HERITAGE IMPACT ASSESSMENT: PROPOSED HOOGLAND 1 WIND FARM AND HOOGLAND 2 WIND FARM, BEAUFORT WEST MAGISTERIAL DISTRICT WESTERN CAPE WITH ROAD UPGRADES IN FRASERBURG & VICTORIA WEST MAGISTERIAL DISTRICTS, NORTHERN CAPE

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999) as part of a Heritage Impact Assessment.

	HWC Case Numbers:	SAHRA Case Number:
HOOGLAND 1	21060101SB0818E	18203
HOOGLAND 2	21060102SB0818E	

Report for:

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On behalf of:

Red Cap Energy (Pty) Ltd

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1st draft: 31 October 2021
2nd draft: 19 January 2022
3rd draft: 15 March 2022
Final report: 01 July 2022

SUMMARY

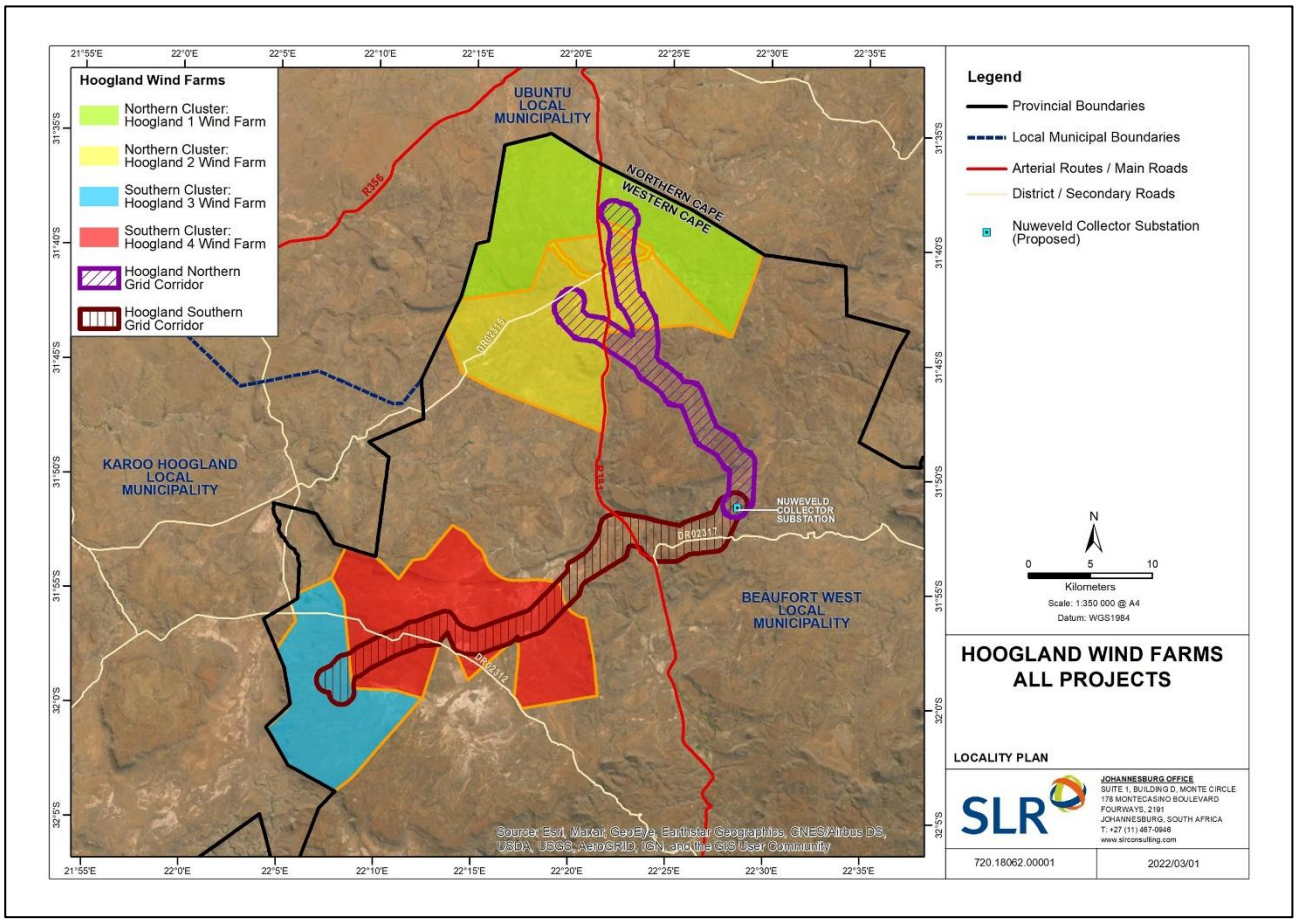
1. Site Name

Hoogland 1 Wind Farm & Hoogland 2 Wind Farm

2. Location

	Hoogland 1	Hoogland 2
Off	R381	R381
Erven	Bastards Poort 2 Portion 2 of Droog Fontein 1 Portion 3 of Droog Fontein 1 Portion 2 of Duikerfontein 5 Remainder of Duikerfontein 5 Remainder of Portion 1 of Duikerfontein 5 Portion 3 of Duikerfontein 5 Remainder of Slange Fontein 6 Remainder of Portion 1 of Slange Fontein 6 Portion 7 of Slange Fontein 6 Portion 1 of Elands Fontein24	Bastards Poort 2 Portion 2 of Duikerfontein 5 Remainder of portion 1 of Duikerfontein 5 Remainder of Portion 1 of Slange Fontein 6 Remainder of Slange Fontein 6 Portion 1 of Farm 7 Portion 2 of Farm 7 Remainder of Farm 7 Portion 2 of Gert Adriaans Kraal 18 Remainder of Gert Adriaans Kraal 18 Portion 1 of Snydersfontein 21 Remainder of Portion 1 of Drooge Onrust 22 Remainder of Portion 2 Drooge Onrust 22 Adj Drooge Onrust 23 Portion 1 of Elands Fontein24
Centre point	S31° 38’ 18.90” E22° 18’ 00.44”	S31° 43’ 16.68” E22° 19’ 50.27”

3. Locality Plan



The green and yellow polygons show the projects covered by the present report.

4. Description of Proposed Development

It is proposed to develop two wind farms with up to 60 turbines each. Each would include powerlines (mostly underground, but overhead where physical constraints occur), access roads, substation, battery storage facility, laydown area, site camp and batching plant.

5. Heritage Resources Identified

Large numbers of heritage resources occur in the area with the majority being historical archaeological sites. These include ruined stone-walled and brick structures of varying types and functions, ash and rubbish middens and other features related to historical occupation. Other resources include fossils, Stone Age artefact scatters (mostly LSA but also some MSA), historical and Stone Age rock engravings, graves and graveyards, buildings, the cultural landscape and places associated with living heritage (the latter are recent engraving sites).

6. Anticipated Impacts on Heritage Resources

Due to the iterative design process that was followed, very few heritage resources will be impacted. Only one significant and unavoidable direct impact is expected on Hoogland 1 Wind Farm and that is where a wind farm road upgrade of an existing road passes through an extensive LSA stone artefact scatter. Other impacts include a cable that will be laid along a road through a ruined farmstead on Hoogland 2 Wind Farm and which will probably not impact any heritage resources, a

road that passes a stone wall around the Slangfontein farm complex on Hoogland 1 Wind Farm and which may need realignment, a powerline that passes through a cultural landscape connected to a ruined farm complex on Hoogland 1 Wind Farm, and three road alignments on Hoogland 2 Wind Farm passing through heritage buffers but that follow roads approved as part of the Nuweveld North Wind Farm.

7. **Recommendations**

Hoogland 1

It is recommended that the proposed project be approved but subject to the following recommendations which must be captured in the EA, should one be issued:

Western Cape:

- The archaeological site at waypoint 1703 that will be crossed by a proposed wind farm road must be excavated prior to construction. Excavation should at least cover the area to be disturbed;
- The archaeological site at waypoints 1978 and 1979 that will be overlapped by a turbine footing must be excavated prior to construction. Excavation must target the densest part(s) of the scatter within or close to the impact zone;
- The two graves at waypoint 1696 must be fenced with a regular farm-style fence with a pedestrian entrance gate so as to ensure that they are easily identifiable on site. The fence must be placed at least 5 m from the graves and the electrical cable must be placed a minimum of 5 m away from the fence, but preferably further if possible;
- Trenching within 30 m of waypoint 1696 must be monitored by relevant project staff and/or the ECO;
- Road construction work around the Slangfontein farm werf must be monitored by relevant project staff and/or the ECO to ensure that the walls remain unharmed;
- A pre-construction survey of the entire authorised footprint must be undertaken in order to determine whether any further archaeological sites may need mitigation or protection through micrositing (if possible);
- The final layout must be evaluated by a palaeontologist to determine which areas, if any, need a pre-construction survey. These will be previously unsurveyed and potentially sensitive areas;
- If necessary, and subject to the agreement of Heritage Western Cape, a Workplan application should be submitted prior to the palaeontological survey to allow for sample collection during the survey;
- A palaeontological chance finds procedure must be incorporated into the EMPr;
- Landscape scarring must be minimised during construction;
- If road surfacing is required then low contrast materials such as concrete with brown exposed aggregate should be used, where possible;
- All areas not required during operation must be rehabilitated in accordance with the Rehabilitation and Revegetation Plan;
- A CAA-approved warning system which only requires the red lights to come on when an aircraft is in the vicinity must be used to reduce the night-time impacts to the sense of place;
- Visually sensitive skylines, rock outcrops and steep slopes must be avoided as per the recommendations of the visual impact assessment;
- Temporary laydown and areas and batching plants should be located in areas approved by the visual specialists;

- Substations and O&M Buildings to be located in unobtrusive low-lying areas away from provincial and district roads where possible;
- On-site signage to be discrete, and billboards prohibited. Signage to be fixed as low as possible, preferably against a backdrop to avoid intrusion on the skyline;
- Security and other outdoor lighting to be fitted with reflectors to conceal the light source;
- In the event of decommissioning, the site must be rehabilitated in accordance with the Rehabilitation and Revegetation Plan;
- If the wind farm is approved and the final layout does not need all approved turbine locations to ensure a maximum of 60 turbines, then where a choice exists between turbines to be dropped, and all other factors are equal, priority should be given to dropping turbines in the highest visual sensitivity areas and within 1 km of the R381, as well as turbines 72 and 75due to their proximity to the Slangfontein homestead which is a IIIA cultural landscape;
- Replacement structures for the existing bridges on the local access roads must be designed to have a similar appearance to the current structures; 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.

Northern Cape:

- Replacement structures for the existing bridges on the local access roads must be designed to have a similar appearance to the current structures; and
- A permit application will need to be made on SAHRIS to allow for demolition or alteration of the bridge on the R381.

<u>Hoogland 2</u>

It is recommended that the proposed project be approved but subject to the following recommendations which must be captured in the EA, should one be issued:

Western Cape:

- The archaeological site at waypoint 1703 that will be crossed by a proposed wind farm road must be excavated prior to construction. Excavation should at least cover the area to be disturbed;
- The two graves at waypoint 702 must be fenced with a regular farm-style fence with a pedestrian entrance gate so as to ensure that they are easily identifiable on site;
- The cable trench proposed through the historic farm complex of Bulskolk (in the vicinity of waypoint 113) must be sure to avoid impacting any ruined structures or other features in the vicinity;
- Roadworks within 30 m of the graves at waypoint 702 must be monitored by relevant project staff and/or the ECO;
- Trenching within the historic werf at Bulskolk (in the vicinity of waypoint 113) must be monitored by relevant project staff and/or the ECO to ensure that the various features remain unharmed;
- A pre-construction survey of the entire authorised footprint must be undertaken in order to determine whether any further archaeological sites may need mitigation or protection through micrositing (if possible);

- The final layout must be evaluated by a palaeontologist to determine which areas, if any, need a pre-construction survey. These will be previously unsurveyed and potentially sensitive areas;
- If necessary, and subject to the agreement of Heritage Western Cape, a Workplan application should be submitted prior to the palaeontological survey to allow for sample collection during the survey;
- A palaeontological chance finds procedure must be incorporated into the EMPr;
- Landscape scarring must be minimised during construction;
- If road surfacing is required then low contrast materials such as concrete with brown exposed aggregate should be used, where possible;
- All areas not required during operation must be rehabilitated in accordance with the Rehabilitation and Revegetation Plan;
- A CAA-approved warning system which only requires the red lights to come on when an aircraft is in the vicinity must be used to reduce the night-time impacts to the sense of place;
- Visually sensitive skylines, rock outcrops and steep slopes must be avoided as per the recommendations of the visual impact assessment;
- Temporary laydown and areas and batching plants should be located in areas approved by the visual specialists;
- Substations and O&M Buildings to be located in unobtrusive low-lying areas away from provincial and district roads where possible;
- On-site signage to be discrete, and billboards prohibited. Signage to be fixed as low as possible, preferably against a backdrop to avoid intrusion on the skyline;
- Security and other outdoor lighting to be fitted with reflectors to conceal the light source;
- In the event of decommissioning, the site must be rehabilitated in accordance with the Rehabilitation and Revegetation Plan;
- If the wind farm is approved and the final layout does not need all approved turbine locations to ensure a maximum of 60 turbines, then where a choice exists between turbines to be dropped, and all other factors are equal, priority should be given to dropping turbines in the high visual sensitivity areas and within 1 km of the R381;
- Replacement structures for the existing bridges on the local access roads must be designed to have a similar appearance to the current structures; 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.

Northern Cape:

- Replacement structures for the existing bridges on the local access roads must be designed to have a similar appearance to the current structures; and
- A permit application will need to be made on SAHRIS to allow for demolition or alteration of the bridge on the R381.

8. **Author/s and Date**

Heritage Impact Assessment: Jayson Orton, ASHA Consulting (Pty) Ltd, 23 June 2022
Archaeological specialist study: Jayson Orton 23 June 2022

Palaeontological specialist study: John Almond June 2022
Visual Impact Assessment: Quinton Lawson & Bernard Oberholzer 09 June 2022

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

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	1.4 Appendix 1
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	viii
c) an indication of the scope of, and the purpose for which, the report was prepared;	1.3
(cA) an indication of the quality and age of base data used for the specialist report;	n/a
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	7.7 7.5 7.9
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	3.2
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	3
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	1.1.8
g) an identification of any areas to be avoided, including buffers;	6
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	6
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	3.7
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	5 7
k) any mitigation measures for inclusion in the EMPr;	8
l) any conditions for inclusion in the environmental authorisation;	11
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	8 11
n) a reasoned opinion- i. (as to) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	10.3 11
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	9
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	9
q) any other information requested by the competent authority.	n/a
2) Where a government notice *gazetted* by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	n/a

SPECIALIST DECLARATION

See separate document

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.

Leiwater: an irrigation channel.

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

Patination: Colour and/or texture changes on the surface of an artefact or rock art as a result of physical and chemical weathering of the substrate.

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

CA: Competent Authority

CAA: South African Civil Aviation Authority

CRM: Cultural Resources Management

DFFE: Department of Forestry, Fisheries and the Environment

EA: Environmental Authorisation

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

KNP: Karoo National Park

LSA: Later Stone Age

MSA: Middle Stone Age

NBKB: Ngwao-Boswa Ya Kapa Bokoni (Heritage Northern Cape)

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

VoC: Dutch East India Company

CONTENTS

TABLES

FIGURES

1. INTRODUCTION

ASHA Consulting (Pty) Ltd has been appointed by SLR South Africa Consulting (Pty) Ltd, on behalf of Red Cap Energy (Pty) Ltd and their affiliate companies (Red Cap Hoogland 1 (Pty) Ltd, Red Cap Hoogland 2 (Pty) Ltd, Red Cap Hoogland 3 (Pty) Ltd and Red Cap Hoogland 4 (Pty) Ltd), hereafter referred to as "Red Cap", to undertake a Heritage Impact Assessment (HIA) for the proposed construction of four wind farms and associated grid connections (together known as the Hoogland Projects) in an area located between Loxton and Beaufort West in the Western Cape Province (Figures 1 to 3). However, some road infrastructure (watercourse crossings) within both Northern Cape and Western Cape will also require upgrade as part of the projects.

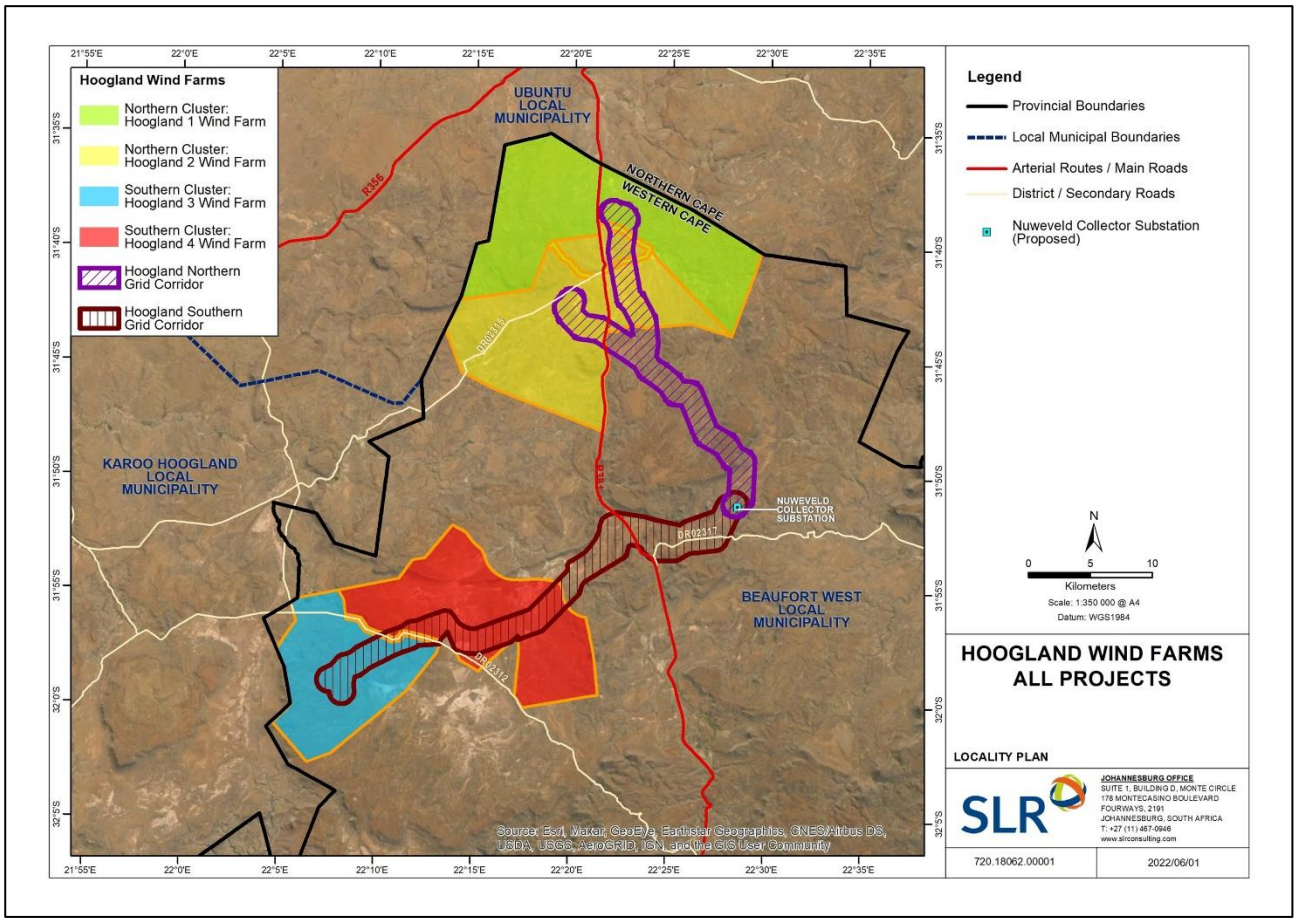


Figure 1-1: *Regional Map showing the project sites in relation to Loxton, Beaufort West and Karoo National Park.*

Hoogland 1 Wind Farm (HL01) and Hoogland 2 Wind Farm (HL02) are located to the north closer to Loxton and form the Northern Cluster of wind farms which will share a grid connection, named the Hoogland Northern Grid Connection. Hoogland 3 Wind Farm and Hoogland 4 Wind Farm are located closer to Beaufort West and comprise the Southern Cluster which will similarly share a separate grid connection, named the Hoogland Southern Grid Connection. The two Grid Connections are each in the form of 132 kV overhead power lines and will connect the Hoogland Wind Farms to the Nuweveld Collector Substation on Red Cap's adjacent Nuweveld Wind Farms Project.

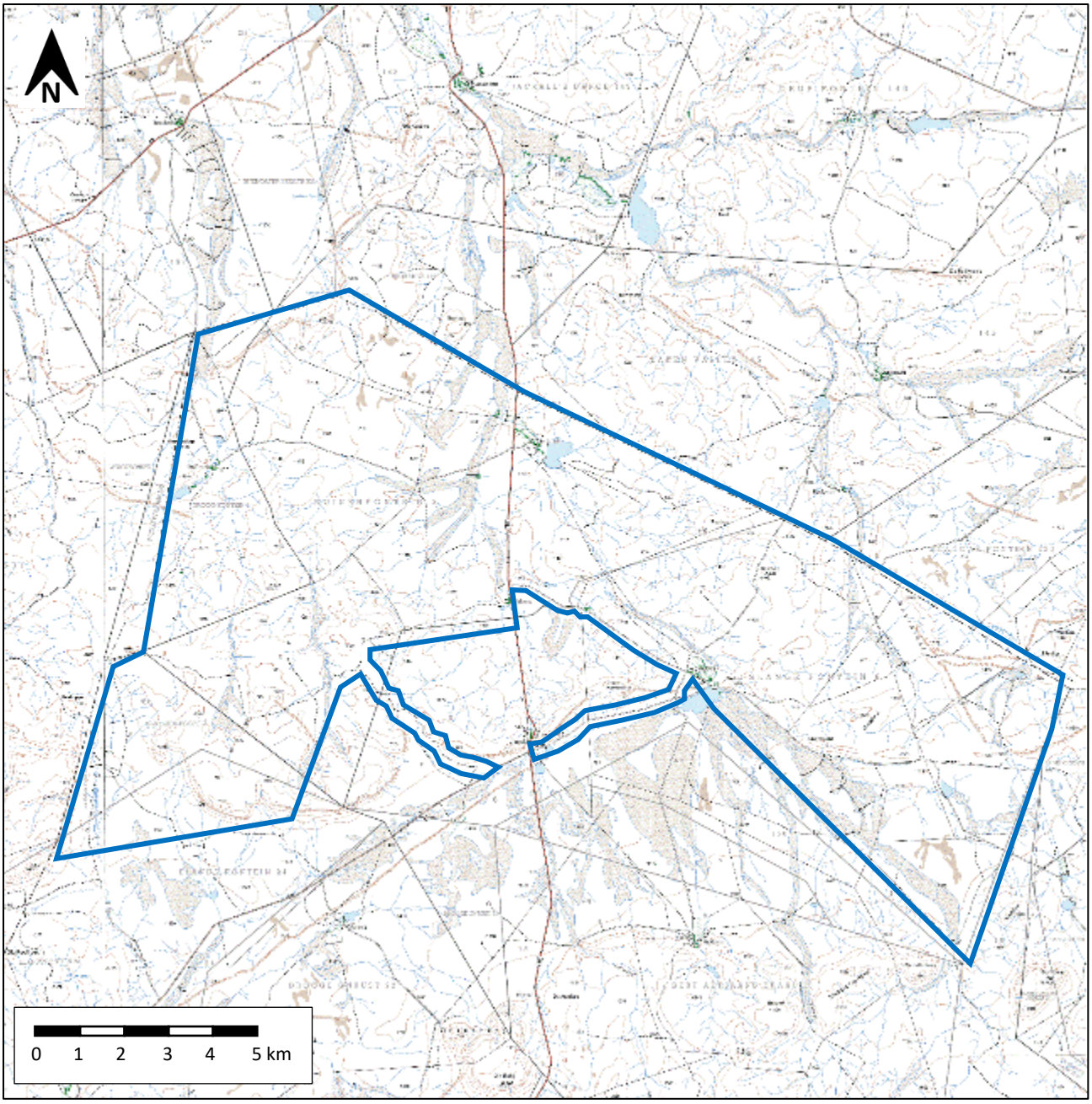


Figure 1-2: *Extract from 1:50 000 mapsheets 3122ca &cb showing the location of the HL01 site (blue polygon) relative to the R381 road that links Beaufort West and Loxton (running north-south through centre of map). Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.*

In terms of the Environmental Impact Assessment (EIA) Regulations various aspects of the proposed development may have an impact on the environment and are considered to be listed activities. These activities require authorisation from the National Competent Authority (CA), namely the Department of Forestry, Fisheries and the Environment (DFFE), prior to the commencement thereof. Specialist studies have been commissioned to verify the sensitivity and assess the impacts of the wind farms under the Gazetted specialist protocols (GN R 320 and GN R 1150 of 2020).

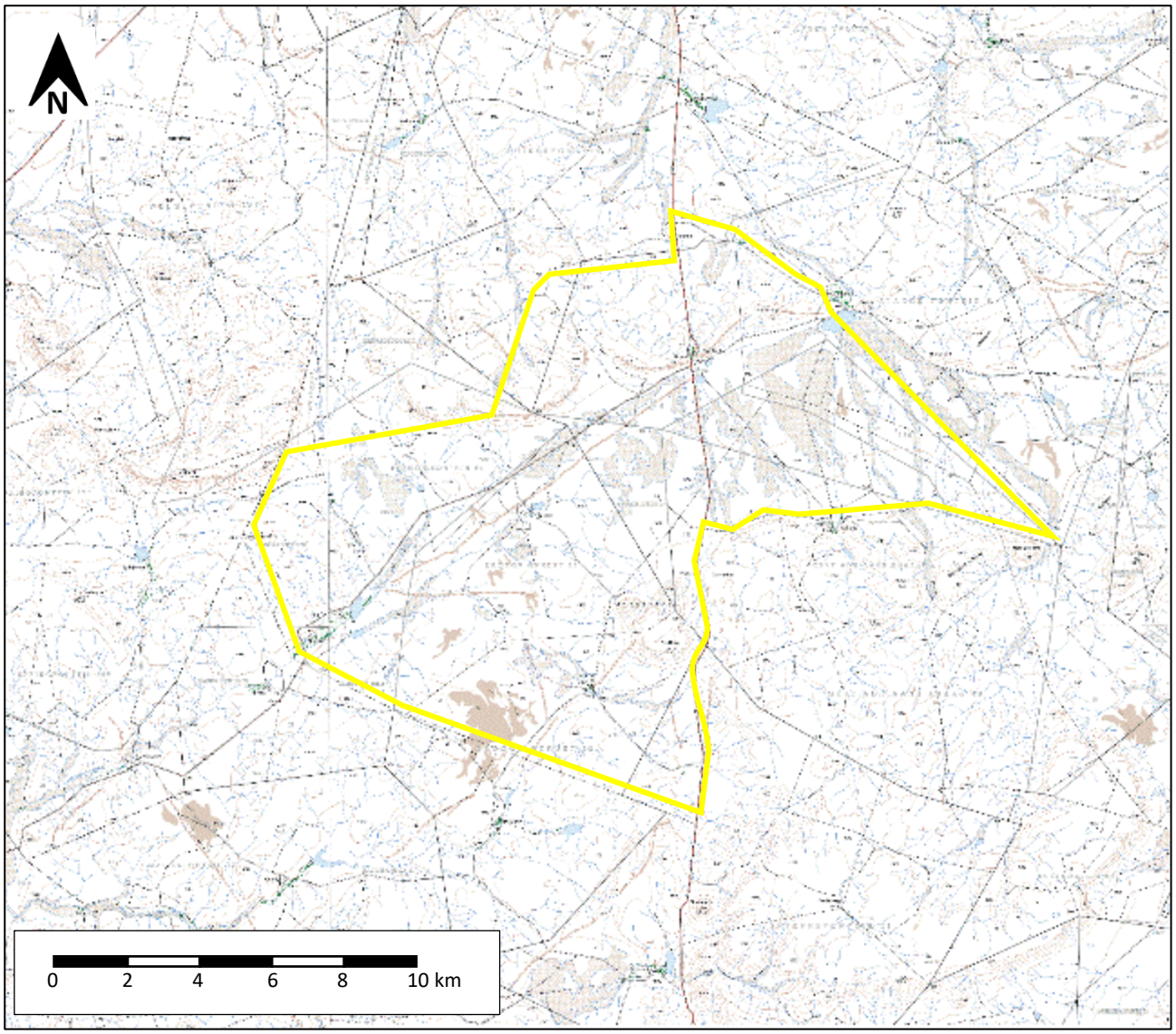


Figure 1-3: *Extract from 1:50 000 mapsheets 3122ca, cb, cc & cd showing the location of the HL02 site (yellow polygon) relative to the R381 road that links Beaufort West and Loxton (running north-south through centre of map). Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.*

The scope of this report is the Hoogland 1 Wind Farm and Hoogland 2 Wind Farm (the Northern Wind Farm Cluster). Even though these are two separate applications they will be considered in the same specialist report. Approximate centre points for these two projects are as follows:

- Hoogland 1: S31° 38’ 18.90” E22° 18’ 00.44”; and
- Hoogland 2: S31° 43’ 16.68” E22° 19’ 50.27”.

The farm portions affected by each are as follows:

- Hoogland 1:
    - Bastards Poort 2
    - Portion 2 of Droog Fontein 1
    - Portion 3 of Droog Fontein 1
    - Portion 2 of Duikerfontein 5

- Remainder of Duikerfontein 5
- Remainder of Portion 1 of Duikerfontein 5
- Portion 3 of Duikerfontein 5
- Remainder of Slange Fontein 6
- Remainder of Portion 1 of Slange Fontein 6
- Portion 7 of Slange Fontein 6
- Portion 1/24 Elands Fontein

- Hoogland 2:
  - Bastards Poort 2
  - Portion 2 of Duikerfontein 5
  - Remainder of portion 1 of Duikerfontein 5
  - Remainder of Portion 1 of Slange Fontein 6
  - Remainder of Slange Fontein 6
  - Portion 1 of Farm 7
  - Portion 2 of Farm 7
  - Remainder of Farm 7
  - Portion 2 of Gert Adriaans Kraal 18
  - Remainder of Gert Adriaans Kraal 18
  - Portion 1 of Snydersfontein 21
  - Remainder of Portion 1 of Drooge Onrust 22
  - Remainder of Portion 2 Drooge Onrust 22
  - Adj Drooge Onrust 23
  - Portion 1/24 Elands Fontein.

1.1. Project description

1.1.1. Wind farms

Each wind farm requires several key components to facilitate the generation of electricity at a large scale. These include:

- Wind turbines;
- Roads;
- Underground cables and overhead high voltage power lines (up to 66 kV);
- Two substations (including buildings for operations and maintenance, workshop, storage); and
- Two battery storage facilities in the vicinity of each substation.

Table 1-1 lists these various wind farm components and their specifications, as well as a detailed breakdown of their impact footprints or sizes per wind farm. Temporary areas necessary for construction are also included. The location of these components in relation to each wind farm site is shown on Figures 4 and 5 respectively.

Table 1-1: *Project components.*

Project Components	Description	Hoogland 1	Hoogland 2
Location	Central coordinates:	31° 38’ 18.90”S, 22° 18’ 0.44”E	31° 43’ 16.68”S, 22° 19’50.27”E

Project Components	Description	Hoogland 1	Hoogland 2
Access	For commuter traffic and some small loads, access from the south would be via Beaufort West via the N1 and R381 travelling between Beaufort West and Loxton. For abnormal loads the main access routes for each wind farm are as follows:	Through Loxton, south along the R381 towards HL01 and HL02	
Extent	The total area of the site being considered for developing each wind farm:	16 772 ha	17 832 ha
Number of wind turbines and generation capacity	Up to a maximum of 60 wind turbines per wind farm will be developed. The targeted nameplate generation capacity for each wind farm is up to a maximum of 420 MW.	60	60
	However, the number of turbines included in the layout for approval for each wind farm is as follows:	87	80
Wind turbine specifications	● Rotor diameter: 100 m to 195 m (50 m to 97.5 m blade / radius) ● Hub height: 80 m to 150 m ● Rotor top tip height: 130 m to 247.5 m (maximum based on 150 m hub + 97.5 m blade = 247.5 m) ● Rotor bottom tip height: minimum of 20 m (and not lower). See Figure 6.		
Turbine Foundations	Each turbine will have a circular foundation with a diameter of up to 35 m, alongside the 40 m hardstand (1400 m^2). The permanent total footprint is as follows:	8.4 ha (permanent)	8.4 ha (permanent)
Turbine Hardstands and Laydown Areas	Each turbine will have a permanent crane pad of 80 m x 40 m placed adjacent to each turbine foundation. The total permanent footprints are as follows:	19.2 ha (permanent)	19.2 ha (permanent)
	An additional 20 m x 40 m of temporary hardstand area will also be required near each of the crane pads. Further, a blade laydown area of 104 m x 20 m and an additional embankment area (where necessary due to slopes) of approximately 104 m x 5 m will be required. A temporary crane boom assembly area of 120 x 15 m will also be accommodated. Temporary areas are up to a maximum of a maximum of 5,200 m^2 per turbine. The total temporary footprints per wind farm are as follows:	31.2 ha (temporary)	31.2 ha (temporary)
Cabling	Turbines to be connected to on-site substation via up to 66 kV cables. Cables to be laid underground in trenches mainly adjacent to proposed wind farm roads (as part of the temporary impact of 'Site roads' below) but in some instances the cables will deviate from the road. Such sections of off-road cables amount to the following length and footprint:	10.7 km 6.4 ha (temporary)	7.6 km 4.6 ha (temporary)
	Where it has been possible, cables have been routed along existing local roads. Note that cables running next to public roads will not be able to run within the road reserve, but as close as possible to the road reserve in the adjacent privately owned land. These have the following length and footprint:	0.5 km 0.3 ha (temporary)	18.8 km 11.3 ha (temporary)
Internal wind farm overhead power lines	In limited instances, overhead monopole lines will be used where burying is not possible due to technical, geological,	0.2 km	0.5 km

Project Components	Description	Hoogland 1	Hoogland 2
	environmental or topographical constraints. Up to 66 kV overhead power lines supported by 132 kV monopole style pylons of up to 22 m high will be required, as well as tracks for access to the pylons. The total length of the line and the footprint of the pylons and tracks are as follows:	0.1 ha (permanent)	0.3 ha (permanent)
	Where possible, to reduce areas of new impact, sections of overhead line have been routed next to proposed Eskom overhead lines. Such sections of overhead lines have the following additional length and footprint:	3.2 km 1.9 ha (permanent)	10.2 km 6.1 ha (permanent)
Site roads	The total road network for each wind farm is as follows:	*122.2 km	*110.8 km
	Permanent roads will be 6 m wide and over above this may require side drains on one or both sides depending on the topography. Many roads will have underground cables running next to them. The permanent footprint of the road network for each wind farm is as follows:	*97.7 ha (permanent)	*88.7 ha (permanent)
	An up to 15 m wide road corridor may be temporarily impacted during construction and rehabilitated to allow for a 6 m road surface after construction. The temporary footprint of the road network for each wind farm is as follows:	*110.0 ha (temporary)	*99.7 ha (temporary)
	This total road network also includes upgrades to sections of public roads, to the following extent:	4.7 km (permanent)	3.6 km (permanent)
	This total road network also includes shared road infrastructure with the other wind farm in the cluster:	16. 9 km (permanent)	16. 9 km (permanent)
	This total road network also includes shared road infrastructure with Nuweveld North and West Wind Farm as follows:	N/A	11.6 km (permanent)
Wind farm Substations	Each wind farm will have two 150 m x 75 m substation yards that will include an Operation and Maintenance (O&M) building, Substation building and a High Voltage Gantry. The area for the two substation yards are as follows:	2.3 ha (permanent)	2.3 ha (permanent)
Battery energy storage system (BESS)	Each wind farm will also potentially have two ±3.5 ha areas for a battery energy storage system (BESS) which may be adjacent or slightly removed from each of the two substation depending on the local constraints. Each BESS may either be connected to the wind farm substation by an underground or overhead cable or may require its own substation which would be located within the BESS footprint and would be connected directly to the Eskom switching station via a short 132 kV overhead line.	7.0 ha (permanent)	7.0 ha (permanent)
Operations and maintenance (O&M) area	The O&M area will include all offices, stores, workshops and laydown area. The substation building will be housed in the substation yard.	Forms part of substation yard	Forms part of substation yard
Security	Security gate and hut to be installed at most entrances to each wind farm site (estimated as 4 entrances each at 20 m^2).	80 m^2	80 m^2

Project Components	Description	Hoogland 1	Hoogland 2
	No fencing around individual turbines, existing fencing shall remain around perimeter of properties. Temporary and permanent yard areas to be enclosed (with access control) with an up to 2.4 m high fence.		
Temporary areas required for the construction / decommissioning phase	Each wind farm will have the following temporary construction areas: ● Temporary site camp/s areas of ±20,000 m² ● Batching plant area of ±2,000 m² ● General laydown area of ± 36,000 m² ● Each wind farm will have a bunded fuel & lubricants storage facility at the site camp. Individual turbine temporary laydown areas including crane boom laydown areas, blade laydown areas and other potential temporary areas are detailed above under "turbine hardstands".	6 ha (temporary)	6 ha (temporary)
Shared offsite infrastructure: N1 Bypass Road	As part of the Nuweveld Wind Farms, a temporary bypass road is required on the N1 to avoid the town of Beaufort West with the major Wind Farm components. The road surface will be up to 6 m wide, with side drains, but a 12 m wide road corridor may be temporarily impacted during construction and rehabilitated once construction is complete. The length of the temporary road will be about 5.6 km of which about 2.5 km is along an existing track. It is planned that this road will also be used by the Hoogland Wind Farms and this is why it is shared infrastructure between the Nuweveld projects and these projects.	6.8 ha (shared, temporary)	6.8 ha (shared, temporary)
Other offsite shared infrastructure	Stream crossings upgrades along the R381 to the north of the project area and along the DR02314 to the north-west of the project area are required.	4.4 ha (shared, permanent) 5 ha (shared, temporary)	4.4 ha (shared, permanent) 5 ha (shared, temporary)
Total disturbance footprint based on a maximum of 60 turbines		165.7 ha temporary and 141 ha permanent	164.6 ha temporary and 136.3 ha permanent

*Note these areas represent more than will be impacted given the road values are based on all the turbines shown in the layout for each individual wind farm being constructed while in reality only 60 of these turbines will be developed per wind farm.

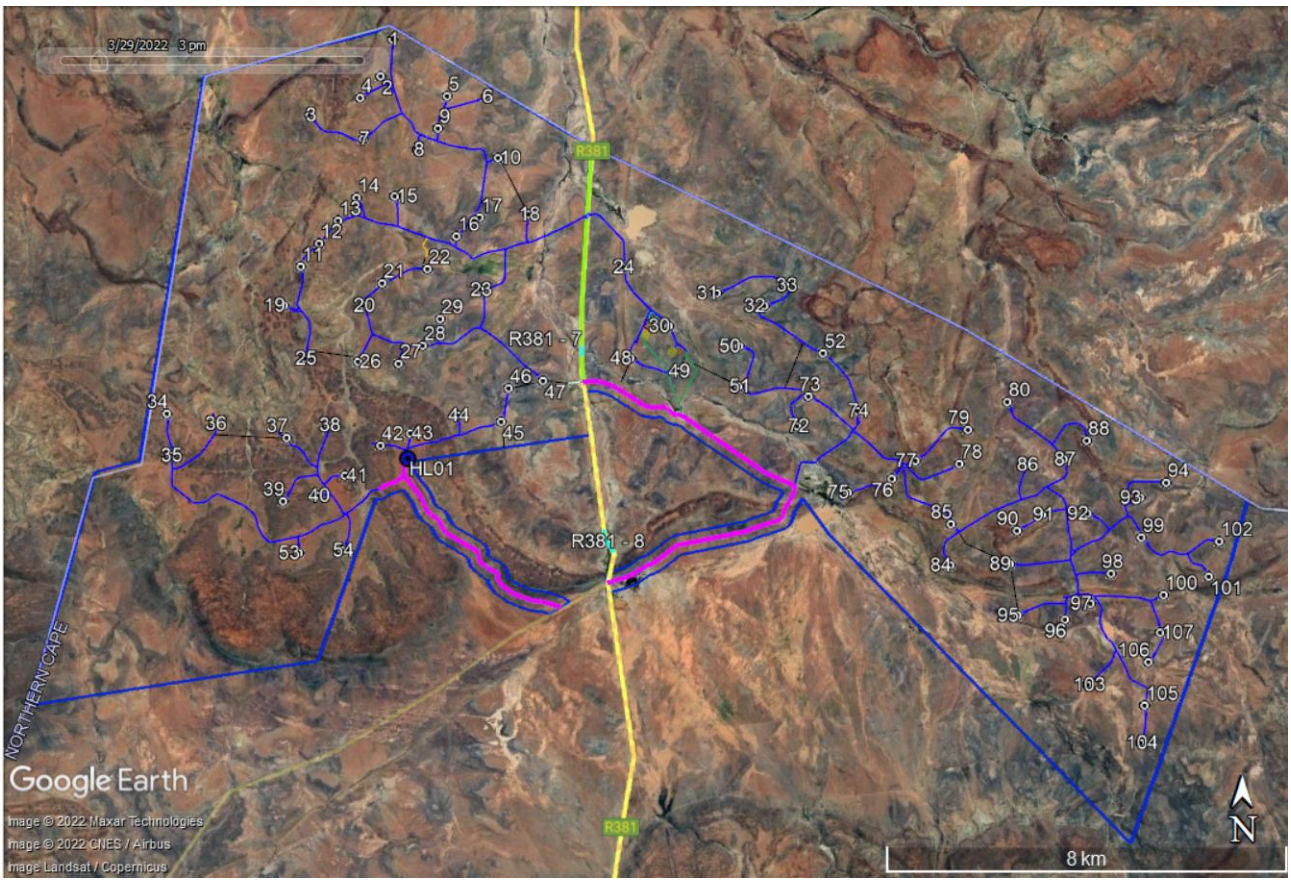


Figure 1-4: *Layout of Hoogland 1. Site boundary and road layout in blue, public road upgrade in green and shared infrastructure in purple.*

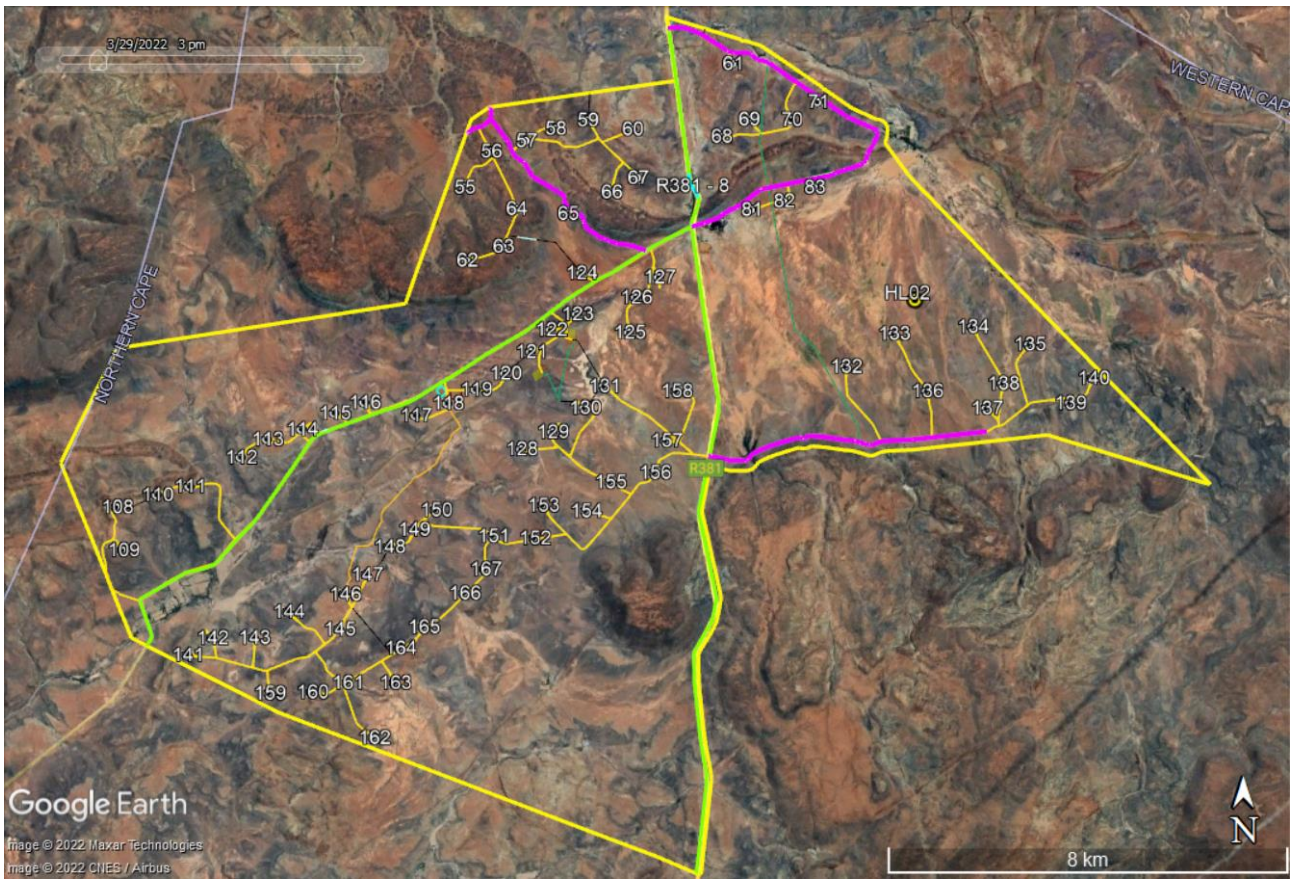


Figure 1-5: *Layout of Hoogland 2. Site boundary and road layout in yellow, public road upgrades in green and shared infrastructure in purple.*

1.1.2. Turbine specifications

Since the turbine technology is continually evolving it is not possible for the developer, at this early stage in the development process, to specify the exact turbine model and specification (or even know what would be available in the marketplace).

Assumptions have been made as to the maximum possible area of impact by the potential turbine blades based on a range of turbine sizes. This area of impact is referred to as the "exaggerated rotor swept area envelope", as it 1) takes into account multiple turbine size scenarios at once, and 2) assumes each turbine has the largest blade it can from the lowest hub height and extends this all the way up to the highest hub height. This reflects an exaggerated worst-case area of impact that would never be realised in any scenario of turbine model. These specifications are described in Table 1.1 and illustrated in Figure 1-6.

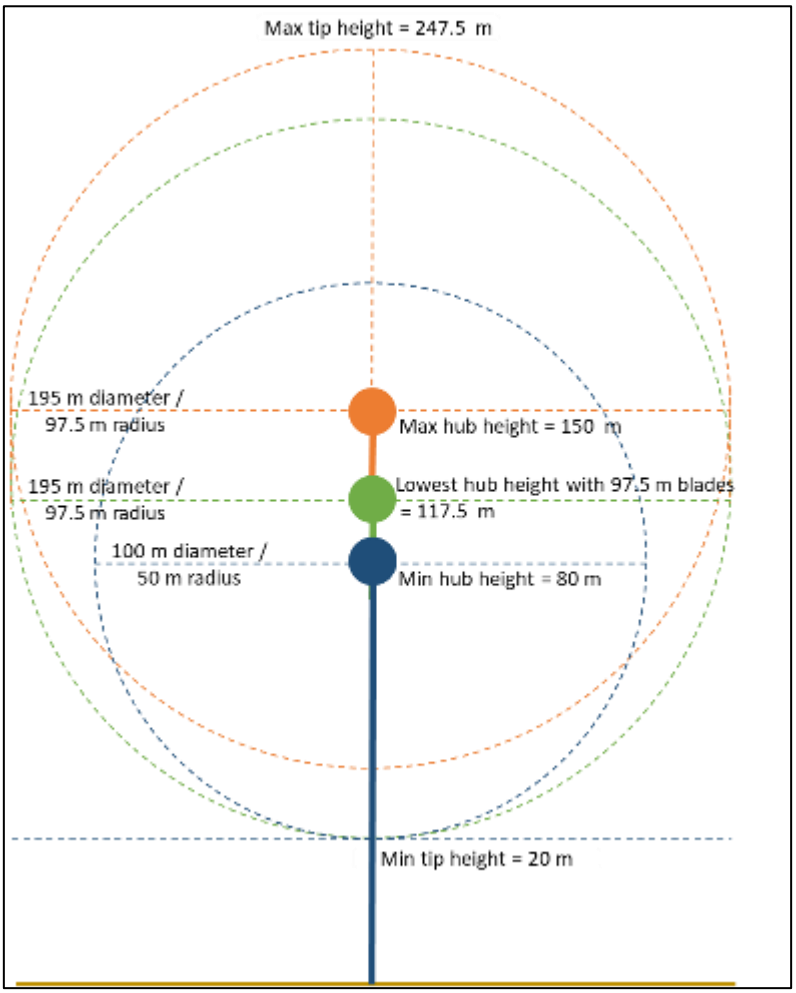


Figure 1-6: *Exaggerated rotor swept area envelope.*

1.1.3. Power transmission

Cables

At each turbine, power is stepped up to a maximum of 66 kV (either in the turbine or in a transformer container next to the turbine). Each turbine will be connected to their respective Wind Farm substation via high voltage power lines (~66 kV lines). For the most, part cables will be laid underground in trenches (~1 m deep), generally running alongside existing or proposed internal roads, but sometimes deviating from these. In limited instances, where burying of cables is not possible due to technical, geological, environmental or topographical constraints, then short overhead power lines will be erected to traverse these constrained areas.

Internal overhead power lines will be spanned using short 132 kV type monopoles of approximately 22 m in height. The typical design for the proposed internal overhead power line monopoles is depicted in Figure 1-7 below.

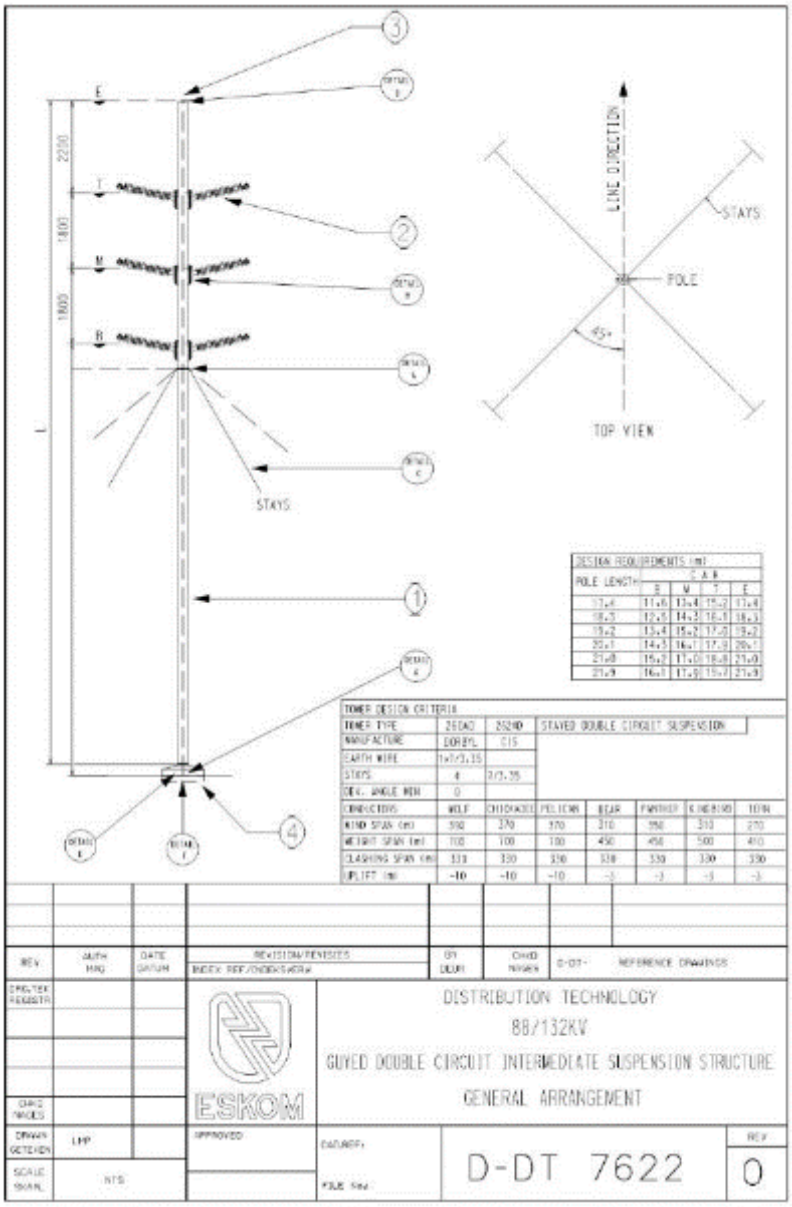


Figure 1-7: *Typical design of the proposed monopoles to be used for the up to 66kV internal overhead power lines (where trenching is not possible)*

Figure 1-4 and Figure 1-5 differentiate between 'Roads and Cables' where cables run alongside proposed or existing roads, 'Off-road Cables' where cables will not run alongside proposed or existing roads, and the 'Internal Overhead Power Lines' where trenching is not possible and overhead cables must be spanned.

Substations

Two substations have been provided for each wind farm. The high voltage (~66 kV) cables described above will collect at the Wind Farm Substations (with transformer) where the power will be stepped-up to 132 kV. The substation yard will house Operation and Maintenance (O&M) buildings, substation building and a High Voltage Gantry. The substation would typically include an area with a subterranean earthing mat onto which a number of concrete plinths are constructed. This, together with several earthing rods, will provide an earth for lightning and possible short circuit

currents. Switching gear, step-up transformers and protection equipment are also mounted on concrete plinths as part of the substation.

1.1.4. Battery facility

Each wind farm proposal includes the possibility for the development of a battery energy storage system (BESS). This will allow for a more continuous source of electricity to the grid as battery facilities can help to smooth out the fluctuations in energy generation from the renewable energy sources and allow them to be closer to conventional generation systems in this regard.

A BESS will be located in close proximity to each wind farm substation and therefore there will be two BESS per wind farm. Each BESS will be fenced off and will be linked to the substation via up to 66 kV cables. They will not have any additional office/ operation/ maintenance infrastructure. However, each BESS may require its own substation, and if this is the case this substation would include typical substation components and be located within the BESS footprint. If the BESS does have its own substation, then it will not have an up to 66 kV cable connection to the wind farm substation but would rather have a short 132 kV connection from the BESS substation to the Eskom switching station (which is situated next to the wind farm substation) and this would use monopole pylons up to 32 m in height.

The battery facility will either be Lithium Ion or Redox Flow and both technologies will be assessed as it is unknown which technology will be selected. The physical footprint of each BESS regardless of technology and grid connection will be approximately 3.5 ha with a peak discharge value of 140 MWac. A brief description of each technology is provided below.

Lithium-Ion

Charged lithium ions are carried via electrolytes between anode (negative electrode) and cathode (positive electrode) within each Lithium-Ion battery cell. There are a number of different battery chemistries that are available. These cells are combined into battery modules, which are housed in battery racks, a number of which are collectively enclosed in sealed containers. These are all assembled in factories and no electrolytic liquid is handled on site. In addition to the battery racks, other components within the containers includes a HVAC or air conditioning system, a fire detection and suppression system (that normally uses inert gas), battery management system and other electrical components required to manage the batteries. The containers are normally a standard size of about 12 m long x 2.5 m wide x 2.7-3 m high. The BESS on the wind farm site will comprise multiple containers (e.g. approximately 240, with an extra 3-5 containers for electrical connections and controls), refer to Figure 4 3 for an example of an installation. The main risk to health and the environment relating to for Lithium-Ion BESS is overheating that leads to spontaneous ignition and subsequent explosion i.e. fire. Since the batteries arrive on site sealed and kept in racks inside sealed containers the risk of chemical spills is extremely low. Figure 8 illustrates this system.

Figure 1-8: *Example of a 15-container Lithium-Ion BESS installation.*

Redox Flow

Redox flow batteries are charged and discharged by means of the oxidation–reduction reaction of a chemical whereby ions are transferred from one element to another. Redox flow batteries therefore comprise an electrochemical battery cell and a flowable electrolyte which is pumped through the cell for charging or discharging electricity and is stored in electrolyte tanks (one tank acting as a cathode and one as an anode). The most common Flow battery electrolytes are based on a water solution including vanadium, zinc or iron salts. Electrolyte storage tanks and cells are typically installed in specially designed steel containers providing secondary and tertiary containment measures (double wall). The containers are filled with electrolyte on site during project installation. Adjacent to this is another container housing the conversion systems and auxiliary systems necessary for the operation of the system (these include HVAC, fire detection and suppression, leak detection and suppression, BESS management), refer to Figure 1-9. The height of the installation will not exceed 3 m. The main environmental risk specific to Flow batteries during construction and operation is the accidental leak or spillage to the environment of the liquid electrolyte. The risk of fire and explosion is low. Figure 1-9 illustrates this system.

1.1.5. Roadworks

Due to restrictions on the R381 from Beaufort West, abnormal loads (including large turbine components) will be delivered from the north via the R381 (south of Loxton) and the DR02314 and DR02312 (south off the R356). These routes require upgraded watercourse crossings which occur outside the Wind Farm boundaries in both Western and Northern Cape. These are included in the Hoogland 1 and 2 application/s as shared infrastructure. The upgrades are required in order to strengthen the crossings and enable them to carry the abnormal loads required during construction. The strengthening will also protect them from flood-damage which could result in potential road closure during construction while repairs are undertaken (one has recently washed away). Table 1-2 lists these points, describing their current state. Since the assessments of the flows within the wider

catchments need to be undertaken before each new structure can be designed, it has been assumed that to accommodate the heavy vehicles and ensure accessibility to the site, all of the structures will be replaced with culverts or, where necessary, bridges.

As part of the Nuweveld Wind Farms, a temporary bypass road is required on the N1 to avoid the town of Beaufort West for transport of the major Wind Farm components. The road surface will be up to 6m wide, with side drains, but a 12m wide road corridor may be temporarily impacted during construction and rehabilitated once construction is complete. The length of the temporary road will be about 5.6 km of which about 2.5 km is along an existing track. It is planned that this road will also be used by the Hoogland Wind Farms and this is why it is shared infrastructure with the Nuweveld projects and included in each of the applications for the Hoogland 1 and Hoogland 2 Wind Farms. This bypass was assessed in Orton (2021b, 2021c, 2021d).

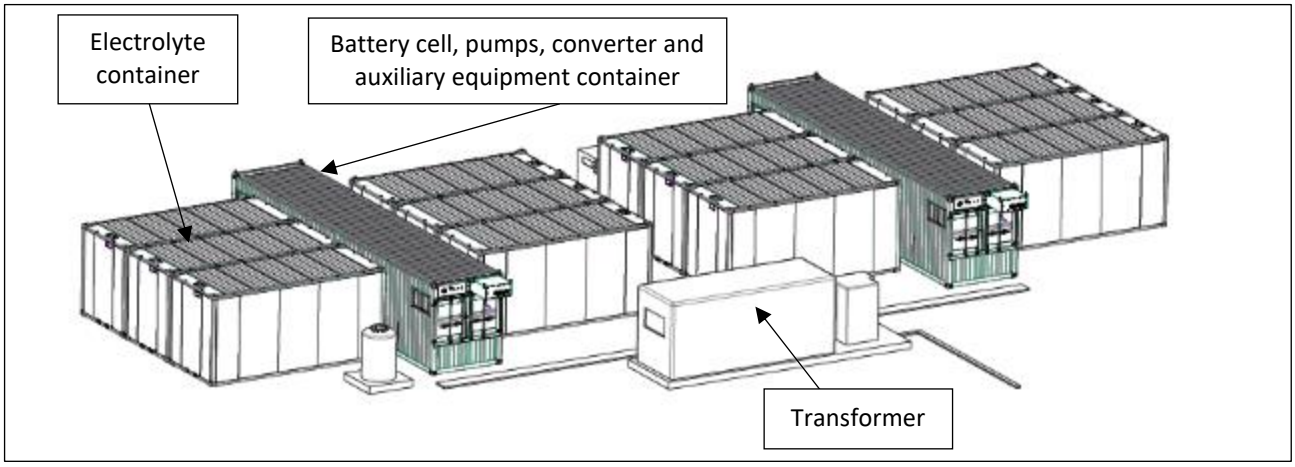


Figure 1-9: *Indicative layout of a Flow battery of approximately 0.1 ha.*

1.1.6. Grid Connection (not included in this report)

The remaining electrical infrastructure is not part of the Hoogland Wind Farm applications and is subject to a separate environmental authorisation process. This includes switching stations (adjacent to each wind farm substation) and a 132 kV line supported largely by 132 kV monopole pylons that connects to the Nuweveld Collector Substation. This will be transferred to Eskom once operational.

1.1.7. Shared infrastructure

Shared access roads

As described in Table 1-1 the Hoogland 1 and Hoogland 2 Wind Farms require shared access roads which are included in both applications should the wind farms not be developed concurrently. Refer to the layouts on Figure 1-4 and Figure 1-5 respectively. In addition, Hoogland 2 includes an access road already authorised as part of the adjacent Nuweveld North and West Wind Farms, should Hoogland 2 be developed before Nuweveld. This access road is therefore included in the assessment here as part of Hoogland 2 Wind Farm. Refer to the layout on Figure 1-6.

Offsite: N1 Bypass

As described in Table 1-1, as part of the Nuweveld Wind Farms, a temporary bypass road is required on the N1 to avoid the town of Beaufort West for transport of the major Wind Farm components. The road surface will be up to 6 m wide, with additional side drains, but a 12 m wide road corridor may be temporarily impacted during construction and rehabilitated once construction is complete. The length of the temporary road will be about 5.6 km of which about 2.5 km is along an existing track. It is planned that this road will also be used by the Hoogland Wind Farms and this is why it is shared infrastructure between the Nuweveld projects and these projects (Figure 4 6). The N1 bypass is included and assessed in both the Hoogland 1 and Hoogland 2 Applications.

Offsite: Watercourse crossing upgrades

Eight stream crossing upgrades along the R381 to the north of the project area and along the DR02314 to the north-west of the project area are required. See Table 1-2.

1.1.8. Timeframes

The formal EIA process typically takes 1 to 2 years to complete and if authorised the developer / applicant would then prepare the project for submission to the REIPPPP during a forthcoming bidding window. It is currently unknown when the future bidding windows will be. It must be noted that with the energy market in South Africa being deregulated, there is also a possibility that wind farms will be developed for private off-take (energy sold to private entities).

Should the project be selected and given “preferred bidder” status the project would then move into the next phase which includes obtaining other permits, licenses, including Water Use Licences, Rezoning permission, and other consents before reaching financial close which is normally less than 1 year after preferred bidder status is announced. Thus, construction is likely to commence no earlier than about 1 to 1.5 years after the issuing of an EA, but this is all dependent on how soon after obtaining the EA the next bidding window is and what the requirements are in the bidding round. The construction period for the facility is estimated to be between 18 to 24 months.

The operational life of a wind energy facility is typically around 20 years where after it could be refurbished / upgraded, or decommissioned depending on the situation at the time, and all subject to the relevant environmental processes and authorisations.

1.1.9. Identification of alternatives

A comprehensive iterative design process has been undertaken to inform the respective Wind Farm layouts and associated Grid Connection infrastructure for the Hoogland Projects.

Integrating the screening and assessment of environmental and social constraints alongside the technical components of the project early in a project lifecycle allowed for the reduction of risks to the project and supported the application of the mitigation hierarchy by demonstrating the avoidance and minimisation of impacts. This integrated design approach negates the need for the assessment of alternatives in the detailed EIA process (as per NEMA) because it is unlikely that there will any fatal flaws.

Table 1-2: Watercourse Crossing Upgrades and temporary Bypass Road.

Watercourse Crossing (No. & road)	Current Situation	Province and Municipality	Coordinates (North)	Coordinates (South)	Road reserve Landowners	Photograph
1. DR02314	Drift	Northern Cape, Namakwa DM, Karoo Hoogland LM	31° 46' 37" 22° 4' 22"	31° 47' 2" 22° 4' 26"	Northern Cape Government: Department of Roads and Public Works	
2 & 3. DR02314	Low water cement drift with culverts	Northern Cape, Namakwa DM, Karoo Hoogland LM	31° 48 ' 36" 22° 5 ' 24"	31° 49' 43" 22° 5' 42"	Northern Cape Government: Department of Roads and Public Works	 
4. DR02314	Low water cement drift with blocked culverts	Northern Cape, Namakwa DM, Karoo Hoogland LM; and Western Cape, Central Karoo DM, Beaufort West LM	31° 52' 49" 22° 5' 21"	31° 53' 2" 22° 5' 20"	Northern Cape Government: Department of Roads and Public Works; and Western Cape Government: Department of Transport and Public Works	
5. R381	Concrete bridge (dated 1952)	Northern Cape, Pixley ka Seme DM, Ubuntu LM	31° 32 ' 1" 22° 20 ' 27"	31° 32' 23" 22° 20' 19"	Northern Cape Government: Department of Roads and Public Works	

Watercourse Crossing (No. & road)	Current Situation	Province and Municipality	Coordinates (North)	Coordinates (South)	Road reserve Landowners	Photograph
						
6. R381	Concrete bridge (undated)	Northern Cape, Pixley Ka Seme DM, Ubuntu LM	31° 33' 17" 22° 21' 2"	31° 33' 33"; 22° 21' 7"	Northern Cape Government: Department of Roads and Public Works	
7. R381	Washed away, with recent repairs flood-damaged again in 2022	Western Cape, Central Karoo DM, Beaufort West LM	31° 38' 28" 22° 21' 10"	31° 38' 35" 22° 21' 10"	Western Cape Government: Department of Transport and Public Works	
8. R381	Concrete bridge with blocked culverts	Western Cape, Central Karoo DM, Beaufort West LM	31° 40' 27" 22° 21' 27"	31° 40' 42" 22° 21' 34"	Western Cape Government: Department of Transport and Public Works	
N1 Bypass	No existing road reserve but gravel tracks present over much of the alignment. Also includes a watercourse crossing upgrade: Low water cement drift with blocked culverts	Western Cape, Central Karoo DM, Beaufort West LM	32° 19' 56" 22° 35' 7"	32° 21' 41" 22° 32' 45"	Farm 185 & RE Erf 5372: Beaufort West Local Municipality	Previously assessed in Orton (2021b, 2021c, 2021d).

However, the preferred layouts of the Hoogland Wind Farms, and respective Grid Corridors, will each be assessed against the 'no-go' alternative. The 'no-go' alternative is the option of not constructing the Project where the status quo of the current farming activities on the site would prevail.

1.1.10. 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 conduct desktop research and a field assessment of the study areas to identify heritage sites. All sites were to be recorded with spatial data provided to the developer to facilitate the design of a sensitive layout. Subsequent deliverables include:

- Screening study (whole project)
- Site Sensitivity Verification reports (one per cluster and one per grid connection);
- Pre-application assessment reports (one per cluster and one per grid connection);
- Scoping report (Hoogland Northern cluster only); and
- Final impact assessment reports (one per cluster and one per grid connection).

NID applications were submitted for each of the six projects. The responses for Hoogland 1 and Hoogland 2 are relevant here and are shown below.

Hoogland 1 Wind Farm

NOTIFICATION OF INTENT TO DEVELOP: PROPOSED HOOGLAND 1 WIND FARM AND ASSOCIATED GRID CONNECTIONS, BETWEEN LOXTON AND BEAUFORT WEST IN THE NORTHERN AND WESTERN CAPE PROVINCES PORTION 2 OF DROOG FONTEIN 1 PORTION 3 OF DROOG FONTEIN 1, PORTION 2 OF DUIKERFONTEIN 5, REMAINDER OF DUIKERFONTEIN 5, PORTION 1 OF DUIKERFONTEIN 5, PORTION 3 OF DUIKERFONTEIN 5, REMAINDER OF SLANGE FONTEIN 6, PORTION 7 OF SLANGE FONTEIN 6, REMAINDER OF FARM 7, BEAUFORT WEST, SUBMITTED IN TERMS OF SECTION 38(1) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

CASE NUMBER: 21060101SB0818E

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 30 August 2021.

You are hereby notified that, since there is reason to believe that the proposed Hoogland 1 Wind Farm And Associated Grid Connections, Between Loxton And Beaufort West In The Northern And Western Cape Provinces Portion 2 Of Droog Fontein 1 Portion 3 Of Droog Fontein 1, Portion 2 Of Duikerfontein 5, Remainder Of Duikerfontein 5, Portion 1 Of Duikerfontein 5, Portion 3 Of Duikerfontein 5, Remainder Of Slange Fontein 6, Portion 7 Of Slange Fontein 6, Remainder Of Farm 7, 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:

- Visual impact assessment study
- Archaeology impact assessment study
- Palaeontological impact assessment study

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.

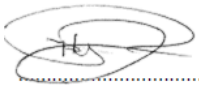
The comments of relevant registered conservation bodies; all Interested and Affected parties; and the relevant Municipality must be requested and included in the HIA where provided. Proof of these requests must be supplied.

Please note, should you require the HIA to be submitted as a Phased HIA, a written request must be submitted to HWC prior to submission. HWC reserves the right to determine whether a phased HIA is acceptable on a case-by-case basis.

If applicable, applicants are strongly advised to review and adhere to the time limits contained the Standard Operational Procedure (SOP) between DEADP and HWC. The SOP can be found using the following link http://www.hwc.org.za/node/293

Kindly take note of the HWC meeting dates and associated agenda closure date in order to ensure that comments are provided within as Reasonable time and that these times are factored into the project timeframes.

HWC reserves the right to request additional information as required.
Should you have any further queries, please contact the official above and quote the case number.



Michael Janse van Rensburg
Chief Executive Officer: Heritage Western Cape

Hoogland 2 Wind Farm

NOTIFICATION OF INTENT TO DEVELOP: PROPOSED HOOGLAND 2 WIND FARM AND ASSOCIATED GRID CONNECTIONS, BETWEEN LOXTON AND BEAUFORT WEST IN THE NORTHERN AND WESTERN CAPE PROVINCES ON BASTARDS POORT 2, PORTION 2 OF DUIKERFONTEIN 5, REMAINDER OF PORTION 1 OF DUIKERFONTEIN 5, REMAINDER OF PORTION 1 OF SLANGE FONTEIN 6, REMAINDER OF SLANGE FONTEIN 6, PORTION 1 OF FARM 7, PORTION 2 OF FARM 7, REMAINDER OF FARM 7, PORTION 2 OF GERT ADRIAANS KRAAL 18, REMAINDER OF GERT ADRIAANS KRAAL 18, PORTION 1 OF SNYDERSFONTEIN 21, REMAINDER OF PORTION 1 OF DROOGE ONRUST 22, REMAINDER OF PORTION 2 DROOGE ONRUST 22, ADJ DROOGE ONRUST 23, PORTION 1/24 ELANDS FONTEIN, BEAUFORT WEST, SUBMITTED IN TERMS OF SECTION 38(1) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)
CASE NUMBER: 21060102SB0818E

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 30 August 2021.

You are hereby notified that, since there is reason to believe that the proposed Proposed Hoogland 2 Wind Farm and associated grid connections, between Loxton and Beaufort West in the Northern and Western Cape Provinces on Bastards Poort 2, Portion 2 of Duikerfontein 5, Remainder of portion 1 of Duikerfontein 5, Remainder of Portion 1 of Slange Fontein 6, Remainder of Slange Fontein 6, Portion 1 of Farm 7, Portion 2 of Farm 7, Remainder of Farm 7, Portion 2 of Gert Adriaans Kraal 18, Remainder of Gert Adriaans Kraal 18, Portion 1 of Snydersfontein 21, Remainder of Portion 1 of Drooge Onrust 22, Remainder of Portion 2 Drooge Onrust 22, Adj Drooge Onrust 23, Portion 1/24 Elands Fontein, 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;
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(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:

- Visual impact assessment study
- Archaeology impact assessment study
- Palaeontological impact assessment study

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.

Please note, should you require the HIA to be submitted as a Phased HIA, a written request must be submitted to HWC prior to submission. HWC reserves the right to determine whether a phased HIA is acceptable on a case-by-case basis.

If applicable, applicants are strongly advised to review and adhere to the time limits contained the Standard Operational Procedure (SOP) between DEADP and HWC. The SOP can be found using the following link http://www.hwc.org.za/node/293

Kindly take note of the HWC meeting dates and associated agenda closure date in order to ensure that comments are provided within as Reasonable time and that these times are factored into the project timeframes.

HWC reserves the right to request additional information as required.
Should you have any further queries, please contact the official above and quote the case number.

.....
Michael Janse van Rensburg
Chief Executive Officer: Heritage Western Cape

Heritage Western Cape
Erfenis Wes-Kaap
ILifa leMveli leNtshona Koloni

27 SEPT 2021

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 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 DFFE who will review the EIA 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. Specialist credentials

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.

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 an EIA. The present report provides the heritage component. HWC is required to provide comment on the Western Cape sections of the proposed projects (i.e. the wind farms and some river crossings), while Ngwao-Boswa Ya Kapa Bokoni (NBKB; Heritage Northern Cape; for built environment and cultural landscapes) and the South African Heritage Resources Agency (SAHRA; for archaeology and palaeontology) are required to comment on the Northern Cape sections (i.e. some of the river crossings) in order to facilitate final decision making by the DFFE.

2.2. Application timeline

The application to DFFE under NEMA is currently in the EIA phase with circulation of a Draft EIR estimated to be in mid- August 2022.

3. APPROACH

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 3-1. Data were also collected via a field survey.

Table 3-1: *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

Data / Information	Source	Date	Type	Description
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.

3.2. Field survey

The site was subjected to a detailed foot survey on 1 April, 2 April, 17 May, 9 September, 10 September 2021, 4 February, 5 February and 29 March 2022. All but two of these days had two archaeologists (Anja Huisamen and the author) on site. A helicopter flight around the broader study area was also undertaken in May 2021 to familiarise specialists with the landscape. Observations from earlier (2019) work in the area have also been included in this report where relevant. The surveys were during various seasons but, in this 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 Global Positioning System (GPS) receiver set to the WGS84 datum (Figure 3-1). Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed developments.

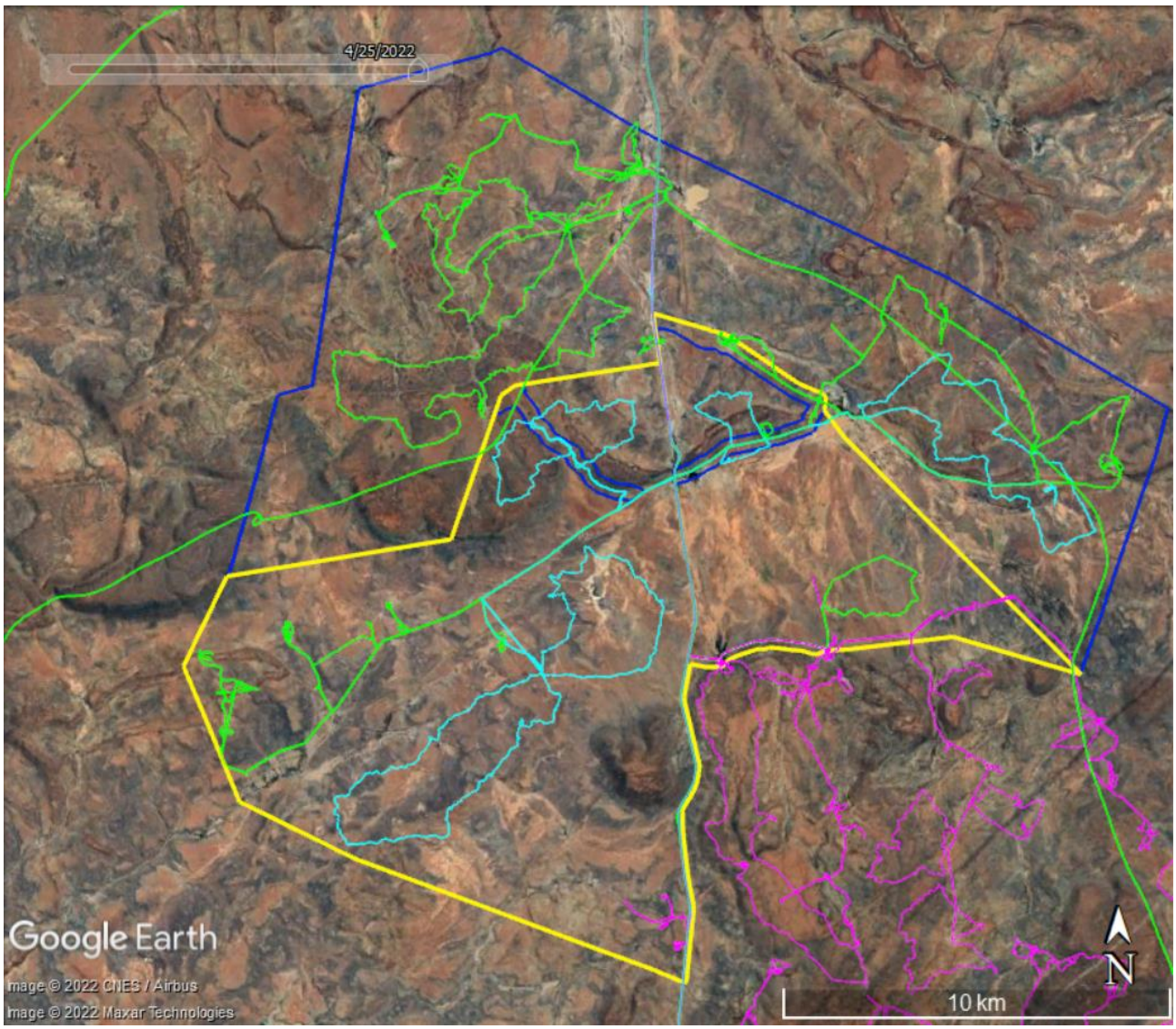


Figure 3-1: *Aerial view of the study areas (blue polygon = HL01, yellow = HL02) showing the survey tracks (green [2021] & turquoise [2022] and purple [2019, Nuweveld project] lines).*

Early surveys aimed to document as many heritage resources as possible so as to be able to produce the required sensitivity data for screening purposes. Subsequent surveys focused more strongly on turbine locations and also aimed to fill in any gaps in coverage in areas favourable for development. Because of the technical process followed to design a wind farm layout, turbines are more difficult to move during the preconstruction micrositing than roads. For this reason, more focus was placed on turbines than on roads. Areas not under consideration for development received minimal or no survey coverage. Survey coverage was also generally less dense on the open plains because they were found to be less sensitive than the hilly areas and valleys.

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

3.3. Specialist studies

As per the HWC NID responses, each of the projects required specialist studies of archaeology, palaeontology and visual impacts. While the former is conducted by the present author and included within the body of the HIA, palaeontology is being considered by Dr John Almond of Natura Viva cc and visual impacts are assessed by Bernie Oberholzer and Quinton Lawson of QARC.

3.4. Impact assessment

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

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 draft HIA was submitted to relevant interested and affected parties as required by HWC in their response to the NID application (Section 1.2). The report was also included in the main public participation process (PPP) required under NEMA as part of the EIA.

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 is very extensive and a comprehensive survey was impossible. It is assumed that the adopted survey methodology (as described in Section 3.2) has recorded a good sample of the area's heritage and allowed for a reliable assessment of the potential impacts of the development. It is further assumed that the layouts provided for assessment are an accurate reflection of the final proposal. The eastern part of Portion 1 of Farm 5 in HL01 was not accessible for survey.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The wind farm sites are 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. All local roads are gravel and 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 HL01 and HL02 sites are not within a Renewable Energy Development Zone (REDZ), but the recently gazetted Beaufort West REDZ (DFFE 2021) lies some 6.5 km south of HL02 (Figure 4-1). The Central Electricity Grid Infrastructure (EGI) corridor lies just to the east of the study areas.

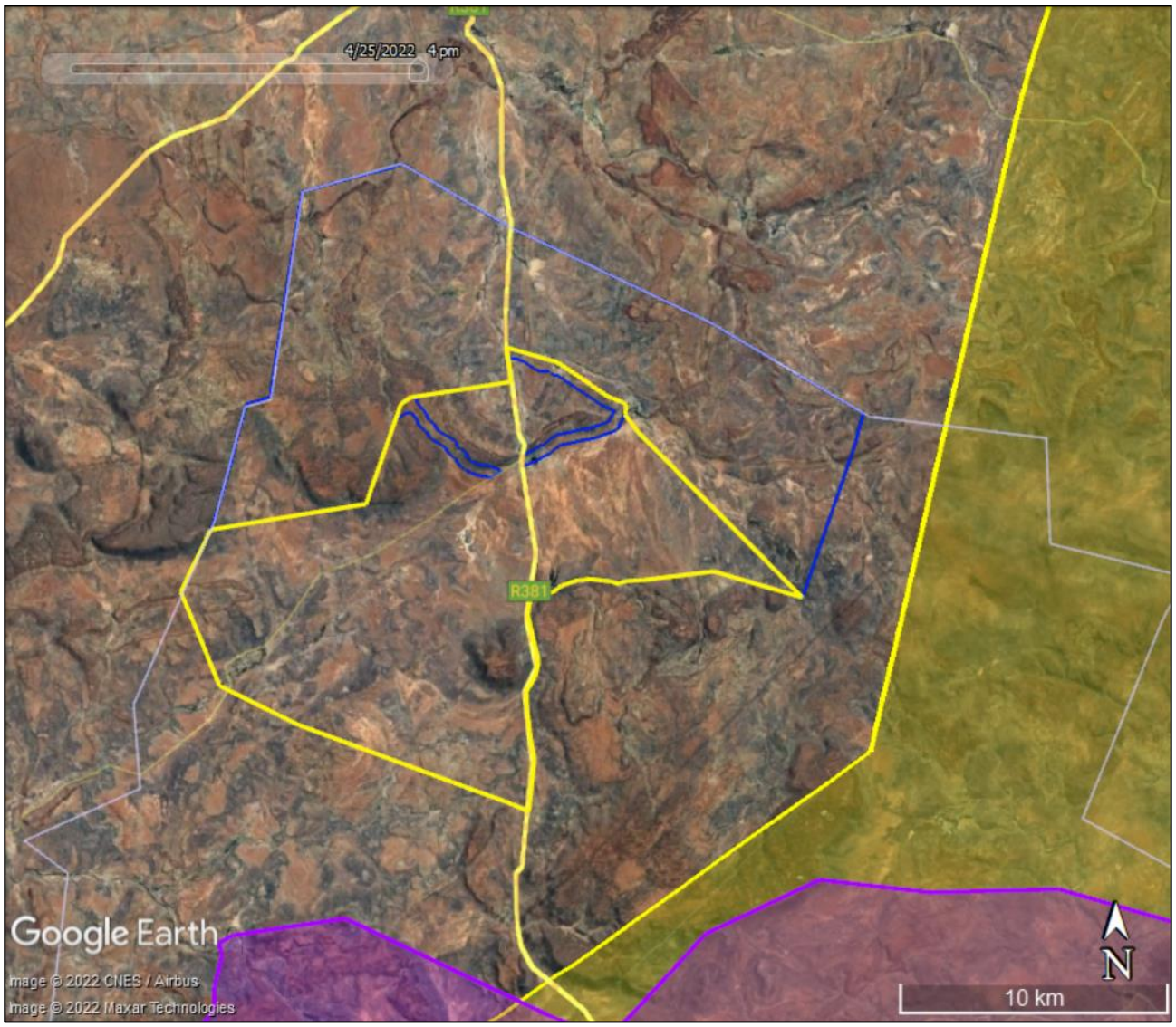


Figure 4-1: *Aerial view of the HL01 and HL02 study areas showing the location of the Beaufort West REDZ several km to the south (purple shaded polygon) and the Central EGI corridor a few km to the east (yellow shaded polygon).*

4.2. Site description

The wind farm sites are located north of the highest part of the Great Escarpment on land varying in elevation from 1390 m above mean sea level (amsl) to 1550 m amsl. Large parts of the overall study area lie on extensive flat, silty plains and these are bounded variably by dolerite dykes that form small or large ridges or hills and low sandstone scarps. In places shale is visible on the surface but this is largely limited to riverbeds. It is generally very hilly and rocky, although the majority of the rocks do not form cliffs but break into pieces through erosion and weathering. The exception is the bands of sandstone that occur in places and are more resistant to weathering. These create low cliffs (in the order to 1 to 5 m high and sometimes result in the formation of rock shelters. Narrow, incised valleys with well-defined rivers are rare. Vegetation tends to be relatively sparse due variably to the elevation and exposure, limited rainfall and sometimes very rocky substrates. Figures 12 to 16 and 17 to 20 provide a series of views across the HL01 and HL02 study areas respectively to show the general character of the landscape.

Figure 4-2: *Looking southeast from near the north-western edge of the HL01 site.*

Figure 4-3: *Looking southwest from near the northern edge of the HL01 site.*

Figure 4-4: *Looking south through the eastern part of the HL01 site.*

Figure 4-5: *Looking northeast from near the northern edge of the HL01 site.*

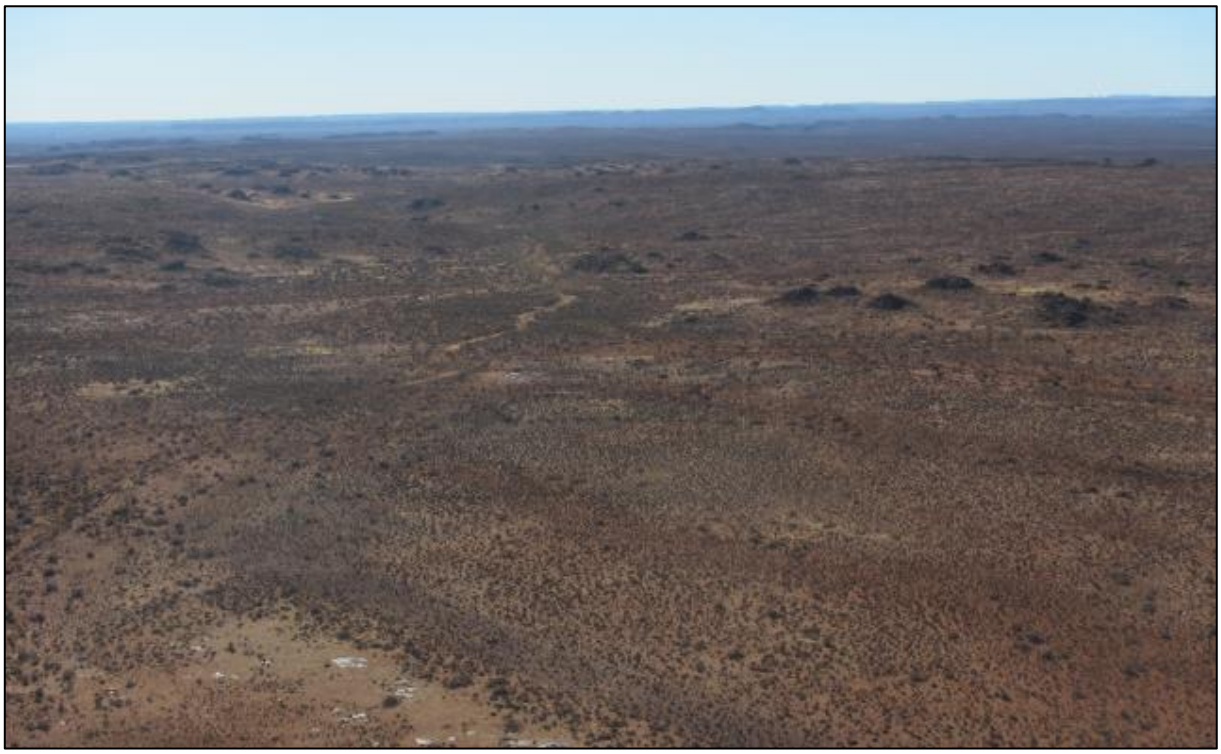


Figure 4-6: *Aerial view looking north through the western part of the HL01 site.*

Figure 4-7: *Looking southeast in the northern part of the HL02 site.*

Figure 4-8: *Looking west in the eastern part of the HL02 site.*

Figure 4-9: *Looking east through a flat plain in the western part of the HL02 site.*

Figure 4-10: *Looking east from high ground in the far western part of the HL02 site.*

5. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project.

5.1. Palaeontology

The SAHRIS Palaeosensitivity map shows both study areas to be of largely very high sensitivity but with patches of moderate and zero sensitivity (Figure 5-1 and Figure 5-2).

Figure 5-1: *Extract from the SAHRIS Palaeosensitivity map showing the HL01 study area to be of very high, moderate and zero palaeontological sensitivity (red, green and grey shading respectively).*

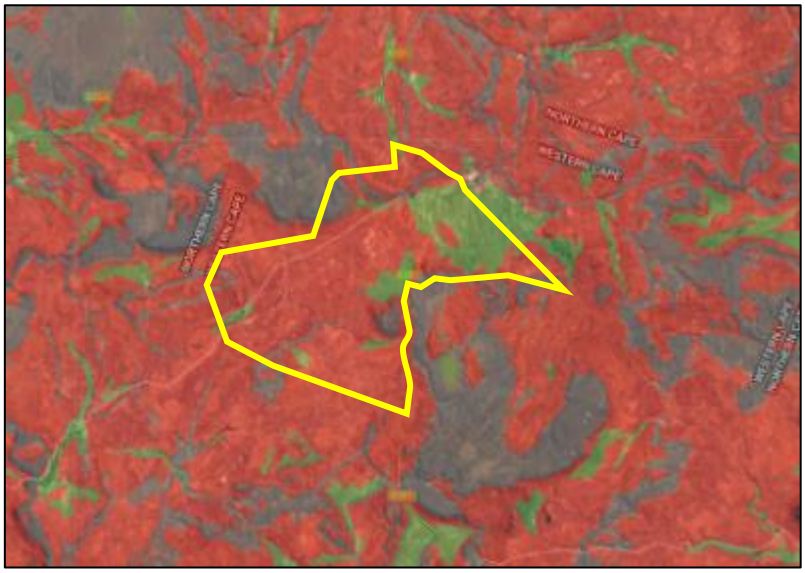


Figure 5-2: *Extract from the SAHRIS Palaeosensitivity map showing the HL02 study area to be of very high, moderate and zero palaeontological sensitivity (red, green and grey shading respectively).*

Almond (2022:i) found that the study area "is underlain by continental sediments of the Lower Beaufort Group (Karoo Supergroup) of Middle to Late Permian age." He notes that existing records of fossil sites are rare from the area and that his surveys produced relatively few new sites. Finds included several tetrapod skulls and post-cranial skeletal remains with these being mostly "small-bodied therapsids such as dicynodonts and therocephalians, numerous tetrapod burrow casts, as well as low diversity trace fossil assemblages but no unequivocal fossil wood and only fragmentary plant material."

He concludes that "well-preserved fossils of scientific and conservation interest are remarkably rare within the project area as a whole. This is attributed to (a) poor levels of bedrock exposure associated with generally low relief and pervasive cover by largely unfossiliferous superficial sediments; (b) extensive dolerite intrusion which has "sterilized" large volumes of potentially fossiliferous bedrocks through thermal metamorphism, leaching and secondary mineralisation, while the large dolerite outcrop areas in the uplands are completely fossil-free; (c) highly impoverished fossil biotas within the Abrahamskraal Formation to lowermost Teekloof Formation (Poortjie Member) stratigraphic interval that are associated with the catastrophic end Middle Permian Mass Extinction Event of ~260 Ma."

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). In this dry landscape, LSA archaeological sites are well-known to be focused most strongly on water sources. This pattern was well demonstrated locally by Orton (2021a, 2021b, 2021c, 2021d), but the 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 archaeological deposits (the latter are unknown from the Nuweveld area though).

The Roggeveld Mountains in the Komsberg REDZ, some 150 km along the escarpment to the southwest, have been extensively studied and also show a very limited amount of Stone Age archaeology. Van der Walt (2016) found an area just above the escarpment to have very few stone artefacts. Hart (2015), working just south of the escarpment edge, noted in his study that precolonial remains were entirely absent and cited the lack of suitable stone for artefact manufacture as the main reason. Orton (2017) working both above and below the escarpment (north and east of Hart's (2015) study area) also noted a remarkable paucity of Stone Age materials but did record a very impressive precolonial kraal complex with minimal associated LSA materials on high ground above the escarpment, and one small geometric tradition rock painting at the base of the escarpment closer to Merweville. Webley and Hart (2010) examined a site to the east of Loxton and located just two flakes that they considered to be of MSA origin. Some 70 km northeast of the present study area, Halkett and Webley (2011) noted fairly widespread background scatter artefacts all of which they attributed to the MSA. Further east, Hart (2016) found Stone Age traces (other than rock art) to be generally quite rare and generally limited to artefact scatters close to rivers.

An interesting aspect of Karoo archaeology 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 65 km to the southeast and 135 km to the north-northeast 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.

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 5-3). Van der Walt (2016) found a rock shelter with fineline paintings at the head of a river valley leading off the escarpment in the Komsberg. About 100 km east of the present study area, Hart (2016) noted that hundreds, if not thousands, of rock art sites occurred in his study area. Most were engravings on dolerite outcrops with many of them being heavily patinated. However, younger images extending into the recent historical past were also documented. He also found an exceptional painted site that was layered with paintings of various ages. Unusually, this site also included engravings on its walls. Parkington *et al.* (2008) have documented many engravings in the 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 5-3: *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.*

Until Orton's (2021a, 2021b, 2021c, 2021d) 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. 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). To the west, in the Komsberg REDZ, Hart (2015) found the remains of stone ruins to be very common. He attributed these to the Trekboers who colonised the area in the 18th and 19th centuries. He noted kraals, stockposts and occasional farmsteads. Also in that area, Van der Walt (2016) found very few ruins but some were the remains of Anglo-Boer War fortifications. Not far to the east, Orton (2017) recorded stone-built ruined structures including two small farm complexes at the foot of the escarpment and a few other indeterminate small structures that were likely shepherd's huts both above and below the escarpment.

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 (Figure 5-4 and Figure 5-5).

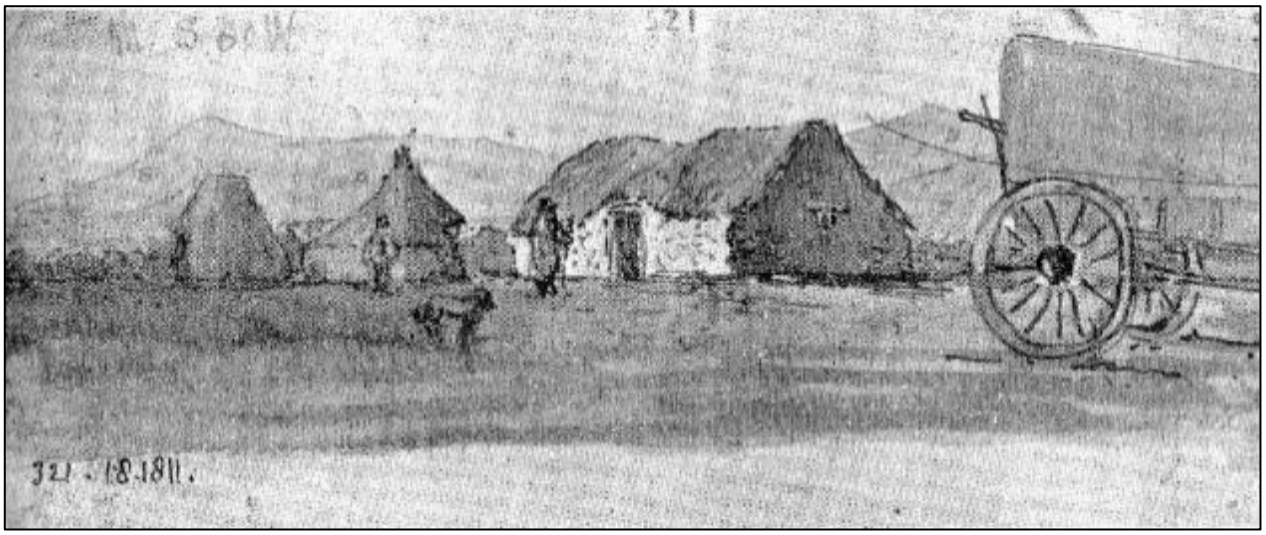


Figure 5-4: *Drawing of an early 19th century trekboer farmhouse by William Burchell. Source: Van Zyl (1975:103).*

Figure 5-5: *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 (Figure 26 & 27). Morris (1988) has reviewed the 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.

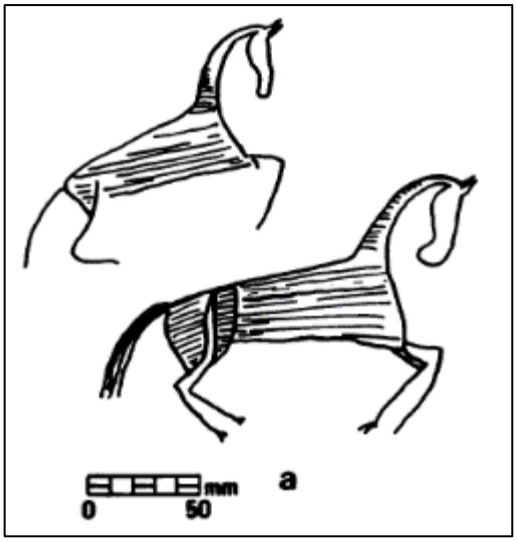


Figure 5-6: *Horse engravings from the Beaufort West area. Source: Morris (1988: fig. 3a).*

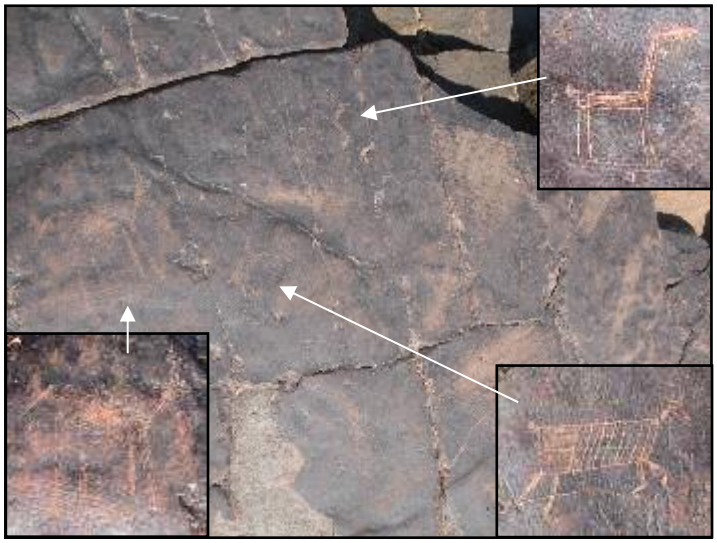


Figure 5-7: *Horse engravings from east of Beaufort West. Source: Orton (2010: fig. 44).*

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 an area about 160 km northeast of the Hoogland 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."

5.2.2. Site visit

The study area has been found to be rich in archaeology, but with sites being in clusters that are often quite far apart. The vast majority of the recorded archaeology dates to the colonial period but Stone Age sites were also present. Appendix 2 lists and describes all the finds with the highlights being presented and illustrated in this section.

The vast majority of the Stone Age finds were from the LSA, although occasional finds of older stone artefacts were also noted. One such scatter was near a dolerite scarp with the heavy patination on the artefacts indicating their relatively great age – the artefacts are no doubt from the MSA (waypoint 059; Figure 5-8). Background scatter artefacts (essentially precolonial litter) were generally uncommon, but when such artefacts were found they tended to be in areas with a light gravel covering and were very ephemeral. These materials are all likely to be of Pleistocene age and, because of their small numbers, are of no consequence. One such ephemeral scatter was found on a river terrace in HL01 at waypoint 1683. No Early Stone Age (ESA) material was seen.

Figure 5-8: *Collection of very well-patinated hornfels flaked stone artefacts dating to the MSA (waypoint 059 in HL01). Scale = 5 cm.*

A few proper LSA occupation sites were found, but all were surface scatters. One was an extensive artefact scatter on the southern side of a river in HL02 (but also HL01 due to shared infrastructure; waypoint 1703; Figure 5-9 & Figure 5-10). Most artefacts are in hornfels but some are in wacke. There are also many ostrich eggshell fragments. An unusual occurrence was a small enclosure or 'clearing' amongst dolerite boulders with a few stone artefacts, some ostrich eggshell, a burnt bone and a fragment of refined white earthenware in it in HL01 (waypoint 1723; Figure 5-11 & Figure

5-12). The site may have been used as a location from which to survey the plains for game. Another significant site lies in the far east of HL01 and comprises of an extensive but relatively low density artefact scatter that includes some grindstones waypoint 1731; Figure 5-13 & Figure 5-14). Also present are ostrich eggshell fragments and a piece of pottery. Single fragments of refined white earthenware and glass may indicate a late date for the site or could have been dropped there later. One site in HL02 located close to the point where a stream cut through a dolerite dyke had pottery, an unfinished bead a lower grindstone and various flaked stone artefacts (waypoint 079; Figure 5-15 & Figure 5-16). Many other LSA sites occurred but most were ephemeral to light scatters of stone artefacts, sometimes including ostrich eggshell fragments.

Figure 5-9: *The location of the dense LSA artefact scatter at waypoint 1703 in HL01 & HL02.*

Figure 5-10: *Stone artefacts and ostrich eggshell at waypoint 1703 in HL01 & HL02. Scale in cm.*

Figure 5-11: *The small 'clearing' on a dolerite dyke at waypoint 1723 in HL01.*

Figure 5-12: *Finds located in the 'clearing' at waypoint 1723 in HL01. Scale in cm.*

Figure 5-13: *The location of the scatter at waypoint 1731 in HL01 at the foot of a dolerite ridge and with a stream in the background.*

Figure 5-14: *Surface appearance showing a lower grindstone and flaked artefacts among gravel at waypoint 1731 in HL01. Scale in cm.*

Figure 5-15: *Stone artefacts, ostrich eggshell fragments, an unfinished bead and a potsherd from waypoint 079 in HL02. Scale in 1 and 5 cm intervals.*

Figure 5-16: *A lower grindstone at waypoint 079 in HL02. Scale in 1 and 5 cm intervals.*

LSA engraved sites also occur but just one has been found in the present study area. It lies in the northeast of HL01 on the same ridge as the small 'clearing' described above. It is an engraved boulder bearing two animals, one of which is clearly an eland due to the presence of a hump. The other animal is less clear, although it has far larger forequarters than hindquarters which might suggest a hyena (Figure 5-17).

Figure 5-17: *Dolerite boulder with two LSA engraved animals on it (waypoint 512 in HL01). The species of the lower left one is indeterminate (although the larger forequarters seem hyena-like), but the upper right one shows the hump characteristic of an eland. Scale in cm.*

One rock painting site is known from the study area thus far – it is in HL01. It is a very faded finger-painted geometric painting in a rock shelter that also contains much scratched historical graffiti (waypoint 1676; Figure 5-18 & Figure 5-19). A few stone artefacts, ostrich eggshell and bone fragments occur in and around the shelter.

Figure 5-18: *The rock shelter containing painting and graffiti (waypoint 1676 in HL01).*

Figure 5-19: *Close up of the remnant paint showing horizontal finger smears (waypoint 1676 in HL01). Scale in cm.*

The colonial period archaeological sites would have been made by the trekboers who colonised this area during the 18th and 19th centuries but evidence of occupation of these sites into the early 20th century was also found in a few instances. These sites are stone-built farm complexes with livestock

enclosures (kraals), houses, cooking shelters (kookskerms), rare threshing floors (trapvloere), various other unidentifiable stone structures and graves. Importantly, they sometimes have associated ash and rubbish dumps which contain extensive material evidence relating to day-to-day life during occupation of these sites. These sites are invariably located along rivers and, for this reason, should largely be protected from harm. Figure 25 above shows an example of a stone-built house photographed in the early 20th century while still in use. The roof would have been of poles, branches, sacking, sheepskins, or other suitable materials. This is probably what many of the less formal stone houses in the area looked like. More formal rectangular houses would have had flat roofs, brakdak during earlier times with corrugated iron coming later.

One such complex is at Bulskolk located in the centre of the HL02 study area at waypoints 98 to 112 and serves well to illustrate a number of the types of features expected on these sites. This complex actually contains older, derelict and ruined 19th century (or possibly older) components as well as more recent components dating to the early and mid-20th century and that, although derelict, can still be regarded as built structures. Figure 5-20 shows a small cottage ruin at waypoint 098. It is located to the north of the main part of the complex and was probably a labourer's cottage. Figure 5-21 to Figure 5-23 show views of what seems to have been the main house. It was added to many times with different materials and, interestingly, even included sun dried bricks made from what must have been riverbank mud that had an LSA site on it – the bricks contain stone artefacts, ostrich eggshell fragments and bones. Figure 5-24 shows a kraal complex probably used to house young animals and/or their mothers (waypoint 110). Plans of the main house and kraal are shown in Figure 5-25 and Figure 5-26. A further large kraal also occurs in the complex (waypoint 099; Figure 5-27) as does a threshing floor which is probably fairly recent (waypoint 108; Figure 5-28).

Figure 5-20: *Ruined structure at waypoint 098 in HL02.*

Figure 5-21: *Part of a house at waypoint 112 in HL02.*

Figure 5-22: *Part of a house at waypoint 112 in HL02 showing sun-dried bricks, stone walls and a filled in doorway.*

Figure 5-23: *Part of a house at waypoint 112 in HL02 showing stone walling and a remnant of a brakdak.*

Figure 5-24: *A stone-walled structure that looks to have been a set of kraals (waypoint 110 in HL02).*

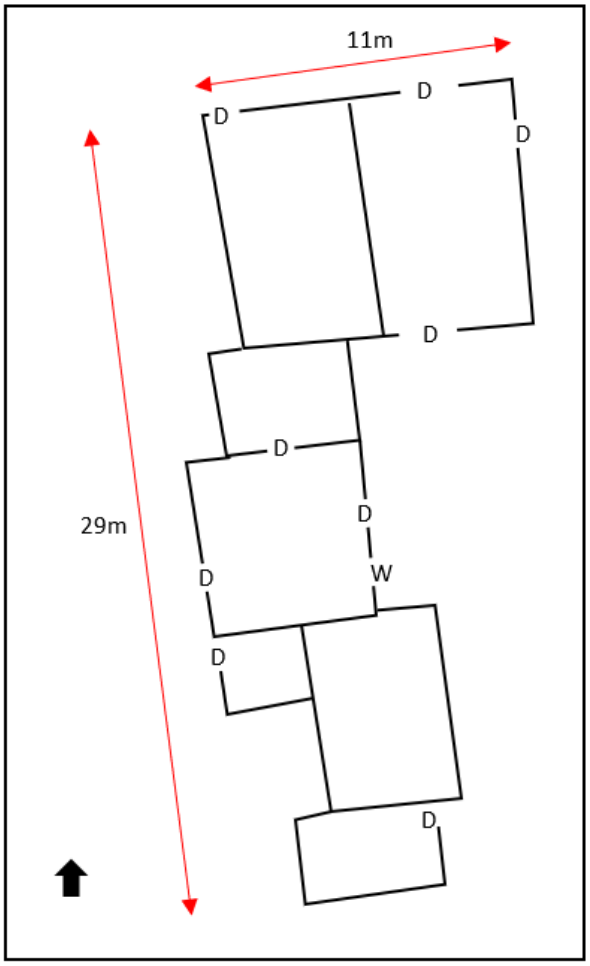


Figure 5-25: *Plan of the house at waypoint 112 in HL02.*

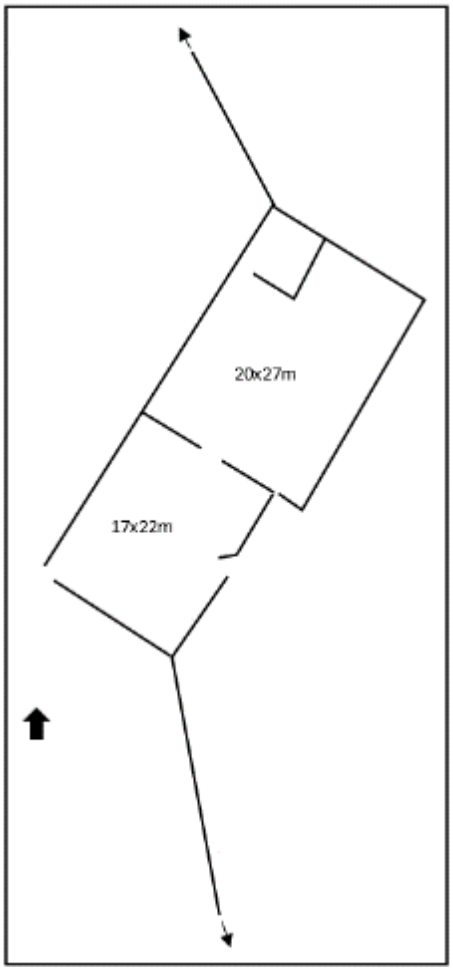


Figure 5-26: *Plan of the kraal at waypoint 110 in HL02.*

Figure 5-27: *A large stone kraal, undoubtedly the primary kraal for the farm (waypoint 099 in HL02).*

Figure 5-28: *The threshing floor and 20th century ruined structure at waypoint 108 in HL02.*

Related features include an extensive stone wall stretching towards the south and then turning west and which was not examined or mapped in detail and infrastructure related to the control and distribution of water. A large stone-lined farm dam occurs at waypoint 100 and smaller *leiwater* features lie below the dam wall (Figure 5-29). The large dam has a metal outlet pipe controlled by a valve with "HEATON HALIFAX" embossed on it. Heaton is a company that started manufacturing valves in Halifax, England, in 1943 which indicates this dam to date no earlier than the mid-20th century. The dam shows the continuation of traditional building methods, no doubt to save money. While a modern metal pipe and valve were necessities, the wall was made of earth and rock and rather than piping the water away from the dam it was led via *leiwater* channels.

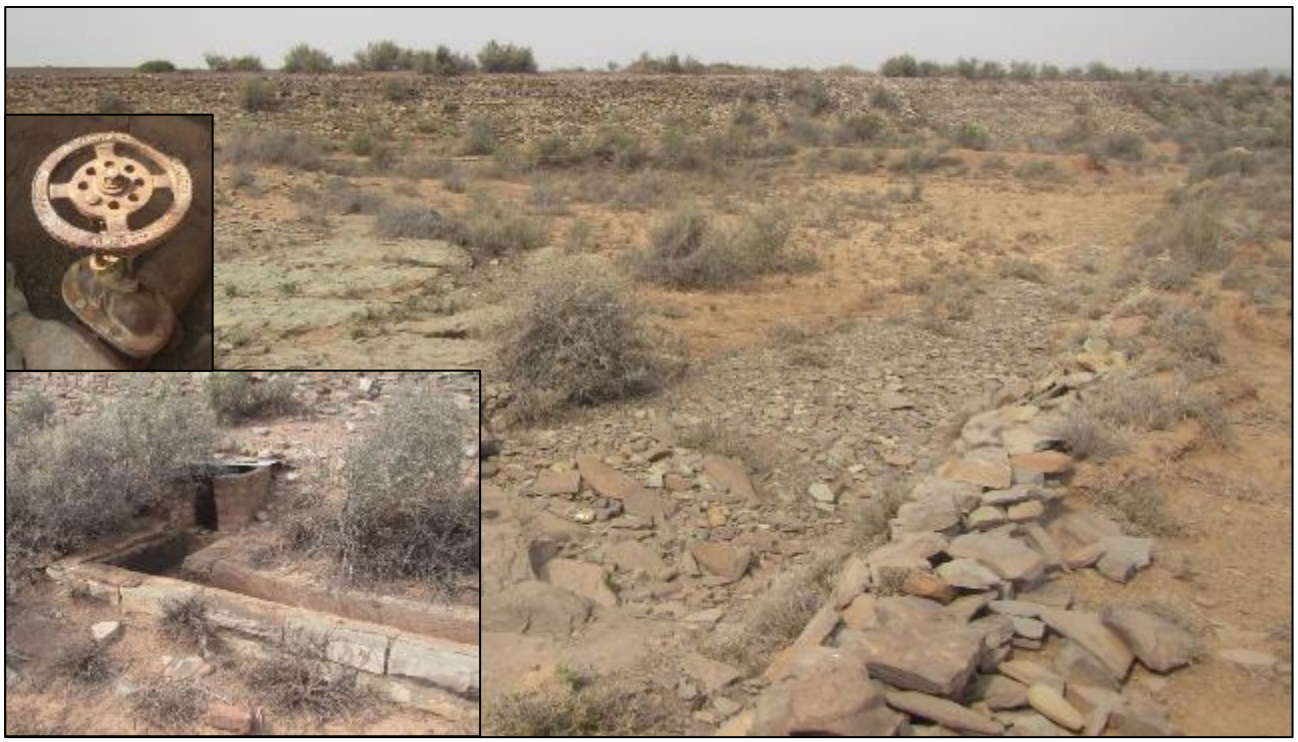


Figure 5-29: *View of the large dam at waypoint 100 in HL02 with the insets showing the outlet valve and associated leiwater.*

Figure 5-30 and Figure 5-31 show two more ruined stone-walled structures just to illustrate the variation in preservation.

Figure 5-30: *Reasonably well-preserved ruined stone-walled house at waypoint 1685 in HL01*.

Figure 5-31: *Ruined and very poorly preserved stone-walled kraal at waypoint 095 in HL02. It is likely that the stones have been robbed for reuse elsewhere leaving only the foundation stones.*

A particularly important part of the farm complex described above is the ash and rubbish dumps that occur at waypoints 105, 107 and 111. The first is the largest (Figure 5-32) and contains a multitude of historical glass and ceramic artefacts (Figure 5-33). Most artefacts seem to be of the types expected for mid-late 19th century occupations.

Figure 5-32: *An enormous stone-lined ash and rubbish dump (middle ground) with an associated small stone feature (foreground) at waypoint 105 in HL02.*

Figure 5-33: Close up of the surface of the ash and rubbish dump at waypoint 105 in HL02. Scale in 1 and 5 cm intervals.

Another aspect of historical archaeology is the many scratched engravings found in clusters in various places. The main subject matter is horses. This is not unexpected; Morris (1988:116) notes that "recently incised engravings, including distinctive horse motifs, are found in great numbers in

the Karoo and areas just north of the Orange River." Figure 5-34 shows a site in the HL02 study area which depicts five animals presumed to be horses and one image in the centre that looks like a bird. The panel is signed by 'MANUS' and looks, from the lack of patination, to be quite recent. Another engraving was unusual in its placement on an exposed section of dolerite bedrock on the side of a hill rather than on a ridge-top outcrop or boulder. It too is recent and bears initials and a date (Figure 5-35). Although the year is given as "34", it is fairly safe to assume from the lack of patiation that this means 1934 rather than an earlier century. It lies in HL01. Only one other historical engraving was found in the area, at waypoint 550 in HL02.

Figure 5-34: *Historical scratched engraving of five (presumably) horses, one bird-like creature and the name 'MANUS' at waypoint 077 in HL02. Scale bar = 15 cm.*

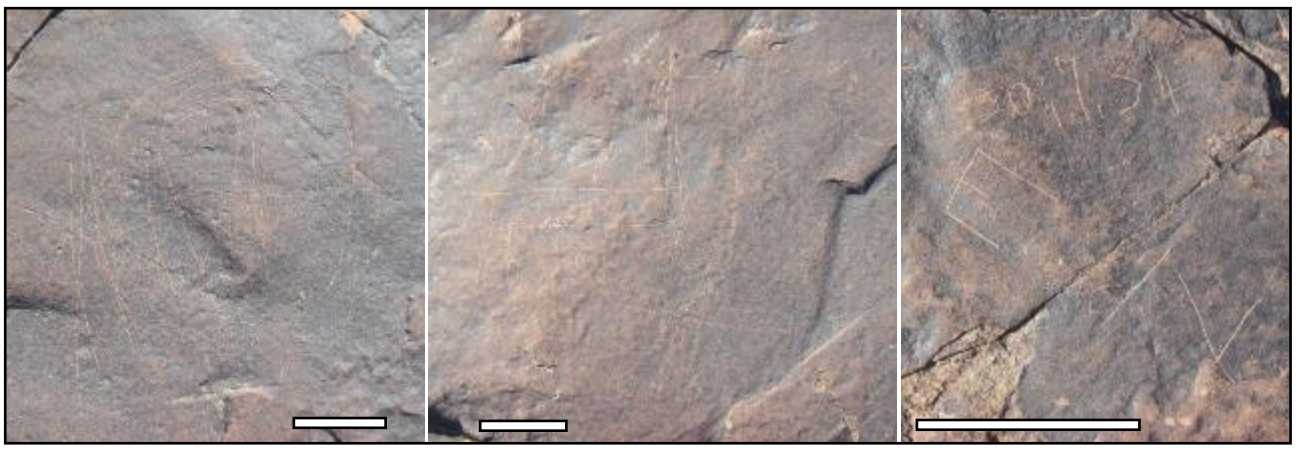


Figure 5-35: *Historical scratched engraving spread over a single section of exposed dolerite at waypoint 073 in HL01. Left: a human portrait, centre: a horse and other scratches, right: date '30.7.34' and initials 'EdV'. Scale bar in each case is 10 cm.*

5.3. Graves

Many graves were seen throughout the study area. Some of them are formal graveyards associated with currently occupied farm complexes. One of these in HL02 on the farm Slangfontein has family graves within the walled enclosure with other graves located immediately outside the wall as well as clusters further away to the northeast and southwest (waypoints 703 & 706) likely to be those of farm workers (waypoint 1746; Figure 5-36 & Figure 5-37). The dated burials extend from 1852 to 1966. Another somewhat less formal graveyard in HL02 appears to be associated with a farmstead located on the other side of a dolerite dyke. Most graves are informal but two have formal headstones and grave surrounds. There is no surrounding wall or fence, but one grave has its own fence. Only one bears a date (1934; waypoint 076; Figure 5-38). Many other graves are located in remote areas, sometimes very close to historical sites such as the graveyard at waypoint 097 in HL02 (Figure 5-39) and a single grave at waypoint 1711, in HL01 & HL02 (Figure 5-40). Two very clear graves were found at waypoint 1696 in HL01 but they were located in a very remote location far from any structures or ruins (Figure 5-41). At waypoint 1733 in HL01, a set of three poorly marked probable graves was also associated with a farm complex and each had only a single standing stone. Although the stones were aligned north-south (suggesting the graves, if parallel as expected, to run east-west), two of the stones had their faces pointing north and south (Figure 5-42).

Figure 5-36: *The formal Minnaar family graveyard at waypoint 1746 in HL02.*

Figure 5-37: *Graves located outside of the walled graveyard at waypoint 1746 in HL02.*

Figure 5-38: *Graveyard at waypoint 076 in HL02.*

Figure 5-39: *A poorly preserved, informal graveyard at waypoint 097 in HL02 in a farm complex.*

Figure 5-40: *Single grave at waypoint 1711 in HL01/2.*

Figure 5-41: *Two fairly clear graves at waypoint 1696 in HL01.*

Figure 5-42: *Set of three probable graves at waypoint 1733 in HL01. They are marked by single standing stones.*

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 5-43). 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 5-44).

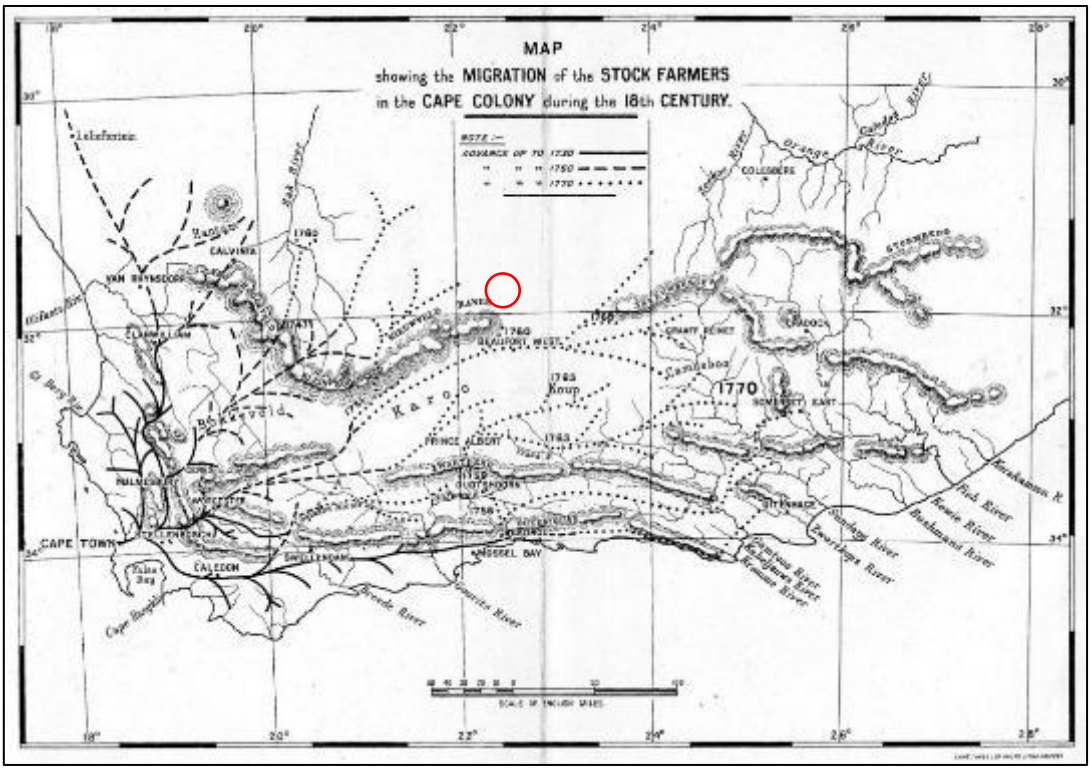


Figure 5-43: *Map showing the mid-18th century trekboer expansion in the Karoo. Source: Botha (1926: opposite preface). The wind farm study area is indicated by the red circle.*

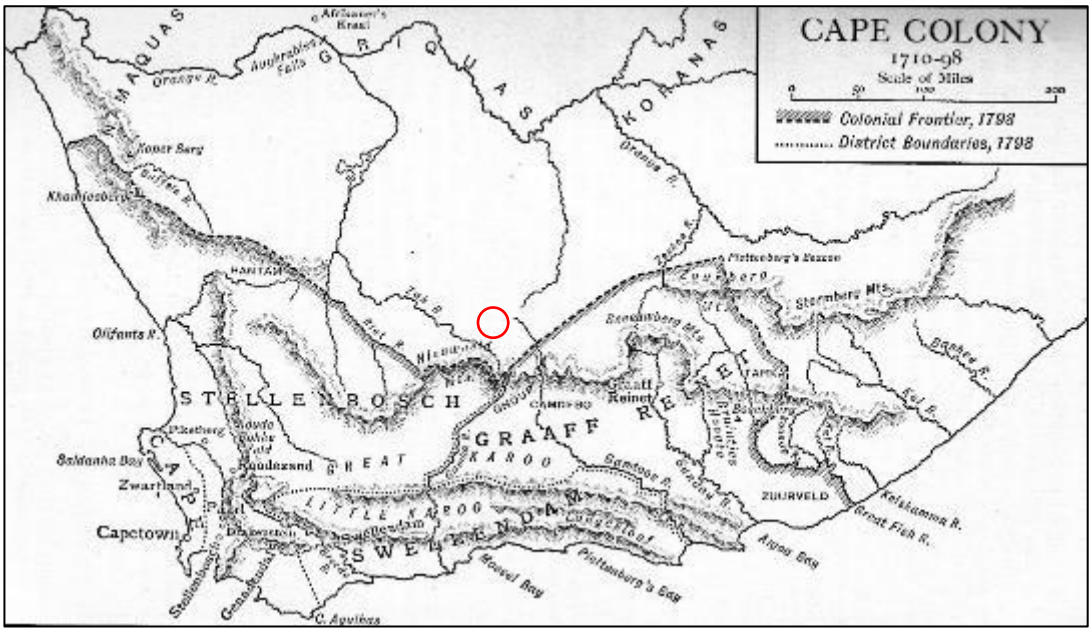


Figure 5-44: *Map showing the extent of the Cape Colony by 1798. Source: Walker (1928:201). The wind farm study area is indicated by the red circle.*

The Nuweveld Mountains were 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 5-45 with the study area fully incorporated by 1825.

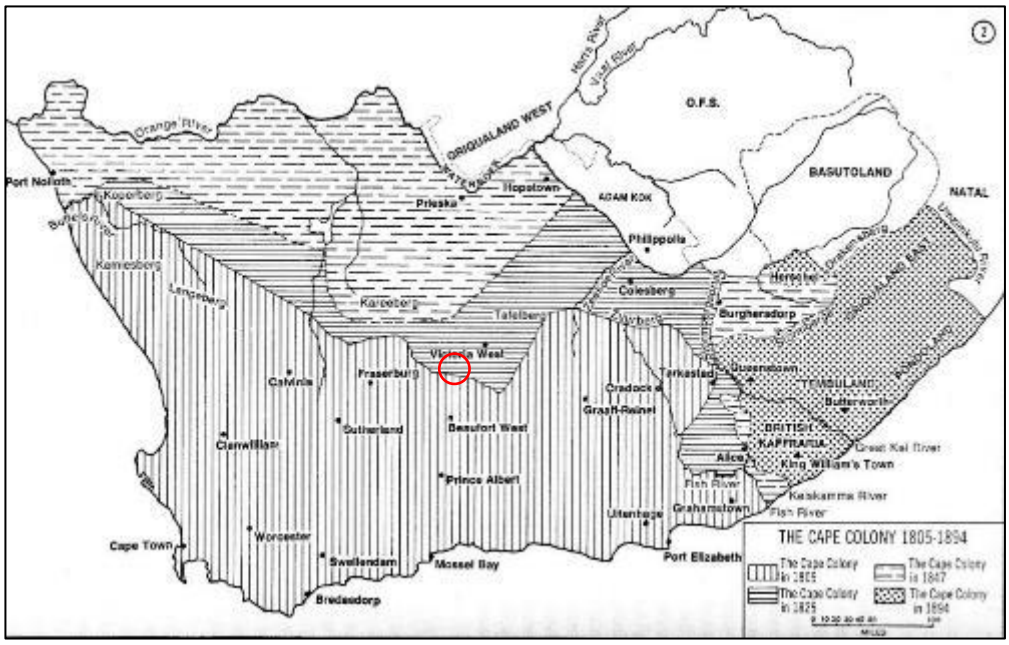


Figure 5-45: *Map showing the expanding boundaries of the Cape Colony under British Rule. Source: Van Zyl (1975:102). The wind farm study area is indicated by the red circle.*

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). Isolated examples are mapped in the KNP and just to the south of the present 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).

Due to the required road bypass, Beaufort West also needs brief consideration here. The town was established on the farm Hooivlakte (originally granted in 1760) in 1818 as a sub-drosty of Graaff-Reinett. The original streets were on a narrow strip of land between the Gamka River in the west and the Kuils River in the east (Fransen 2004). It was originally named Beaufort, but the 'West' was added later to avoid confusion with Fort Beaufort and Port Beaufort. The Dutch Reformed Church (DRC) in the town was established in 1825 under Reverend Colin Fraser. The Parish was vast and included mostly trek boers moving in and out of the area (Frandsen 2018). The first church of 1826 was replaced by the present one in 1891 (Fransen 2004). Beaufort West became the first municipality in South Africa, having been established on 3rd February 1837 (Frandsen 2018). With the railway from the Cape reaching the town in 1880, it became an important railway marshalling yard and locomotive depot, especially once the railways had been extended to the diamond fields of Kimberley and the gold mines at Johannesburg (Bulpin 2001; Frandsen 2018). The town retains a large number of heritage buildings but unfortunately, due to the regular addition of modern structures in between them, significant streetscapes are generally absent. The northern edge of Beaufort West is most relevant to the present application and it is noted in this regard that many of the houses in the small 'suburb' of Noord Einde and the golf course, near which the new detour road would run, were already present in 1945 (Figure 5-46). Also visible are a number of scars on the landscape which are old stone quarries, no doubt used to build some of the stone structures in the town. Orton (2021a, 2021b, 2021c) examined these quarries and found them to be of no particular heritage concern.

Figure 5-46: *Aerial view of northern Beaufort West from 1945 (Job 90, strip 019, photograph 01387) showing the extent of the town. The red line shows the proposed bypass road. The historic quarrying activities can be seen (arrowed).*

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. These passes lie well south of the Hoogland study area. 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

Several historical buildings occur in the study area. Some are occupied and others are not. A few examples are presented here. In the north-eastern part of HL01 at waypoints 1691 and 1692 there is an abandoned farm complex with standing buildings, gardens and many trees (Figure 5-47). The house appears to date to the first half of the 20th century and is still in fair condition, despite having been abandoned for perhaps 40 years (Figure 5-48 to Figure 5-51). Also of heritage value is the cultivated landscape of trees and now unused gardens that surrounds the house and stretches towards the northeast. The trees include fruit trees and a tree-lined avenue along the access road (Figure 5-52).

Figure 5-47: *View of the farmstead at waypoint 1692 in HL01 and showing the many trees that surround the house.*

Figure 5-48: *The main house at waypoint 1692 in HL01 as seen from the north.*

Figure 5-49: *The stoep and front door of the main house at waypoint 1692 in HL01.*

Figure 5-50: *The lounge area in the main house at waypoint 1692 in HL01.*

Figure 5-51: *A fireplace in the house at waypoint 1692 in HL01.*

Figure 5-52: *Trees in the farm werf at waypoints 1691 & 1692 in HL01.*

The Slangfontein farmstead in HL01 is still in use and contains several structures. Many are modern but a few late 19th or early 20th century buildings in good condition also occur (Figure 5-53 & Figure 5-54). The houses are also surrounded by a substantial planted landscape, all of which is enclosed by a stone werf wall. Another house (part of the modern Bulskolk farmstead) seemingly in good condition but also probably unoccupied lies close to waypoint 113 in HL02 but was not visited. It is likely early 20th century in age (Figure 5-58).

Figure 5-53: *Historical structure at Slangfontein (waypoint 1747 in HL01).*

Figure 5-54: *Historical structure at Slangfontein (waypoint 1747 in HL01).*

Figure 5-55: *An unvisited house close to waypoint 113 in HL02.*

In addition to these structures, at least one bridge on the R381 in Northern Cape is historical in that it is dated 1952. It is essentially a modern concrete bridge which is not in very good condition. It and the other existing watercourse crossing structures in both Northern and Western Cape are considered to have very low cultural significance and require no further study.

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". There are several aspects that require discussion here.

The oldest is the landscape inhabited by the indigenous Bushmen hunter-gatherers and Khoekhoen who left little trace of their passing but did mark the landscape with paintings, engravings and rock gongs. 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 farm complexes are generally marked by the presence of many trees and some agricultural lands (Figure 5-47, Figure 5-55, Figure 5-56 to Figure 5-59). They often contain different layers of heritage and can be thought of as areas of higher density of heritage resources. The Slangfontein werf along the southern edge of HL01 (Figure 5-56 & Figure 5-57), for example, has a stone werf wall and disused stone kraals that probably originate in the mid-19th century, some structures that are either late 19th or early 20th century, and other structures that are mid-20th century and later. The farm graveyard tells us that people were living on the werf prior to the mid-19th century since the first death was in 1852. Elandsfontein in the far west of HL02 (Figure 5-58 & Figure 5-59) is another example but has not been visited for this report.

Figure 5-56: *Historical aerial view of the Slangfontein werf (mostly on HL01) and associated agricultural landscape from 1959 showing the landscape at that time.*

Figure 5-57: *Modern aerial view of the Slangfontein werf (mostly on HL01) showing that structures have been added and that there are more and larger trees. Source: CapeFarmMapper.*

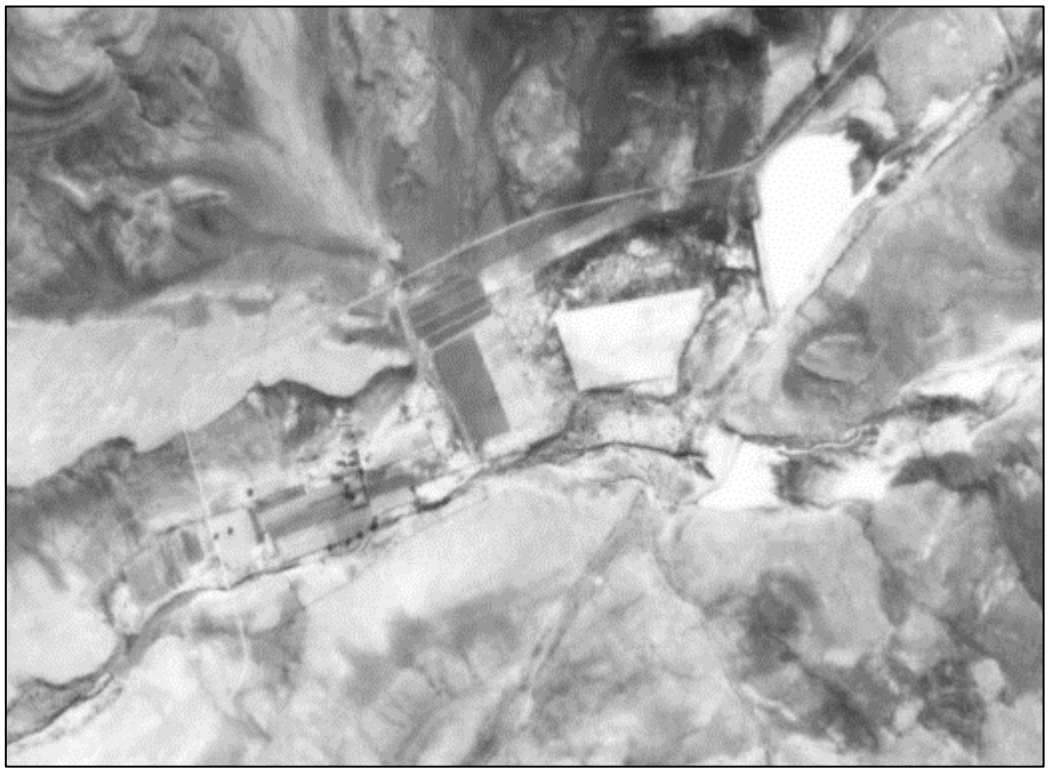


Figure 5-58: *Historical aerial view of the Elandsfontein werf on HL02 and associated agricultural landscape from 1960 showing the landscape at that time.*

Figure 5-59: *Modern aerial view of the Elandsfontein werf on HL02 showing that structures have been added and that the amount of arable land has slightly increased. Source: CapeFarmMapper.*

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 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, although it must be noted that parts of the R381 pass through the Beaufort West REDZ and three other wind farms have been approved by HWC in the area. The KNP lies some 49 km and 39 km south of HL01 and HL02 respectively. It is a significant landscape and offers formal protection to a section of the highly scenic escarpment. The KNP and escarpment are both too far south to be affected by the proposed wind farms.

5.6. Places associated with living heritage

As noted above, the historical engravings of the area demonstrate continuity in the tradition of engraving. This signature is minimal in the study area with just one site known in HL01 and two sites in HL02. What is perhaps of greatest interest is that the engraving tradition appears to have continued even longer than expected as evidenced by the dated example described above.

5.7. Visual impact assessment

Lawson and Oberholzer (2022) note the project setting to be an expansive semi-arid landscape. Flat-topped hills are seen as a characteristic feature of what is an otherwise fairly featureless landscape

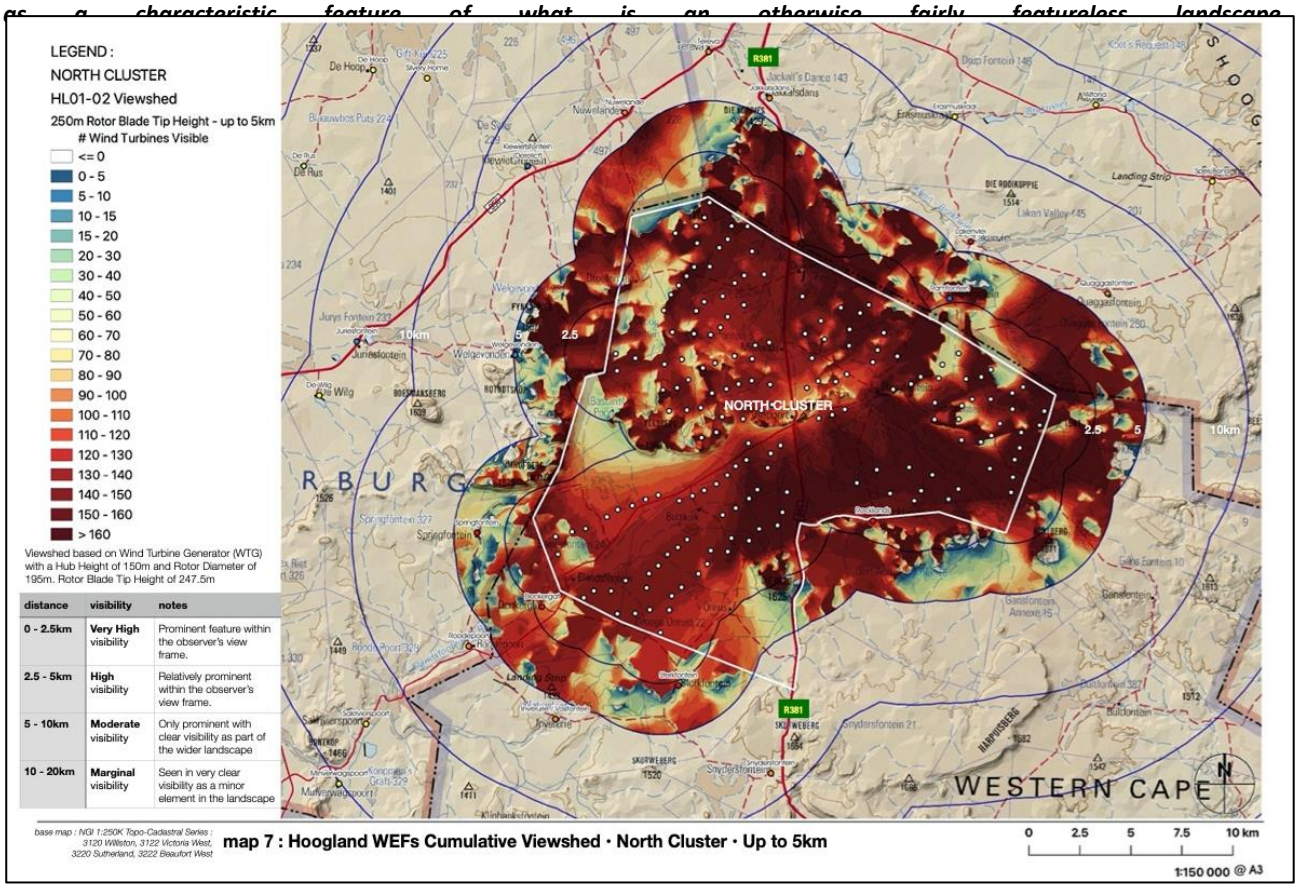


Figure 5-60 and Figure 5-61 show viewshed maps for HL01 and HL02 wind farms together. Figure 5-60shows a zoomed in viewshed and is based on blade tip height for the turbine positions as seen from within 5km and Figure 5-61 is based on hub height for the turbine positions as seen from further than 5km (the towers are used in this instance as distance mitigates the visibility of the blades), and where after 10km visibility in general becomes marginal. The colours denote how many turbines are visible from each location. It is notable that with more open plains to the north of the study area the visual exposure is greater there than is the case to the south and especially the east where the land is more mountainous.

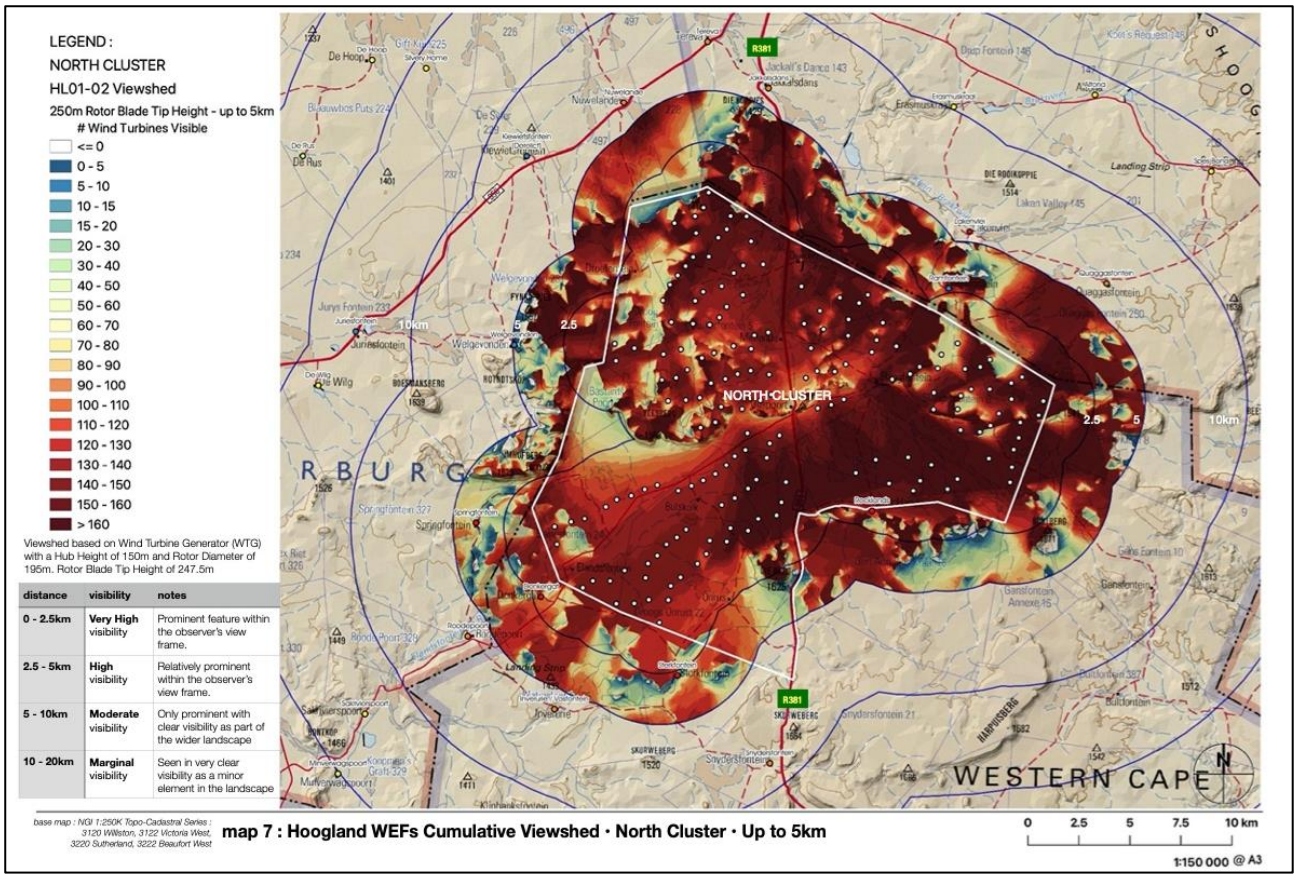


Figure 5-60: *Viewshed map of the study area for both HL01 and HL02, up to 5km. Source: Lawson & Oberholzer (2022: Map 7).*

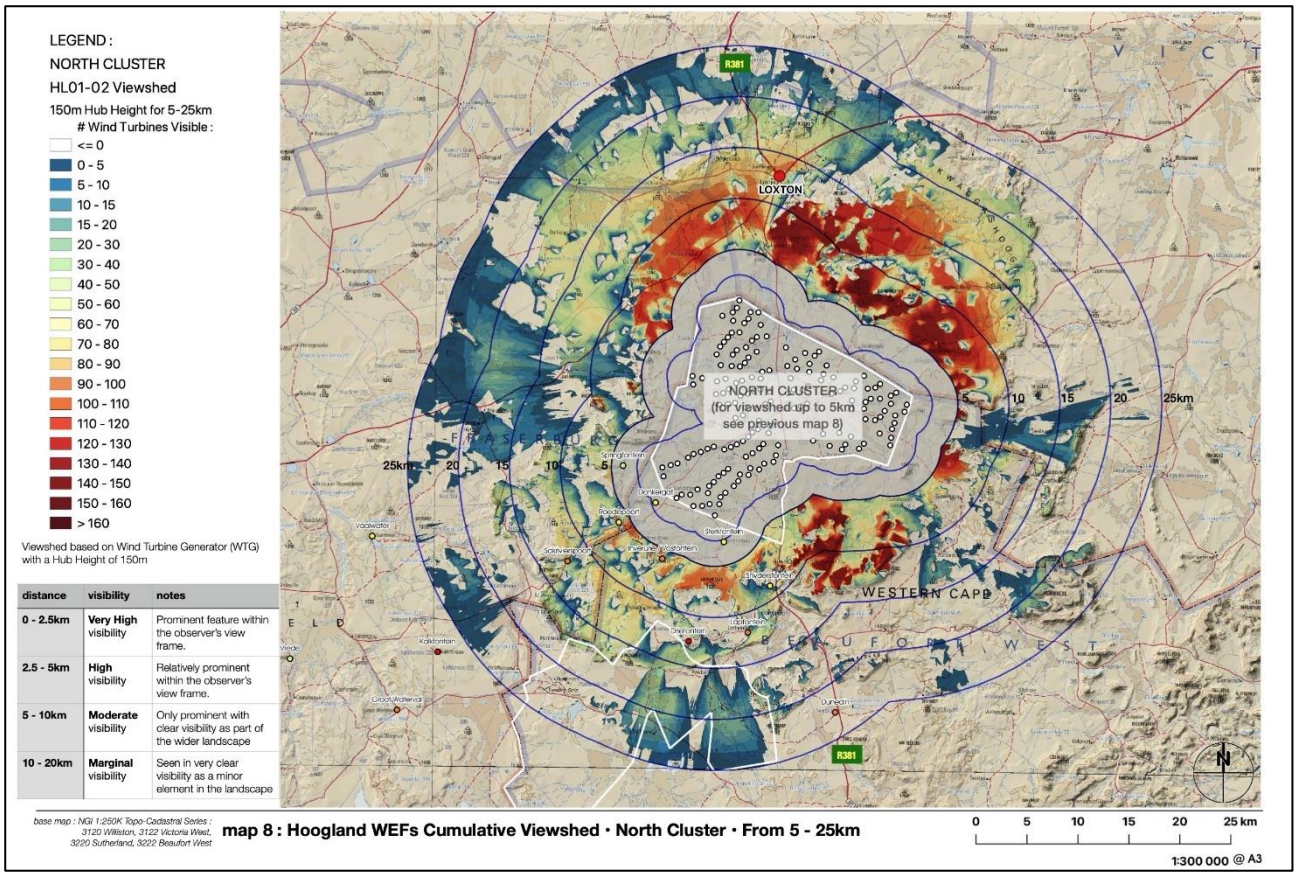


Figure 5-61: *Viewshed map of the study area for both HL01 and HL02, from 5km to 25km. Source: Lawson & Oberholzer (2022: Map 7).*

The site is noted to have a high level of integrity with relatively undisturbed and uncluttered rural and natural landscapes. Aside from the cultural features of the landscape, the natural components regarded as visually sensitive are the dolerite dykes, hills and outcrops. The VIA report (included here as Appendix 5) contains several photomontages which provide an idea of the appearance of the landscape after construction of the projects.

5.8. Statement of significance and provisional grading: HL01 & HL02

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 palaeontological resources of the study area are variable in their distribution but, although very small areas may be of high cultural significance at the local level for the scientific value of the fossils, the vast majority of the area is considered in practice to be of low significance. The most important areas should be regarded as up to Grade IIIB, although the possibility does exist for Grade IIIA fossil to occur in the study area. The majority of individual fossils are, however, Not Conservation Worthy (NCW) or Grade IIIC.

The archaeological resources have highly variable significance with most being very low to low (NCW or Grade IIIC). However, there are many sites of high cultural significance at the local level for their

scientific, historical and social values. These most important sites are assigned Grade IIIA. Despite the wealth of archaeology, there is nothing of provincial significance in the study area.

Graves are deemed to have high cultural significance at the local level for their social value. They are Grade IIIA.

Most buildings in the study area were not specifically examined but their significance would be variably low to high at the local level for their architectural, historical and social values. A range of grades from NCW to IIIA can be expected.

The broader cultural landscape in the vicinity of the wind farm study area has medium cultural significance at the local level for its aesthetic value and is considered to be Grade IIIB, while the escarpment edge and Karoo National Park are considered to have high significance for the same reason and are assigned Grade IIIA. The immediate areas around the farm werfs, however, are considered as IIIA landscapes due to the generally large number of individual heritage resources they contain.

Places associated with living heritage are archaeological in nature (despite their apparently recent age) and follow the archaeological gradings.

Grading maps of heritage resources are shown in Section 6.

5.9. Summary of heritage indicators: HL01 & HL02

Palaeontological resources are patchily distributed across the study area and will be impacted by the proposed wind farms. Due to their nature (i.e. buried in hard rock), it is accepted that not all fossils can be rescued but a representative sample should be retained from the study area, whether *in situ* or in an institutional collection.

- Indicator: Uncontrolled damage to fossils should be minimised as far as possible.

LSA and particularly historical archaeological sites occur widely across the study area. Engravings (including historical and recent ones indicating living heritage) are less common. All such sites and graves should be avoided, although it is acceptable that power lines span above such sites if required. While buffers of at least 30 m from archaeological resources are desirable, linear features (i.e. wind farm roads and electrical cables) can run closer to these sites if absolutely necessary. If existing roads (not jeep tracks) run close to such sites then these can be reused. Because engraving sites are visual in nature, significant examples should be avoided by wider margins. Historical sites are generally more difficult and/or time-consuming to mitigate which makes it strongly desirable to avoid direct impacts.

- Indicator: Direct damage to archaeological sites should be avoided as far as possible and, where some damage to significant sites is unavoidable, scientific/historical data should be rescued.
- Indicator: Buffers of at least 30 m should be maintained around known archaeological sites as far as possible.
- Indicator: Buffers of at least 200 m should be maintained around the most significant rock art sites (i.e. grade IIIA) *as far as possible* but all rock art sites should be buffered by at least 30 m.
- Indicator: Direct impacts to graves must be avoided completely with a 30 m buffer.

The cultural landscape will be impacted and, because of the nature and scale of the proposed development, reducing impacts is generally difficult. The landscape views from the R381 are considered to be the most significant because of their accessibility. Determination of appropriate buffers can be guided by the visual recommendations that stipulate wider visual buffers in areas of higher scenic value. It is noted that PGWC (2006) provides a buffer of 500 m from local roads as a general guideline. The same should apply to farmsteads.

- Indicator: The wind farms, when seen from the R381, should ideally not dominate views in multiple directions.
- Indicator: Turbines should be placed far enough away from the R381 to ensure that one's appreciation of the landscape is not significantly diminished.
- Indicator: Clustering of turbines is preferred rather than having them spread out in a linear fashion. No turbines should exist as outliers.
- Indicator: Powerlines should be buried as far as possible.
- Indicator: Road surfacing, where required, should avoid high contrast materials.
- Indicator: Related infrastructure (substation, battery storage facility, buildings) should be in areas of low visibility (especially from the R381).

Built heritage resources also exist in the study area, but impacts are unlikely. The minimum distance between turbines and structures will be about 0.63 km in the case of HL01 and 0.50 km in the case of HL02.

- Indicator: Buffers of at least 30 m should be maintained around all built elements, but where existing roads are upgraded this distance can be reduced as needed but should still guarantee the integrity of the resource.

6. SENSITIVITY MAPPING

Table 6-1: shows the way in which heritage sensitivity was determined. This information, together with the graded heritage resource map provided to the developer, was used in the development of the wind farm layouts shown in Figure 6-1 to Figure 6-5. Note that heritage is just one of many specialists to have provided sensitivity mapping. The maps show high, medium and low sensitivity buffers. Some of these features are considered to be no-go for turbines and substation (including battery storage facility and buildings). Note that full mapping of archaeological heritage resources is presented in Appendix 3, while palaeontological mapping is contained in the specialist study in Appendix 5. The entire area is regarded as a cultural landscape, although the Karoo National Park and escarpment are the most important parts. These are too far from the study area to require mapping in relation to the potential impacts. The R381 in this area is a local route with lesser significance due to being away from the major topographic landscape features. At Beaufort West there is one area of low sensitivity that has been avoided by the proposed bypass road (but does fall partly within the studied corridor), although the majority of the alignment has not been specifically surveyed.

Table 6-1: *Relationship between heritage grades, sensitivity ratings and project components as developed during the early part of the project.*

Project component	IIIA	IIIB	IIIC	NCW

	Feature	Buffer	Feature	Buffer	Feature	Buffer	Feature
Turbines	No-go	No-go	High	Medium	Medium	Low	Neutral
Substations, buildings	No-go	No-go	High	Medium	Medium	Low	Neutral
New roads and jeep tracks for upgrade	No-go	No-go	High	Medium	Medium	Low	Neutral
Existing proper gravel roads (not jeep tracks) for upgrade	No-go	High	Medium	Low	Low	Low	Neutral
Pylons	No-go	No-go	High	Medium	Medium	Low	Neutral
Overhead lines (spanning)	No-go	High	Medium	Low	Low	Low	Neutral

- Sensitivity classes are designed to be in line with the HWC grading scheme, since the gradings MUST be used in all HIAs. Although NCW is low sensitivity (the lowest rating in the Red Cap scheme), they are coloured black and called 'neutral' to distinguish low heritage sensitivity from NCW.
- Note that existing roads would obviously not go over point sites but they may pass through larger multi-component sites.
    - Existing roads to be widened/upgraded get a lower level of sensitivity as they are already present and it is more desirable to upgrade than to build a second road nearby.
    - Occasionally very small 'twee-spoor' jeep tracks can pass very close to heritage sites and create minimal existing impacts. For this reason, their upgrades are best treated like building new roads.

  Overhead lines spanning over sites also get lower ratings because there would be no physical damage. BUT there is still a chance of damage during construction so spanning lines are only one sensitivity level lower.

Allocation of protective buffers is as follows:

- <u>Scenic passes, roads and cultural landscapes</u>
    - Buffer to be determined by visual specialist for Grade IIIB linear features.
    - Buffer 50 m around Grades IIIA and IIIB cultural landscapes. Agricultural landscapes were delineated by including all arable lands clearly visible on aerial photography. Note that these are really visual issues and hence different buffers may be proposed by the visual practitioners. The 50 m buffer suggested here should be treated as a minimum.
- <u>Archaeology, Built environment, Graves</u>
    - Buffer 50 m around waypoints for small, single component sites (Grades IIIA to IIIC)
    - Buffer 50 m around outer edge of larger, multi-component sites (Grades IIIA to IIIC)
    - Note that, in line with the relevant heritage indicator and although it may not always be possible due to the multitude of other limitations on turbine layout, buffers of up to 200 m are encouraged for IIIA rock art sites.

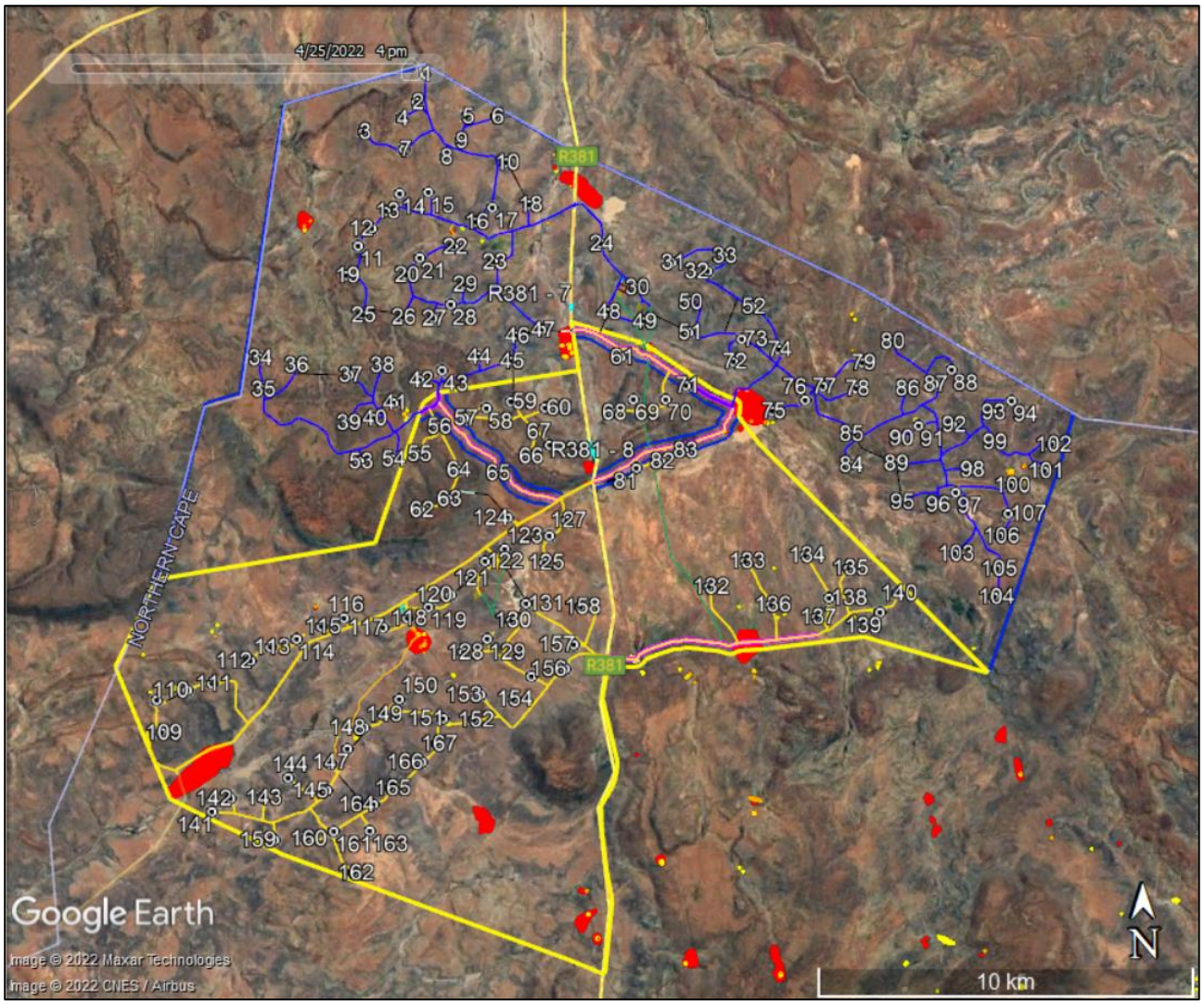


Figure 6-1: *Sensitivity map for the entire HL01 (blue layout) and HL02 (yellow layout) area. Red, orange and yellow shaded areas are high, medium and low sensitivity respectively.*

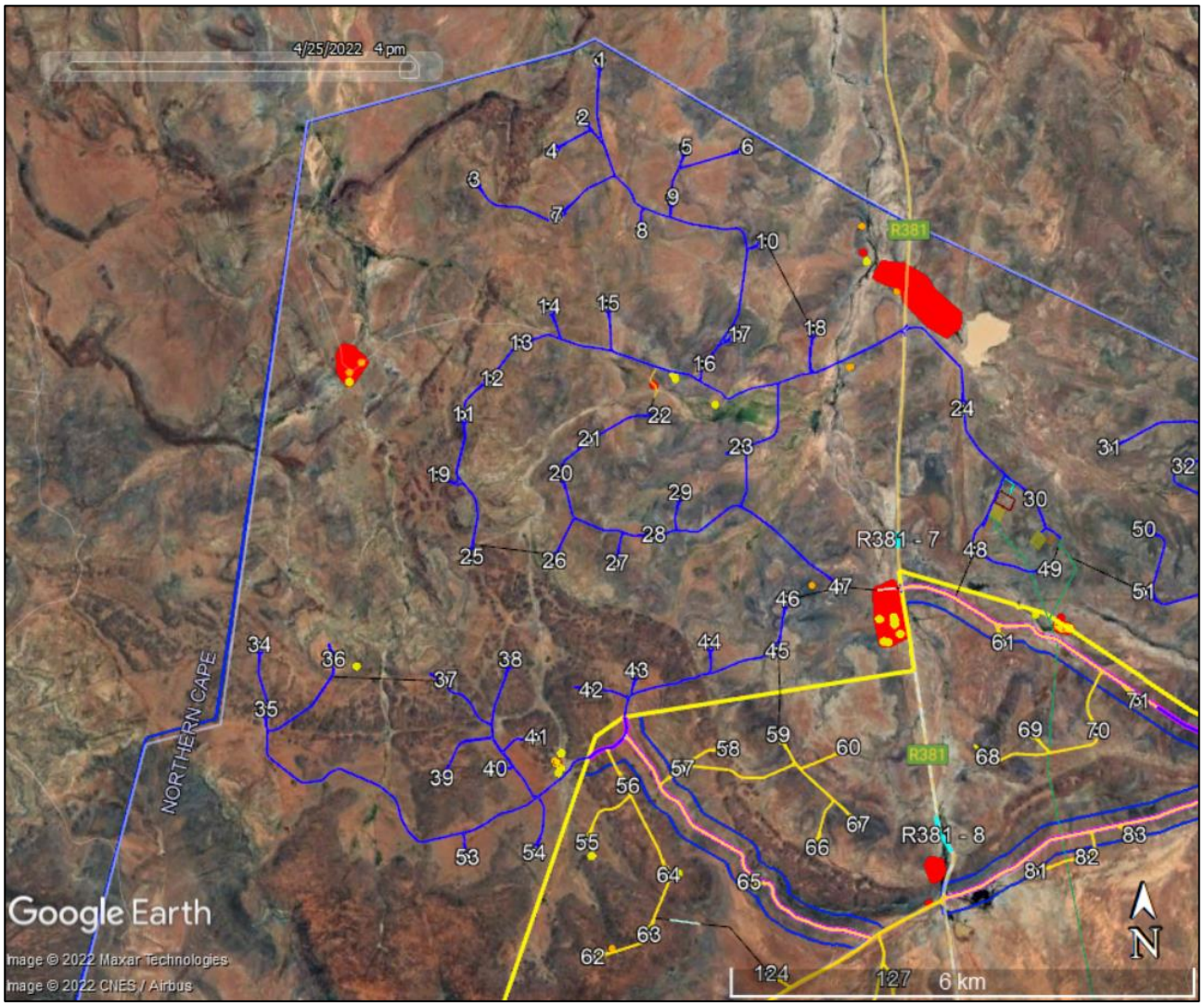


Figure 6-2: *Enlarged sensitivity map showing the north-western part of Figure 6-1. Key as per Figure 6-1.*

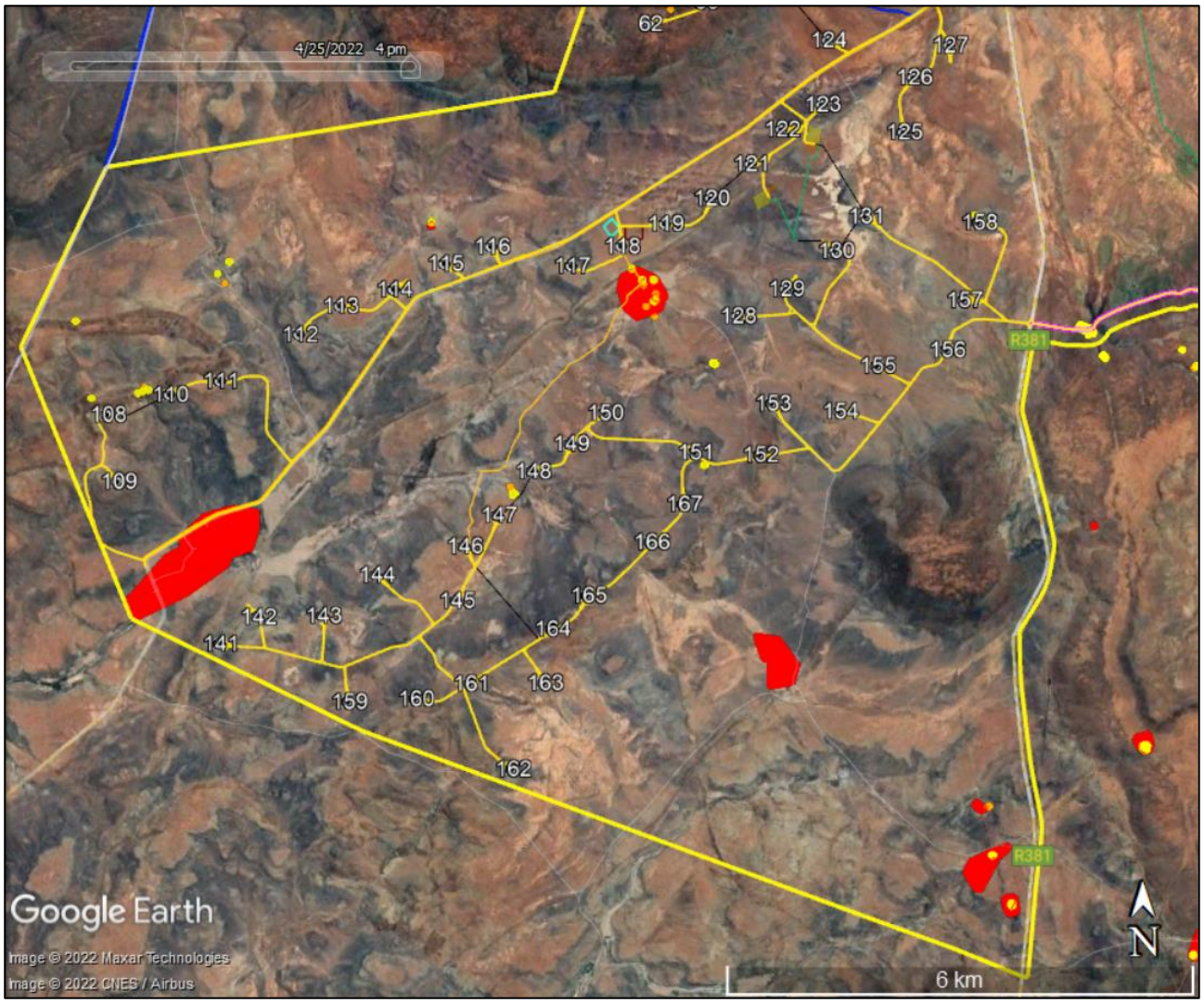


Figure 6-3: *Enlarged sensitivity map showing the south-western part of Figure 6-1. Key as per Figure 6-1.*

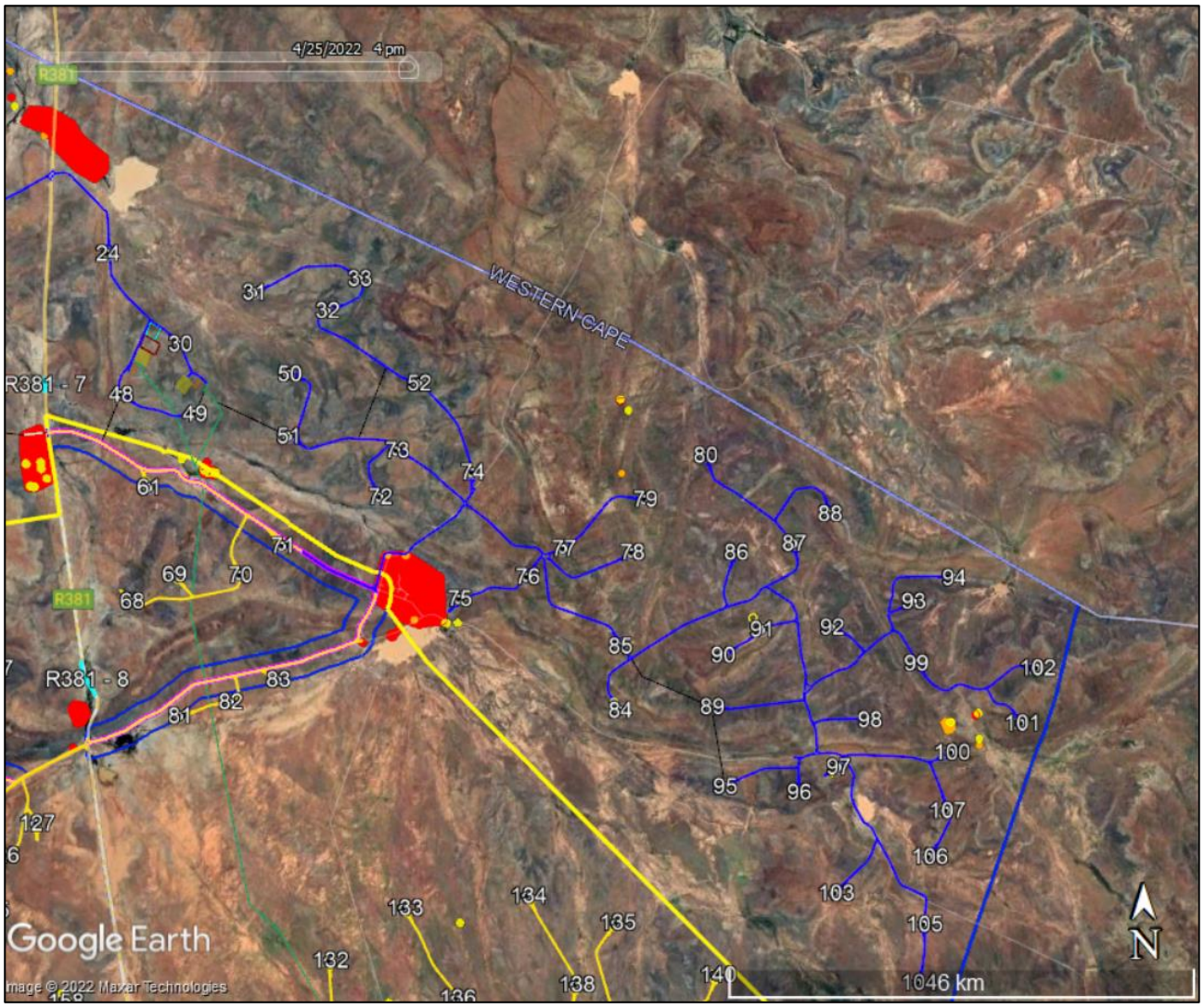


Figure 6-4: *Enlarged sensitivity map showing the north-eastern part of Figure 6-1. Key as per Figure 6-1.*

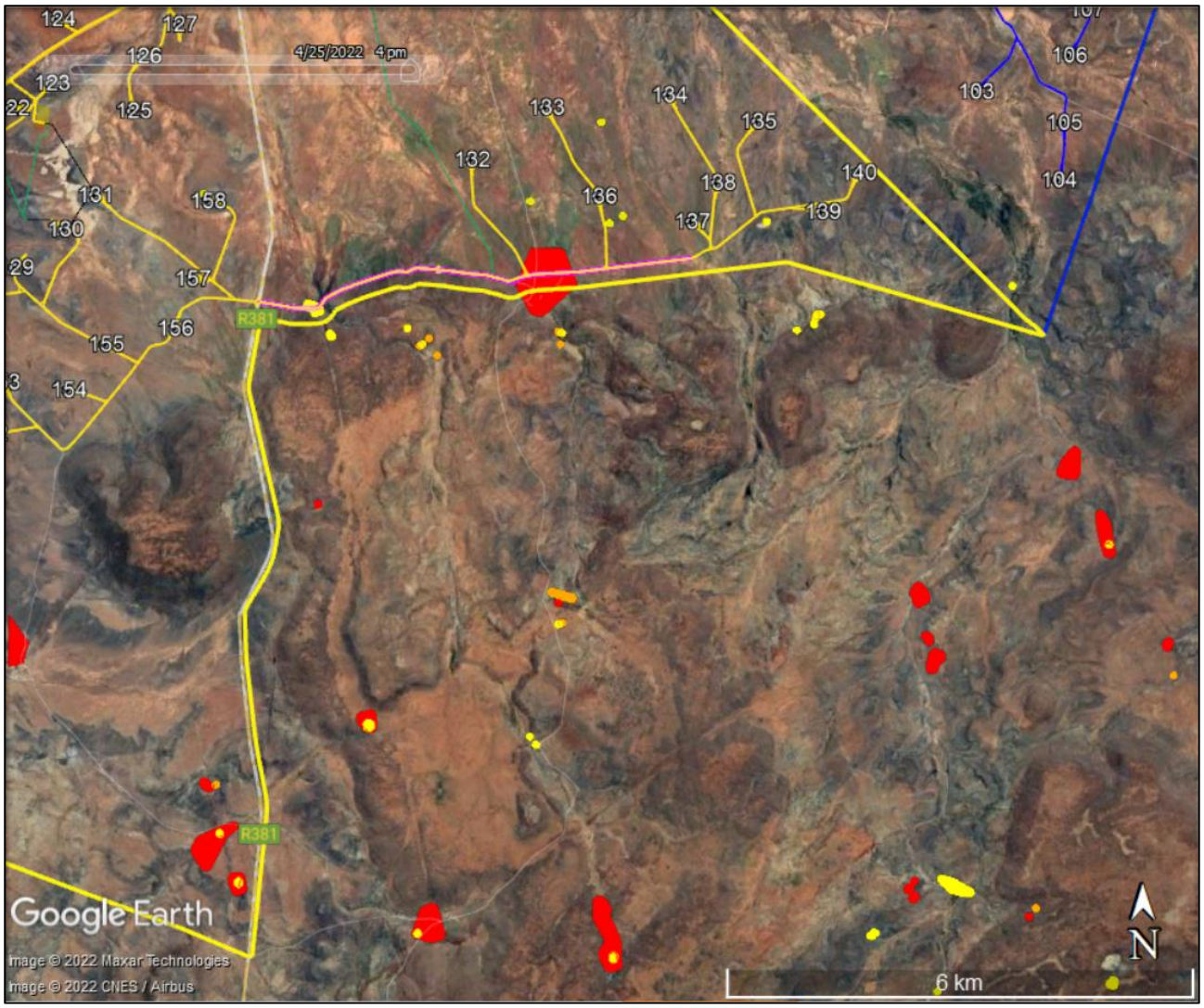


Figure 6-5: *Enlarged sensitivity map showing the south-eastern part of Figure 6-1. Key as per Figure 6-1.*

The implications of the mapped sensitivities are discussed in the conclusions. There are no highly significant concerns requiring major adjustment to the layout as these have been addressed through avoidance.

7. ASSESSMENT OF IMPACTS

The main impacts identified for Hoogland 1 are as follows:

- Impacts to palaeontology
- Impacts to archaeology (including places associated with living heritage);
- Impacts to built heritage; and
- Impacts to the cultural landscape (including visual impacts to historical structures).

The main impacts identified for Hoogland 2 are as follows:

- Impacts to palaeontology
- Impacts to archaeology (including places associated with living heritage); and

- Impacts to the cultural landscape (including visual impacts to historical structures).

Each of these impacts will be assessed in turn below by project phase.

7.1. Construction Phase: HL01

7.1.1. Impacts to palaeontological resources

Formal assessment of impacts to fossils is contained in the palaeontological specialist study (Almond 2022). It is noted that the impact significance was found to be **medium negative** and **very low negative** before and after mitigation respectively and that pre-construction analysis, survey and fossil collection as necessary were suggested measures to reduce impacts.

7.1.2. Impacts to archaeological resources

Direct impacts to archaeology would occur during the construction phase only, since further impacts will not occur once the layout has been established. Aside from a grade IIIC ruined structure at waypoint 545 whose buffer is intersected by a road (it will involve the upgrading of an existing road and is therefore acceptable), the present layout only directly affects one known archaeological resource, a grade IIIB LSA scatter at waypoint 1703 (the impact would be from a proposed new road). This impact is likely unavoidable since the scatter is wide and the wind farm road largely makes use of an existing farm road through the area which is more desirable than constructing a second road through the area. However, it is conceivable that some unknown ones could occur within the footprint area. While most as yet unknown occurrences are likely to be of low to very low cultural significance, there is a chance that more significant finds could be revealed. An intensity of high has been predicted, largely because of the one known impact. Because this impact is guaranteed, the impact significance calculates to **high negative** (Table 7-1). Mitigation will entail commissioning a pre-construction survey to locate any as yet undiscovered archaeology within the footprint. Any sites found that require further attention could then either be avoided through micrositing or else mitigated through recording, mapping and collection as necessary under an approved Workplan issued by HWC. The known site that will be impacted must also be excavated. The post-mitigation impact significance is **very low negative**. There are no fatal flaws in terms of construction phase impacts to archaeology.

Table 7-1: *Assessment of archaeological impacts (HL01).*

Issue	Impacts to archaeological resources	
Description of Impact		
Archaeological materials can be damaged or destroyed during grubbing and excavation of foundations and trenches.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	Very Low
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	High	Low

Probability	Definite / Continuous	Conceivable
Significance	High -	Very Low -
Degree to which impact can be reversed	Low. Heritage resources cannot be replaced or recreated.	
Degree to which impact may cause irreplaceable loss of resources	High. Heritage resources are unique and irreplaceable.	
Degree to which impact can be mitigated	High. Archaeological heritage can very easily be sampled and/or mapped as needed, although in the case of historical sites this can be more time-consuming.	
Mitigation actions		
The following measures are recommended:	Pre-construction survey of the layout followed by micrositing or mitigation as appropriate or possible. Sampling of the stone artefact scatter at waypoint 1703.	
Monitoring		
The following monitoring is recommended:	ECO to ensure that construction activities remain in approved footprint and that mitigation at waypoint 1703 has been completed.	
Cumulative impacts		
Nature of cumulative impacts	Negative	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	Very Low -

7.1.3. Impacts to built heritage

Impacts to built heritage are only expected to occur during the construction phase. The chances at the wind farm site are small, however, because the layout has been designed to avoid impacts. The bridges and culverts to be upgraded are not significant heritage resources and thus not considered further here. Only one area at the HL01 wind farm site remains of minor concern and that is the stone wall around the Slangfontein farm complex. Only a small area might be impacted and the intensity is medium. Despite the permanence of such an impact, the small chance of it occurring means that the significance is **insignificant** (Table 7-2). No mitigation is needed which means that the rating stays **insignificant**.

Table 7-2: *Assessment of built heritage impacts (HL01).*

Issue	Damage to or destruction of built heritage resources	
Description of Impact		
Built heritage resources can be physically harmed during construction, either to make way for development or accidentally.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Very Low
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	Low	Low
Probability	Unlikely / improbable	Unlikely / improbable
Significance	Insignificant	Insignificant
Degree to which impact can be reversed	Low. Heritage resources are unique and cannot be replaced, although repairs can be made in the event of minor damage.	

Degree to which impact may cause irreplaceable loss of resources	High. Heritage resources are unique and cannot be replaced.	
Degree to which impact can be mitigated	High. Road footprints can be adjusted to avoid sensitive features.	
Mitigation actions		
The following measures are recommended:	None required	
Monitoring		
The following monitoring is recommended:	ECO to ensure that enough space exists between roads and built structures.	
Cumulative impacts		
Nature of cumulative impacts	Negative	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Very Low -	Very Low -

7.1.4. Impacts to the cultural landscape

Direct impacts to the cultural landscape will occur during construction when large vehicles and equipment are brought into the rural landscape, altering it to one with a more industrial character. The activity, dust and noise will also disturb the sense of place. These impacts are rated as being of medium intensity but their duration will be relatively short, depending on the duration of the construction period. The pre-mitigation impact significance calculates to **medium negative** (Table 7-3:). Mitigation measures will entail minimising the duration of the construction period and minimising and/or reducing the visual disruption to the landscape. Because of the scale of the equipment and structures involved, these measures are unlikely to affect the significance rating enough to drop it a level. The post-mitigation significance thus remains at the **medium negative** level. These ratings are in agreement with the VIA (Lawson & Oberholzer 2022). Although having the facility on one side of the R381 would have been preferred, this is not feasible given that the road splits the study area in half and that other wind farms have already been approved in the area. There are no fatal flaws in terms of construction phase impacts to the cultural landscape.

Table 7-3: *Assessment of construction phase impacts to the cultural landscape (HL01).*

Issue	Visual intrusion into the cultural landscape and disturbance of the setting and context of heritage resources.	
Description of Impact		
Intrusion into the rural landscape of industrial equipment and structures.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Medium
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Definite / Continuous	Definite / Continuous
Significance	Medium -	Medium -

Degree to which impact can be reversed	Medium. Once construction is complete all the equipment would be removed but the turbines and related structures would remain present. However, almost all noise and activity would cease.	
Degree to which impact may cause irreplaceable loss of resources	Medium. Every landscape setting is unique but similar landscapes do occur widely in the central interior of South Africa.	
Degree to which impact can be mitigated	Low, since concealing the activity and structures is not feasible.	
Mitigation actions		
The following measures are recommended:	Keep construction duration as short as possible. Minimise landscape scarring. Rehabilitate any areas not required during operation. Where road surfacing is required use low contrast materials where possible.	
Monitoring		
The following monitoring is recommended:	ECO to ensure that construction activities remain in approved footprint.	
Cumulative impacts		
Nature of cumulative impacts	Negative	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Medium -

7.2. Construction Phase: HL02

Note that because there are no potential built environment impacts on the HL02 wind farm site and the bridges and culverts for upgrading are not considered culturally significant, no built environment impact assessment has been included here.

7.2.1. Impacts to palaeontological resources

Formal assessment of impacts to fossils is contained in the palaeontological specialist study (Almond 2022). It is noted that the impact significance was found to be very low negative after mitigation and that pre-construction surveys and sampling were suggested measures to reduce impacts.

7.2.2. Impacts to archaeological resources

Direct impacts to archaeology would occur during the construction phase only, since further impacts will not occur once the layout has been established. Aside from a poorly preserved and isolated grade IIIC historical engraving (waypoint 550) whose buffer is intersected by a turbine hardstand, the present layout only directly affects one known archaeological resource, a grade IIIB LSA scatter at waypoint 1703 (the impact would be from a proposed new road). However, it is possible that some unknown ones could occur within the footprint area. This impact is likely unavoidable since the scatter is wide and the wind farm road largely makes use of an existing farm road through the area which is more desirable than constructing a second road through the area. While most as yet unknown occurrences are likely to be of low to very low cultural significance, there is a chance that more significant finds could be revealed. An intensity of high has been predicted, largely because of the one known impact. Because this impact is guaranteed, the impact significance calculates to **high negative** (Table 7-4:). Mitigation will entail commissioning a pre-construction survey to locate any as yet undiscovered archaeology within the footprint. Any sites found that require further attention could then either be avoided through micrositing or else mitigated through recording, mapping and

collection as necessary under an approved Workplan issued by HWC. The known site that will be impacted must also be excavated. The post-mitigation impact significance is **very low negative**. There are no fatal flaws in terms of construction phase impacts to archaeology.

Table 7-4: *Assessment of archaeological impacts (HL02).*

Issue	Impacts to archaeological resources	
Description of Impact		
Archaeological materials can be damaged or destroyed during grubbing and excavation of foundations and trenches.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	Very Low
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	High	Low
Probability	Definite / Continuous	Conceivable
Significance	High -	Very Low -
Degree to which impact can be reversed	Low. Heritage resources cannot be replaced or recreated.	
Degree to which impact may cause irreplaceable loss of resources	High. Heritage resources are unique and irreplaceable.	
Degree to which impact can be mitigated	High. Archaeological heritage can very easily be sampled and/or mapped as needed, although in the case of historical sites this can be more time-consuming.	
Mitigation actions		
The following measures are recommended:	Pre-construction survey of the layout followed by micrositing or mitigation as appropriate or possible. Sampling of the stone artefact scatter at waypoint 1703.	
Monitoring		
The following monitoring is recommended:	ECO to ensure that construction activities remain in approved footprint and that mitigation at waypoint 1703 has been completed.	
Cumulative impacts		
Nature of cumulative impacts	Negative	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	Very Low -

7.2.3. Impacts to the cultural landscape

Direct impacts to the cultural landscape will occur during construction when large vehicles and equipment are brought into the rural landscape, altering it to one with a more industrial character. The activity, dust and noise will also disturb the sense of place. These impacts are rated as being of medium intensity but their duration will be relatively short, depending on the duration of the construction period. The pre-mitigation impact significance calculates to **medium negative** (Table 7-5). Mitigation measures will entail minimising the duration of the construction period and minimising and/or reducing the visual disruption to the landscape. Because of the scale of the

equipment and structures involved, these measures are unlikely to affect the significance rating enough to drop it a level. The post-mitigation significance thus remains at the **medium negative** level. These ratings are in agreement with the VIA (Lawson & Oberholzer 2022). Although having the facility on one side of the R381 would have been preferred, this is not feasible given that the road splits the study area in half and that other wind farms have already been approved in the area. There are no fatal flaws in terms of construction phase impacts to the cultural landscape.

Table 7-5: *Assessment of construction phase impacts to the cultural landscape (HL02).*

Issue	Visual intrusion into the cultural landscape and disturbance of the setting and context of heritage resources.	
Description of Impact		
Intrusion into the rural landscape of industrial equipment and structures.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Medium
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Definite / Continuous	Definite / Continuous
Significance	Medium -	Medium -
Degree to which impact can be reversed	Medium. Once construction is complete all the equipment would be removed but the turbines and related structures would remain present. However, almost all noise and activity would cease.	
Degree to which impact may cause irreplaceable loss of resources	Medium. Every landscape setting is unique but similar landscapes do occur widely in the central interior of South Africa.	
Degree to which impact can be mitigated	Low, since concealing the activity and structures is not feasible.	
Mitigation actions		
The following measures are recommended:	Keep construction duration as short as possible. Minimise landscape scarring. Rehabilitate any areas not required during operation. Where road surfacing is required use low contrast materials where possible.	
Monitoring		
The following monitoring is recommended:	ECO to ensure that construction activities remain in approved footprint.	
Cumulative impacts		
Nature of cumulative impacts	Negative	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Medium -

7.3. Operation Phase: HL01 & HL02

7.3.1. Impacts to the cultural landscape

Direct impacts to the cultural landscape will occur during operation as a result of the presence of large wind turbines and associated infrastructure in the landscape. They will result in an industrial character being introduced. These impacts are rated as being of low intensity and it is likely that, in time, the wind farm would gradually become an acceptable component of the local landscape. The impact duration will be long term, depending on the duration of the operation phase. The pre-mitigation impact significance calculates to **medium negative** for both HL01 and HL02 respectively (Table 7-6). The VIA rates the impact of the turbines as high negative both before and after mitigation, while other aspects are given a medium negative rating. The negative impact of the bypass road is considered high negative before mitigation in the VIA but this is not a heritage concern. No feasible mitigation measures for reducing daytime visual intrusion from the turbines exist, although the Applicant has committed to reduce night-time impacts to the sense of place from CAA lighting, by adopting a warning system that only switches the lights on when an aircraft approaches. One best practice mitigation measure suggested is to ensure that all maintenance activities remain in the authorised footprint and that vehicles remain on the approved roads and tacks. This is unlikely to affect the significance rating enough to reduce daytime impacts. The post-mitigation significance thus remains at the **medium negative** level. However, with no red flashing lights at night it is likely that the impacts at night could be seen as **very low negative** because of the substantially reduced visual impacts. Lastly, design phase mitigation is applicable in the event that the wind farm is approved, and the final layout does not need all approved turbine locations to ensure a maximum of 60 turbines. In this case, where a choice exists between turbines to be dropped, and all other factors are equal, priority should be given to dropping turbines in the high visual sensitivity areas, and specifically for HL01, to consider dropping turbines 72 and 75 due to their proximity to the Slangfontein homestead. There are no fatal flaws in terms of operational phase impacts to the cultural landscape.

Table 7-6: *Assessment of operation phase impacts to the cultural landscape (HL01 and HL02).*

Issue	Visual intrusion into the cultural landscape and disturbance of the setting and context of heritage resources.	
Description of Impact		
Intrusion into the rural landscape of industrial structures.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Low	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Definite / Continuous	Definite / Continuous
Significance	Medium -	Medium -
Degree to which impact can be reversed	High. Once the facility is decommissioned and the land rehabilitated, the impacts would be almost entirely gone.	

Degree to which impact may cause irreplaceable loss of resources	Medium. Every landscape setting is unique but similar landscapes do occur widely in the central interior of South Africa. With decommissioning the landscape could be restored.	
Degree to which impact can be mitigated	Low, since concealing the activity and structures is not feasible.	
Mitigation actions		
The following measures are recommended:	No maintenance activities to take place outside of the authorised footprint and all vehicles to remain on authorised roads and tracks. Make use of a warning system in which the aviation lights stay off at night until needed.	
Monitoring		
The following monitoring is recommended:	No specific monitoring other than to ensure the above measure is complied with.	
Cumulative impacts		
Nature of cumulative impacts	Negative	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Medium -

7.4. Decommissioning Phase: HL01 & HL02

7.4.1. Impacts to the cultural landscape

Direct impacts to the cultural landscape will occur during decommissioning when large vehicles and equipment are brought into the rural landscape, altering it to one with a more industrial character. The activity, dust and noise will also disturb the sense of place. These impacts are rated as being of medium intensity but their duration will be relatively short, depending on the duration of the decommissioning period. The pre-mitigation impact significance calculates to **medium negative** (Table 7-7) for both HL01 and HL02 respectively. Mitigation measures will entail minimising the duration of the decommissioning period and minimising and/or reducing the visual disruption to the landscape. Because of the scale of the equipment and structures involved, these measures are unlikely to affect the significance rating enough to drop it a level. The post-mitigation significance thus remains at the **medium negative** level. These ratings are in agreement with the VIA (Lawson & Oberholzer 2022). There are no fatal flaws in terms of decommissioning phase impacts to the cultural landscape.

Table 7-7: *Assessment of decommissioning phase impacts to the cultural landscape (HL01 and HL02).*

Issue	Visual intrusion into the cultural landscape and disturbance of the setting and context of heritage resources.	
Description of Impact		
Intrusion into the rural landscape of industrial equipment and structures.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Decommissioning	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Medium
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Medium	Medium

Probability	Definite / Continuous	Definite / Continuous
Significance	Medium -	Medium -
Degree to which impact can be reversed	Medium. Once decommissioning is complete all the equipment would be removed and the site would be rehabilitated. Although it would likely take hundreds of years for the landscape to fully recover, the general pre-construction sense of place would be restored.	
Degree to which impact may cause irreplaceable loss of resources	Medium. Every landscape setting is unique but similar landscapes do occur widely in the central interior of South Africa.	
Degree to which impact can be mitigated	Low, since concealing the activity and structures is not feasible.	
Mitigation actions		
The following measures are recommended:	Keep decommissioning duration as short as possible. Ensure effective rehabilitation of all areas.	
Monitoring		
The following monitoring is recommended:	ECO to ensure that construction activities remain in approved footprint.	
Cumulative impacts		
Nature of cumulative impacts	Negative	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Medium -

7.5. Cumulative impacts: HL01 & HL02

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).

Other than the proposed Nuweveld Wind Farms, there are currently no approved renewable energy EA applications within a 30 km (or even 50 km) radius of the project site (Figure 6-5). The nearest operational wind farm from the site is the Noblesfontein Wind Farm located approximately 65 km to the east. In addition, the South African Renewable Energy EIA Application Database (REEA) ("REEA_OR_2021_Q4") shows several renewable energy projects (solar) authorised close to Beaufort West. Further research confirmed that none of these projects are going ahead/have a valid EA. The cumulative impact assessed will therefore be the collective impact of the four Hoogland Wind Farms and Grid Connection applications together with the three Nuweveld Wind Farm and Gridline applications (Figure 6-5).

All of the projects considered here have followed a similar iterative process and have been designed to have minimal impacts to heritage resources. Cumulative impacts to archaeological heritage are expected to be of **low negative** significance before mitigation (Table 7-1& Table 7-4) and would occur during the construction phase of the various projects, since there is the possibility that some archaeological resources could still be present within the final authorised footprints. Pre-construction surveys will be required to determine whether any sites require avoidance through micrositing or else archaeological mitigation. Post-mitigation impact significance is expected to be **very low negative**.

Impacts to the cultural landscape are largely visual and relate to the intrusion of industrial-type structures and equipment in the cultural landscape. These impacts will occur during all phases and are rated as **medium negative** in each case. There is no mitigation that can make a meaningful difference to these ratings since the structures are far too large to hide. Measures that are suggested anyway are as listed in Table 7-3and Table 7-5 to Table 7-7. With mitigation the rating remains at **medium negative**. From a visual point of view, the VIA rates these impacts as high negative both before and after mitigation.

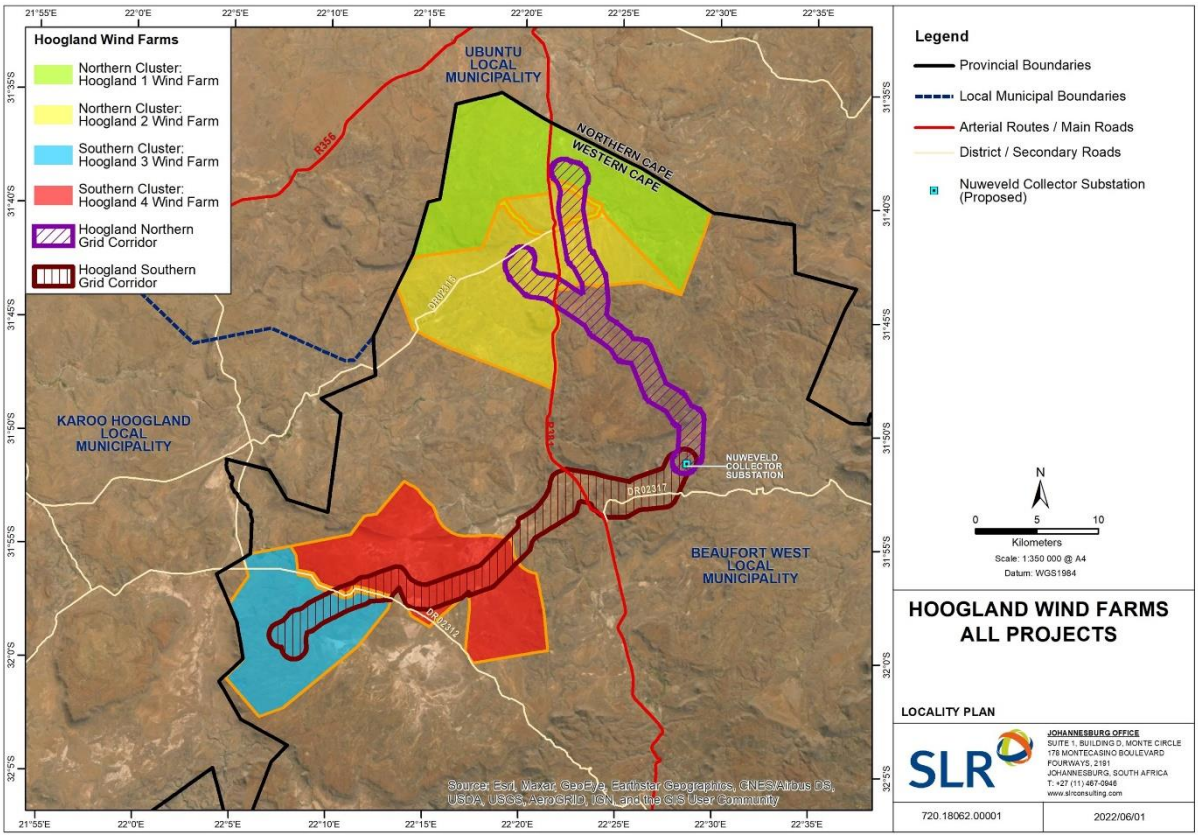


Figure 7-1: *Cumulative Map indicating renewable energy facilities within the 30km buffer of the Hoogland Wind Farms*

7.6. Evaluation of impacts relative to sustainable social and economic benefits: HL01 & HL02

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 proposed WEFs would generate and feed electricity into the national grid. This is something very much needed for economic development in South Africa due to the historical and ongoing problems associated with electricity supply. Economic development has knock-on effects throughout society, but it is also noted that construction and operation phase jobs would be created. Upgrades and contributions to ongoing maintenance of the local roads would improve access in the area where currently budgetary constraints apply. The project will thus provide socio-economic benefits. The expected impacts to heritage resources from the development are generally low and are thus outweighed by the potential benefits to be derived.

7.7. Existing impacts to heritage resources: HL01 & HL02

Aside from the natural degradation, weathering and erosion that will affect fossils, archaeological materials and buildings, the only obvious threat to heritage resources on the site is the robbing and reuse of stones and possibly bricks from historical sites. Trampling from grazing animals and/or farm/other vehicles could also occur. Some of the buildings are unoccupied and unmaintained which is also resulting in accelerated natural degradation. The impacts to archaeological sites from the removal of building materials is considered to be of **low negative** significance, since these sites are, in any case, likely to be in a ruinous state before being raided. Other existing impacts are generally **insignificant** or **very low negative**. There are no existing impacts to the landscape.

7.8. The No-Go alternative: HL01 & HL02

Due to the comprehensive iterative design process that has been undertaken to inform the Hoogland 1 and Hoogland 2 wind farm layouts and their associated infrastructure, no site or layout alternatives will be assessed. However, it is required that the 'no-go' alternative be assessed. The 'no-go' alternative is the option of not constructing the project where the status quo of the current farming activities on the site would prevail.

Not constructing the facilities means that the study area would remain undeveloped and the status quo would be retained. The impacts that would occur would be as per the existing impacts described above in Section 7.7. Importantly, electricity generation would not take place, which means that this benefit would be lost to society. Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is more significant and suggests that the No-Go option is less desirable.

7.9. Levels of acceptable change: HL01 & HL02

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. Any uncontrolled impacts to standing heritage structures are unacceptable. 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.

8. MITIGATION AND EMPR REQUIREMENTS

The primary mitigation measure that needs to be complied with is to have the final authorised footprint surveyed well before construction starts. This should occur at least six and preferably eight months before construction to allow time for the following sequence of activities:

- Pre-construction survey;
- Survey report;
- Workplan application to HWC for any archaeological sites that require excavation;
- Consideration of the Workplan and issue of the approval;
- Mitigation excavations as needed;
- Analysis and reporting; and
- Final approval by HWC.

A permit application to NBKB will need to be made on SAHRIS for alteration or demolition of the R381 bridge which is older than 60 years.

The actions recorded in Table 8-1 should be included in the environmental management program (EMPr) for the project. This will be updated as required after the pre-construction survey. Note that palaeontological considerations are contained in the relevant specialist report.

Table 8-1: *Heritage considerations for inclusion in the EMPr (HL01 and HL02).*

Impact	**Mitigation / management objectives**	**Mitigation / management actions**	**Monitoring**		
			Methodology	**Frequency**	**Responsibility**
Impacts to archaeology and graves					
Damage or destruction of archaeological sites or graves	Avoid impacts (preferred) or locate and sample or rescue sites/burials before disturbance	Pre-construction survey, micrositing of infrastructure where possible	Appoint archaeologist to conduct survey c. 6 months before construction to allow for approval of survey report and workplan application, conducting of mitigation and approval of mitigation report	Once-off	Project developer
		Archaeological excavation and sampling of significant sites that cannot be avoided	Appoint archaeologist to conduct excavations well before construction	Once-off	Project developer
Damage or destruction of archaeological sites or graves	Rescue information, artefacts or burials before extensive damage occurs	Reporting chance finds as early as possible, protect *in situ* and stop work in immediate area	Inform staff and carry out inspections of excavations	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly)	ECO
Impacts to built heritage					
Damage or destruction of buildings	Avoid impacts	Ensure all structures on site are no-go areas, using signage if close enough to be at risk.	Inform staff and carry out inspections. Particularly important here are (1) the roadworks around the Slangfontein werf wall at waypoints 1721 & 1722 in HL01, (2) the trenching past the graves at waypoint 1696 in HL01, (3) the roadworks near the graves at waypoint 702 in HL02, and (4) the trenching in the vicinity of waypoint 113 in HL02.	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly)	ECO
Impacts to the cultural landscape					
		Ensure disturbance is kept to a		Ongoing basis	Construction Manager or Contractor

Impact	Mitigation / management objectives	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Visible landscape scarring	Minimise landscape scarring	minimum and does not exceed project requirements. Rehabilitate areas not needed during operation in accordance with the revegetation and rehabilitation plan.	Monitoring of surface clearance relative to approved layout	As required	ECO

9. CONSULTATION WITH HERITAGE CONSERVATION BODIES

As per the HWC requirements (see section 1.2 above), the final HIA will be sent to the local municipality and registered (with HWC) heritage conservation bodies for 30 days of consultation prior to submission.

A separate letter with the results will be submitted to HWC with the HIA.

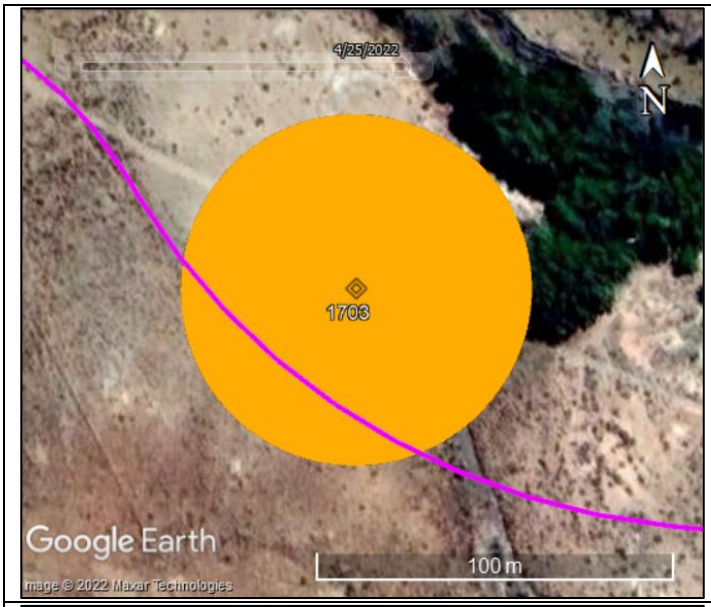
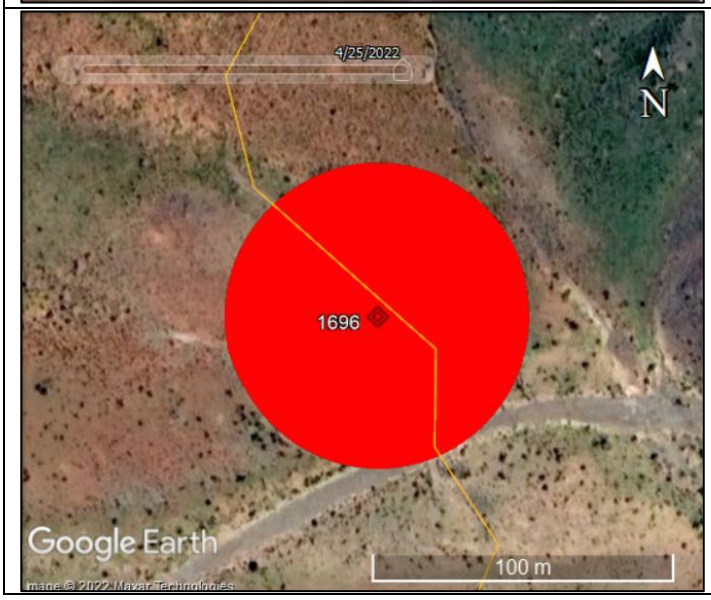
10. CONCLUSIONS

In general, the iterative process followed in the development of the Hoogland 1 and Hoogland 2 Wind Farm layouts has meant that, aside from the unavoidable impacts to the wider cultural landscape, impacts to heritage resources are minimal. This section discusses the various specific instances where heritage buffers have been intersected and lists the project responses to the heritage indicators.

10.1. Hoogland 1 Wind Farm

There are no significant concerns for this project. In most instances where the project will impinge on heritage buffers these are found to be acceptable, while mitigation measures have been suggested to mitigate impacts in two cases and prevent direct impacts in a third case (Table 10-1; Figure 10-1). The heritage indicators are listed and discussed in Table 10-2. Note that in addition to the listed project responses, recommendations have been made to deal with any as yet unknown sensitive areas.

Table 10-1: *Intersection of buffers in Hoogland 1.*

	Waypoint 1703 is the mid-point of a stone artefact scatter that extends northwest and south of the existing farm road. The scatter is crossed by a wind farm road shared with HL02 (pink line). It would be better to reuse the current farm road, but the deviation to the south is required due to ecological impacts. Since the site is a stone artefact scatter, it can easily be mitigated and this will be required.
	Waypoints 1978 and 1979 are denser spots in a large LSA hornfels scatter. Since the site is a stone artefact scatter, it can easily be mitigated and this will be required.
	Waypoint 1696 marks two graves located close to a farm track in which an electrical cable (orange line) would be laid. It is recognised that placing the cable along the track reduces ecological impacts and the site will require careful management to avoid impacts. Mitigation will be needed (fencing graves and micrositing the cable and farm track) if necessary.

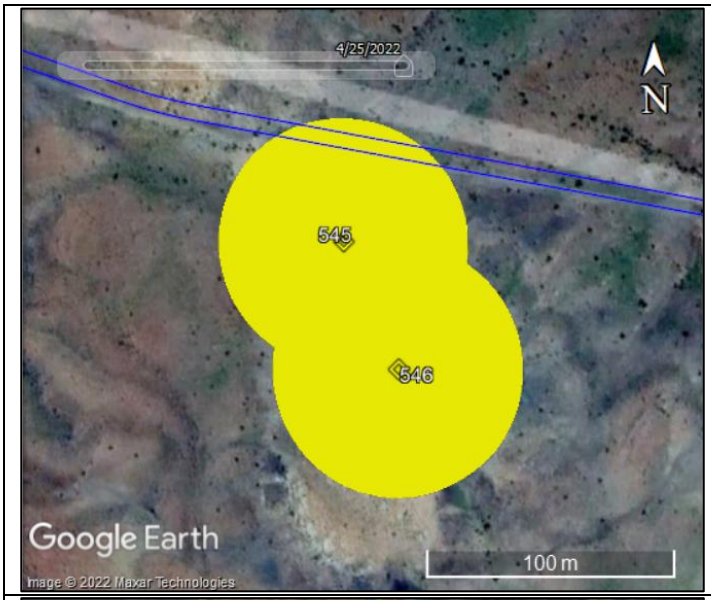
	Waypoint 545 is a grade IIIC collapsed stone structure whose buffer zone has been intersected by a wind farm road (blue lines). The project is reusing an existing farm road which is preferable to building a new one outside the buffer and this is therefore acceptable.
	Powerline (black/white line) crosses a cultural landscape zone with an overhead line (white section) used across a river and farm dam. The location has been chosen to align with the shared road in the HL02 site to the east (pink line). The powerline will be a minimal impact when seen against the wind farm and will not unduly affect the agricultural landscape.
	Waypoint 1747 represents the structures of the Slangfontein farmstead. Waypoint 1721 and 1722 mark the corners of the stone werf wall. The wind farm road (blue lines) originally followed an existing farm road but, due to potential impacts to the stone wall, it has been moved further away. The wind farm road will now be a minimum of 25 m away from the stone wall which is acceptable (see Figure 10-1).

Figure 10-1: *Relationship between HL01 road layout (blue lines) and werf wall (white line) at Slangfontein.*

Table 10-2: *Heritage indicators and project responses for Hoogland 1.*

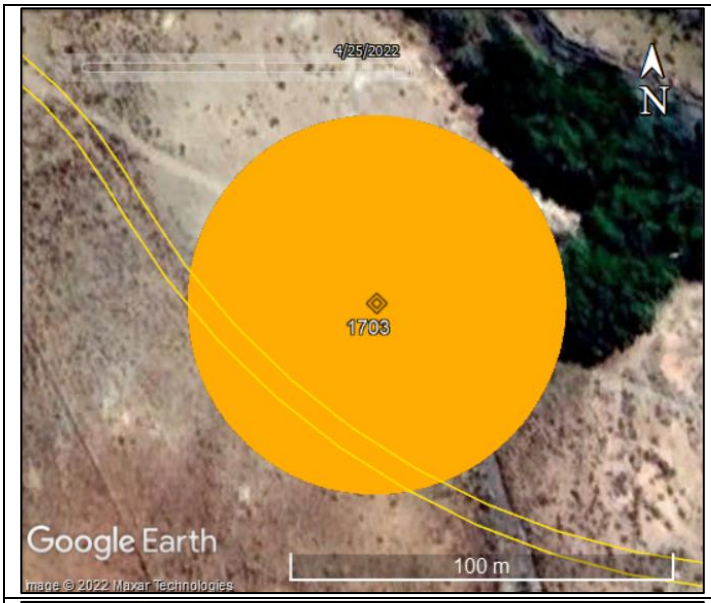
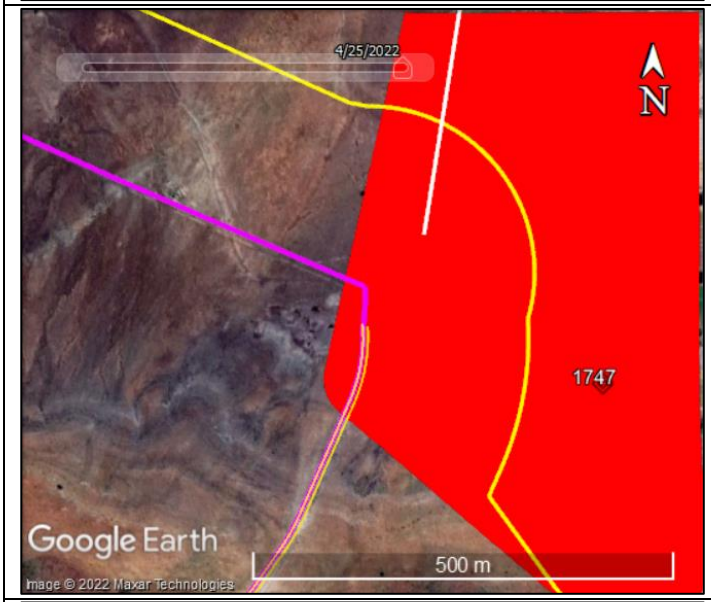
Indicator	Project Response
Uncontrolled damage to fossils should be minimised as far as possible.	The present layout avoids known sensitive areas.
Direct damage to archaeological sites should be avoided as far as possible and, where some damage to significant sites is unavoidable, scientific/historical data should be rescued.	This has been done in all locations except one (waypoint 1703) where archaeological mitigation will be required.
Buffers of at least 30 m should be maintained around known archaeological sites as far as possible.	Aside from waypoint 1703, this has been done in all locations except one (waypoint 545) but this one is acceptable.
Buffers of at least 200 m should be maintained around the most significant rock art sites (i.e. grade IIIA) as far as possible but lower significance sites should be buffered by at least 30 m.	This has been done.

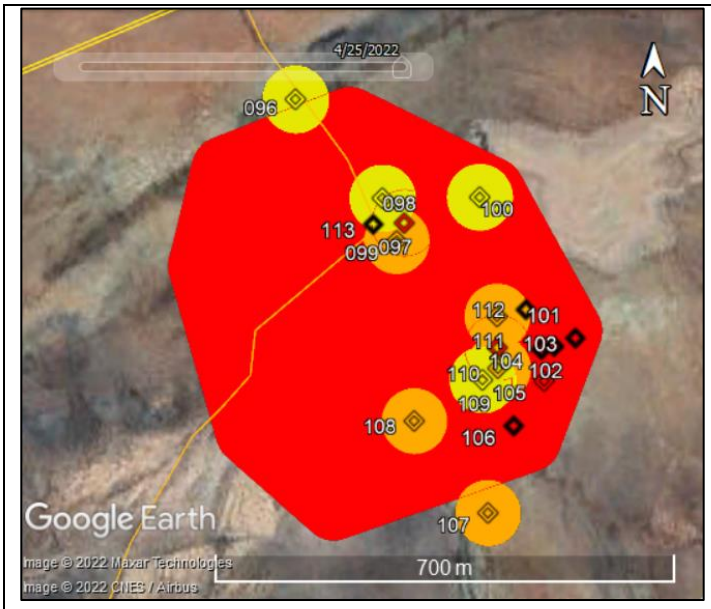
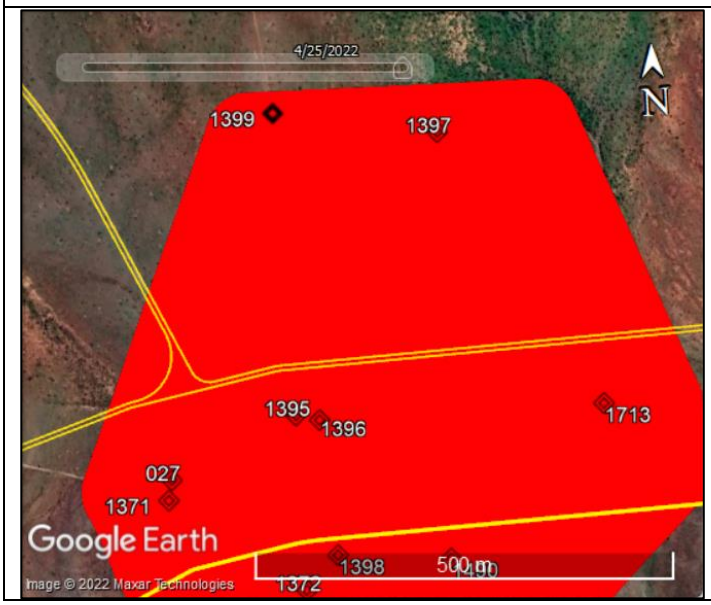
Indicator	Project Response
Direct impacts to graves must be avoided completely with a 30 m buffer.	This has been done in all locations except one (waypoint 1969) where it is desirable to place an electrical cable within a farm track. Mitigation will be required in the form of fencing the graves and micrositing the cable if needed.
The wind farm, when seen from the R381, should ideally not dominate views in multiple directions.	The project will be visible on both sides of the road but this impact is unavoidable given the site location and is offset by the socio-economic benefits of the project. Other projects have been approved in the area, establishing this land use.
Turbines should be placed far enough away from the R381 to ensure that one's appreciation of the landscape is not significantly diminished.	Turbines are a minimum of 0.75 km from the R381, which follows a visual recommendation of having turbines at least 0.75 km from the road.
Clustering of turbines is preferred rather than having them spread out in a linear fashion. No turbines should exist as outliers.	There are no obvious outliers and the project would be seen as a single large cluster, either on its own or in combination with the other projects proposed in the area.
Powerlines should be buried as far as possible.	This has been done with the only overhead sections being where there are environmental or technical constraints.
Road surfacing, where required, should avoid high contrast materials.	This will be a recommendation, since it is not known yet whether any surfacing will be required.
Related infrastructure (substation, battery storage facility, buildings) should be in areas of low visibility (especially from the R381).	These structures are 1.2 km from the R381 and located just over a low ridge which will shield the lowermost parts of these structures. The construction camp and laydown area are about 1.3 km from the R381 just over the same low ridge but are temporary. The current locations have all been approved by the visual specialists with conditions.
Buffers of at least 30 m should be maintained around all built elements, but where existing roads are upgraded this distance can be reduced as needed but should still guarantee the integrity of the resource.	This has been done with one exception. This is the Slangfontein werf wall (waypoints 1721 and 1722) where a mitigated road layout has been implemented to reduce the chances of impacts. Although the minimum distance between wall and road is now 25 m, this is acceptable.

10.2. Hoogland 2 Wind Farm

There is currently just one significant concern for this project, although the layout impinges on heritage buffers in a number of other places, all of which are found to be acceptable. Mitigation will be needed at the one significant place (Table 10-3). The heritage indicators are listed and discussed in Table 10-4.

Table 10-3: *Intersection of buffers in Hoogland 2.*

	Waypoint 1703 is the mid-point of a stone artefact scatter that extends northwest and south of the existing farm road. The scatter is crossed by a wind farm road (parallel yellow lines). It would be better to reuse the current farm road, but the deviation to the south is required due to ecological impacts. Since the site is a stone artefact scatter, it can easily be mitigated and this will be required.
	Waypoint 1747 represents the structures of the Slangfontein farmstead with the white line being the stone werf wall. A wind farm road shared with HL01 (pink line and parallel yellow lines) just passes through the edge of the buffer around the cultural landscape. This is acceptable. (Note that the yellow line to the northeast is the site boundary and does not represent any infrastructure.)
	Waypoint 702 is a set of four graves located about 15 m away from the farm road to be upgraded to a wind farm road (parallel yellow lines). The site will require careful management to reduce the chances of impacts. Mitigation will be needed (fencing graves).

	This is a largely ruined farmstead. A buried electrical cable (orange line) will follow the existing farm road but will need to be outside the road itself. Waypoint 113 is a small indeterminate stone foundation which lies very close to the road. It is NCW but nonetheless, if avoidable, it should be avoided by keeping the cable trench far enough away to prevent harm. All other components are far enough from the road to remain unaffected. Waypoint 096 represents two very poorly preserved stone-walled features which are far enough from the road to remain unaffected. Even if waypoint 113 is lost, the layout is deemed acceptable since the cable will be buried and the existing farm road will be upgraded.
	This is the Rocklands Farmstead. The west-east wind farm road (parallel yellow lines) follows the approved Nuweveld Wind Farm road which has been moved away from the main features of the farmstead. The road to the north follows an existing farm road. This layout is acceptable. (Note that the yellow line in the south is the site boundary and does not represent any infrastructure.)

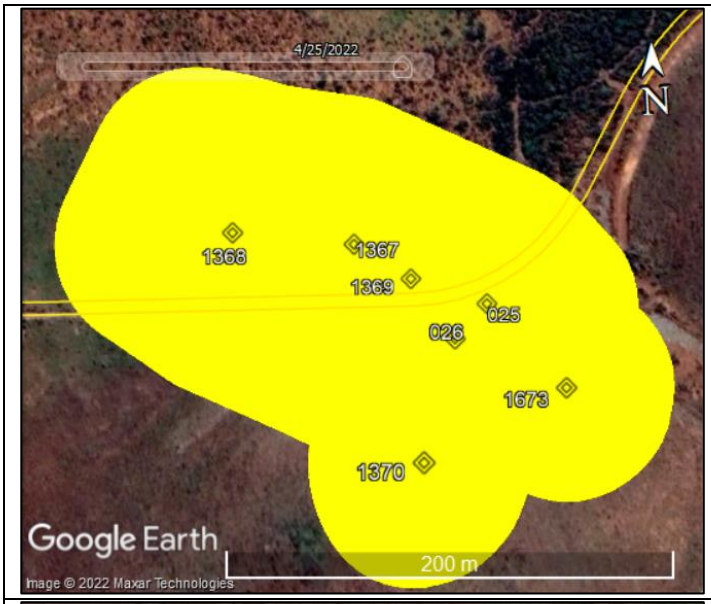
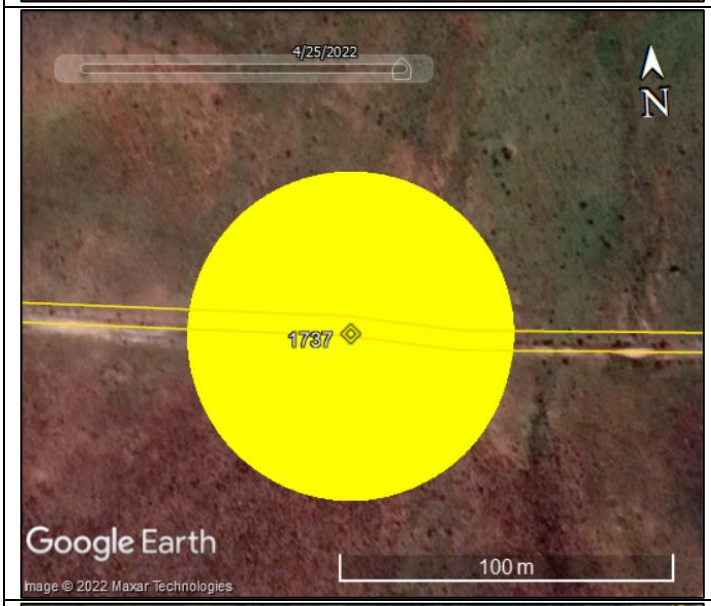
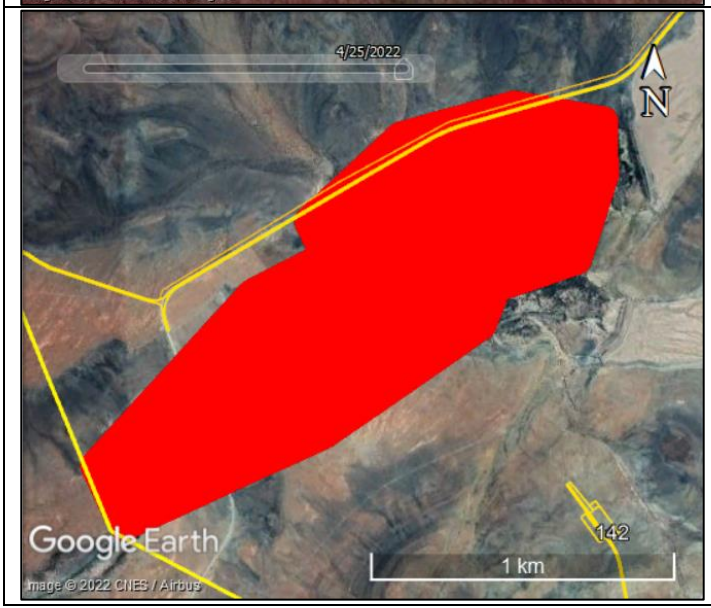
	This is a very poorly preserved stone-walled settlement from which almost all rocks have been removed. The wind farm road (parallel yellow lines) follows the approved Nuweveld Road which mostly follows the existing farm road and is acceptable.
	Waypoint 1737 is a point representing an old fence line with stone pillars running parallel to the farm road. The wind farm road (parallel yellow lines) follows an approved Nuweveld Road along an existing farm road and is acceptable.
	A wind farm road and electrical cable (yellow and orange lines) crosses the edge of a cultural landscape (the Elandsfontein farmstead, which was not recorded on site, hence no waypoint number) but reuses an existing road which is acceptable. (Note that the yellow line to the southwest is the site boundary and does not reflect infrastructure.)

Table 10-4: *Heritage indicators and project responses for Hoogland 2.*

Indicator	Project Response
Uncontrolled damage to fossils should be minimised as far as possible.	The present layout avoids known sensitive areas.
Direct damage to archaeological sites should be avoided as far as possible and, where some damage to significant sites is unavoidable, scientific/historical data should be rescued.	This has been done in all locations except one (waypoint 1703) where archaeological mitigation will be required.
Buffers of at least 30 m should be maintained around known archaeological sites as far as possible.	Aside from waypoint 1703, this has been done in all locations.
Buffers of at least 200 m should be maintained around the most significant rock art sites as far as possible but lower significance sites should be buffered by at least 30 m.	This has been done.
Direct impacts to graves must be avoided completely with a 30 m buffer.	Direct impacts have been avoided but in one instance the 30 m buffer is transgressed by a wind farm road. Fencing of the graves and monitoring of the roadworks has been recommended to prevent accidental damage.
The wind farm, when seen from the R381, should ideally not dominate views in multiple directions.	The project will be visible on both sides of the road but this impact is unavoidable given the site location and is offset by the socio-economic benefits of the project. Other projects have been approved in the area, establishing this land use.
Turbines should be placed far enough away from the R381 to ensure that one's appreciation of the landscape is not significantly diminished.	Turbines are a minimum of 0.75 km from the R381, which follows a visual recommendation of having the turbines at least 0.75 km from the road.
Clustering of turbines is preferred rather than having them spread out in a linear fashion. No turbines should exist as outliers.	There are no obvious outliers and the project would be seen as a single large cluster, either on its own or, depending on viewing angle, in combination with the other projects proposed in the area.
Powerlines should be buried as far as possible.	This has been done with the only overhead sections being where there are environmental or technical constraints.
Road surfacing, where required, should avoid high contrast materials.	This will be a recommendation, since it is not known yet whether any surfacing will be required.
Related infrastructure (substation, battery storage facility, buildings) should be in areas of low visibility (especially from the R381).	These structures are 2.5 km from the R381 but are 0.80 km and 0.50 km from another local road (DR02315). The construction camp and laydown area are 0.08 km and 0.26 km from the local road but are temporary. The current locations have all been approved by the visual specialists.

Indicator	Project Response
Buffers of at least 30 m should be maintained around all built elements, but where existing roads are upgraded this distance can be reduced as needed but should still guarantee the integrity of the resource.	This has been done.

10.3. Reasoned opinion of the specialist: HL01 & HL02

Given that the site lies just outside of a REDZ and that other wind farms have been approved in the area, the proposed land use is deemed acceptable because renewable energy facilities are to be expected in the future. The various other individual impacts highlighted above can easily be dealt with through micrositing or archaeological mitigation as appropriate. It is therefore the opinion of the heritage specialist that the proposed Hoogland 1 Wind Farm and Hoogland 2 Wind Farm should both be authorised in full, but subject to the recommendations listed below.

11. RECOMMENDATIONS

11.1. Hoogland 1

It is recommended that the proposed project be approved but subject to the following recommendations which must be captured in the EA, should one be issued:

Western Cape:

- The archaeological site at waypoint 1703 that will be crossed by a proposed wind farm road must be excavated prior to construction. Excavation should at least cover the area to be disturbed;
- The archaeological site at waypoints 1978 and 1979 that will be overlapped by a turbine footing must be excavated prior to construction. Excavation must target the densest part(s) of the scatter within or close to the impact zone;
- The two graves at waypoint 1696 must be fenced with a regular farm-style fence with a pedestrian entrance gate so as to ensure that they are easily identifiable on site. The fence must be placed at least 5 m from the graves and the electrical cable must be placed a minimum of 5 m away from the fence, but preferably further if possible;
- Trenching within 30 m of waypoint 1696 must be monitored by relevant project staff and/or the ECO;
- Road construction work around the Slangfontein farm werf must be monitored by relevant project staff and/or the ECO to ensure that the walls remain unharmed;
- A pre-construction survey of the entire authorised footprint must be undertaken in order to determine whether any further archaeological sites may need mitigation or protection through micrositing (if possible);
- The final layout must be evaluated by a palaeontologist to determine which areas, if any, need a pre-construction survey. These will be previously unsurveyed and potentially sensitive areas;

- If necessary, and subject to the agreement of Heritage Western Cape, a Workplan application should be submitted prior to the palaeontological survey to allow for sample collection during the survey;
- A palaeontological chance finds procedure must be incorporated into the EMPr;
- Landscape scarring must be minimised during construction;
- If road surfacing is required then low contrast materials such as concrete with brown exposed aggregate should be used, where possible;
- All areas not required during operation must be rehabilitated in accordance with the Rehabilitation and Revegetation Plan;
- A CAA-approved warning system which only requires the red lights to come on when an aircraft is in the vicinity must be used to reduce the night-time impacts to the sense of place;
- Visually sensitive skylines, rock outcrops and steep slopes must be avoided as per the recommendations of the visual impact assessment;
- Temporary laydown and areas and batching plants should be located in areas approved by the visual specialists;
- Substations and O&M Buildings to be located in unobtrusive low-lying areas away from provincial and district roads where possible;
- On-site signage to be discrete, and billboards prohibited. Signage to be fixed as low as possible, preferably against a backdrop to avoid intrusion on the skyline;
- Security and other outdoor lighting to be fitted with reflectors to conceal the light source;
- In the event of decommissioning, the site must be rehabilitated in accordance with the Rehabilitation and Revegetation Plan;
- If the wind farm is approved and the final layout does not need all approved turbine locations to ensure a maximum of 60 turbines, then where a choice exists between turbines to be dropped, and all other factors are equal, priority should be given to dropping turbines in the highest visual sensitivity areas and within 1 km of the R381, as well as turbines 72 and 75due to their proximity to the Slangfontein homestead which is a IIIA cultural landscape;
- Replacement structures for the existing bridges on the local access roads must be designed to have a similar appearance to the current structures; 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.

Northern Cape:

- Replacement structures for the existing bridges on the local access roads must be designed to have a similar appearance to the current structures; and
- A permit application will need to be made on SAHRIS to allow for demolition or alteration of the bridge on the R381.

11.2. Hoogland 2

It is recommended that the proposed project be approved but subject to the following recommendations which must be captured in the EA, should one be issued:

Western Cape:

- The archaeological site at waypoint 1703 that will be crossed by a proposed wind farm road must be excavated prior to construction. Excavation should at least cover the area to be disturbed;
- The two graves at waypoint 702 must be fenced with a regular farm-style fence with a pedestrian entrance gate so as to ensure that they are easily identifiable on site;
- The cable trench proposed through the historic farm complex of Bulskolk (in the vicinity of waypoint 113) must be sure to avoid impacting any ruined structures or other features in the vicinity;
- Roadworks within 30 m of the graves at waypoint 702 must be monitored by relevant project staff and/or the ECO;
- Trenching within the historic werf at Bulskolk (in the vicinity of waypoint 113) must be monitored by relevant project staff and/or the ECO to ensure that the various features remain unharmed;
- A pre-construction survey of the entire authorised footprint must be undertaken in order to determine whether any further archaeological sites may need mitigation or protection through micrositing (if possible);
- The final layout must be evaluated by a palaeontologist to determine which areas, if any, need a pre-construction survey. These will be previously unsurveyed and potentially sensitive areas;
- If necessary, and subject to the agreement of Heritage Western Cape, a Workplan application should be submitted prior to the palaeontological survey to allow for sample collection during the survey;
- A palaeontological chance finds procedure must be incorporated into the EMPr;
- Landscape scarring must be minimised during construction;
- If road surfacing is required then low contrast materials such as concrete with brown exposed aggregate should be used, where possible;
- All areas not required during operation must be rehabilitated in accordance with the Rehabilitation and Revegetation Plan;
- A CAA-approved warning system which only requires the red lights to come on when an aircraft is in the vicinity must be used to reduce the night-time impacts to the sense of place;
- Visually sensitive skylines, rock outcrops and steep slopes must be avoided as per the recommendations of the visual impact assessment;
- Temporary laydown and areas and batching plants should be located in areas approved by the visual specialists;
- Substations and O&M Buildings to be located in unobtrusive low-lying areas away from provincial and district roads where possible;
- On-site signage to be discrete, and billboards prohibited. Signage to be fixed as low as possible, preferably against a backdrop to avoid intrusion on the skyline;
- Security and other outdoor lighting to be fitted with reflectors to conceal the light source;
- In the event of decommissioning, the site must be rehabilitated in accordance with the Rehabilitation and Revegetation Plan;
- If the wind farm is approved and the final layout does not need all approved turbine locations to ensure a maximum of 60 turbines, then where a choice exists between turbines to be dropped, and all other factors are equal, priority should be given to dropping turbines in the high visual sensitivity areas and within 1 km of the R381;
- Replacement structures for the existing bridges on the local access roads must be designed to have a similar appearance to the current structures; 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.

Northern Cape:

- Replacement structures for the existing bridges on the local access roads must be designed to have a similar appearance to the current structures; and
- A permit application will need to be made on SAHRIS to allow for demolition or alteration of the bridge on the R381.

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APPENDIX 1 – Curriculum Vitae

Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 23 Dover Road, Muizenberg, 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 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

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)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

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
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 –
Heritage Western Cape APM Committee member	2013 –
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	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
  - Notification of Intent to Develop applications (for Heritage Western Cape)
  - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
  - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
  - Archaeological specialist studies
  - Phase 1 archaeological test excavations in historical and prehistoric sites
  - Archaeological research projects
- Development types
  - Mining and borrow pits
  - Roads (new and upgrades)
  - Residential, commercial and industrial development
  - Dams and pipe lines
  - Power lines and substations
  - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

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

Awards:

Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.

APPENDIX 2 – List of finds

Project	Waypoint	Co-ordinates	Description	Grade
HL01	1676	S31 36 47.4 E22 21 10.8	Small rock shelter with faded red finger paintings in it and much scratched graffiti. One graffiti has the date 19/5/19. The paintings consist of long, curved, red finger smears and one classic geometric motif (vertical line with several horizontals crossing it). The floor has a light scatter of hornfels, ostrich eggshell and bone. Also one bullet case. There does not seem to be any deposit but there is plenty of ostrich eggshell and hornfels artefacts on the talus slope stretching about 15 m down the slope. The site apparently featured in a recently filmed Deon Meyer film.	IIIB
HL01	1677	S31 36 36.8 E22 20 56.8	Two upright stones about 16 m apart that presumably formed one end of a wire-fenced area on the river terrace.	NCW
HL01	1678	S31 36 34.7 E22 20 56.5	A light scatter of LSA hornfels artefacts in front of a small rock shelter along a low scarp. Also one quartz and two orange CCS artefacts seen, as well as occasional pieces of glass and refined white earthenware.	IIIC
HL01	1679	S31 36 33.1 E22 20 58.2	A stone feature on the river terrace with a number of slabs and one stone pillar. Not lying in any organized manner.	NCW
HL01	1680	S31 36 32.6 E22 20 57.1	A very poorly preserved stone-walled kraal of about 8x20 m built against a low scarp. One piece of black glass seen as well.	NCW
HL01	1681	S31 36 31.5 E22 20 55.7	A single stretch of walling similar to 1680 but even more ephemeral and might even be natural.	NCW
HL01	1682	S31 36 31.0 E22 20 54.7	A packed stone mound on a river terrace. It is circular and about 3 m in diameter. Although not the right shape for a grave, it could possibly be one. There are some fragments of glass and ostrich eggshell in the surrounding area which may speak to a different function for the rocks. To be conservative it is considered as IIIA.	IIIA
HL01	1683	S31 36 28.3 E22 20 52.4	There is a widespread background scatter of mixed age (MSA and LSA) on the river terrace in this area.	NCW
HL01	1684	S31 36 21.7 E22 20 54.5	Three clusters of stones on the river terrace. They have variable numbers of rocks and some clear and black glass and some refined white earthenware fragments were seen in the area.	NCW
HL01	1685	S31 36 20.0 E22 20 54.3	A moderately well preserved house ruin located at the foot of a scarp. It faces northeast and has three rooms. The walls show that it had a flat roof sloping down towards the south. There is a small circular enclosure with east-facing entrance a few meters to the north of the house. One of its walls has been extended towards the east in front of the western part of the house. A light scatter of glass and ceramics occurs in the surrounding area. This house was said by the landowner to have been a labourers cottage when his great grandfather farmed there.	IIIB

HL01	1686	S31 36 19.4 E22 20 54.9	A small, possibly square structure of maybe 2x2 m. It is badly collapsed. There is a light scatter of glass, ceramics and potjie fragments in the area.	NCW
HL01	1687	S31 36 19.6 E22 20 53.2	A presumed kraal with some missing walls built against the scarp just southwest of the 1685 house.	NCW
HL01	1688	S31 36 20.5 E22 20 53.1	Another L-shaped enclosure further along the scarp southwest of 1687.	NCW
HL01	1689	S31 36 17.9 E22 20 53.0	A stone cairn on top of the scarp about 0.7 m in diameter and about 0.5 m high.	NCW
HL01	1690	S31 37 03.3 E22 17 04.2	A point along a large leiwater channel. It would lead water towards the southwest, into a stream which feeds a dam.	NCW
HL01	1691	S31 37 14.4 E22 16 47.4	This is the north-eastern entrance to the farm werf on Portion 2 of Droogfontein 1. There is a landscape of trees here. A tree-lined avenue leads towards the house at 1692 and many trees surround fields and the house itself.	IIIB
HL01	1692	S31 37 18.5 E22 16 41.5	An early twentieth century farmhouse (1930s or 1940s) under a low-pitched corrugated iron roof which has been abandoned, perhaps partly due to the reduction in water availability in recent decades. It is built of red clay bricks with mud mortar but plastered with cement on the outside. There is no evidence of additions or alterations. It is surrounded by vegetable gardens and fruit trees which undoubtedly provided for the occupants. The front of the house faces northeast and is three bays wide with a central door flanked by sash windows. Stoep kamers occur on the corners of the house. There is a central passage leading through to a family room with a square arch supported by square pillars. A kitchen and scullery occur at the back. The lounge and northern stoep kamer have matching fire places. The floors are wooden strip flooring. There is a garage to the southwest of the house (same construction as the house) and two outbuildings to the south (these were not examined).	IIIB
HL01	1693	S31 37 42.0 E22 16 53.3	A rectangular stone kraal built against a scarp. It is 6 m wide and has a 5 m long room against the rock and a 9 m long room extending further out. It is very badly collapsed. Rare glass and ceramic fragments occur and the rusted remains of an old spade were seen.	NCW
HL01	1694	S31 37 43.3 E22 16 54.2	A round stone structure of about 4 m diameter. There are rare glass and ceramic fragments around it. A large cleared area to the north between this feature and the scarp may have been a wire-fenced kraal.	NCW
HL01	1695	S31 37 22.6 E22 16 41.3	A reasonably well-preserved square stone structure of about 3x3 m with door to the north.	IIIC
HL01	1696	S31 37 25.5 E22 19 10.9	Two graves on a river terrace. Both have stone mounds and stone headstones at their western ends.	IIIA
HL01	1697	S31 37 18.0 E22 20 46.7	A cluster of stones with some glass, ceramics and metal around about.	NCW
HL01	1698	S31 37 18.4 E22 20 46.9	A low density dump of glass and ceramics and metal.	NCW
HL01	1699	S31 37 18.8 E22 20 47.1	A well-preserved stone house ruin facing towards the east. Its walls show that it had a flat roof sloping down towards the west. It has two rooms, both with doors to the outside on the east side. There is a shelf in the	IIIB

			north-western corner of the northern room. A window in the northern room faces west, while another in the southern room faces south. There is a small flowerbed on the south-eastern corner. A single line of stones runs north to south in front of the house and there is a collapsed pile of stones to the south suggesting another room to have been there.	
HL01	1700	S31 37 18.7 E22 20 48.0	An ash head located about 20 m to the east of the house at 1699. The glass includes clear, aqua, brown, green, emerald green, blue, black, pink), the ceramics include refined white earthenware, transfer-printed, willow pattern, lined industrial ware and a dolls limb. Metals fragments occur and a padlock was seen. There was also a calcite crystal.	IIIB
HL01	1701	S31 37 18.9 E22 20 49.0	A stone-walled kraal with three enclosures. All walls have been broken down close to ground level and the stones removed.	NCW
HL01	508	S31 36 45.9 E22 20 56.1	Old dam wall with an ostrich egg and a brown bottle broken at its base. No evidence of the eggshell being a flask but this is possible.	NCW
HL01	509	S31 36 50.2 E22 20 39.2	A small outcrop of calcite with an ephemeral scatter of fairly fresh hornfels artefacts around it.	NCW
HL01	510	S31 36 50.8 E22 20 38.1	A C-shaped stone-walled structure of about 2x3 m that is open to the west.	NCW
HL01/2	1702	S31 40 11.1 E22 23 49.6	Two modern memorial stones in memory of deceased family members and enclosed by fences. Not heritage, both <20 years old.	---
HL01/2	1703	S31 39 10.6 E22 22 18.4	A large LSA scatter of hornfels and wacke flaked artefacts on a river bank. Also ostrich eggshell fragments and some sandstone flakes. Extends about 30 m south and 30 m northwest of the waypoint and is bisected by a farm track.	IIIB
HL01/2	1704	S31 39 08.2 E22 22 28.0	A house plinth with all walls removed. It is 3.5 m wide and 10 m long. There is a hearth foundation of 1x1 m on the south-eastern end of the house. There are three cross walls with the second room from the northwest being the largest. The other three are all about the same size. There is a light scattering of glass, ceramics and metal lying about.	IIIC
HL01/2	1705	S31 39 07.7 E22 22 28.0	A small stone foundation of 2x3 m. There is black and green glass and some ceramics (coarse porcelain, transfer printed, hand-painted), ostrich eggshell and bone scattered about.	IIIC
HL01/2	1706	S31 39 09.1 E22 22 28.7	An ash heap with plenty of bone, glass (black, light and dark green, clear, purple, blue, aqua), ceramics (transfer-printed, hand-painted, lined industrial ware, stoneware), metal, a dolerite upper grindstone, a horseshoe and a copper lid and chain. Within the ash heap there are also two small stone features/structures of 1x1 m and 1.5x1.5 m.	IIIA
HL01/2	1707	S31 39 09.2 E22 22 29.8	A small northeast-facing house with two square rooms and a stoep. The house is badly tumbled but both main rooms have doors facing northeast and a shelf sits in the southern corner of the south-eastern room. There is a light scatter of glass, ceramics and metal in the vicinity. Also a dolerite cobble upper grindstone.	IIIC

HL01/2	1708	S31 39 08.7 E22 22 29.8	A small ash and rubbish heap with a stone cluster in it that looks like, but presumably is not, a grave.	IIIC
HL01/2	1709	S31 39 09.0 E22 22 31.9	Two single room stone kraals with other walling partially linking them. The northern kraal also has two smaller structures built onto its southern and eastern corners. The northern kraal is far better preserved than the southern one with the latter having been removed to ground level. There is a 4 m wide entrance on the north side of the northern kraal. A 1 m diameter circular feature occurs in the middle of the eastern part of the southern kraal.	IIIC
HL01	1710	S31 39 09.4 E22 22 33.6	This is the southern point of the 1709 kraal complex.	
HL01/2	1711	S31 39 09.2 E22 22 27.7	A single grave with head and foot stones about 1.3 m apart.	IIIA
HL01	1712	S31 39 04.0 E22 22 29.7	A collection of stone slabs lying on a river terrace. Their function cannot be determined.	NCW
HL01	1713	S31 39 04.8 E22 22 29.4	Probably three graves with the stone coverings of two of them having been affected by erosion. Only one grave is clear and has a head/foot stone on its eastern end. The three align west-east and are parallel to one another supporting all three being graves.	IIIA
HL01	1714	S31 39 02.2 E22 22 29.3	A place where building blocks have been sourced along the river. Unclear whether any formal quarrying happened since it looks as though the rock layer just breaks up on its own.	NCW
HL01/2	1715	S31 39 06.6 E22 22 21.9	A stone cluster and a small stone cairn on a hilltop overlooking a river. There is also an ephemeral LSA hornfels artefact scatter on this hilltop.	NCW
HL01/2	1716	S31 39 03.4 E22 22 16.8	Stone walling that seems to have surrounded part of the river valley. In this area it is running from SE to NW. It then turns SW across the river and runs back towards the SE again. Seems variably preserved.	IIIC
HL01/2	1717	S31 39 02.6 E22 22 17.6	A circular stone-walled structure of about 3 m diameter.	NCW
HL01	1718	S31 39 00.1 E22 22 15.7	A stone structure that was inaccessible due to a fence but looks very similar in size and preservation to 1717.	NCW
HL01/2	1719	S31 39 07.5 E22 22 13.6	An ephemeral scatter of LSA hornfels flaked artefacts.	NCW
HL01	1720	S31 39 02.9 E22 22 47.0	A concrete dam with an associated concrete leiwater leading water from another stream into the dam.	NCW
HL01	1721	S31 39 44.4 E22 23 57.3	A corner point on a long wall that may be a walled valley-type occurrence alongside a farmstead.	IIIB
HL01	1722	S31 39 44.8 E22 24 06.5	A corner point on a long wall that may be a walled valley-type occurrence alongside a farmstead.	IIIB
HL01	1723	S31 39 11.6 E22 25 52.5	A small clearing between dolerite boulders and rocks on a dolerite ridge. It contains hornfels flaked artefacts, ostrich eggshell fragments and some bone. This is a LSA 'structure' perhaps used while spying out the land for game.	IIIB
HL01	1724	S31 39 11.4 E22 25 52.7	A dolerite boulder very close to, but presumably not associated with, 1723 and which has historical scratching on it. The motif looks like a stylized female human figure.	NCW
HL01	1725	S31 38 55.0 E22 25 53.3	An ephemeral but quite widespread LSA hornfels scatter in the saddle area of a dolerite ridge. The land is	NCW

			actually quite flat to the west but to the east of the dyke the land is much lower.	
HL01	1726	S31 38 45.4 E22 25 56.2	A light LSA hornfels flaked artefact scatter on the western side of a hill on a dolerite dyke. It is likely on an exposure of hornfels nodules.	IIIC
HL01	1727	S31 38 41.0 E22 25 54.2	A widespread ephemeral LSA hornfels flaked artefact scatter in a flat area on the east side of a dolerite ridge.	NCW
HL01	1728	S31 38 42.3 E22 25 54.0	A widespread ephemeral LSA hornfels flaked artefact scatter on the east side of a dolerite ridge.	NCW
HL01	1729	S31 39 30.9 E22 26 50.0	There are a number of large berms across the valley, presumably for flood irrigation of crops when there was more rainfall. The berms have stones packed around their ends to protect them from erosion. This one also had some cement visible along the berm. Not significant in and of itself but these are indicative of a past landscape use which is no longer feasible under the current rainfall regime.	NCW
HL01	1730	S31 39 52.5 E22 27 11.6	An earthen-walled dam with a cement overflow structure in its centre. Also more berms in the surrounding area up and downstream of the dam. Presumably the dam enabled controlled water release. It is also part of the historical cultural landscape.	NCW
HL01	1731	S31 41 06.3 E22 28 45.6	A light but extensive LSA artefact scatter with hornfels flaked artefacts but a few in other materials too. Also seen were ostrich eggshell fragments, bone fragments, one piece of precolonial pottery, two dolerite lower grindstones, one dolerite upper grindstone, one blue and white transfer-printed refined white earthenware and one piece of glass. The site is located in an eroding area at the foot of a dolerite ridge and close to a stream.	IIIB
HL01	1732	S31 40 52.9 E22 28 45.3	Some piled stone walling on the side of a scarp. A wall running along the slope is best visible with one wall running up to the scarp just discernible. It is likely a very poorly preserved kraal. There is a tiny rock shelter (about 0.7 m high) in the scarp and on which the kraal is centered. There is nothing in the shelter but a single hornfels flake was seen sitting on a ledge inside it. Below the shelter there is a light scatter of hornfels and ostrich eggshell on the talus slope. There are also two clusters of rocks further downslope of the kraal walling.	IIIC
HL01	1733	S31 40 53.8 E22 28 44.1	A set of three gravestones located in a north-south line at the foot of the scarp. The southern one is triangular in cross-section. The other two are flat and both have their flat faces facing north-south. There are no stone mounds but a few stones are scattered about.	IIIA
HL01	1734	S31 41 00.2 E22 28 47.3	An ephemeral LSA scatter of hornfels artefacts and one piece of stoneware. It is located at the foot of a scarp and close to a riverbed.	NCW
HL01	1735	S31 41 03.5 E22 28 45.6	A widespread light LSA scatter of hornfels flaked stone artefacts located on a dolerite hillside overlooking a river.	IIIC
HL01	1736	S31 40 59.4 E22 28 31.6	A large historical stone-walled kraal built on the east side of a scarp. It is about 22x35 m but its southern wall is longer then the northern one. It also has walling along the top edge of the scarp. An east-facing house with three small enclosures is built onto the east side	IIIB
HL01	1737	S31 40 57.9 E22 28 31.5		

			of the south-eastern corner. There is a square room, a curve-walled room and a circular enclosure. Just north of this is the entrance to the kraal. At the north end of the east wall a semi-circular enclosure of about 6x6 m has been built. This might be a lammertjie kraal. A large drain from the main kraal opens into this smaller kraal but is now completely closed up by accumulated sediment. Its entrance faces north and it also has a short straight wall extending southwards off its side. Near the east end of the north wall is another semi-circular enclosure but it is smaller at about 2x2 m. There are some chunks of material that look like slag but are yellow in colour and presumably related to burning of urine-soaked dung. 1736 is at the south-eastern corner of the kraal. 1737 is at the north-eastern corner of the kraal.	
HL01	1738	S31 40 56.8 E22 28 29.4	Another kraal of about 9x12 m located just a bit further north along the same scarp as 1736/7. Its northern wall is longer than its southern wall. A small rock shelter (about 0.6 m high roof) at the point where the northern wall meets the scarp has been walled in. The slope of the scarp in this area both inside and north of the kraal has much LSA hornfels flaked artefact and ostrich eggshell scatter. Unfortunately the LSA material has been much disturbed and plenty of it has accumulated in the lower part of the kraal.	IIIB
HL01	1739	S31 40 56.6 E22 28 31.6	A circular house ruin of about 3 m diameter and with its door facing east. Quite badly tumbled.	IIIC
HL01	1740	S31 40 56.0 E22 28 32.3	A circular stone-packed platform of about 1.5 m diameter. Its function is unknown.	NCW
HL01	1741	S31 40 54.9 E22 28 31.9	A cluster of stones of indeterminate function.	NCW
HL01	1742	S31 40 13.0 E22 24 31.6	A light LSA scatter of hornfels flaked artefacts and ostrich eggshell fragments at the base of a hill.	IIIC
HL01	1743	S31 40 13.0 E22 24 25.6	A light LSA scatter of hornfels flaked artefacts and ostrich eggshell fragments at the base of a hill. There is also some historical stone walling at the foot of the hill here.	IIIC
HL01	1744	S31 40 13.1 E22 24 26.3	A denser scatter of LSA hornfels artefacts and ostrich eggshell fragments. There is also some glass and ceramics (blue and white transfer printed and stoneware) here.	IIIC
HL01	1745	S31 40 11.5 E22 24 10.3	A huge stone-walled kraal complex on the hill overlooking the dam and farmstead. It was not examined in detail.	IIIB
HL01	1746	S31 40 16.8 E22 24 00.9	A family graveyard (Minnaar) with thirteen people buried in nine graves. The oldest burial is dated 1852 and the most recent is 1966. Interestingly, a berm has been constructed around the graveyard to protect it from flooding when the adjacent dam is full. The dam is a later addition to the landscape.	IIIA
HL01	1747	S31 40 02.4 E22 24 02.4	Homestead located on farm Slange Fontein 6. It includes a few late 19th or early 20th century buildings in good condition as well as some modern houses. A substantial planted landscape extends towards the north with avenues, windows and agricultural lands all surrounded by a stone wall (waypoints 1721 & 1722 are on this wall).	IIIA

HL01	511	S31 38 48.2 E22 25 58.4	Ephemeral LSA hornfels scatter near the base of a dolerite ridge.	NCW
HL01	512	S31 38 41.5 E22 25 52.7	Two LSA scraped animal engravings, one of them is an eland. There is a faint ladder-like motif above one of them.	IIIA
HL01	513	S31 38 40.8 E22 25 52.4	Circular stone structure of about 2 m diameter with door facing to the east. Some ceramics (refined white earthenware, lined industrial ware), glass (green, blue, purple, black) as well as some LSA hornfels flakes and ostrich eggshell fragments. Also a pile of rocks about 1.5 m diameter about 10 m east of the house. It is collapsed and of indeterminate function.	IIIC
HL01	514	S31 38 39.2 E22 25 52.8	Small open-C-shaped stone kraal on the side of a scarp. Also a small pile of rocks of indeterminate function about 8 m east of the enclosure.	NCW
HL01	515	S31 40 54.6 E22 28 33.3	A scatter of ostrich eggshell fragments with a few LSA hornfels flakes and cores present.	NCW
HL01	1767	S31 36 54.5 E22 21 24.5	A family graveyard with two graves, each for two people. The dates of death are 1920s to 1940s.	IIIA
HL01	1768	S31 39 06.6 E22 21 12.0	A small water channel constructed from slabs of stone standing on their edges.	NCW
HL01	1769	S31 39 03.9 E22 21 07.4	A stone and brick structure with the rear portion of stone and a newer section added to the front in brick. Interestingly, although some cement bricks are used, the mortar is mud. There are two chimneys on the smaller front portion and inside there is a closed oven with iron door and an open hearth. Structure is in very poor condition and a tree has fallen onto its roof.	IIIC
HL01	1770	S31 39 04.9 E22 21 07.6	A *c.* mid-20th century farm building with corrugated iron roof and cement plinth.	IIIC
HL01	1771	S31 39 06.8 E22 21 07.7	A stone and mud mortar ruin that has various later changes made with modern bricks and cement. Now partly collapsed.	IIIC
HL01	1772	S31 39 04.5 E22 21 00.3	Small stone and mud mortar cottage ruin with end gables. It has an internal dividing wall of modern bricks and cement. Modern cement has also been pressed in between the stones on the outside in an attempt to repair the building. There is a stone quarry about 30 m west of this ruin which is no doubt the source of all or most of the stones in this farm complex. There is plenty of glass scattered around but it seems to be largely 20th century material.	IIIC
HL01	1773	S31 39 13.8 E22 21 02.3	A stone ruin with door facing east and a window opening to the north. There are many modern glass fragments and tins scattered about the area.	IIIC
HL01	1774	S31 39 14.2 E22 21 04.2	A stone and mud mortar with an internal dividing wall made from mud bricks. Its door faces towards the east and there is a window to the north. There is a corner hearth in the northwest corner with a small horizontal slot window in the west wall next to the hearth. The upper wall of the hearth is supported on a wooden beam. It had a flat roof sloping down towards the west and several roof beams were still in place.	IIIC
HL01	1775	S31 39 10.8 E22 21 10.4	A stone kraal of 17 x 46 m with two rooms. The eastern room is not square with he western one. Parts of the walls have collapsed, and one section has been robbed.	IIIC

			A door to the north has a wall extending further out that usual.	
HL01	059	S31 38 50.1 E22 20 27.3	An MSA scatter of about 30 m diameter on heavily weathered and orange-patinated material that is assumed to be hornfels. The scatter includes many blades and points, some classic triangular flakes and many artefacts with retouched edges (scraper/notched edges). The site is unusual because the general MSA background scatter in the wider area is extremely ephemeral. Although the site does not meet the density criteria listed above for Grade IIIB, it is allocated this grade for its rarity.	IIIB
HL01	060	S31 39 30.2 E22 18 57.4	A set of stone features of unknown function. In the north is an east-west line of stones. A short distance to their south is another but with alignments extending southwards from either end. Slightly further south is an oval feature. The site is assumed to be historical but has no associated artefacts at all.	NCW
HL01	061	S31 39 58.4 E22 18 23.2	A scatter of LSA hornfels artefacts and ostrich eggshell fragments on a river terrace. There is a very ephemeral widespread scatter but a reasonable concentration here.	IIIC
HL01	062	S31 39 59.3 E22 18 20.6	This point marks an isolated lower grindstone (found face-up) and quite well buried in the silt. Only its grinding surface protrudes. There are also two lightly ground patches on a nearby dolerite outcrop between 062 and 061.	NCW
HL01	063	S31 40 01.4 E22 18 19.7	A square, piled-stone kraal measuring 8 m by 8 m. It is quite well-preserved with relatively few stones having tumbled off. Ut has an opening at the eastern end of the southern side. There is a light scatter of glass (green, clear, blue, pink, aqua), ceramics (white refined earthenware, transfer prints, hand-painted) and metal inside the kraal. There is further light scatter outside the kraal to its south and east including some black glass. There is a line of four stones buried in the ground extending southwards from the south-western corner of the kraal and another single one to the south of the opening. These stones only protrude about 10-15 cm above the ground surface.	IIIB
HL01	064	S31 40 02.3 E22 18 20.6	A small stone-built house with tumbled walls. It is about 3 m by 4 m. There is a door in the west end of the southern side but it is not possible to determine the location of any windows. There is an ephemeral scatter of glass, ceramics and metal both inside and outside. There is also a low stone wall curving towards the southeast from the north-eastern corner.	IIIC
HL01	065	S31 40 02.0 E22 18 21.4	Rubbish dump related to 064. It is located about 10-15 m east of the house on a low dolerite outcrop. There is glass (brown, clear, aqua, blue, black, pink, and two different shades of green, stopper), ceramics (refined white earthenware, hand-painted, transfer printed, miniature saucer but not from a dolls tea set), metal (horse shoe, wire, flat pieces, part of an iron potjie, bullet case), part of a black plastic comb and a brown gun flint.	IIIA
HL01	066	S31 40 01.4 E22 18 23.8	A 3 m long stone-packed feature oriented north-south. Its function is unknown.	NCW

HL01	067	S31 40 01.3 E22 18 25.3	The remnants of a breached and partially washed away dam wall with three sections showing some packed stones.	NCW
HL01	068	S31 40 03.4 E22 18 23.5	A tiny dam wall with some packed stones in an erosion gully.	NCW
HL01	069	S31 40 04.0 E22 18 22.8	A 7 m long stone-packed feature oriented north-south. Its function is unknown.	NCW
HL01	070	S31 40 04.7 E22 18 22.8	A scatter of LSA hornfels artefacts and ostrich eggshell fragments on a river terrace. There is a very ephemeral widespread scatter but a reasonable concentration here.	IIIC
HL01	071	S31 40 06.6 E22 18 21.8	A scatter of LSA hornfels artefacts and ostrich eggshell fragments on a river terrace. There is a very ephemeral widespread scatter but a reasonable concentration here.	IIIC
HL01	072	S31 39 16.9 E22 16 05.0	A 110 m wide dam wall with a concrete spillway in the centre. The dam has silted up to the level of the spillway.	NCW
HL01	073	S31 39 21.0 E22 16 43.8	A historical scratched engraving in three sections. It lies on an exposed section of bedrock on a mid-slope rather than in the usual position on a ridge or scarp edge. One section shows a horse and some other scratches, the second shows a human portrait, while the third is the initials **E d V** and the date **30:7:34**. The date is assumed to be 1934 which means the site is not technically archaeological, but it has been graded just in case.	IIIC
HL01	074	S31 38 03.2 E22 19 31.3	A 340 m wide dam wall with a concrete spillway in the centre. The dam has silted up to the level of the spillway. There is a curve in the northern end that forms a bulge on the upstream side.	NCW
HL01	075	S31 37 51.4 E22 19 37.2	A packed stone circular feature of about 2.5 m diameter and unknown function.	NCW
HL01	545	S31 37 21.5 E22 19 20.8	Small collapsed circular stone structure with opening towards the north.	IIIC
HL01	546	S31 37 23.1 E22 19 21.6	Small circular stone structure with opening towards the north and with a lower curved wall creating a second enclosure on the north side. Light scatter outside the structure with white refined earthenware (transfer-printed, hand-painted, lined industrial), glass (black, blue, green, pink, aqua), ostrich eggshell, metal frags (minimal).	IIIC
HL01	547	S31 38 21.7 E22 17 52.1	Scratched dolerite boulder. Many parallel scratches with some other at an angle.	NCW
HL01	548	S31 37 35.4 E22 19 34.2	Low wall, possibly a retaining wall, made of earth but with stones packed over it.	NCW
HL01	549	S31 37 33.6 E22 19 40.4	Stone kraal with tumbled walls measuring 26 m by 20 m. Minimal ceramic scatter in the area, mostly white refined earthenware but also one stoneware. Also a small room built onto the northeast side.	IIIC
HL01/2	702	S31 40 20.6 E22 23 44.9	A row of four graves and a hole which might indicate a grave having been exhumed (the hole is larger than that which would be excavated by an animal). There are no stones around the hole but the grave alongside it has two headstones, one heart-shaped one standing on the surface leaning against the one which clearly belongs to that grave.	IIIA

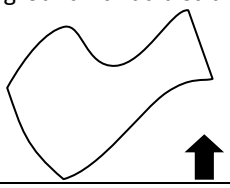
HL01	704	S31 41 14.3 E22 27 36.6	A hollow and partially collapsed cairn on top of a hill.	NCW
HL01	705	S31 41 16.8 E22 27 33.5	A scatter of LSA artefacts located in the lee of a small 1.5 m high dolerite ridge. Most artefacts are of hornfels but some others too including a scraper on tuff.	IIIC
HL01	1975	S31 40 02.0 E22 24 46.4	A light scatter of hornfels flaked stone artefacts dating to the LSA.	NCW
HL01	1976	S31 40 12.3 E22 26 55.8	A moderate density scatter of hornfels flaked stone artefacts dating to the LSA.	IIIC
HL01	1977	S31 40 48.9 E22 26 02.2	A scatter of bottle glass that looks like it belongs to one bottle. Two pieces of the base are present and look as though they may have been flaked. There is no other archaeology present.	NCW
HL01	1978	S31 40 49.8 E22 25 46.8	A moderate density scatter of hornfels flaked stone artefacts dating to the LSA. This and waypoint 1979 are two spots within a larger area that seems to overlie a hornfels source.	IIIC
HL01	1979	S31 40 46.7 E22 25 47.6	A moderate density scatter of hornfels flaked stone artefacts dating to the LSA. This and waypoint 1978 are two spots within a larger area that seems to overlie a hornfels source.	IIIC
HL02	550	S31 43 24.9 E22 13 53.3	Historical scratched engraving with largely indeterminate imagery, but definitely including at least two animals, presumably horses. Not very well preserved.	IIIC
HL02	076	S31 41 03.1 E22 21 22.5	A graveyard alongside the main road with about 16 graves. Only one has a formal headstone indicating De Vries, died 1934.	IIIA
HL02	077	S31 43 57.1 E22 14 00.2	Historical scratched engraving with five horses and a bird-like image all in different orientations. Four horses have their bodies coloured in by scraping and/or pecking while the fifth remains hollow. The name “MANUS” appears immediately beneath this last one. Seems again as though it may not be very old. Still given a grading just in case.	IIIC
HL02	078	S31 43 55.6 E22 14 24.3	A low dolerite retaining wall stretching between two small outcrops at the base of a dolerite dyke. Function unknown.	NCW
HL02	079	S31 43 55.2 E22 14 22.9	There is a widespread, low density scatter of LSA material at the base of a dolerite dyke but a concentration occurs at this location. It includes flaked artefacts in hornfels and ‘other’, ostrich eggshell fragments, a partly made ostrich eggshell bead, one small potsherd that is 15 mm thick and is black inside with a pale beige burnished surface outside, some bone fragments and a small lower grindstone (face-up).	IIIC
HL02	080	S31 43 54.6 E22 14 25.0	An LSA scatter with flaked artefacts in hornfels and ‘other’ as well as some ostrich eggshell fragments. It is located close to a river. The site is about 20 m diameter.	IIIC
HL02	081	S31 43 53.8 E22 14 27.9	An LSA scatter with flaked artefacts in hornfels and ‘other’ as well as some ostrich eggshell fragments, bone and some pottery. The site is about 15 m in diameter and there is an isolated lower grindstone (face up) bout 15 m east of the scatter.	IIIC
HL02	082	S31 43 52.9 E22 14 26.8	A scatter of ostrich eggshell fragments, one bone fragment and a lower grindstone (face up).	NCW

HL02	083	S31 43 53.7 E22 14 26.0	The two waypoints represent the ends of this large site located on the terrace alongside a river. The flaked artefacts are mostly in hornfels but some 'other' is also present. Included are some bladelets. There are also some anvils and an upper grindstone/hammerstone. Pottery is present, with most being in a single cluster in the northern part of the site. There are bone fragments and plenty of ostrich eggshell. A single large piece of *Unio caffer* (freshwater mussel) was also present.	IIIB
HL02	084	S31 43 52.8 E22 14 25.9		
HL02	085	S31 43 55.2 E22 15 33.7	A large earthen-walled dam with a central concrete spillway.	NCW
HL02	086	S31 43 09.8 E22 15 06.1	Two historical dumps with plenty of glass (blue, pink, clear, green, black, brown), ceramics (refined white earthenwares, transfer-printed including willow pattern, hand-painted, lined industrial) and some metal. A bottle base has been used as a core and extensively flaked. There is a clear glass stopper with LEA & PERRINS on it. This company is famous for their Worcestershire Sauce first sold in 1837.	IIIB
HL02	087	S31 43 09.3 E22 15 07.0	A long, thin stone foundation of about 3 m wide and about 20 m long. Its function is unknown as there is no top structure. There are a few bricks lying about.	NCW
HL02	088	S31 43 10.7 E22 15 07.3	The stone foundation of a structure attached to the northern side of the western corner of a large kraal. The kraal is about 55 m by 75 m. Both structures have been extensively robber such that only the lowermost rocks and finer rubble remain. A line of *Agave americana* plants grows along the south-western side of the kraal. A light scattering of glass, ceramics and metal occurs next to the smaller structure. This includes a large copper item, now flattened.	NCW
HL02	089	S31 43 10.2 E22 15 08.1	A low-density glass, ceramic and metal dump to the northeast of the structure at waypoint 088.	NCW
HL02	090	S31 43 05.7 E22 15 02.6	An LSA scatter of hornfels and ostrich eggshell fragments. Included are several bladelets an adze made on a thin bladelet. The scatter is about 20 m in diameter and located alongside a river.	IIIC
HL02	091	S31 42 59.2 E22 15 05.2	A large earthen-walled dam with a concrete spillway at its eastern end.	NCW
HL02	092	S31 43 00.7 E22 15 08.4	A stone-walled kraal with two rooms. Its total size measures 32 m by 37 m. Some pats are well-preserved but others are badly tumbled.	IIIC
HL02	093	S31 42 59.8 E22 15 08.6	A badly collapsed square stone feature with two stones standing upright. It is not a grave but it is so poorly preserved that function cannot be determined.	NCW
HL02	094	S31 42 46.8 E22 16 48.0	A stone foundation of about 2.5 m by 7.0 m. A second smaller foundation of about 3 m by 3 occurs alongside but is very poorly reserved. There is an ash and rubbish dump alongside the foundations with much bone and some glass (blue, green, turquoise, aqua, brown), ceramics (refined white earthenware, transfer-printed, hand-painted, stoneware), iron and copper. There are some glass bottle stoppers present and a green 'fake emerald' that would have been part of a brooch or ring. Amongst the ceramic items is a doll's head. Amongst the metal items was a button with "RING EDGE BEST' embossed on it, some enamel bowl fragments, some potjie fragments, a copper plate with	IIIA

			what looks like a family crest or similar embossed on it, and a perforated copper item that might have the top of a salt cellar.	
HL02	095	S31 42 45.2 E22 16 48.2	A large kraal complex located along the southern edge of a sandstone scarp. The main kraal enclosures have large quantities of vitrified dung in them. There are two small enclosures built inside the kraal along the scarp edge and another enclosure plus additional walling occur outside the main kraal to its west. The walls are very poorly preserved and it is clear that the stones have been robbed for reuse elsewhere.	IIIC
HL02	096	S31 43 05.9 E22 18 26.5	A square enclosure built from piled dolerite cobbles and located on a small dolerite dyke. It is about 7 m by 7 m and is largely collapsed. There is an entrance in the eastern end of the north side. A second, larger but even less well-preserved enclosure occurs at lower elevation on the southern side of the dyke. It is about 10 m by 10 m.	IIIC
HL02	097	S31 43 11.9 E22 18 32.7	A set of at least 6 graves which have been badly disturbed and become somewhat overgrown. There may be as many as 8 graves present. They are all in a single row side by side. All are stone mounds, and some have small head- and/or footstones	IIIA
HL02	098	S31 43 10.7 E22 18 31.5	A stone house ruin measuring 3 m by 4 m. Some parts are very badly collapsed and other stand to full height. A door opens to the east but the locations of windows could not be determined. There is also the remnants of a wall extending northwards from the north-eastern corner of the ruin. There is also the remains of an indeterminate stone feature about 10 m to the east. In between and to the south is a scatter of glass and ceramics. Most of the glass appears to be quite modern. There are also a few pieces of plain refined white earthenware and some bits of metal. A few pieces of what looks like an old plastic box with very thick walls are also present. One of them has “MERCURY” embossed on it.	IIIC
HL02	099	S31 43 12.8 E22 18 32.3	A well-maintained stone kraal with fences inside and which appears to still be in use. It is 30 m by 14 m in size. There is minimal damage to some of the corners.	IIIB
HL02	100	S31 43 10.6 E22 18 37.1	A very large dam with its wall built of earth and then lined with stones. It has a valve chamber at its base with an outlet valve in it with “HEATON HALIFAX” embossed on the handle. Heaton is a valve manufacturer that started in England in 1943 (http://www.heaton-valves.com/). A ceramic water pipe is also visible in the chamber. The corresponding inlet is just visible inside the dam where the stonework of its chamber protrudes from the silt. It is filled with silt and thus no longer functional. Several other features related to water management also occur in the area below the dam wall including a leiwater leading from the valve chamber and a smaller dam/weir.	IIIC
HL02	101	S31 43 16.2 E22 18 39.8	Two parallel lines of erect stones that may be a section of an old leiwater. Poorly preserved and does not extend very far.	NCW

HL02	102	S31 43 18.0 E22 18 41.4	A large mid-20th century shed with brick walls, metal windows and a corrugated iron roof. The sliding doors from the front have been removed but the rail still sits above the entrance.	NCW
HL02	103	S31 43 17.6 E22 18 42.6	The foundation of a stone wall running north to south. It lies east of the shed at waypoint 102. All upper rocks have been removed. Function unknown.	NCW
HL02	104	S31 43 18.1 E22 18 40.7	The foundation of a stone wall running north to south. It lies west of the shed at waypoint 102. All upper rocks have been removed. Function unknown.	NCW
HL02	105	S31 43 19.7 E22 18 40.8	An enormous ash and rubbish midden with thousands of artefacts coating its surface. It appears that a wall was built to contain the ash but it has overtopped and spread over the surrounding area. The centre of the midden is probably about 1 m deep. The artefacts include a wide array of glass and ceramic items with all the usual styles and colours present. An unusual inclusion is mochaware. There are also fragments of what might be coal. Also a small stone structure/feature alongside the midden but within the overall area of scatter.	IIIA
HL02	106	S31 43 21.9 E22 18 39.1	A very poorly preserved stone kraal with a small stone structure at its northeast corner. An enormous walled enclosure also extends to the north. The kraal and structure are attached to this larger main enclosure. The walls have all had their rocks removed for reuse elsewhere.	NCW
HL02	107	S31 43 26.2 E22 18 37.6	A small ash and rubbish dump occurs here alongside another small stone enclosure attached to the east side of the main wall referred to in waypoint 106. Another small kraal is attached to the west side of the main wall at this point. The main enclosure wall runs along the top of a scarp (but a little back from the edge and then eventually turns off the scarp and runs towards the northwest into the distance.	IIIB
HL02	108	S31 43 21.7 E22 18 33.3	A 13 m diameter threshing floor with a 20th century structure attached to its northeast side. The structure has no windows and the door opens to the southwest into the threshing floor. The threshing floor has an entrance opening to the southwest as well. The threshing floor is surrounded by a wire fence and is very well preserved. Beyond its entrance is a large, wide strip of packed rocks extending off towards the southwest. Function unknown. To the northeast of the structure there is a similar area of packed rocks. There is also a 6 m diameter circular packed stone feature in this area. Function unknown.	IIIB
HL02	109	S31 43 19.6 E22 18 37.3	A two-room Karoostyle cottage facing towards the southeast. There is one door and one window on the southeast side and no other openings. There is an internal hearth in the northeast room (same room as the window and door open from. The structure is 20th century, disused and not well maintained.	IIIC
HL02	110	S31 43 19.0 E22 18 38.1	A kraal with two main enclosures and a smaller enclosure inside the northern one. Walls extend away from opposite corners towards the north and south. The main structure has a fence running through it and	IIIB

			the walls have been demolished to allow the fence to pass through.	
HL02	111	S31 43 18.0 E22 18 38.1	An ash and rubbish dump with lots of glass, ceramics and what is likely coal. There are many artefacts but the dump itself is only about 8 m across. There is a reasonable scatter of artefacts extending towards the north as well (in the direction of the house at waypoint 112. There is a wide variety of different bottle types, including three small bottles that are whole. The ceramics are mostly refined white earthenware with transfer-printed, sponge-printed and hand-painted examples occurring. There is also stoneware present. Some metal is present including a horseshoe and what must have been a door handle or similar.	IIIA
HL02	112	S31 43 16.5 E22 18 38.1	A large, very complex, east-facing house ruin that has seen multiple phases of construction. The phases include stone walling, mud brick walling of different types of mud bricks and more recent cement blocks. The house is quite poorly preserved with some sections of walling having fallen down. It was not possible to determine the full building sequence in the time available. One of the types of mud bricks was made with material collected from an LSA site and contains hornfels artefacts, ostrich eggshell fragments and even a whole maxilla (small-medium bovid size). The central section, which looks like the original cottage, still has remnants of brakdak clinging to one edge of the roof. Its internal walls were plastered with mud and painted (only small fragments survive). The locations of all or most doors could be determined but, due to tumbled walls, most windows were no longer visible. On one end there is a shed attached with an old John Deere plough inside.	IIIB
HL02	113	S31 43 12.0 E22 18 30.9	A square stone foundation of about 3m by 3m. Upper stones removed and function unknown.	NCW
HL02	114	S31 41 56.0 E22 19 38.9	An earthen-walled dam packed with stones.	NCW
HL02	1776	S31 42 50.5 E22 23 55.8	A stone dam and wind pump.	IIIC
HL02	1777	S31 43 00.2 E22 24 34.4	A line of stone pillars from a historical fence line which is no longer in use. It runs SW-NE.	IIIC
HL02	1778	S31 42 57.3 E22 24 41.0	A flat stone feature alongside the old fence line. The fence ends 50 m to the northeast of this point.	IIIC
HL02	1779	S31 42 17.8 E22 24 31.1	A line of stone pillars from a historical fence line running approximately north-south.	IIIC
HL02	572	S31 40 48.7 E22 19 19.8	Scratched rock with indeterminate historical motifs.	IIIC
HL02	573	S31 41 19.2 E22 18 46.8	Historical scratched engraving with four female figures on one rock and three on a second neighbouring rock. A third rock about 5 m away has indeterminate scratched motifs.	IIIB
HL02	574	S31 40 41.0 E22 18 37.5	Small C-shaped stone-walled structure of about 2 m diameter. No associated artefacts.	IIIC
HL02	575	S31 42 49.3 E22 21 17.0	Five fragments of industrial slipware on a small hill.	NCW
HL02	576	S31 42 45.4 E22 21 15.3	A small rectangular stone ruin of about 4m by 5 m. A single piece of metal was seen nearby.	IIIC

HL02	577	S31 42 44.9 E22 21 16.0	A pile of stones of about 1.5 m by 2.5 m. Located alongside 576.	NCW
HL02	578	S31 43 26.6 E22 19 17.1	A rectangular stone-walled kraal on top of a small flat-topped hill at its southwestern edge. It is about 12 m by 15 m. No associated artefacts.	IIIC
HL02	686	S31 44 28.3 E22 19 01.1	A stone kraal against the southern side of a small sandstone hill. There were a few fragments of green and brown glass in and around the kraal	IIIC
HL02	687	S31 44 28.5 E22 19 00.7	A small, circular stone house ruin measuring 2.5 m diameter and with door facing east. There was a muurkas directly opposite the door, but the remaining walls are too badly tumbled to see if there were any widows present. It is located 5 m west of the kraal at 686. No associated artefacts.	IIIC
HL02	688	S31 45 31.5 E22 17 52.8	A few sandstone slabs on top of a dolerite dyke. There were a few fragments of dark green bottle glass and a metal container that looks a bit like a powder horn. The container has a flat base and folded seems up both sides.	NCW
HL02	689	S31 45 43.8 E22 15 54.4	An ephemeral stone foundation of about 6 m by 9 m and with only a single row of stones lying on the ground. It had a strange shape as follows: 	NCW
HL02	690	S31 44 40.3 E22 17 26.9	A small section of ephemeral walling against a scarp making an enclosure about 2 m across.	NCW
HL02	691	S31 44 39.6 E22 17 26.4	A stone-walled ruin of about 3 m by 5 m located on the top edge of a scarp which drops down towards the east. It has two rooms, one is a square with entrance to the north, while the second is a circular voorkamer attached to the north side of the square and with its entrance to the northwest. No associated artefacts.	IIIC
HL02	692	S31 44 39.2 E22 17 27.3	A collapsed, small circular structure with thin slabs sticking up from its wall in places. It is about 5 m diameter. Half a light green bottle base and one bone fragment were seen alongside the feature.	IIIC
HL02	693	S31 44 38.6 E22 17 26.4	693 and 694 represent the southern and northern ends of an 80 m long stone-walled complex built against the east side of a low sandstone scarp. There is a small two-roomed house with very narrow doorways (main entrance faces east and there is an entrance into each room) and with an external muurkas directly behind the central dividing wall (i.e. on the west side of the house). There are also livestock enclosures. A large enclosure lies behind and to the north of the house and has a very small opening to the east (40 cm wide) and anormal-sized entrance to the north. Walling has been built along the top edge of the scarp in places too along the back of the main kraal as well as a partial enclosure to the south. There is a variety of refined white earthenware, stoneware and glass (including one orange piece) scattered about but no dump. The majority of artefacts are within 3 m of the house to its east. Included was a quarter of what seemed to be a	IIIB
HL02	694	S31 44 36.3 E22 17 25.2		

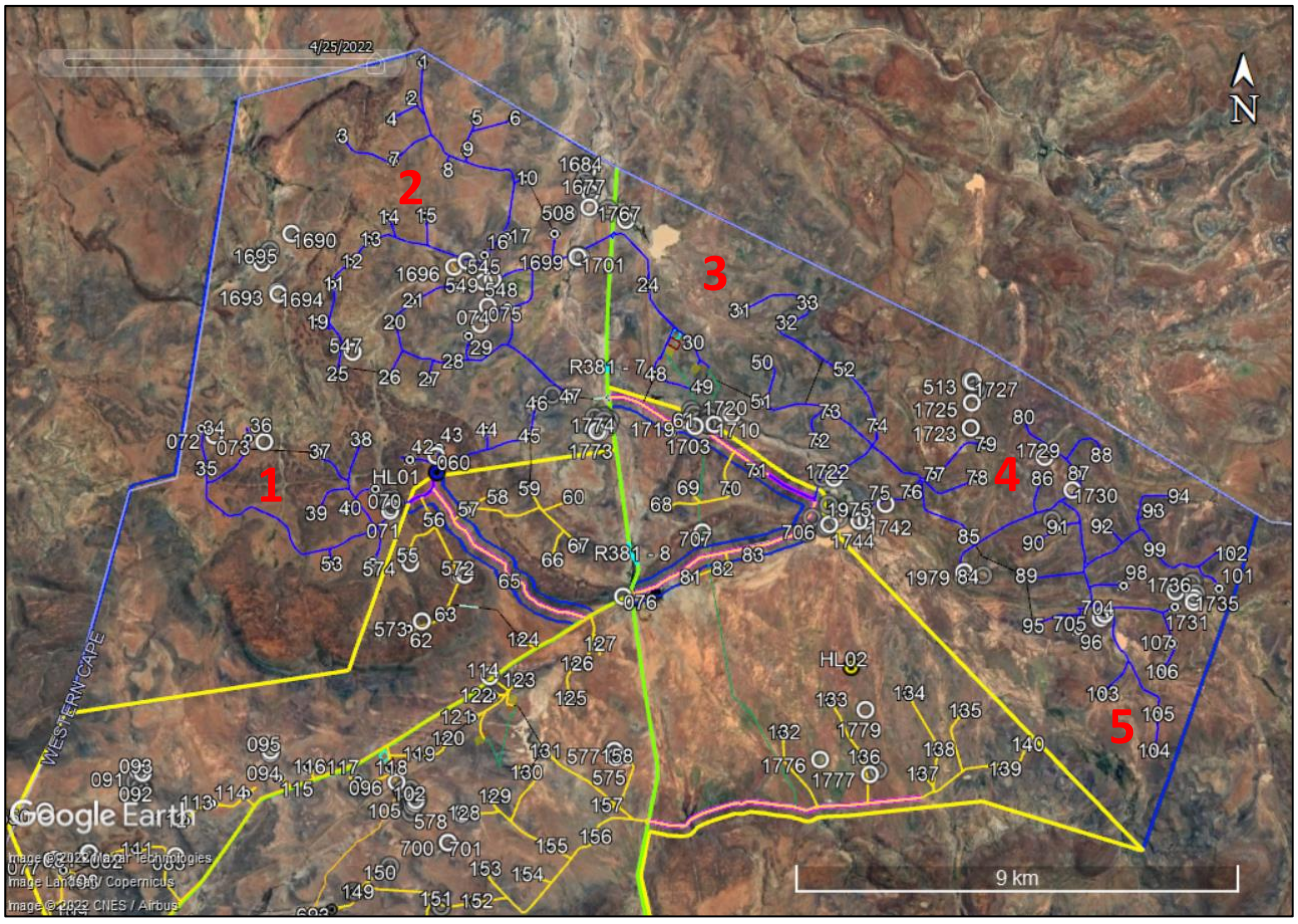
			small white ceramic ball. Also seen here was half a small brown pebble.	
HL02	695	S31 44 37.4 E22 17 26.8	Two collapsed, square stone features about 1-2 m across and of unknown function.	NCW
HL02	696	S31 44 39.7 E22 17 33.1	An earthen wall paved with stone slabs that seems like a dam wall, but it is only half of a dam since the north-eastern end ends at a small stream. The south-western end extends out from the edge of a scarp.	NCW
HL02	697	S31 44 18.5 E22 17 52.4	A short section of very low walling on a rock outcrop, possibly to trap water.	NCW
HL02	698	S31 44 01.6 E22 18 21.1	An ephemeral scatter of heavily weathered, orange-patinated ESA artefacts.	NCW
HL02	699	S31 43 45.9 E22 19 05.8	Open C-shaped stone-walled feature about 3 m across and with the open side facing towards the southwest. It is located on the flat ground below a scarp. 699 to 701 form a small cluster.	IIIC
HL02	700	S31 43 45.8 E22 19 06.4	A horseshoe-shaped stone-walled feature with opening towards the south. It is 2 m in diameter. 699 to 701 form a small cluster.	IIIC
HL02	701	S31 43 46.3 E22 19 06.8	An oval stone-walled feature built against a scarp. It is about 2 m by 3 m in size and one refined white earthenware fragment was seen associated. 699 to 701 form a small cluster.	IIIC
HL02	703	S31 40 17.7 E22 23 59.1	A graveyard with about 40 graves in it and which has been flooded by the neighbouring dam after the heavy rains. These graves lie outside and to the southwest of the walled graveyard with the berm around it at waypoint 1746. Only one date is present and that reads born 1957 and died 1958.	IIIA
HL02	706	S31 40 15.4 E22 24 02.9	A set of four or possibly five graves located outside and to the northeast of the formal graveyard with a berm around it at waypoint 1746.	IIIA
HL02	707	S31 40 20.6 E22 22 24.2	A cluster of small manuported stones on dolerite soil with one of them being a large chopper. One end is flaked from use and the other crushed.	NCW

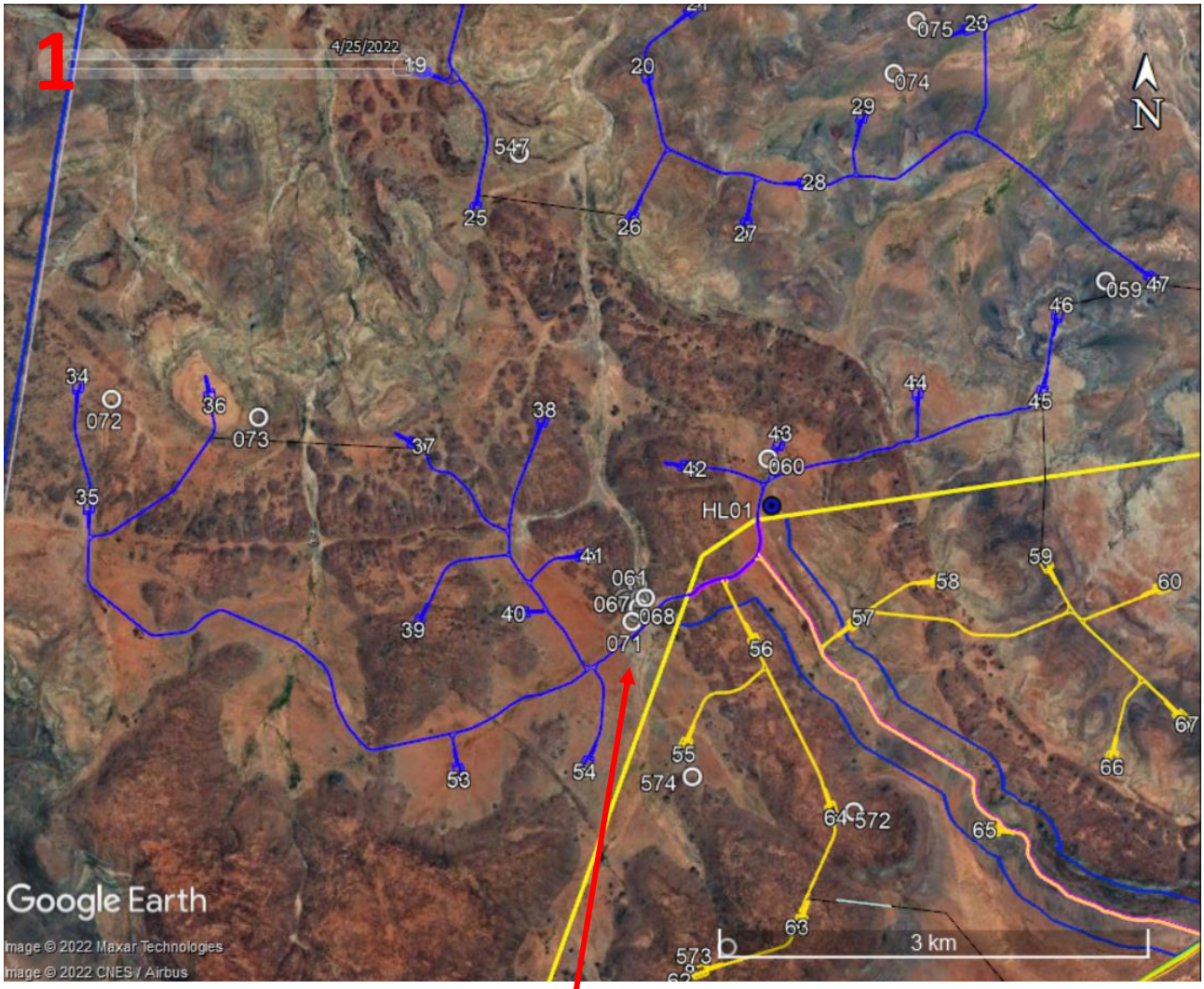
APPENDIX 3a – Mapping: Hoogland 1

All waypoints recorded for the present applications are shown as circles and listed in Appendix 2. All waypoint recoded for the Nuweveld projects are shown as diamonds and their details can be found in the relevant reports (Orton 2021a, 2021b, 2021c, 2021d).

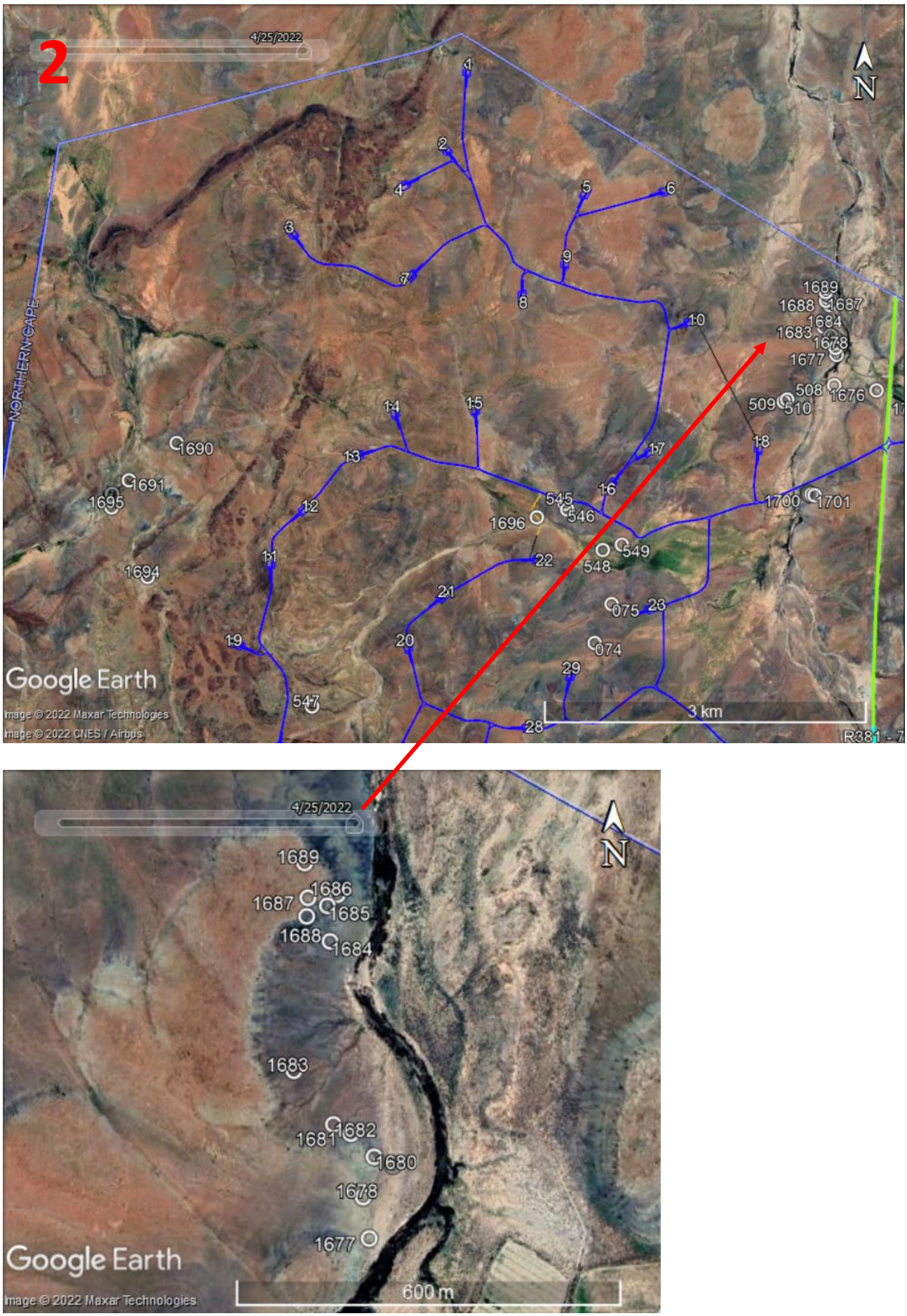
The map below shows the entire HL01 study area while the five that follow show larger scale sections centred on the red numbers 1-5.

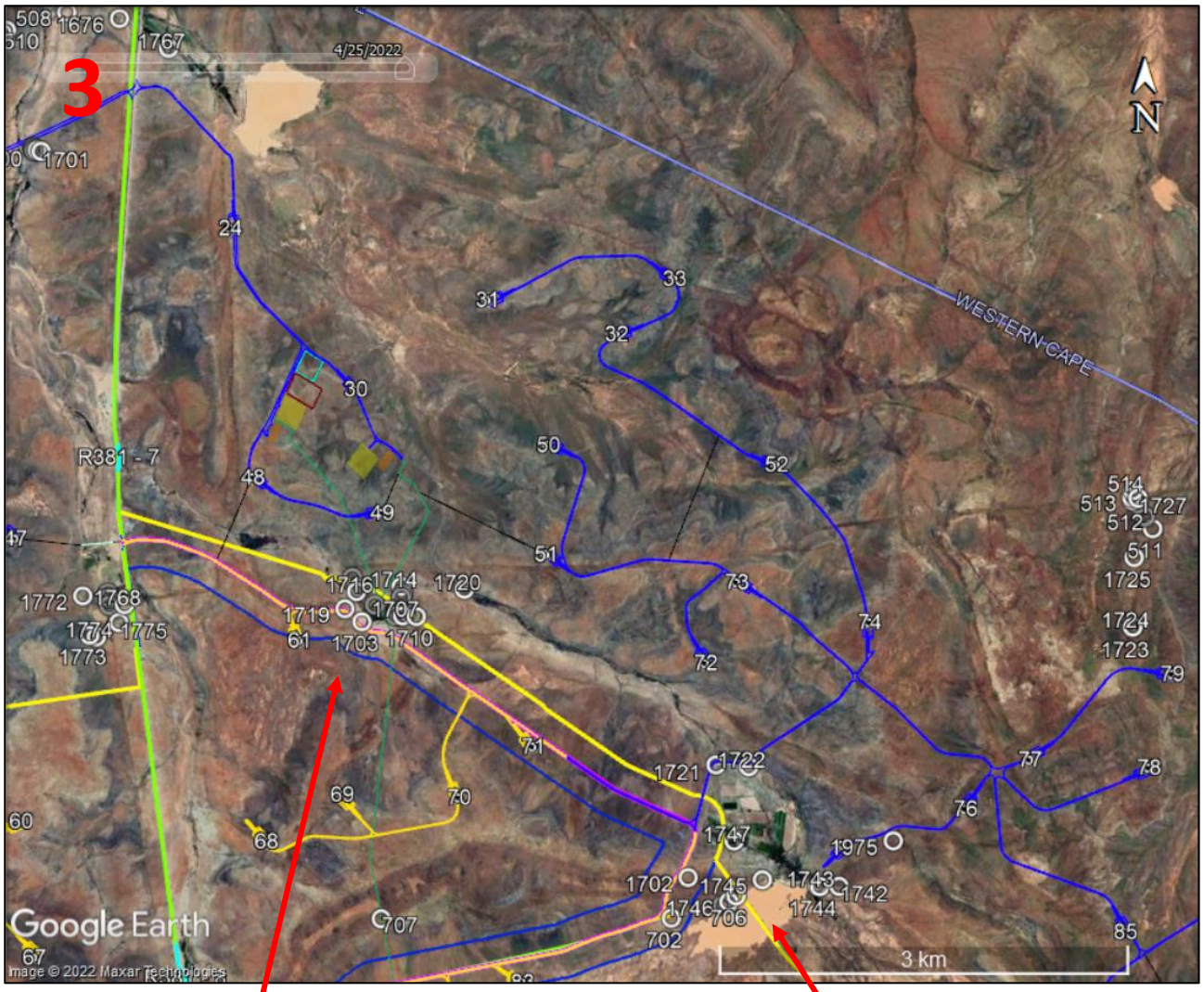
Key to maps:
Blue polygon: Hoogland 1 site
Numbered dots: turbines
Blue lines: roads, many with buried powerlines
Black/dark green/turquoise/orange lines: other powerlines
Bold light green line: public road to be upgraded
Red polygon: laydown area
Turquoise polygon: site camp & batching plant
Green square: battery energy storage facility
Filled yellow rectangle: battery energy storage system
Filled orange rectangle: substation

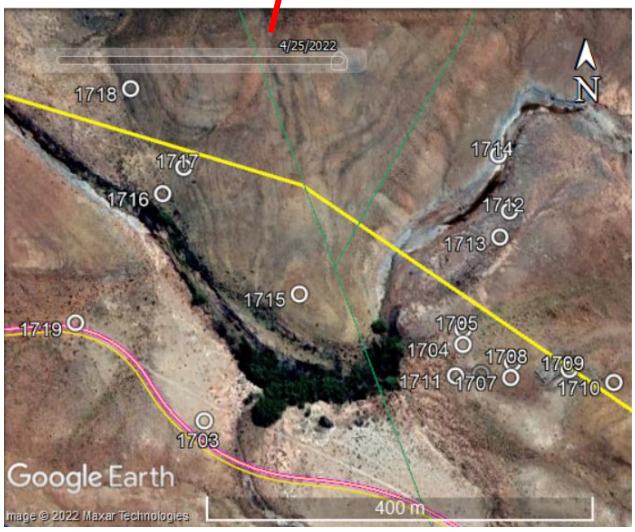


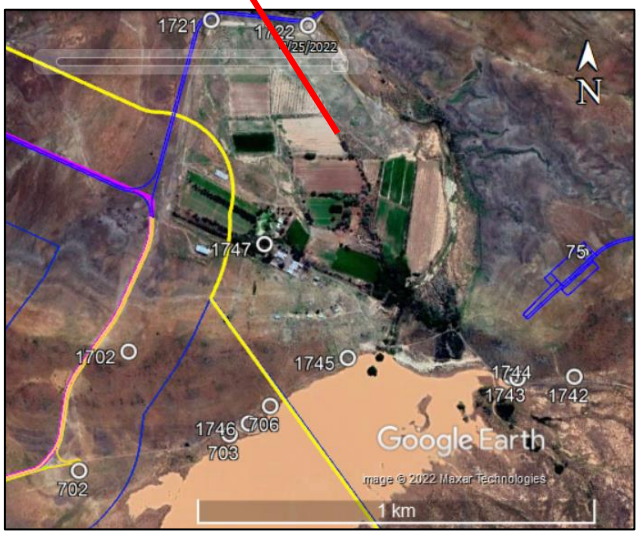

1
4/25/2022
N
Google Earth
Image © 2022 Maxar Technologies
Image © 2022 CNES / Airbus
3 km
HL01

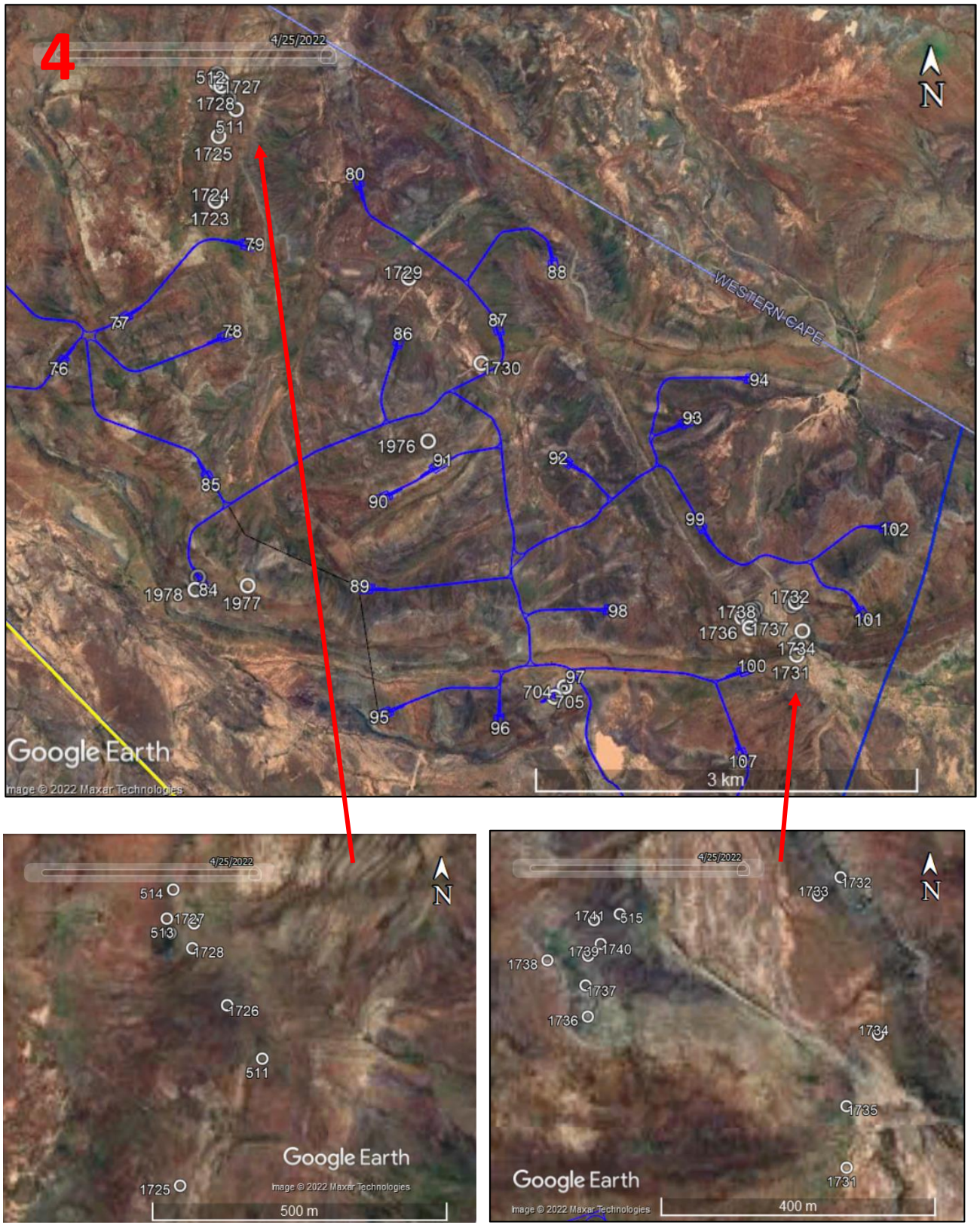

4/25/2022
N
Google Earth
Image © 2022 Maxar Technologies
300 m


2
4/25/2022
N
NORTHERN CAPE
1689
1688
1687
1684
1683
1678
1677
508
509
510
1676
1690
1691
1695
1694
545
546
1696
549
548
1700
1701
075
074
547
3 km
Google Earth
Image © 2022 Maxar Technologies
Image © 2022 CNES / Airbus
4/25/2022
N
1689
1686
1687
1685
1688
1684
1683
1682
1681
1680
1678
1677
600 m
Google Earth
Image © 2022 Maxar Technologies


3
4/25/2022
N
WESTERN CAPE
R381 - 7
Google Earth
Image © 2022 Maxar Technologies
3 km

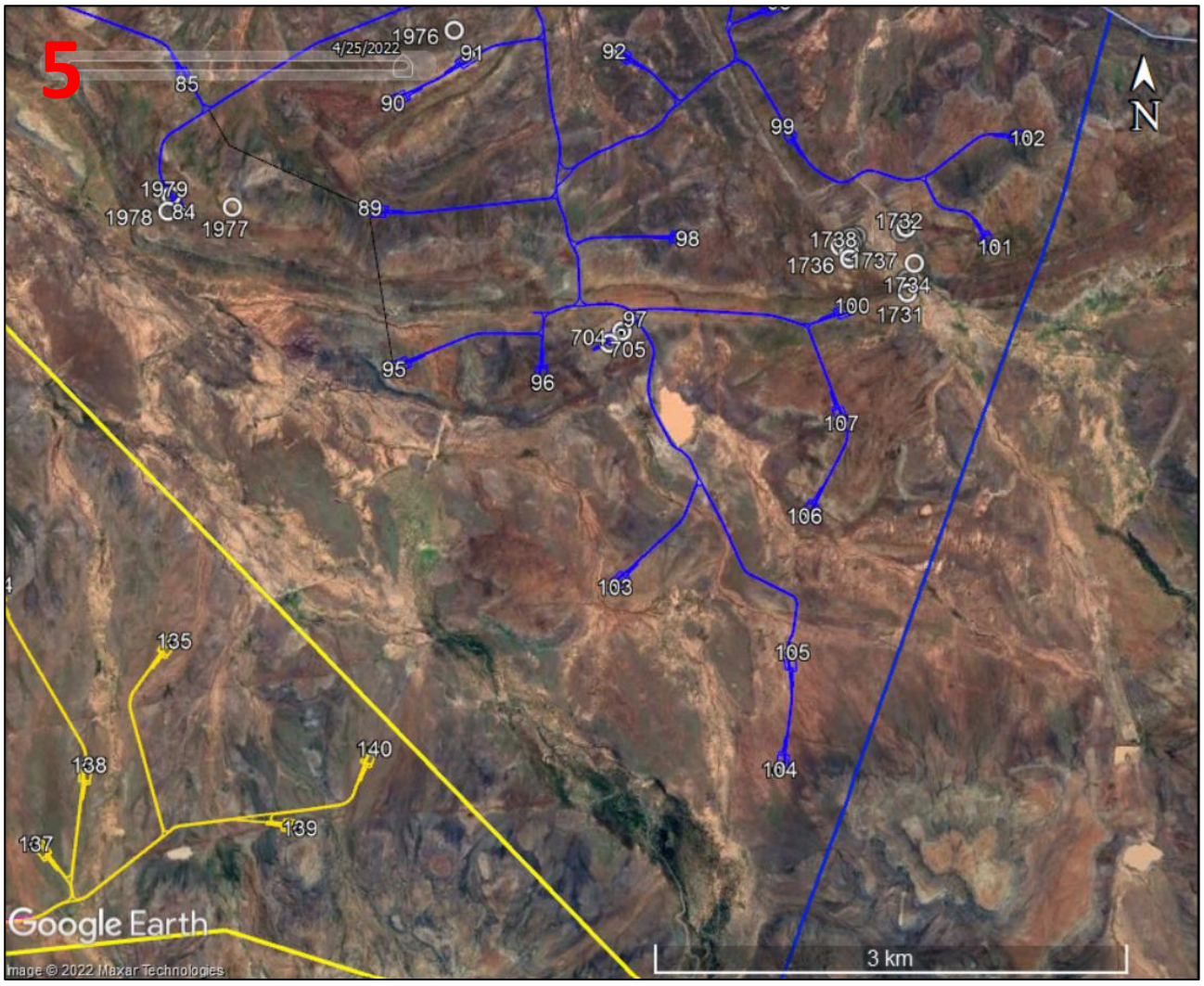

4/25/2022
N
Google Earth
Image © 2022 Maxar Technologies
400 m


N
Google Earth
Image © 2022 Maxar Technologies
1 km


4
4/25/2022
N
WESTERN CAPE
512
1727
1728
511
1725
80
1724
1723
79
1729
88
77
78
86
87
76
1730
94
93
1976
91
92
85
90
99
102
1978
84
1977
89
98
1732
1738
1737
101
1736
1734
100
1731
97
704
705
95
96
107
Google Earth
Image © 2022 Maxar Technologies
3 km

4/25/2022
N
514
1727
513
1728
1726
511
1725
Google Earth
Image © 2022 Maxar Technologies
500 m

4/25/2022
N
1732
1733
1741
515
1739
1740
1738
1737
1736
1734
1735
1731
Google Earth
Image © 2022 Maxar Technologies
400 m

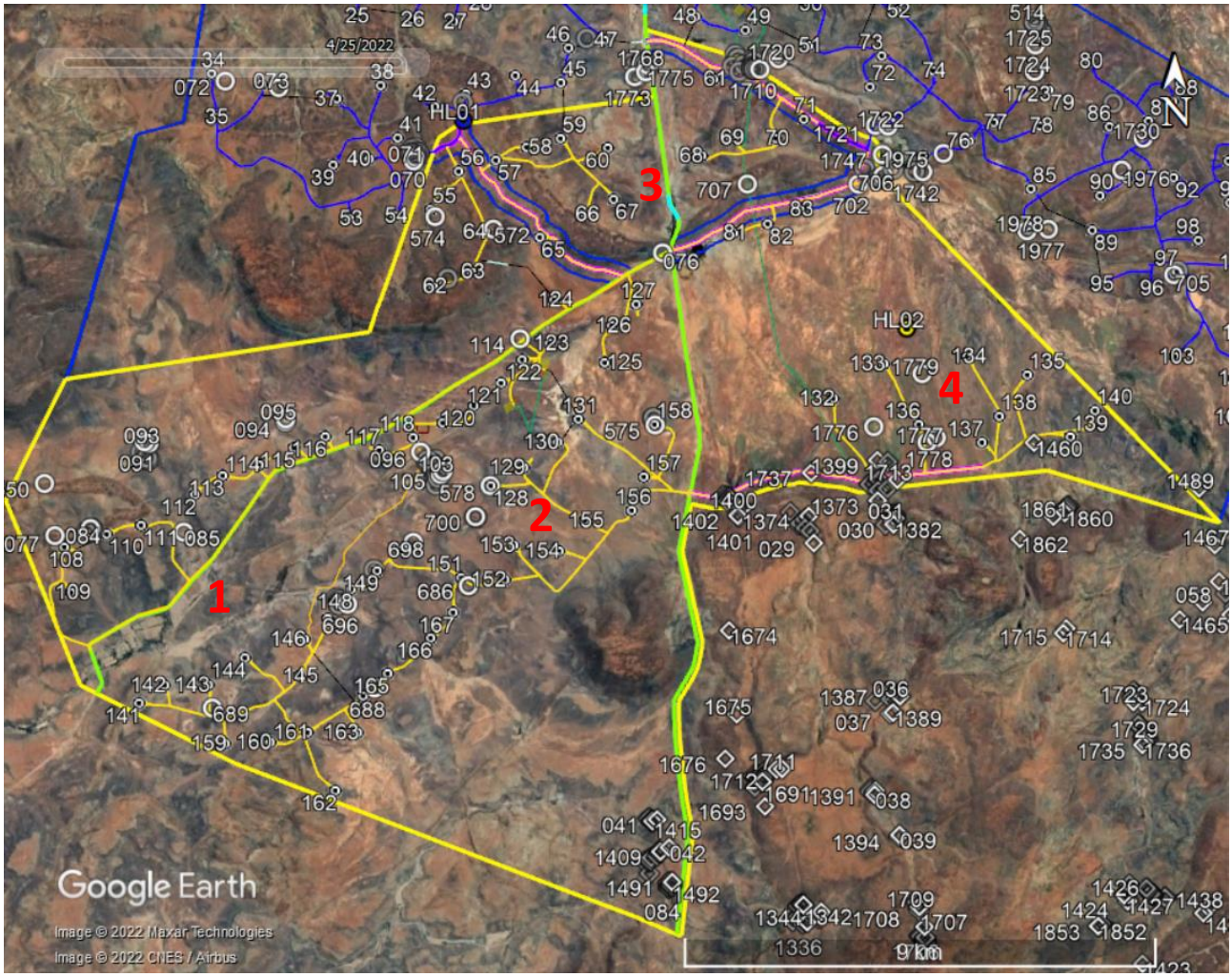

5
4/25/2022
1976
91
92
85
90
99
102
1979
1978
84
1977
89
98
1732
1738
1736
1737
1734
1731
101
100
97
704
705
95
96
107
106
103
135
105
140
138
104
139
137
N
Google Earth
Image © 2022 Maxar Technologies
3 km

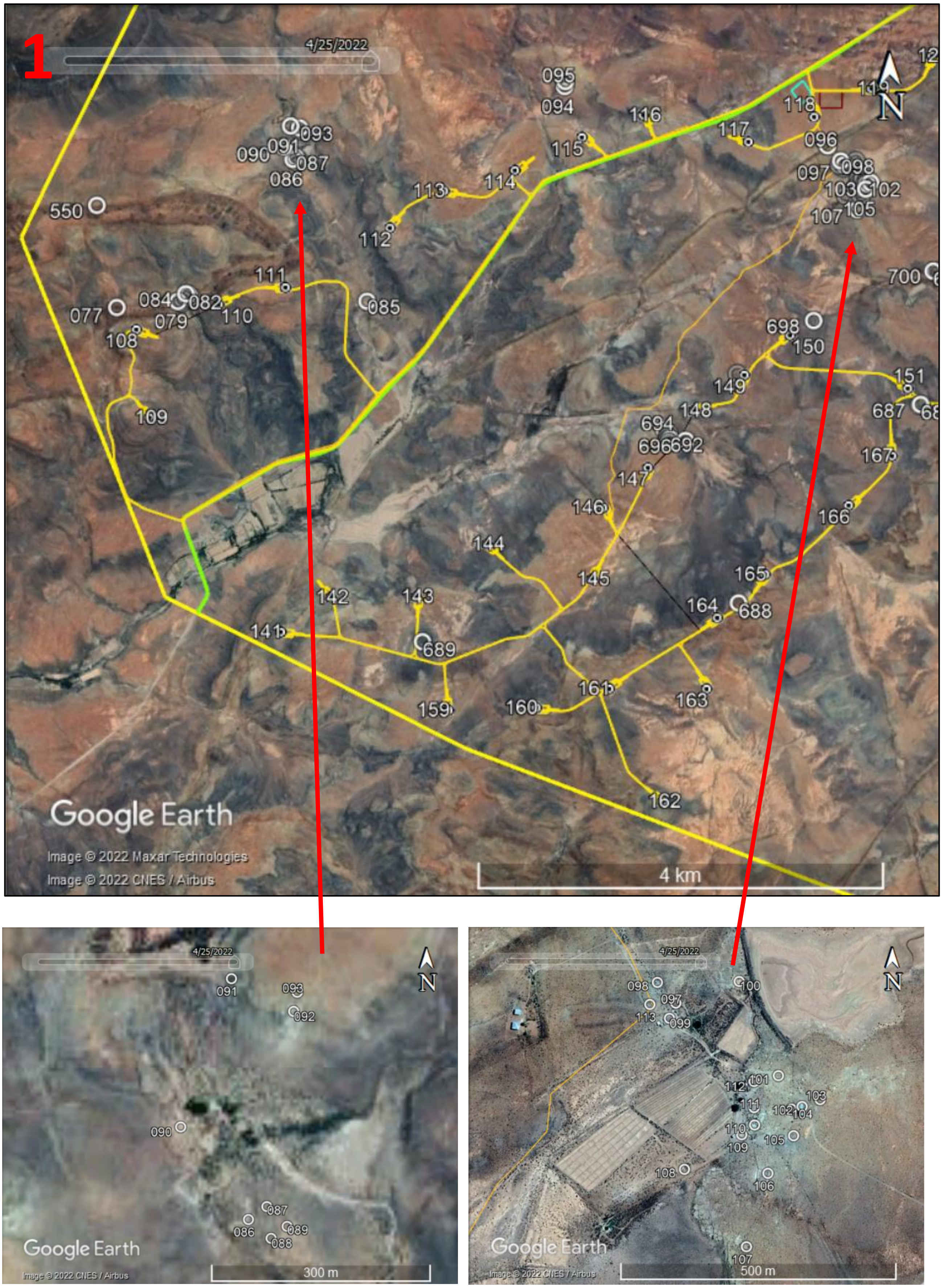
APPENDIX 3b – Mapping: Hoogland 2

All waypoints recorded for the present applications are shown as circles and listed in Appendix 2. All waypoint recoded for the Nuweveld projects are shown as diamonds and their details can be found in the relevant reports (Orton 2021a, 2021b, 2021c, 2021d).

The map below shows the entire HL02 study area while the five that follow show larger scale sections centred on the red numbers 1-5.

Key to maps:
Yellow polygon: Hoogland 1 site
Numbered dots: turbines
Yellow lines: roads, many with buried powerlines
Black/dark green/turquoise/orange lines: other powerlines
Bold light green line: public road to be upgraded
Red polygon: laydown area
Turquoise polygon: site camp & batching plant
Green square: battery energy storage facility
Filled yellow rectangle: battery energy storage system
Filled orange rectangle: substation




1
4/25/2022
095
094
116
117
118
119
096
097
098
103
102
107
105
093
091
090
087
086
550
113
114
115
112
111
084
082
077
079
110
108
085
109
700
698
150
149
151
148
687
694
696
692
167
147
146
166
144
145
165
164
688
142
143
141
689
159
160
161
163
162
Google Earth
Image © 2022 Maxar Technologies
Image © 2022 CNES / Airbus
4 km
N
091
093
092
090
087
086
089
088
300 m
098
097
113
099
100
112
101
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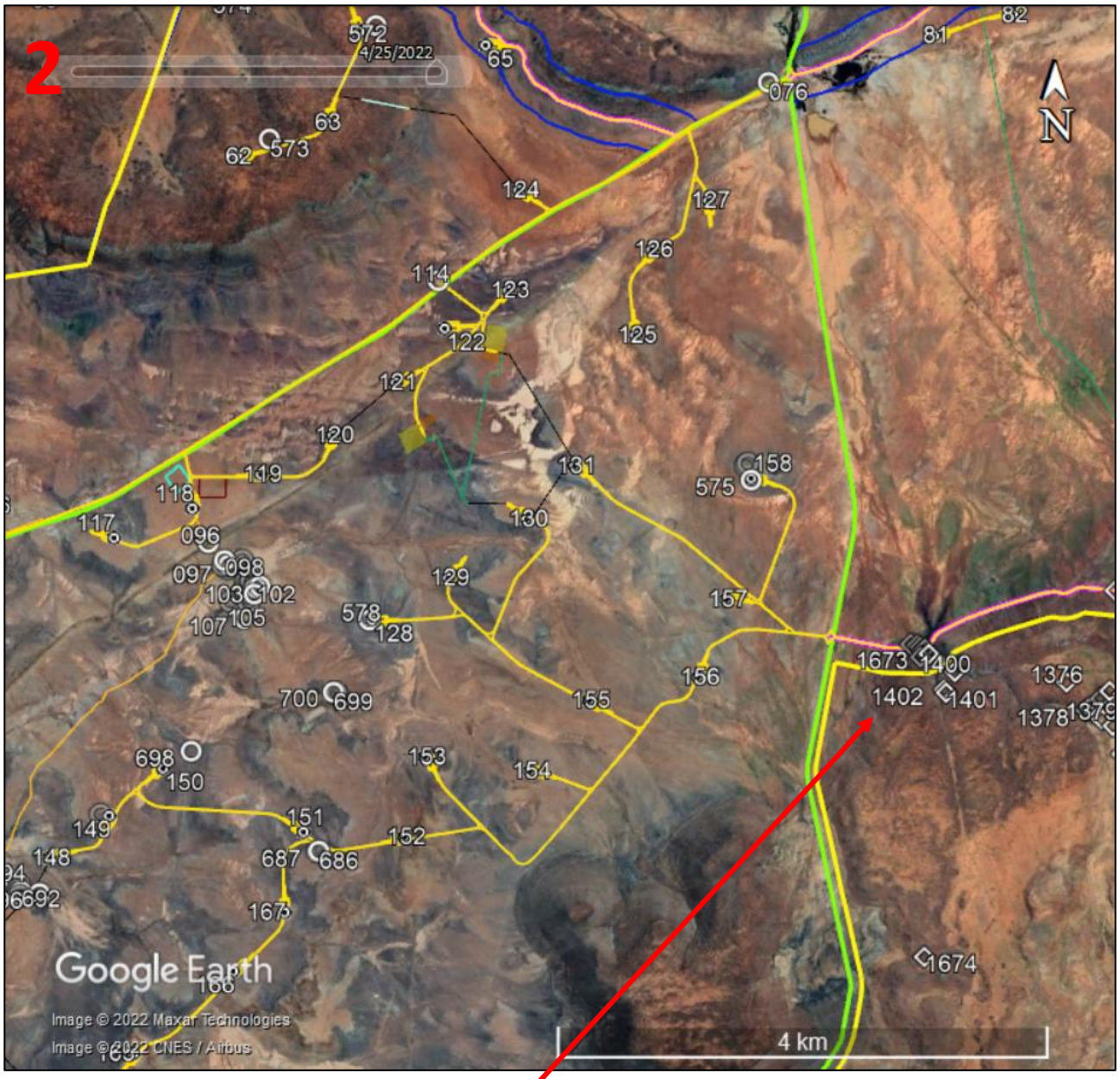
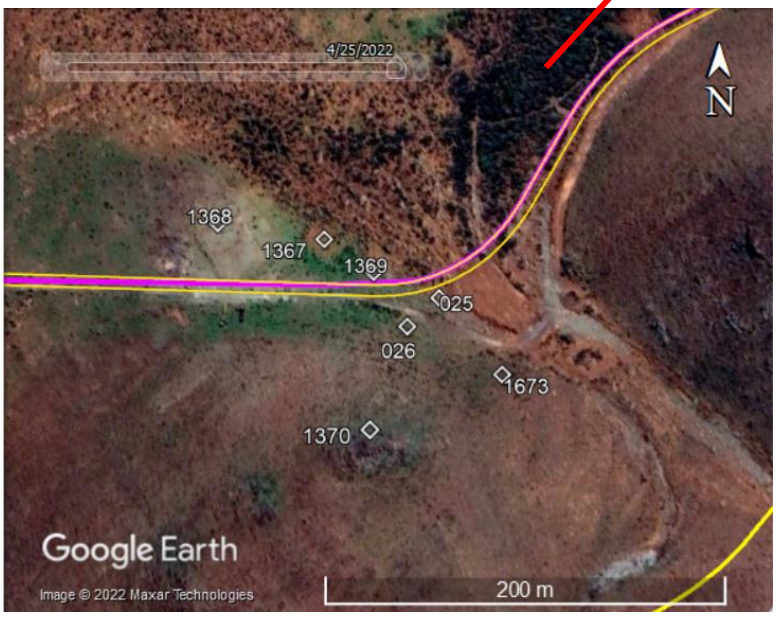
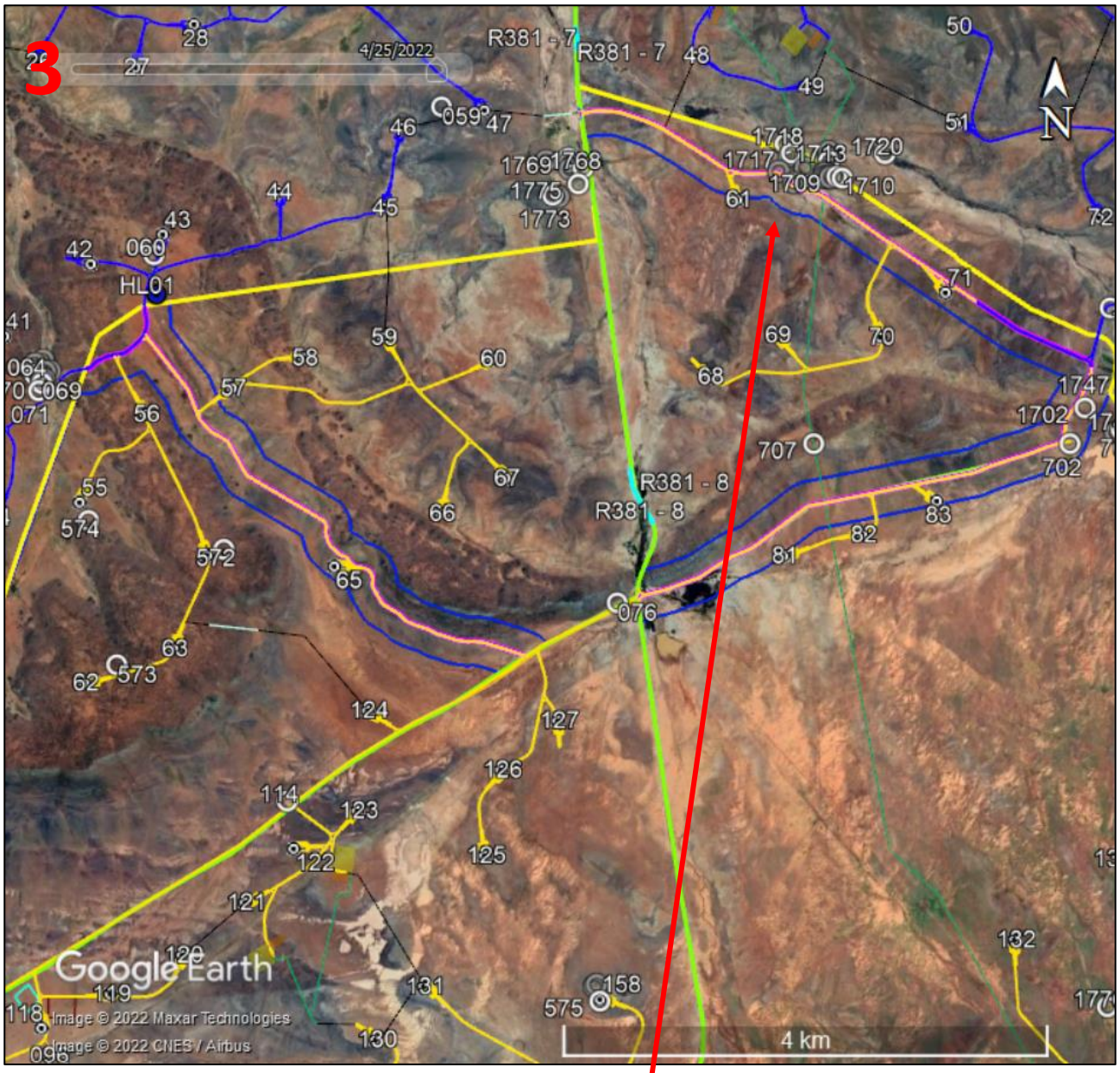
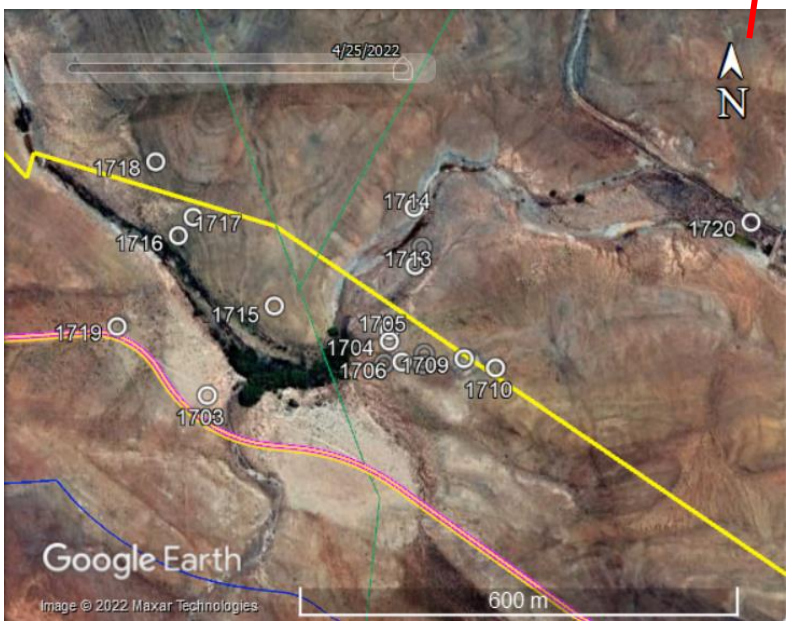
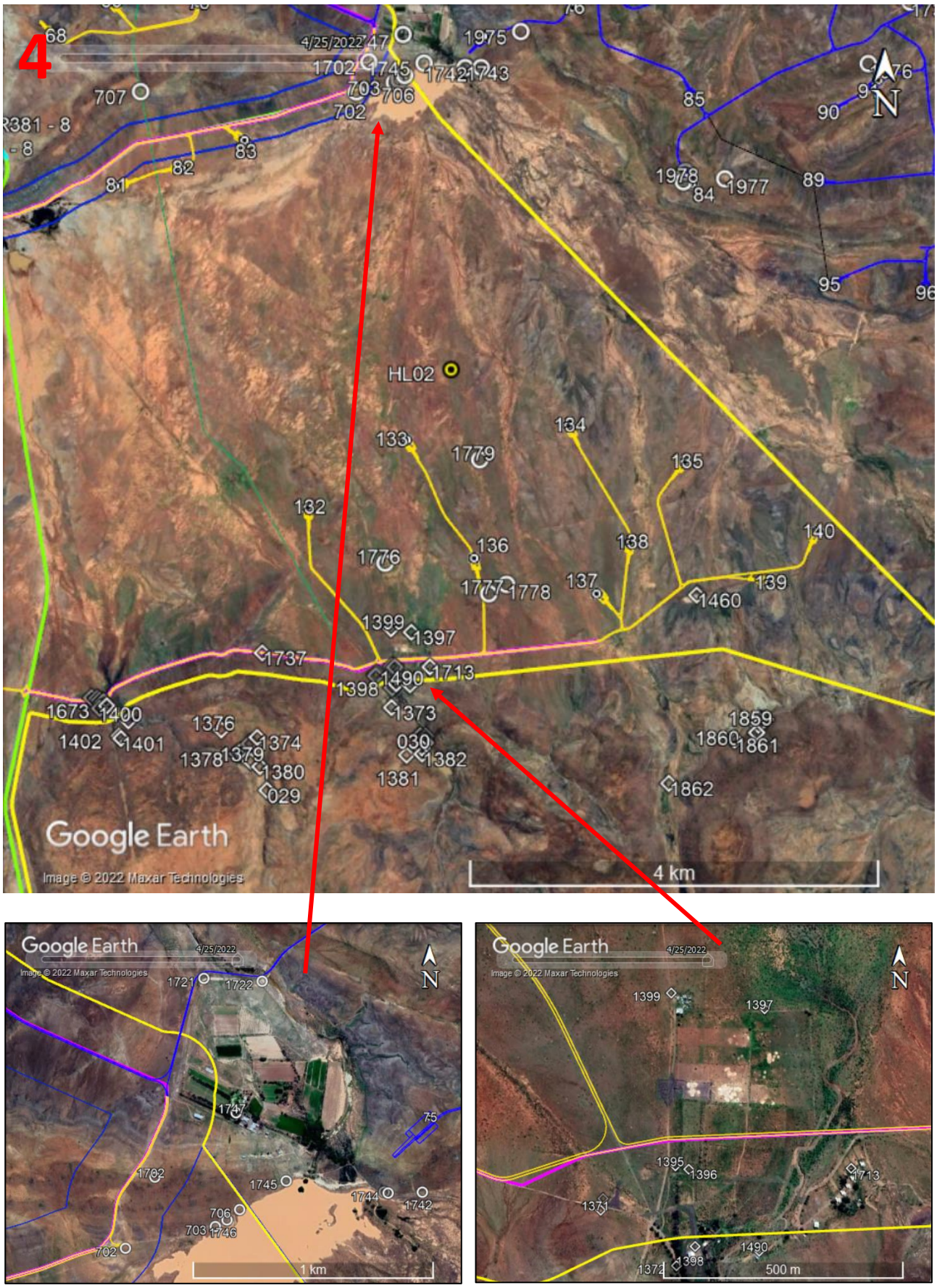
103
104
110
109
105
108
106
107
500 m


2
4/25/2022
N
572
65
076
82
81
63
62
573
124
127
126
114
123
122
125
121
120
119
131
158
575
118
117
130
096
097
098
103
102
107
105
578
128
129
157
700
699
155
156
1673
1400
1402
1401
1376
1378
698
150
153
154
149
151
152
148
687
686
692
167
166
1674
Google Earth
Image © 2022 Maxar Technologies
Image © 2022 CNES / Airbus
4 km


4/25/2022
N
1368
1367
1369
025
026
1673
1370
Google Earth
Image © 2022 Maxar Technologies
200 m


3
4/25/2022
R381 - 7
R381 - 8
HL01
Google Earth
Image © 2022 Maxar Technologies
Image © 2022 CNES / Airbus
4 km


4/25/2022
Google Earth
Image © 2022 Maxar Technologies
600 m


4
4/25/2022
HL02
Google Earth
Image © 2022 Maxar Technologies
4 km
1 km
500 m
N

APPENDIX 4 – Palaeontological specialist study

Please see separate appendix to the EIA Report

APPENDIX 5 – Visual Impact Assessment

Please see separate appendix to the EIA Report

APPENDIX 6 – Site Sensitivity Verification

SITE SENSITIVITY VERIFICATION: HOOGLAND NORTH CLUSTER

CONTENTS

1. INTRODUCTION

Red Cap Energy (Pty) Ltd ('Red Cap') is proposing to develop four wind farms and associated grid connections (together known as the Hoogland Projects) in an area located between Loxton and Beaufort West in the Western Cape Provinces. Refer to Figure 1 and Figure 2.

Hoogland 1 Wind Farm and Hoogland 2 Wind Farm are located to the north closer to Loxton and form the Northern Cluster of wind farms which will share a grid connection, named the Hoogland Northern Grid Connection. Hoogland 3 Wind Farm and Hoogland 4 Wind Farm are located closer to Beaufort West and comprise the Southern Cluster which will similarly share a separate grid connection, named the Hoogland Southern Grid Connection. The two Grid Connections are each in the form of 132 kV overhead power lines and will connect the Hoogland Wind Farms to the Nuweveld Collector Substation on Red Cap's adjacent Nuweveld Wind Farms Project.

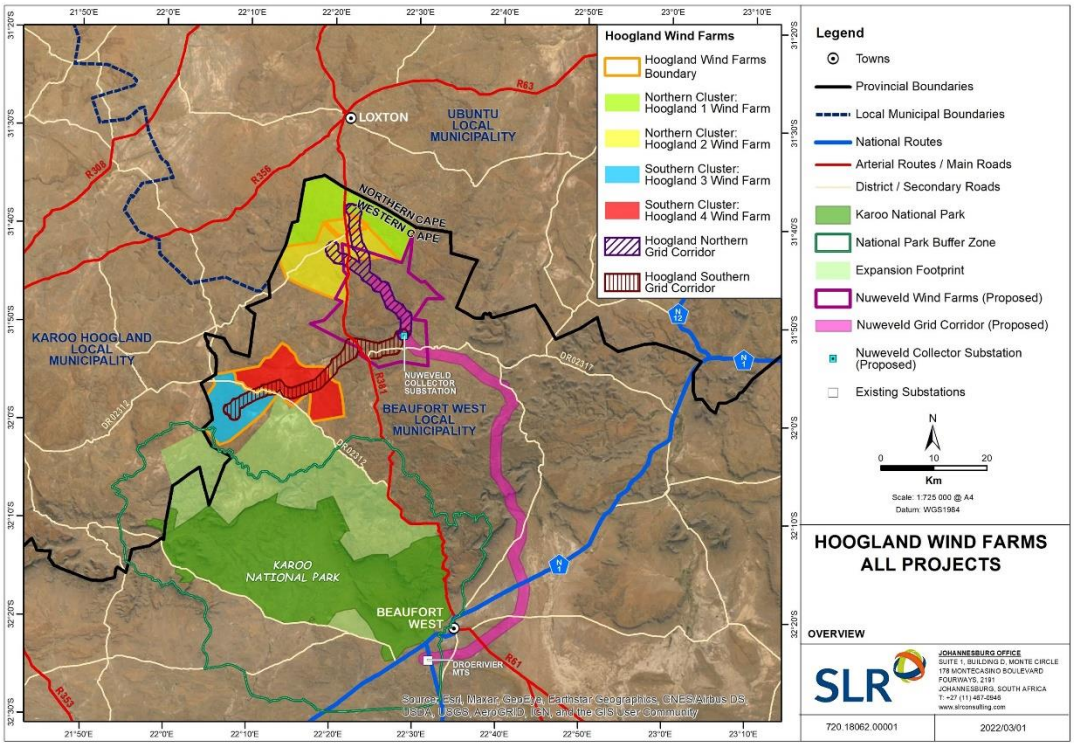


Figure 1: Locality Map of the Proposed Hoogland Wind Farms and associated Grid Corridor showing the adjacent Nuweveld Wind Farms and Grid Connection (part of six separate application processes)

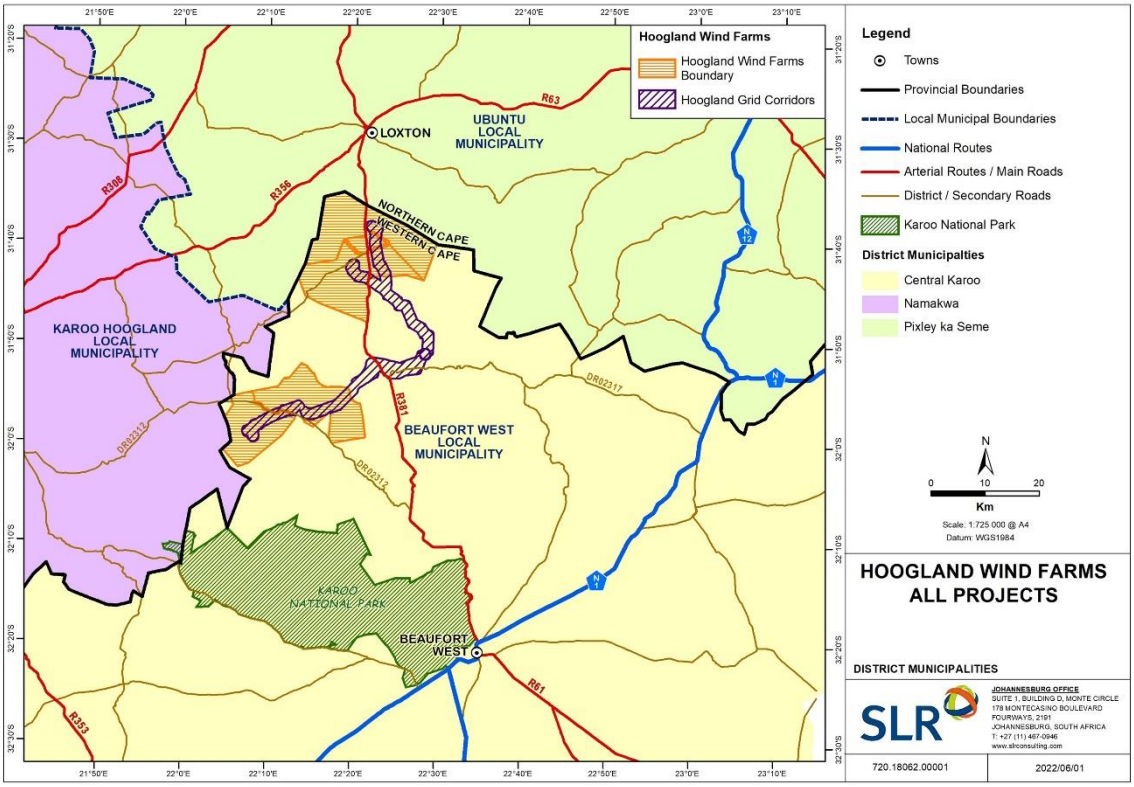


Figure 2: Situational Map of the Proposed Hoogland Wind Farms and associated Grid Connection Corridor (part of 6 separate application processes) within Namakwa and Central Karoo Municipality respectively

In accordance with GN 320 and GN 1150 (20 March 2020) [1] of the NEMA EIA Regulations of 2014, prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool). ASHA Consulting (Pty) Ltd has been commissioned to verify the heritage sensitivity of the Hoogland Wind Farm and Grid Connection project sites under these specialist protocols.

The scope of this report is the Hoogland 1 Wind Farm and Hoogland 2 Wind Farm (the Northern Wind Farm Cluster) application. Even though these are two separate applications they will be considered in the same specialist report.

2. SITE SENSITIVITY VERIFICATION METHODOLOGY

The steps followed are as follows:

- Desktop research to determine the kinds of heritage expected to occur in the general area;
- Desktop analysis of satellite imagery to locate any potentially sensitive areas; and
- Extensive fieldwork was conducted. This involved:
    - Driving the roads of the study area to look for likely areas where heritage resources might be present (e.g. water sources, appropriate topography and/or surface conditions);
    - Walking those areas identified from satellite photography and during driving through the area; and

[1] [1] GN 320 (20 March 2020): Procedures for The Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation

- Walking strings of turbines in order to randomly (in terms of heritage) sample sections of the landscape suited to development.

3. OUTCOME OF SITE SENSITIVITY VERIFICATION

Figure 3 shows the archaeological and heritage sensitivity according to the Screening Tool. It shows the entire study area and surrounding land to be of low sensitivity. This sensitivity is disputed by the heritage specialist based on the findings of the field surveys. Large numbers of archaeological heritage sites with variable cultural significance have been located in the study area and the various farm complexes are noted to be locally significant landscapes. The result is a large number of small areas of varying sensitivity set within a matrix of low sensitivity land (Figure 4).

The sites include Later Stone Age (LSA) rock art and occupations as well as large numbers of historical sites such as stone-walled settlements and engravings. The Nuweveld was an important area for colonial settlement and many small grazing farms were established close to water sources.

The types of sites recorded are as follows:

- A small rock shelter with finger paintings (Figures 5 & 6);
- LSA stone artefact scatters (Figure 7);
- LSA engravings (Figure 8)
- Stone-walled house ruins and the ruins of many associated outbuildings (Figure 9 & 10);
- Ash and rubbish middens with many artefacts (Figures 11 & 12);
- Abandoned and/or occupied houses and other farm buildings (Figure 13);
- Graves (Figure 14); and
- Historical engravings (Figure 15 & 16).

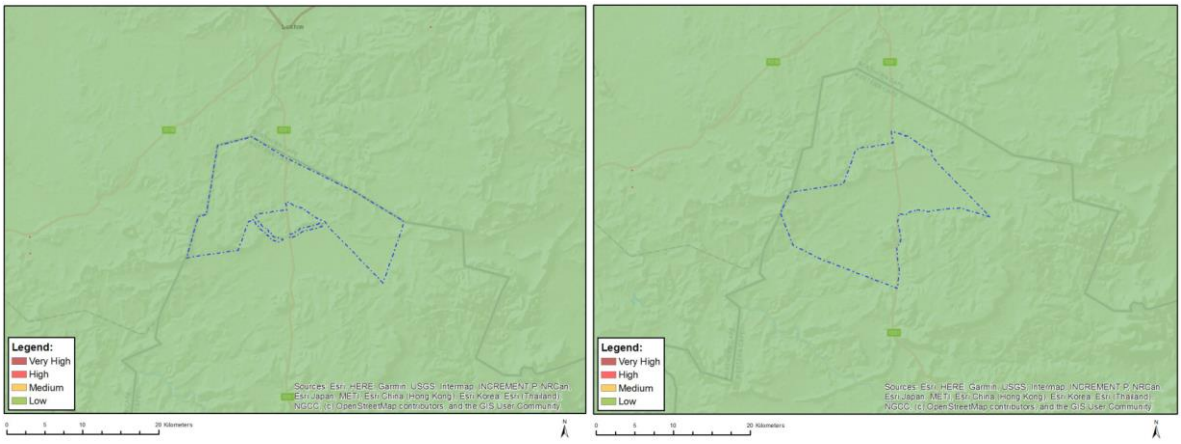


Figure 3: Screening tool maps showing the archaeological and heritage sensitivity to be low throughout the study area.

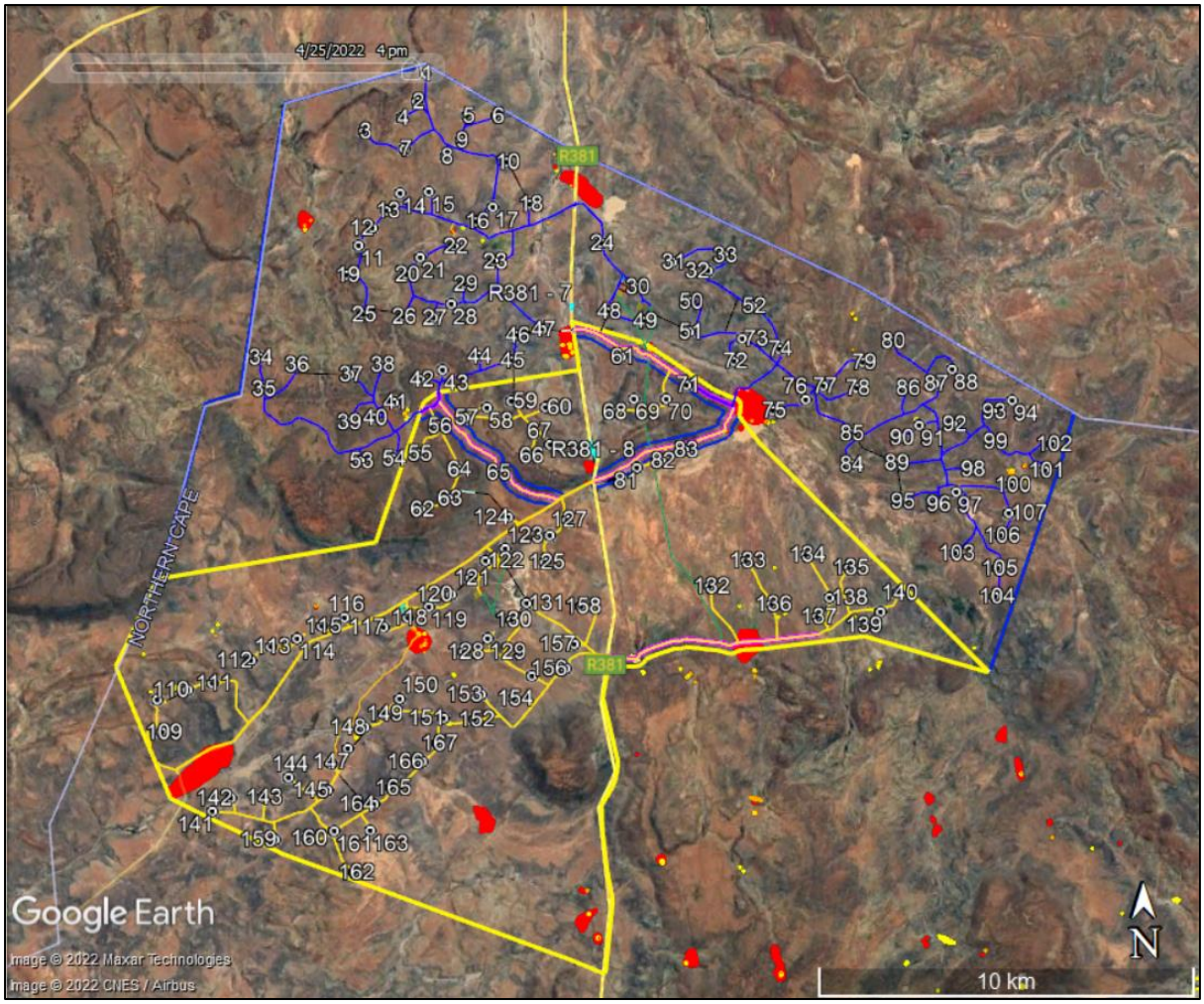


Figure 4: Sensitivity map showing the archaeological and heritage sensitivity to be generally low but with pockets of low (yellow), medium (orange) and high (RED) sensitivity scattered throughout the study area (green polygon = HL01; yellow polygon = HL02).

Figures 5 & 6: Rock shelter at waypoint 1676 with finger painted smears.

Figure 7: LSA stone artefacts at waypoint 1726. Scale in cm.

Figure 8: LSA engravings at waypoint 512. Sale in cm.

Figure 9: Ruined stone-walled house at waypoint 1685.

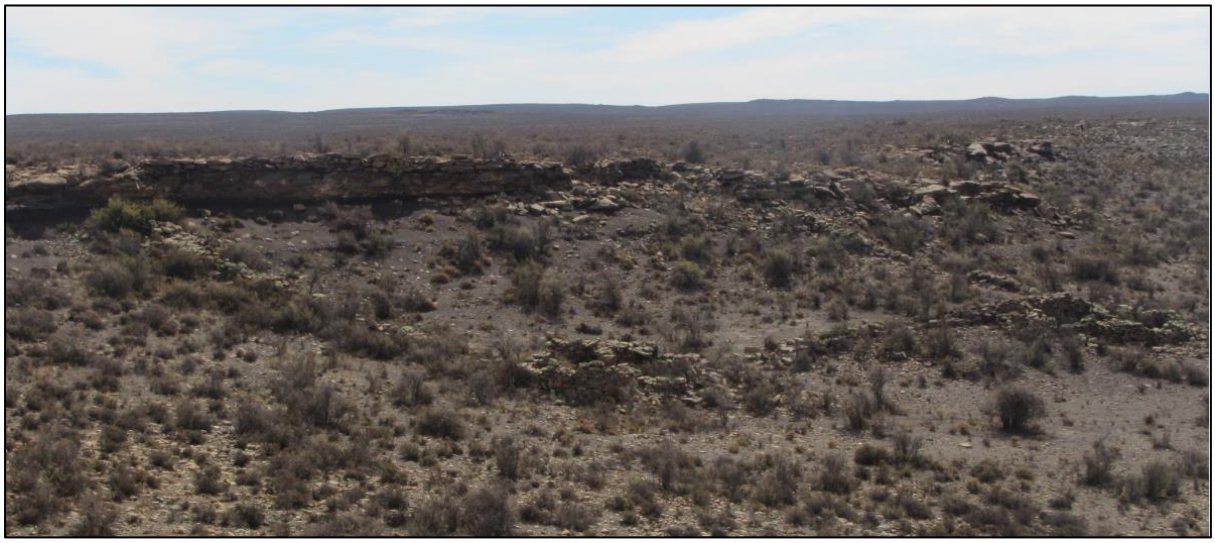


Figure 10: Ruined stone-walled kraal at waypoint 1736.

Figures 11 & 12: Artefacts from an ash and rubbish midden at waypoint 1700. Scale in cm.

Figure 13: Farmhouse at waypoint 1692.

Figure 14: Set of three graves at waypoint 1713.

Figure 15 & 16: Historical engravings at waypoint 073 with a date of 30.7.34 probably being 1934 and suggesting the site to not be a heritage resource.

Figure 17: Engravings of horses and the name “Manus” from waypoint 077.

All these archaeological and built heritage resources provide a wealth of information about the past occupants of the Nuweveld Mountains. The LSA engravings are of high local significance, as are the best preserved historical sites, ash and rubbish dumps and all graves. Heritage sites are strongly focused along water courses, but engravings occur on some dolerite ridges.

4. CONCLUSION

This report and desktop research shows that there is a wealth of heritage in the Nuweveld Mountains and the area cannot be regarded as of uniformly low sensitivity. It is true that the majority of the land area is of low sensitivity, but many culturally significant heritage sites exist in the area and demand further research.