist Name	Dr Jayson Orton
Professional Registration Number	ASAPA: 233; APHP: 043
Specialist Affiliation / Company	ASHA Consulting (Pty) Ltd

Method of the Site Sensitivity Verification

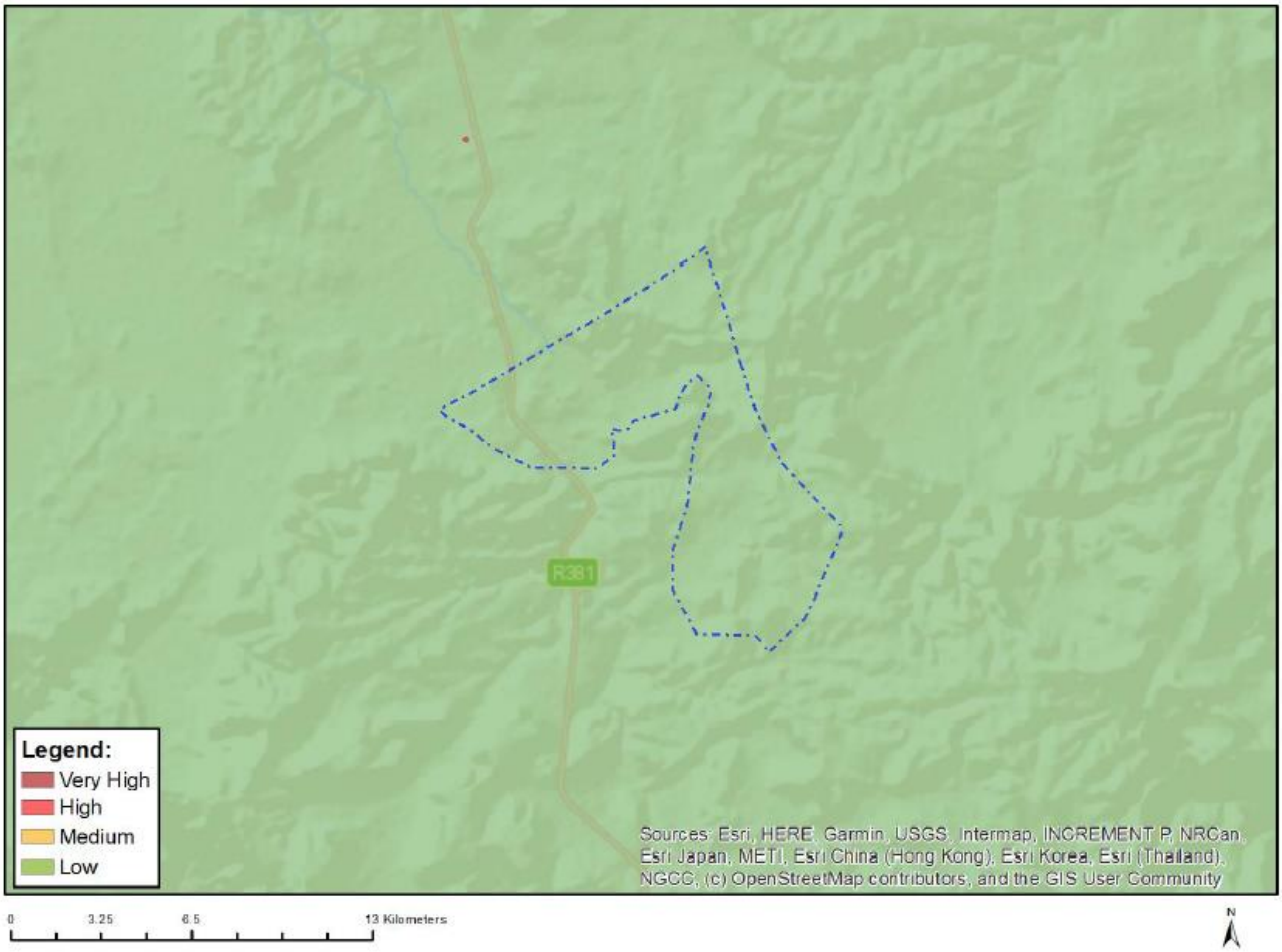
Initial work was carried out using satellite aerial photography in combination with the author's accumulated knowledge of the local landscape. This was used to determine sensitive areas. Subsequent fieldwork served to ground truth the site, including areas identified as potentially sensitive. Desktop research using maps, historical aerial photography, published literature and commercial reports was also conducted to inform on the heritage context of the area. This information is presented in the report (Sections 5.2.1 and 5.4.1).

Outcome

The first map below is extracted from the screening tool report and shows the archaeological and heritage sensitivity to be low throughout the study area. The screening tool completely ignores the landscape sensitivity which is determined to be medium over the wider area and high in the KNP and along the escarpment. In addition, the site visit showed that a number of small areas (where heritage resources were found) are considered to be of medium to high sensitivity. The second map below shows the areas considered to be sensitive from a heritage point of view, but noting that the wider landscape, considered Grade IIIB, covers the entire map area. Photographs of the specific sites are included in the impact assessment report and in Appendix 2.

The heritage specialist therefore **disputes** the Screening Tool map.

Note: Sites of Grade IIIA (high cultural significance) and IIIB (medium cultural significance) should be regarded as of high sensitivity. IIIC sites (low cultural significance) can be seen as medium, while NCW (very low significance) are low sensitivity.


R381
Legend:
Very High
High
Medium
Low
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
0
3.25
6.5
13 Kilometers
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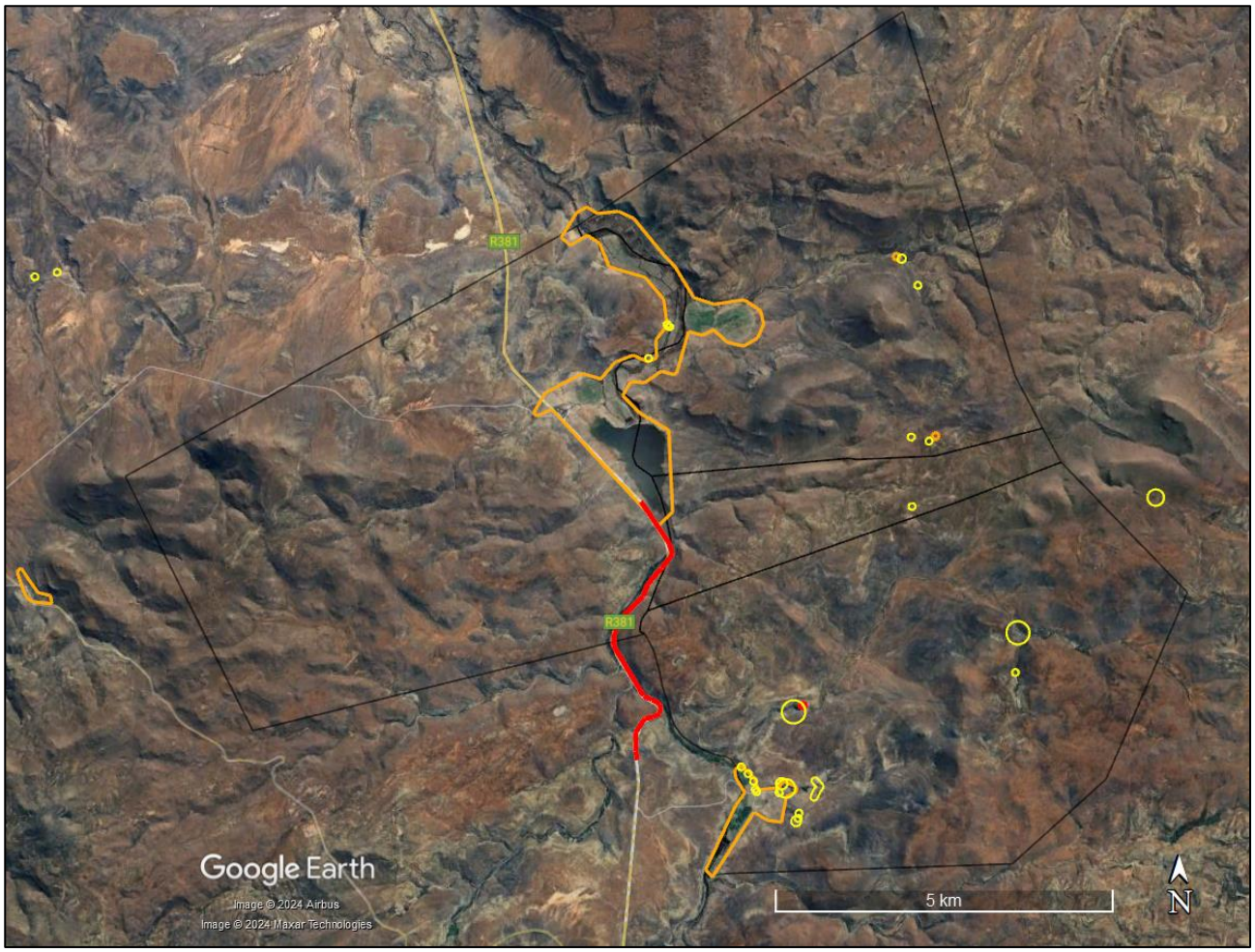
R381
R381
Google Earth
Image © 2024 Airbus
Image © 2024 Maxar Technologies
5 km
N

APPENDIX 5 – Palaeontological study

APPENDIX 6 – Visual Impact Assessment