HERITAGE IMPACT ASSESSMENT:

PROPOSED GRID CONNECTION INFRASTRUCTURE TO SUPPORT THE KOKERBOOM 1, KOKERBOOM 2 AND KOKERBOOM 3 WIND ENERGY FACILITIES, CALVINIA MAGISTERIAL DISTRICT, NORTHERN CAPE

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

SAHRA Case No.: TBC

Report for:

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On behalf of:

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SUMMARY

ASHA Consulting (Pty) Ltd was appointed by Zutari (Pty) Ltd to assess the potential impacts to heritage resources that might occur through the proposed construction of three linked powerlines and three switching stations, to be located some 52 km to 62 km north of Loeriesfontein, Northern Cape. The projects will be on Portion 1 (existing Helios Substation site) and the Remainder of Farm Sous 226, the Remainder of Kleine Rooiberg 227, the Remainder of Leeubergrivier 1163, the Remainder of Springbokpan 1164, the Remainder of Springbok Tand 215, and Portions 1 and 2 of Karee Doorn Pan 214. The powerline will also span over Portion 3 of Farm 226 which houses a railway line. The powerline is to support the authorised Kokerboom 1, Kokerboom 2 and Kokerboom 3 Wind Energy Facilities and will serve to connect the facilities to the national electricity grid. The study area is approximately defined by three co-ordinates as follows:

- S30° 23’ 09.1” E19° 23’ 54.5” (northwest),
- S30° 21’ 37.0” E19° 30’ 49.0” (northeast), and
- S30° 30’ 04.0” E19° 33’ 55.7” (southeast, at Helios Substation).

The study area is gently undulating with the surface being variably gravelly and slightly sandy. Occasional shale and dolerite outcrops occur in places. Vegetation tends to be low and scrubby. An existing wind energy facility, substation and switching station occurs in the immediate vicinity of the project area, while another similar facility occurs further to the east. The large Eskom Helios Substation and the Sishen Saldanha Railway also occur nearby at the south-eastern end of the project area.

The preferred alignment within the 300m wide corridor was surveyed over six days in June 2021, although earlier surveys had covered parts of the corridors in 2016, 2017 and 2020. A few archaeological sites were found within the corridors. They are all Later Stone Age finds comprised largely of stone artefacts. One site, however, is a small, stone-walled feature. Background scatter artefacts likely all from the Middle Stone Age also occur in places but, due to their low density and poor context, are of no further concern. The landscape has a low degree of cultural significance for its aesthetic value but has been compromised through the construction of two wind energy facilities, substations and the railway line. Impacts to the landscape are thus of low significance.

There are no highly significant heritage concerns for this project. Some archaeological sites will require sampling and recording prior to disturbance, but this is easily effected and does not influence the approval of the project. Either of the two alternatives for the Kokerboom 3 portion of the project may be authorised, and both pylon types are considered acceptable from a heritage point of view. Although only the preferred alignment within the 300 m wide corridors was assessed on the ground, the possibility still exists of avoiding some or all of the sites because pre-construction micrositing can still occur within the corridor. As such, no highly significant impacts are expected and there are no fatal flaws. There are no areas requiring avoidance, but obviously best practice suggests that those sites that can be avoided should be, if feasible.

It is recommended that the proposed project should proceed but the following conditions must be included in the environmental authorisation, should one be issued:

- Any unsurveyed portions of the final alignment that cross hilltops or other potentially sensitive areas (e.g. pans, low rock outcrops) must be surveyed before construction to inform micro-siting and/or to determine preconstruction mitigation requirements as appropriate;

- Any significant sites that might be impacted must be sampled and recorded prior to construction. This includes those at 526, 527 and 1952 if they are to be impacted; 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.

Glossary

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

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

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

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

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

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

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

CRM: Cultural Resources Management

DEFF: Department of Environment, Forestry and Fisheries

EA: Environmental Authorisation

ECO: Environmental Control Officer

EIA: Environmental Impact Assessment

GP: General Protection

GPS: global positioning system

HIA: Heritage Impact Assessment

LSA: Later Stone Age

MSA: Middle Stone Age

NBKB: Ngwao-Boswa Ya Kapa Bokoni

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

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

PPP: Public Participation Process

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

Contents

1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by Zutari (Pty) Ltd to assess the potential impacts to heritage resources that might occur through the proposed construction of three linked powerlines and three switching stations, to be located some 52 km to 62 km north of Loeriesfontein, Northern Cape (Figures 1 & 2). The project will be on Portion 1 (existing Helios Substation site) and the Remainder of Farm Sous 226, the Remainder of Kleine Rooiberg 227, the Remainder of Leeubergrivier 1163, the Remainder of Springbokpan 1164, the Remainder of Springbok Tand 215, and Portions 1 and 2 of Karee Doorn Pan 214. The powerline will also span over Portion 3 of Farm 226 which houses a railway line. The powerline is to support the authorised Kokerboom 1, Kokerboom2 and Kokerboom 3 Wind Energy Facilities and will serve to connect the facilities to the national electricity grid. The study area is approximately defined by three co-ordinates as follows:

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- S30° 30’ 04.0” E19° 33’ 55.7” (southeast, at Helios Substation).

1.1. The proposed project

1.1.1. Project description

The project entails the construction of several components as follows:

- Kokerboom 1 Switching Station (collector station)of up to 100 m by 150 m to be located adjacent to the Kokerboom 1 WEF Substation;
- A 5000 m^2 temporary laydown area to be located adjacent to the Switching Station;
- A 132 kV single or double circuit powerline within a 32 m wide servitude (300 m wide corridor being assessed) and extending approximately 16 km from the Switching Station to the Eskom Helios Substation. Pylons to be up to 32 m tall but extending to a maximum of 45 m if needed to cross other infrastructure. There will be approximately 108 pylons disturbing about 10 m by 10 m each;
- Kokerboom 2 Switching Station of up to 100 m by 100 m to be located adjacent to the Kokerboom 2 WEF Substation;
- A 132 kV single or double circuit powerline within a 32 m wide servitude a (300m wide corridor being assessed) and extending approximately 10 km from the Kokerboom 2 Switching Station to the Kokerboom 1 Switching Station (collector station). Pylons to be up to 32 m tall but extending to a maximum of 45 m if needed to cross other infrastructure. There will be approximately 68 pylons disturbing about 10 m by 10 m each;
- Kokerboom 3 Switching Station of up to 100 m by 100 m to be located adjacent to the Kokerboom 3 WEF Substation;
- A 132 kV single or double circuit powerline within a 32 m wide servitude (300 m wide corridor being assessed) and extending approximately 9 km from the Kokerboom 3 Switching Station to the Kokerboom 1 Switching Station (collector station). Pylons to be up to 32m tall but extending to a maximum of 45 m if needed to cross other infrastructure. There will be approximately 127 pylons disturbing about 10 m by 10 m each; and
- No new roads are required since the proposed WEF roads would be used for access. However, a jeep track will be required beneath the powerline for construction and maintenance purposes.

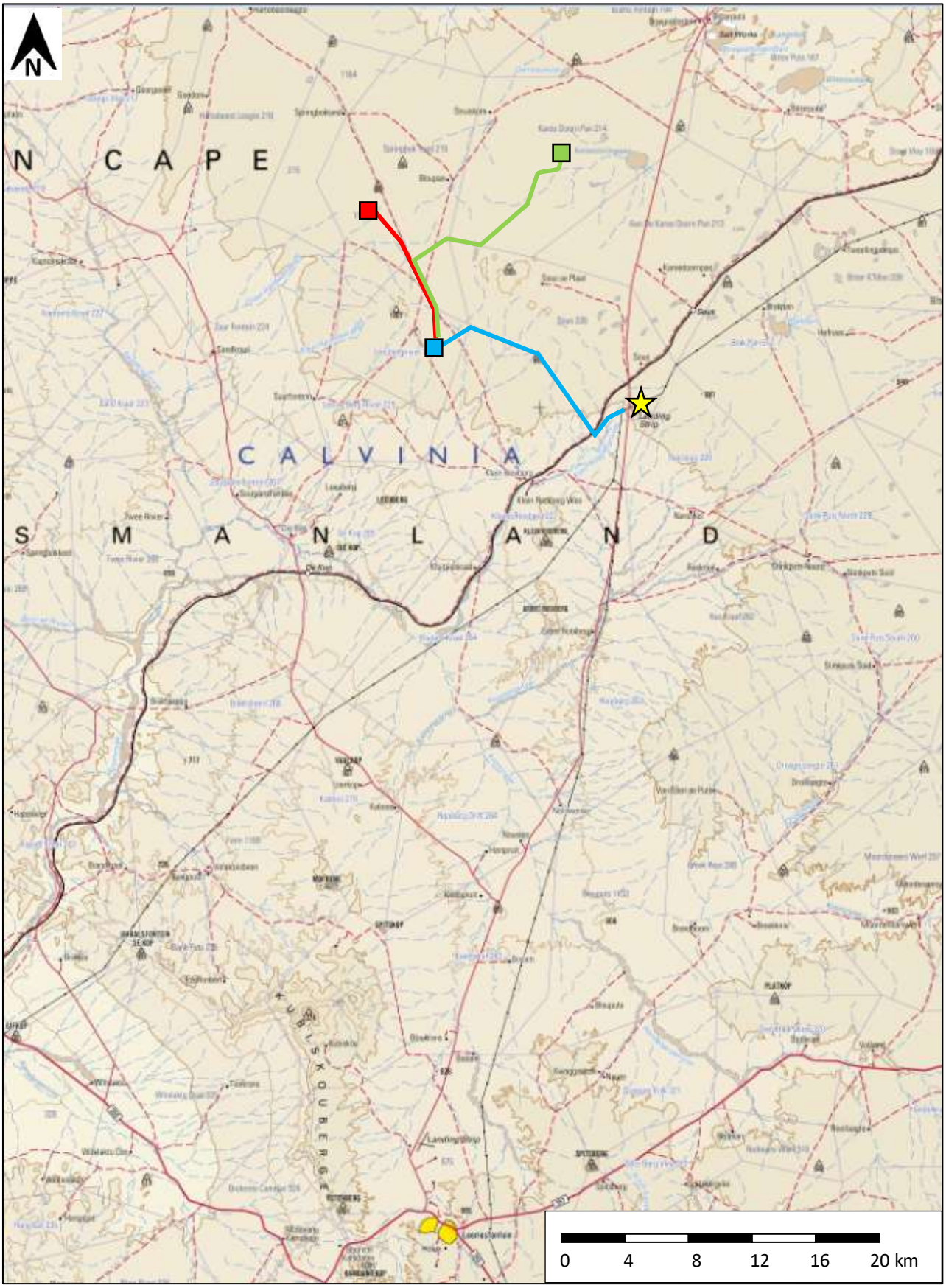

Figure 1: *Extract from 1:50 000 topographic map 3019BC showing the location of the site relative to Loeriesfontein in the far south. The turquoise line and square = Kokerboom 1 powerline and switching station, red = the Kokerboom 2 powerline and switching station and green = Kokerboom 3 with two*

switching station options. Yellow star = existing Eskom Helios Substation. Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.

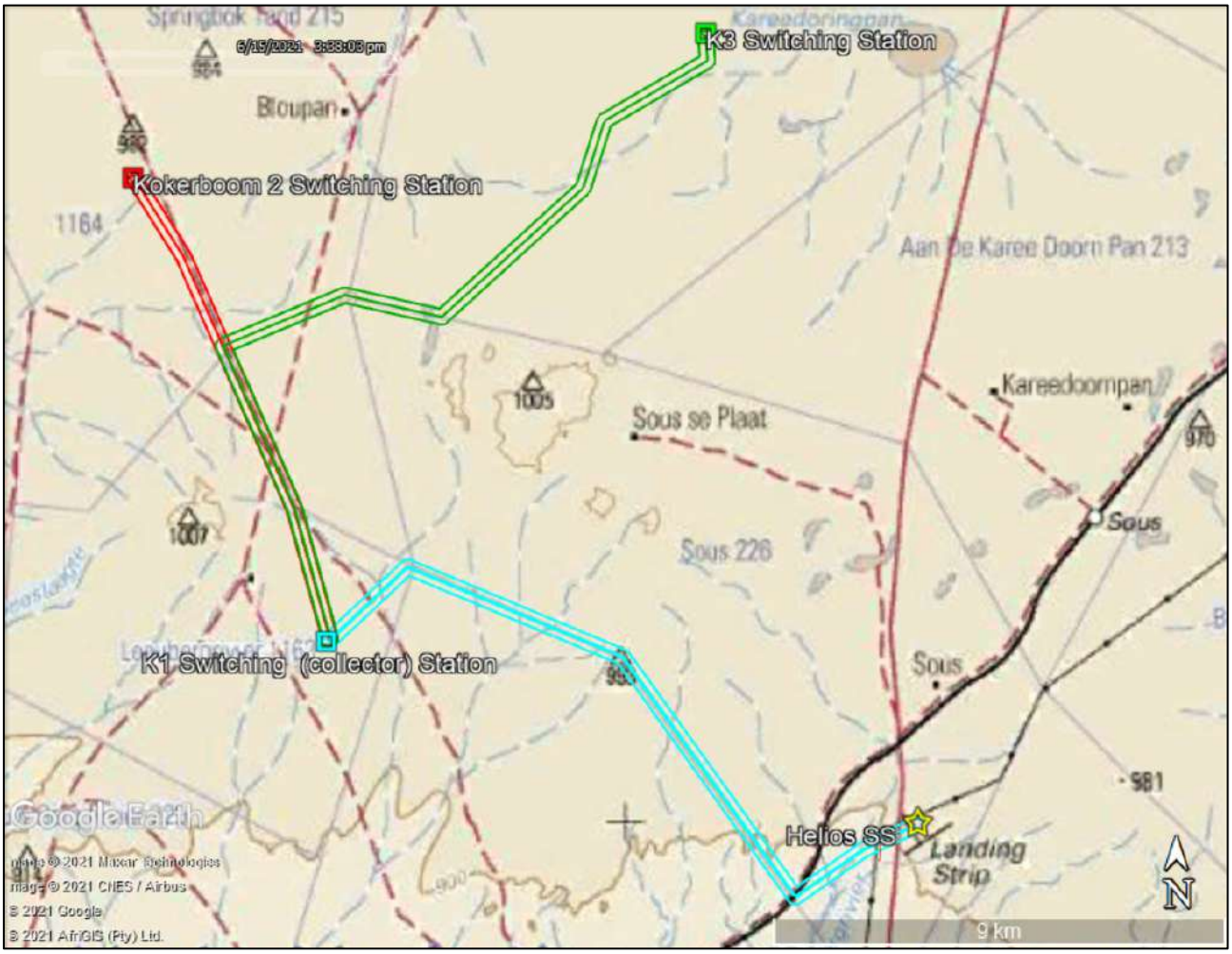

Figure 2: *Map showing the proposed layout of the project.*

1.1.2. Identification of alternatives

There are no project alternatives for this development since the powerline, switching stations and collector station are the most technically feasible way of evacuating the power to the grid. However, a 300m wide corridor is being considered in order to allow some design flexibility. Two switching station options were initially identified for the Kokerboom 3 project but one has been scoped out and the other slightly shifted during the course of the assessment. There is no meaningful difference from a heritage point of view. As such, only the No-Go option will be assessed against the development proposal.

1.1.3. Aspects of the project relevant to the heritage study

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

1.2. Terms of reference

ASHA Consulting was requested to conduct a field assessment of the study area for the proposed project and compile a heritage impact assessment (HIA) report. The report was to also include a desktop study and make us of the Zutari impact assessment methodology.

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 the National Department of Forestry, Fisheries and the Environment (DFFE) who will review the Basic Assessment (BA) and grant or refuse authorisation. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

1.4. The author

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

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

1.5. Declaration of independence

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

2. LEGISLATIVE CONTEXT

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

The NHRA protects a variety of heritage resources as follows:

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

- Section 37: public monuments and memorials.

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

- Structures: “any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith”;
- Palaeontological material: “any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace”;
- Archaeological material: a) “material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures”; b) “rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation”; c) “wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation”; and d) “features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found”;
- Grave: “means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place”; and
- Public monuments and memorials: “all monuments and memorials a) “erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government”; or b) “which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual.”

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

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

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

Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA then it must include a heritage component that satisfies the requirements of S.38(3). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to a BA. The present report provides the heritage component. Ngwao-Boswa Ya Kapa Bokoni (Heritage Northern Cape; for built environment and cultural landscapes) and the South African Heritage Resources Agency (SAHRA for archaeology and palaeontology) are required to provide comment on the proposed project in order to facilitate final decision making by the DFFE.

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources used in this report are presented in Table 1. Data were also collected via a field survey.

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

Data / Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography of the study area and immediate surrounds
Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
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 preferred alignment within the 300m wide corridor was subjected to a detailed foot survey on 8, 9, 10, 11, 12 and 14 June 2021, but earlier surveys in 2016, 2017 and 2020 also covered the broader corridor and general area (Figure 3). This was during winter but, in this very 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. Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

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

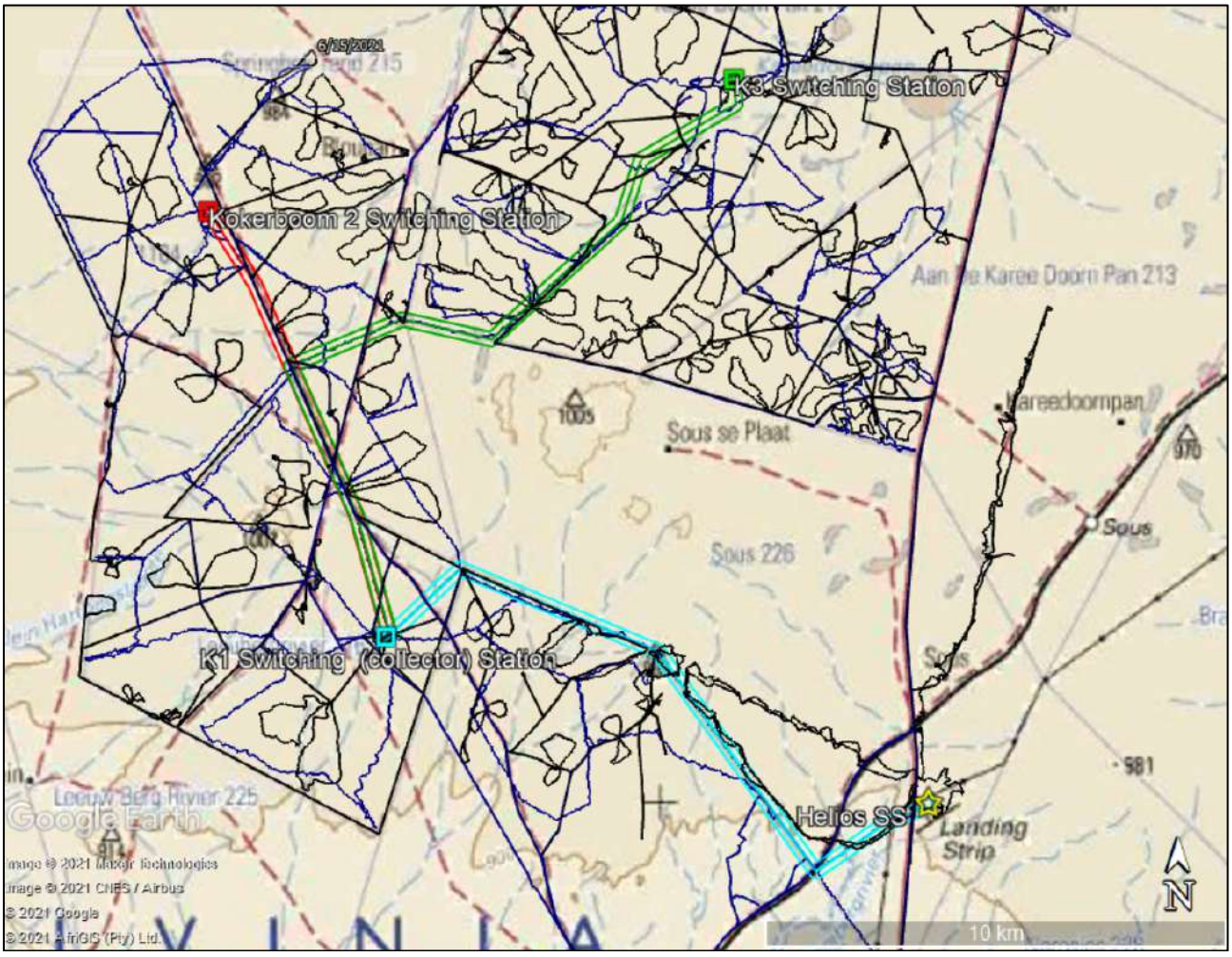

Figure 3: *Map showing the proposed powerline (green, red and turquoise) and survey tracks from 2017 and earlier (black) and 2021 (dark blue).*

3.3. Specialist studies

No separate specialist study has been commissioned as part of this HIA but a study of the potential impacts to palaeontological heritage has been carried out and reported on in a separate report by Dr John Almond.

3.4. Impact assessment

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

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. SAHRA (2007) has formulated its own system[1] for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action).

3.6. Consultation

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

3.7. Assumptions and limitations

The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. It was not possible to survey the entire 300 m wide corridor. The survey therefore focused on the preferred alignment but did also visit any potentially sensitive locations within the corridor. Furthermore, extensive fieldwork for the adjacent WEFs has also been undertaken in the same area and an excellent understanding of archaeological site

[1] The system is intended for use on archaeological and palaeontological sites only.

distribution has been obtained. The survey density within the 300 m corridor is thus not considered to have limited the outcome of this report.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The site is in a very remote location on land that is used for livestock grazing. A precedent has already been set for the development of electrical infrastructure with two wind energy facilities already constructed to the south and east of the present study area and several wind energy facilities and a solar energy facility having been authorised nearby (see Appendix 2). A large Eskom Substation (Helios) lies at the south-eastern end of the present study area, alongside the gravel road that leads northwards from Loeriesfontein. Just west of the Helios Substation and passing through the south-eastern edge of the study area is the Sishen-Saldanha Railway.

4.2. Site description

The site is a gently undulating landscape. While it is generally flatter in the north, the southern part is more variable and includes a fairly prominent hill. There are some slightly sandy areas with low shrubs in places, with most of these being areas washed by water after heavy rains. In other areas erosion has resulted in the surfaces being gravelled. A number of large stream beds were present in the southern part of the study area traversed by the Kokerboom 1 section of the alignment. Figures 4 to 11 show views of the proposed powerline route proceeding from the Helios Substation in the southeast along the alignment of the three powerline sections towards the northern end of the project area.

Figure 4: *View towards the northeast towards the Helios Substation in the Kokerboom 1 alignment. Another powerline is under construction in the same area.*

Figure 5: *View towards the southwest across a sandy floodplain in the alignment (Kokerboom 1).*

Figure 6: *View towards the southwest towards the point where the Kokerboom 1 section of the powerline would cross the railway line.*

Figure 7: *View towards the southeast across one of the few larger stream beds crossed by the Kokerboom 1 section of the powerline.*

Figure 8: *View towards the northwest from the high ground near the middle of the Kokerboom 1 section of the powerline.*

Figure 9: *View towards the northwest across sandy flats traversed by the Kokerboom 1 section of the powerline.*

Figure 10: *View towards the southwest across a low, broad hill crossed by the Kokerboom 3 section of the powerline.*

Figure 11: *View towards the southwest across a flat, sandy area crossed by the Kokerboom 3 section of the powerline.*

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. Archaeology

5.1.1. Desktop study

Beaumont *et al.* (1995:240) have stated that "Thousands of square kilometres of Bushmanland are covered by a low density lithic scatter". Many impact assessments have found this to be true, although it can be stated that the scatter tends to be more noticeable in northern Bushmanland than in the south. The artefacts include material dating to the Early (ESA), Middle (MSA) and Late (LSA) Stone Ages.

In the general vicinity of the present study area Van Schalkwyk (2011) found Stone Age sites to be associated with hills – they were either located on the crests or at the foot of the hills and were from both the MSA and the LSA. In contrast, Orton (2017a, 2017b, 2017c) found MSA material to be more frequent on the lowlands and generally attributable to background scatter, while LSA sites were focused on hills. Orton (2013) found a few small LSA artefact scatters associated with both hill tops and the margins of the Klein Rooiberg River to the southeast. In addition to widespread but low density MSA artefacts forming part of the background scatter, Webley and Halkett (2012) also reported small LSA sites located on the crests of low hills a short distance to the south of the present study area. These sites revealed primarily stone artefacts and ostrich eggshell, although one had pottery and a bead on it. They found another site, located close to a stream bed, which had a number of grooved grindstones on it.

Beaumont and Morris (1985 in Morris 2013) found dense LSA sites around pans to the west of Brandvlei (well to the east of the present study area). The finds included scatters of stone artefacts, pottery and ostrich eggshell, the latter perhaps having originated from water containers. A later survey by Morris (1996) to the north of the present study area yielded further similar sites on dunes associated with pans; he also recorded ostrich eggshell beads and pottery there.

Also to the east, Rudner and Rudner (1968) recorded engravings on dolerite outcrops as well as occupation sites dating to the LSA. These sites included stone artefacts, pottery, ostrich eggshell beads and stone features that may have been the remnants of hut circles and/or kraals.

Fourie (2011), who found nothing during his survey, reports the oral testimony of a Loeriesfontein farmer regarding the presence of rock art and engravings in the area and also that a cache of ostrich eggshell flasks had been found on his farm. Such caches have been reported from various parts of western South Africa (Henderson 2002; Jerardino *et al.* 2009; Morris 1994; Morris & Von Bezing 1996; Parkington 2006) and date to the LSA. Similar flasks are on display in the Fred Turner Museum in Loeriesfontein along with several bored stones and soapstone pipes from farms in the general region.

Other surveys have yielded low density scatters of stone artefacts of varying age (Fourie 2017b, 2017c, 2017f; Kaplan 2008; Morris 2007, 2013), while some, despite large areas being surveyed, found nothing at all (Fourie 2011, 2017a, 2017d, 2017e; Van der Walt 2012, 2013).

The only historical archaeological material reported came from the farm Kleine Rooiberg, a short distance south of the present study area. It consisted of ceramic, glass and metal fragments thought to date to the early 20th century (Webley & Halkett 2012).

5.1.2. Site visit

A large number of archaeological sites have been recorded in the larger study area for the Kokerboom 1 to 3 WEFs through which the proposed powerline route runs. Most have been described in the reports for the WEF projects and therefore only those falling within the 300 m wide corridor are reported here along with two small sites (waypoints 1954 & 1955) that fall just outside the corridor but have not been reported elsewhere (Table 2 and Figure 12). All the recorded sites except that at waypoint 173 lie within the Kokerboom 1 section of the corridor. Rare background scatter artefacts were occasionally seen. These are Pleistocene-aged materials, likely all from the MSA, and are of no concern due to their poor context.

Table 2: *List of archaeological heritage sites recorded in the powerline corridors. The list is organised such that the records are in order starting from the southeast. The* ***red text*** *indicates the mitigation that would be required if the site is to be disturbed during construction (hours indicates the hours of sampling/ recording time needed on site)*

Waypoint	Co-ordinate	Description	Significance	Grade
1951	S30 30 38.6 E19 32 26.5	An isolated broken lower grindstone that has extensive pitting on its surface indicating use as an anvil as well.	Very low	GPC
527	30 29 37.3 1931 07.2	A round piled stone circle about 1.5 m in diameter. The stones are piled highest towards the north and those along the southern edge might actually just be natural in which case the structure would be C-shaped. There was one tortoise bone and three ostrich eggshell fragments immediately outside it.	Low **Record**	GPB
398	S30 28 47.9 E19 30 21.2	Four fresh hornfels artefacts on top of a hill.	Very low	GPC
526	S30 28 16.4 E19 29 56.2	A scatter of CCS and hornfels flaked stone artefacts about 20 m in diameter on a hilltop. Mostly CCS. [Recorded as waypoint 393 in Orton 2017a, 2017b.]	Medium-Low **4 hours**	GPB
1952	S30 28 16.0 E19 29 59.6	A scatter of LSA CCS and hornfels artefacts of about 30 m diameter. This is a waypoint in a second artefact concentration in the greater scatter on this hilltop.	Medium-Low **6 hours**	GPB
1953	S30 28 02.0 E1929 28.8	A small discrete LSA hornfels scatter of 3 m diameter on top of a hill.	Low	GPC
1954	S30 28 04.4 E19 29 07.5	Very ephemeral LSA CCS scatter on a hilltop. [Just outside corridor but included as not reported earlier.]	Very low	GPC
1955	S30 28 04.5 E19 29 01.5	A small discrete LSA hornfels scatter of 5 m diameter on top of a hill. [Just outside corridor but included as not reported earlier.]	Low	GPC
173	S30 26 06.9 E19 25 31.2	Small scatter of historical ceramic fragments on an isolated hill.	Very low	GPC

Figure 12: *Map showing the locations of the finds. Yellow symbols are Grade GPB, white symbols are GPC.*

Interestingly, most of the sites are associated with the area of hills in the central part of the Kokerboom 1 portion of the study area. One of these is a small circular piled stone enclosure. It is higher on the northern side. It has many bushes in and around it which made it difficult to record. It is likely that the site functioned as a small screen behind which people hid for hunting purposes (Figure 13).

Figure 13: *Small circular piled stone feature built on a dolerite outcrop at Waypoint 527. This view faces towards the north and the walling can be seen behind the central bush.*

The most significant site was a very large scatter of LSA stone artefacts (Figures 14) over the top of the highest hill in the area (Figure 15). There appear to be two concentrations of artefacts each about 20 m to 30 m in diameter. Whether these represent a single larger occupation is not known, but it is most likely that the site is a palimpsest formed through multiple short-term occupations of this hilltop over a period of time. One historical site was found within the powerline corridors. This was a small scatter of ceramic fragments located atop a small isolated hill (Figure 16). Historical ceramics have been seen in several location in the wider Kokerboom WEF study area. It is also generally not uncommon to find a broken ceramic item (often only with a few pieces present). In the present instance, however, the scatter was very small but yet two or more vessels were represented.

Figure 14: *A few crypto-crystalline silica and hornfels artefacts from the large hilltop scatter at waypoints 526 & 1952.*

Figure 15: *View across the hilltop where the large LSA stone artefact scatter was found. It is one of the most prominent hills in the area.*

Figure 16: *Ceramic fragments from the hilltop scatter at waypoint 173.*

5.2. Graves

No graves were seen in the study area and, due to the generally rocky substrate, the chance of finding graves is very limited.

5.3. Historical aspects and the Built environment

5.3.1. Desktop study

Van Schalkwyk (2011) reported an early 20th century farmstead constructed of stone and brick with corrugated iron roof. It is unlikely that many earlier farmsteads would be present because this harsh landscape was only permanently settled in relatively recent times. This is borne out by the fact that the two farms under study were only surveyed in 1898. Prior to this, Van Schalkwyk (2011) notes that Dutch-speaking trek boers would have used the area on a seasonal basis. It was only after the 1870s introduction of wind pumps that water was more readily available and the area became more amenable to farming (Webley & Halkett 2012).

Van Schalkwyk (2011) found an unusual house on the farm portion to the east of the study area that was built of clay and bricks and then cladded with corrugated iron sheeting. He thought it to date to approximately the 1920s. Another corrugated iron house nearby was visited by Orton (2013) who described a well-maintained stone livestock enclosure ('*kraal*'), a recent but traditionally-styled cooking shelter ('*kookskerm*') and another outbuilding. Van Schalkwyk (2011: fig. 8) also illustrates (but does not describe) another farmhouse from the region – it is far grander than that noted above and looks to be from the early to mid-20th century.

Loeriesfontein, the nearest town to the site, was first established in 1894 by Frederik Turner who built a shop, the first building in Loeriesfontein (Figure 17). Once the shop was established, the town slowly grew around it.

Figure 17: *The first building in Loeriesfontein as photographed in 1895 (Source: Fred Turner Museum, Loeriesfontein).*

Van Schalkwyk (2011) and Orton (2013) both described a small graveyard with two graves near the 1920s house mentioned above; one was dated to 1913. Van Schalkwyk (2011) also illustrated (but did not describe) an isolated grave.

5.3.2. Site visit

No historical materials aside from the archaeology noted above were seen in the study area.

5.4. Cultural landscapes and scenic routes

The site has a very weakly developed cultural landscape since the majority of anthropogenic interventions relate to farm tracks and fences. The landscape is largely a natural one (although it does still have cultural significance for its aesthetic value), but has now been compromised by two neighbouring wind farm developments, the Helios Substation and associated power lines, and the Sishen-Saldanha railway line which create a new 'cultural' layer on the landscape. The adjacent gravel road is not considered a scenic route.

5.5. Statement of significance and provisional grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), ''cultural significance'' means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA (see Section 2 above).

The archaeological resources are deemed to have medium to low cultural significance for their scientific value and are considered up to grade GPB.

Graves are deemed to have high cultural significance for their social value but none are known or expected to occur on the site.

The cultural landscape has low cultural significance for its aesthetic and social value.

5.6. Summary of heritage indicators

The primary heritage resource of concern here is archaeology, which is generally widespread on the landscape.

- **Indicator:** Significant archaeological sites must not be damaged or destroyed prior to appropriate archaeological interventions.

The cultural landscape is a secondary concern but since this area has been identified for electrical development through the construction of substations, renewable energy facilities and associated electrical infrastructure impacts to the landscape are of very limited concern and no specific indicators are required.

6. ASSESSMENT OF IMPACTS

The only aspects of heritage that require formal assessment are archaeology and the cultural landscape. Palaeontological impacts are considered in a separate specialist study. Note that the two alternatives for the switching station on the Kokerboom 3 portion of the powerline are completely equal to one another and the two pylon types are also no different to one another in terms of heritage impacts. The assessments below thus apply equally to both.

6.1. Impacts to archaeological resources

Direct impacts to archaeological resources would occur during the construction phase only. Because of the relatively low local cultural significance of the archaeological materials found, the extent of impacts is local. Total destruction would result in a potentially high intensity but, because of the corridor approach, the probability has only been rated as likely. The overall impact calculates to **moderate negative** (Table 3). Impacts to archaeological sites are generally very easy to mitigate because the sites can be excavated, sampled and recorded as required. As such, the significance rating post-mitigation becomes **minor negative**, although a rating of negligible perhaps better reflects the real situation. There are no fatal flaws.

Table 3: *Assessment of construction phase archaeological impacts.*

Project phase	**Construction**			
Impact	**Destruction of archaeological resources**			
Description of impact	**Destruction of and damage to archaeological materials during earthmoving activities**			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	**- Pre-construction survey of any hilltops or potentially sensitive to inform micro-siting and confirm whether any sites require sampling prior to construction. - Archaeological excavations, sampling and recording of sites.**			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Very limited	Limited to specific isolated parts of the site
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	**Moderate - negative**		**Minor - negative**	
Comment on significance	The significance rating is driven mostly by the fact that impacts to archaeology are permanent. The post-mitigation impact would probably be negligible.			
Cumulative impacts	Cumulative impacts are expected to be of low significance.			

6.2. Impacts to the cultural landscape

Impacts to the cultural landscape would occur during the construction and operation phase due to the introduction of incompatible structures and construction machinery to the rural landscape. Construction would not last for long (short term), however, and the structures would not be visible from a very long way off (moderate intensity). Because of this the significance calculates to **minor negative** (Table 4). The construction equipment would likely have the greatest impact. For this reason, once the powerline and switching station are established, the intensity drops. However, the duration increases to permanent and this is the main reason for the calculated operation phase impacts being **moderate negative** (Table 5). Given the other electrical infrastructure already present in the landscape a rating of minor negative is probably more appropriate. There are no fatal flaws in terms of impacts to the cultural landscape.

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

Project phase	**Construction**			
Impact	**Intrusion into the cultural landscape of incompatible structures**			
Description of impact	**Alteration of the landscape through its transformation from a rural to an industrial nature and visual disturbance from construction vehicles.**			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	**- None feasible**			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environment will be able to recover from the impact	High	The affected environment will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Minor - negative**	
Comment on significance	The minor significance is largely due to the short term of construction impacts and the fact that other similar developments already exist in the area.			
Cumulative impacts	Cumulative impacts are expected to be of low significance.			

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

Project phase	**Operation**			
Impact	**Intrusion into the cultural landscape of incompatible structures**			
Description of impact	**Alteration of the landscape through its transformation from a rural to an industrial nature.**			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	**- None feasible**			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environment will be able to recover from the impact	High	The affected environment will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Moderate - negative**		**Moderate - negative**	
Comment on significance	The main driver of significance is the long duration. An impact of minor negative is probably more accurate.			
Cumulative impacts	Cumulative impacts are expected to be of low significance.			

6.3. Existing impacts to heritage resources

There are currently no obvious threats to archaeological heritage resources on the site aside from the natural degradation, weathering and erosion that will affect archaeological materials. Trampling from grazing animals and/or farm/other vehicles could also occur. These impacts would be of **negligible negative** significance. The cultural landscape is already heavily compromised through the addition of a new electrical layer. The site is quite remote and does not have a high degree of aesthetic significance which means the existing impacts to the cultural landscape are likely to be of **minor negative** significance.

6.4. The No-Go alternative

The No-Go alternative would involve not constructing the proposed project. The effect would be that the associated Kokerboom 1, Kokerboom 2 and Kokerboom 3 WEFs, if authorised and constructed, would not be able to feed power into the national grid. While the impacts to heritage resources for the No-Go option would effectively be negligible to minor negative as per the existing impacts above, the loss of power to the grid would have socio-economic impacts for South Africa.

6.5. Cumulative impacts

Electrical projects considered in this cumulative impact assessment are listed in Appendix 2. However, non-electrical projects also affect heritage resources.

Cumulative impacts to archaeological resources are very difficult to assess accurately since it is clear from the desktop study that (1) archaeological surveys are variable in quality and/or (2) archaeological resources are extremely variably distributed on the landscape. Professional experience suggests that sites of high significance are rare and usually occur in areas avoided by developments for environmental reasons. Cumulative impacts to archaeology are thus likely to be low, especially since the survey reported here found no significant archaeology.

The cultural landscape has already been compromised by the various other electrical facilities (substations, WEFs and the Transnet Railway Line) which have effectively established this area for power generation. The addition of this new powerline will thus not have a significant cumulative impact because its contribution to the impacts will be very small.

Construction of the project will result in a cumulative benefit to South Africa through the improvement of its electricity supply.

6.6. Levels of acceptable change

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many vantage points is undesirable. Although the powerlines and switching stations have tall components, they would be seen against the various other existing facilities in the area and would thus not add new dominating features. In this context the proposed developments are acceptable.

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

Because some significant archaeological sites were found within the study area, a few conditions will need to be incorporated into the Environmental Management Program (EMPr) in order to ensure that impacts to these sites are minimised. Certain best practice measures should be incorporated. The relevant measures are as follows:

- The developer must contract an archaeologist to review the final alignment of the powerlines. Any locations that are likely to be sensitive (e.g. hilltops, pan margins) must be checked on the ground if they have not already been covered by the survey reported in the present report, to inform micro-siting and confirm if any sites require pre-construction mitigation work (i.e. sampling/ recording);
- The developer must contract an archaeologist to carry out mitigation work as required once the final alignment has been confirmed and reviewed. This must happen well in advance of construction to allow time for the permit process, actual work, and approval of the report by SAHRA;
- The environmental control officer (ECO) should ensure that all work occurs within the authorised footprints; and
- If any heritage materials (stone artefacts, pottery, fossils, human remains) are found during construction then they should be protected in place and reported to the heritage authorities and/or a heritage consultant for further action as may be required.

8. EVALUATION OF IMPACTS RELATIVE TO SUSTAINABLE SOCIAL AND ECONOMIC BENEFITS

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development. The proposed development will assist with the provision of electricity for use in South Africa. This is deemed an important function because of the historical and ongoing problems associated with South Africa's electricity supply. The construction phase for the projects will also provide an increase in jobs for the local population. None of the heritage impacts (which are of generally low significance after mitigation) is considered to be more important than these social and economic benefits.

9. CONCLUSIONS

There are no highly significant heritage concerns for this project. Some archaeological sites may require sampling and recording if impacted by the final alignment, but this is easily effected and does not influence the approval of the project. Although not alternatives, both pylon types are considered acceptable from a heritage point of view and may be used as needed. It is recommended that the final routing within the 300m wide corridor is subject to a pre-construction walkthrough by an archaeologist to inform micro-siting and undertake mitigation (sampling/ recording) if/as appropriate. The possibility still exists of avoiding some or all of the sites because micro siting can still occur. As such, no highly significant impacts are expected and there are no fatal flaws. There are no areas requiring avoidance, but obviously best practice suggests that those sites that can be avoided should be, if feasible. The single heritage indicator proposed for the project will be easily met (Table 6).

Table 6: Heritage indicators and project responses.

Indicator	Project Response
Significant archaeological sites must not be damaged or destroyed prior to appropriate archaeological interventions.	No design response possible. This indicator will be easily met during the pre-construction phase of the project.

9.1. Reasoned opinion of the specialist

Because the expected impacts to heritage resources are of low significance and can be easily mitigated, and there are social and economic benefits that would accrue through the implementation of the project, it is the opinion of the heritage specialist that the project may be authorised in full.

10. RECOMMENDATIONS

It is recommended that the proposed project should proceed but the following conditions must be included in the environmental authorisation, should one be issued:

- Any unsurveyed portions of the final alignment that cross hilltops or other potentially sensitive areas (e.g. pans, low rock outcrops) must be surveyed before construction to inform micro-siting and/or to determine pre-construction mitigation requirements (sampling/ recording) as appropriate;
- Any significant sites that might be impacted must be sampled and recorded prior to construction. This includes those at 526, 527 and 1952 if they are to be impacted; 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.

11. REFERENCES

Beaumont, P.B., Smith, A.B. & Vogel, C. 1995. Before the Einiqua: the archaeology of the frontier zone. In: Smith, A.B. (ed.) *Einiqualand: studies of the Orange River frontier*: 236–264. Cape Town: University of Cape Town Press.

Fourie, W. 2011. Concentrated solar power EIA – Kaalspruit: Heritage Impact Assessment. Unpublished report prepared for SiVEST Environmental Division. PGS Heritage & Grave Relocation Consultants.

Fourie, W. 2017a. South Africa Mainstream Renewable Power Developments (Pty) Ltd – Hartebeesleegte Wind Energy Facility: Heritage Impact Report. Unpublished report prepared for SiVEST Environmental Division. PGS Heritage & Grave Relocation Consultants.

Fourie, W. 2017b. South Africa Mainstream Renewable Power Developments (Pty) Ltd – Itemba Wind Energy Facility: Heritage Impact Report. Unpublished report prepared for SiVEST Environmental Division. PGS Heritage & Grave Relocation Consultants.

Fourie, W. 2017c. South Africa Mainstream Renewable Power Developments (Pty) Ltd – !Xhaboom Wind Energy Facility: Heritage Impact Report. Unpublished report prepared for SiVEST Environmental Division. PGS Heritage & Grave Relocation Consultants.

Fourie, W. 2017d. South Africa Mainstream Renewable Power Developments (Pty) Ltd – Ithemba Wind Energy Facility (WEF) – 132kV Grid connection and substation: Heritage Impact Report. Unpublished report prepared for SiVEST Environmental Division. PGS Heritage & Grave Relocation Consultants.

Fourie, W. 2017e. South Africa Mainstream Renewable Power Developments (Pty) Ltd – Hartebeest Leegte Wind Energy Facility (WEF) – 132kV Grid connection and substation: Heritage Impact Report. Unpublished report prepared for SiVEST Environmental Division. PGS Heritage & Grave Relocation Consultants.

Fourie, W. 2017f. South Africa Mainstream Renewable Power Developments (Pty) Ltd – Graskoppies Wind Energy Facility (WEF) – 132kV Grid connection and substation: Heritage Impact Report. Unpublished report prepared for SiVEST Environmental Division. PGS Heritage & Grave Relocation Consultants.

Henderson, Z. 2002. A dated cache of ostrich eggshells from Thomas' Farm, Northern Cape Province, South Africa. *South African Archaeological Bulletin* 57: 38–40.

Jerardino, A., Horwitz, L., Mazel, A. & Navarro, R., 2009b. Just before Van Riebeeck: glimpses into terminal LSA lifestyle at Connies Limpet Bar, West Coast of South Africa. *South African Archaeological Bulletin* 64: 75–86.

Kaplan, J. 2008. Phase 1 archaeological impact assessment the proposed upgrading and enlargement of oxidation dams erf 675 Loeriesfontein Northern Cape Province. Unpublished report prepared for Van Zyl Environmental Consultants.

Morris, D. 1994. An ostrich eggshell cache from the Vaalbos National Park, Northern Cape, South Africa. Southern African Field Archaeology 3: 55–58.

Morris, D. 1996. An Archaeological Impact Assessment at Flamink, Waterkuil, Calvinia District. Unpublished report prepared for Gypsum Industries. Kimberley: McGregor Museum.

Morris, D. 2007. Archaeological specialist input with respect to upgrading railway infrastructure on the Sishen-Saldanha ore line in the vicinity of new Loop 7a near Loeriesfontein. Unpublished report prepared for unknown client. Kimberley: McGregor Museum.

Morris, D. 2013. Khobab Wind Energy Facility: power line route options, access road and substation positions. Specialist input for the environmental Basic ASsessment and Environmental Management Programme for proposed power line options for the Loeriesfontein 1 Wind & Loeriesfontein 3 Solar Energy facility at Sous and Aan De Karee Doorn Pan, north of Loeriesfontein, Northern Cape Province: archaeology. Unpublished report prepared for Savannah Environmental. Kimberley: McGregor Museum.

Morris, D. & Von Bezing, I. 1996. The salvage of a cache of ostrich eggshell flasks near Kenhardt, Northern Cape. McGregor Miscellany 6(2): 3–4.

Orton, J. 2014. Heritage impact assessment for the proposed re-alignment of the authorised 132 kV power line for the Loeriesfontein 2 Wind Energy Facility, Calvinia Magisterial District, Northern Cape. Unpublished report prepared for Savannah Environmental (Pty) Ltd. Muizenberg: ASHA Consulting (Pty) Ltd.

Orton, J. 2017a. Heritage Impact Assessment for proposed transmission lines & associated infrastructure north of Loeriesfontein, Calvinia Magisterial District, Northern Cape. Unpublished report prepared for Aurecon South Africa (Pty) Ltd. Muizenberg: ASHA Consulting (Pty) Ltd.

Orton, J. 2017b. Heritage Impact Assessment for the proposed Kokerboom 1 Wind Energy Facility on Farm 227/Rem and Farm 1163/Rem, north of Loeriesfontein, Calvinia Magisterial District, Northern Cape. Unpublished report prepared for Aurecon South Africa (Pty) Ltd. Muizenberg: ASHA Consulting (Pty) Ltd.

Orton, J. 2017c. Heritage Impact Assessment for the proposed Kokerboom 2 Wind Energy Facility on Farm 215/Rem and Farm 1164/Rem, north of Loeriesfontein, Calvinia Magisterial District, Northern Cape. Unpublished report prepared for Aurecon South Africa (Pty) Ltd. Muizenberg: ASHA Consulting (Pty) Ltd.

Parkington, J. 2006. *Shorelines, Strandlopers and shell middens*. Cape Town: Creda Communications.

Rudner, J. & Rudner, I. 1968. Rock-art in the thirstland areas. *South African Archaeological Bulletin* 23: 75–89.

SAHRA. 2007. Minimum Standards: archaeological and palaeontological components of impact assessment reports. Document produced by the South African Heritage Resources Agency, May 2007.

Van der Walt, J. 2012. Archaeological Impact Assessment for the proposed Hantam PV solar energy facility on the farm Narosies 228, Loeriesfontein, Northern Cape Province. Unpublished report prepared for Savannah Environmental. Heritage Contracts and Archaeological Consulting cc.

Van der Walt, J. 2013. Archaeological Impact Assessment for the Mining Right Application on the Farm Dikpens 182 Portions 2 and 4 situated in the District of Calvinia (Northern Cape Province). Unpublished report prepared for Site Plan Consulting. Heritage Contracts and Archaeological Consulting cc.

Van Schalkwyk, J. 2011. Heritage impact assessment for the proposed establishment of a wind farm and PV facility by Mainstream Renewable Power in the Loeriesfontein Region, Northern Cape Province. Unpublishd report prepared for SiVEST. Monument Park: J. van Schalkwyk.

Webley, L. & Halkett, D. 2012. Heritage Impact Assessment: proposed Loeriesfontein Photo-Voltaic Solar Power Plant on portion 5 of the farm Klein Rooiberg 227, Northern Cape Province. Unpublished report prepared for Digby Wells Environmental. St James: ACO Associates cc.

APPENDIX 1 – Curriculum Vitae

Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

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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 – Projects considered in cumulative impact assessment

Development	Current status of EIA/development	Proponent	Technology	Capacity	Farm details
Dwarsrug Wind Farm	EA issued	Mainstream Renewable Power	Wind	140MW	Remainder of the Farm Brak Pan No 212
Khobab Wind Farm	Operational	Mainstream Renewable Power	Wind	140MW	Portion 2 of the Farm Sous No 226
Loeriesfontein 2 Wind Farm	Operational	Mainstream Renewable Power	Wind	140MW	Portions 1 & 2 of the Farm Aan de Karree Doorn Pan No 213
Graskoppies Wind Farm	EA Issued	Mainstream Renewable Power	Wind	235MW	Portion 2 of the Farm Graskoppies No. 176; and Portion 1 of the Farm Hartebeest Leegte No. 216.
Hartebeest Leegte Wind Farm	EA issued	Mainstream Renewable Power	Wind	235MW	Entire part of the Remainder of the Farm Hartebeest Leegte No. 216.
Xha! Boom Wind Farm	EA issued	Mainstream Renewable Power	Wind	235MW	Entire part of Portion 2 of the Farm Georg's Vley No. 217.
Ithemba Wind Farm	EA issued	Mainstream Renewable Power	Wind	235MW	Western portion of Portion 2 of the Farm Graskoppies No. 176; and Western portion of Portion 1 of the Farm Hartebeest Leegte No. 216.
Loeriesfontein PV3 Solar Energy Facility	EA issued	Mainstream Renewable Power	Solar	100MW	Portion 2 of the Farm Aan de Karree Doorn Pan No 213
Hantam PV Solar Energy Facility	EA issued	Solar Capital (Pty) Ltd	Solar	Up to 525MW	Remainder of the Farm Narosies No 228
Loeriesfontein PV Solar Power Plant	EA issued	BioTherm Energy	Solar	70MW	Portion 5 of the Farm Kleine Rooiberg No 227
Kokerboom 4 Wind Farm	Environmental Impact Assessment (EIA) underway	Business Venture Investments No. 1788 (Pty) Ltd (BVI)	Wind	240MW	Remainder of the Farm Leeuwbergrivier No. 1163; and Remainder of the Farm Kleine Rooiberg No. 227.
Kokerboom 1 Wind Farm	Environmental Impact Assessment (EIA) underway	Business Venture Investments No. 1788 (Pty) Ltd (BVI)	Wind	240MW	Remainder of the Farm Leeuwbergrivier No. 1163; and Remainder of the Farm Kleine Rooiberg No. 227.
Kokerboom 2 Wind Farm	Environmental Impact Assessment (EIA) underway	Business Venture Investments No. 1788 (Pty) Ltd (BVI)	Wind	240MW	Remainder of the Farm Leeuwbergrivier No. 1163; and Remainder of the Farm Kleine Rooiberg No. 227.

Development	Current status of EIA/development	Proponent	Technology	Capacity	Farm details
Kokerboom 3 Wind Farm	Environmental Impact Assessment (EIA) underway	Business Venture Investments No. 1788 (Pty) Ltd (BVI)	Wind	240MW	Remainder of the Farm Aan De Karree Doorn Pan No. 213; Portion 1 of the Farm Karree Doorn Pan No. 214; and Portion 2 of the Farm Karree Doorn Pan No. 214.

In addition to the above renewable energy facilities, six existing powerlines connecting to the Helios Substation have also been identified for consideration of cumulative impacts (Figure A2.1).

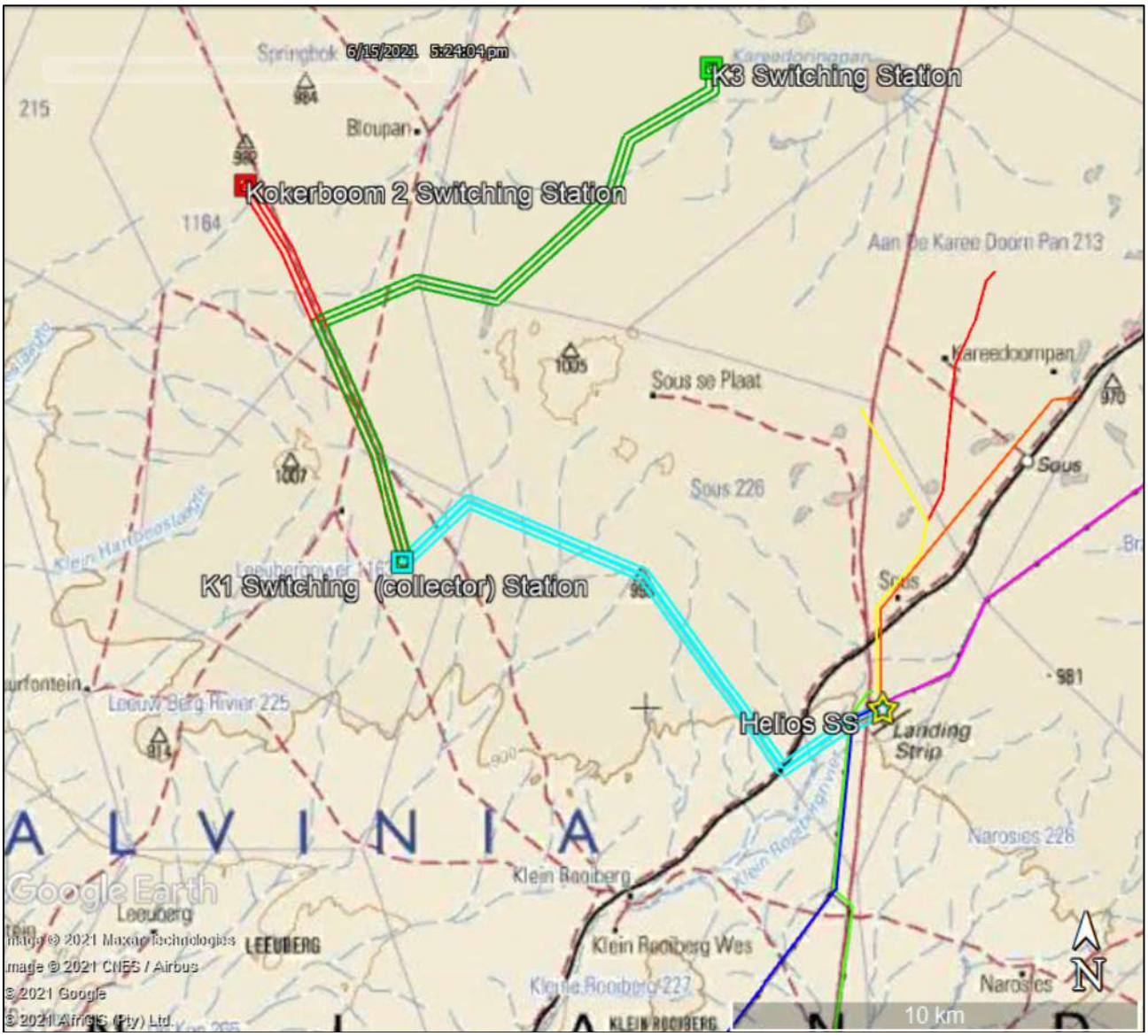


Figure A2.1: *Map showing existing powerlines in the vicinity of the study area. The red and yellow lines belong to the operational WEFs listed above.*

APPENDIX 3 – Site Sensitivity Verification

A site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area. The details of the site sensitivity verification are noted below:

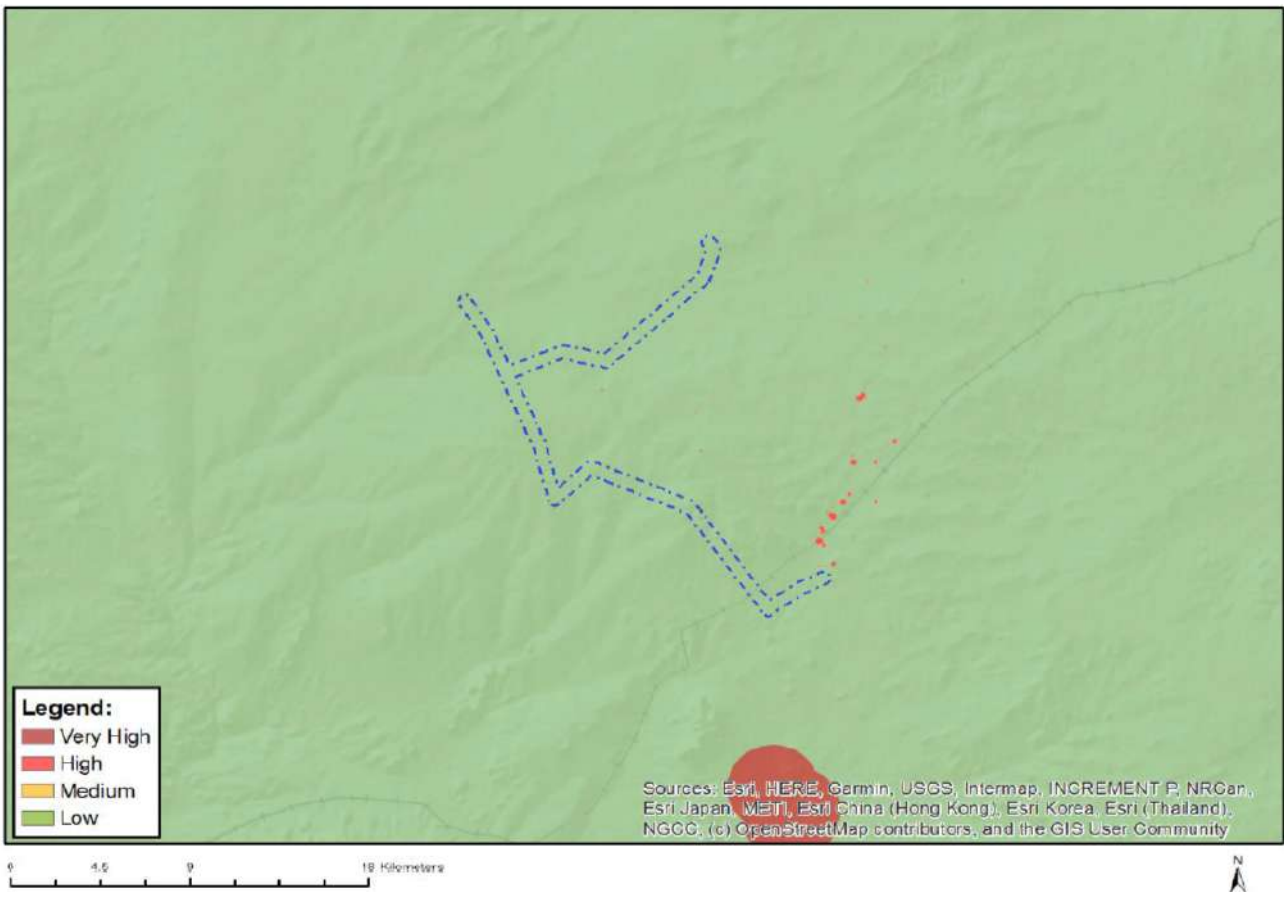
Date of Site Visit	8, 9, 10, 11, 12 and 14 June 2021
Specialist Name	Dr Jayson Orton
Professional Registration Number	ASAPA: 233; APHP: 043
Specialist Affiliation / Company	ASHA Consulting (Pty) Ltd

- Provide a description on how the site sensitivity verification was undertaken using the following means:
(a) desk top analysis, using satellite imagery;
(b) preliminary on -site inspection; and
(c) any other available and relevant information.

Initial work was carried out using satellite aerial photography in combination with the author's accumulated knowledge of the local landscape. This was used to identify areas likely to be sensitive and which needed to be targeted for survey on site. Subsequent fieldwork served to ground truth the site, including areas identified as potentially sensitive. Desktop research was also used to inform on the heritage context of the area. This information is presented in the report (Sections 5.1.1 and 5.3.1).

- Provide a description of the outcome of the site sensitivity verification in order to:
(a) confirm or dispute the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.; and
(b) include a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.

The map below is extracted from the screening tool report and shows the archaeological and heritage sensitivity to be low. The site visit showed that study area is of generally very low sensitivity but with a few small areas where archaeological sites occur being rated as of medium sensitivity. A photographic record and description of the relevant heritage resources is contained within the impact assessment report. The specialist thus largely confirms the sensitivity of the screening tool report.



Screening tool map showing the sensitivity of the study area to be low.

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

- Kokerboom 1 wind energy facility transmission line and switching station- Basic Environmental Assessment
- Kokerboom 2 wind energy facility transmission line and switching station- Basic Environmental Assessment
- Kokerboom 3 wind energy facility transmission line and switching station- Basic Environmental Assessment

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

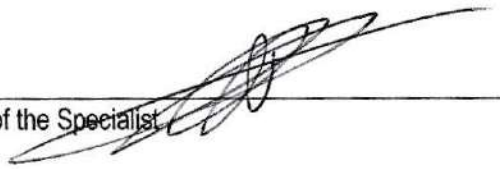
1. SPECIALIST INFORMATION

Specialist Company Name:	ASHA Consulting (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	0
Specialist name:	Dr Jayson Orton			
Specialist Qualifications:	D.Phil (Archaeology, Oxford, UK) MA (Archaeology, UCT)			
Professional affiliation/registration:	ASAPA CRM member No. 233 APHP member No. 043			
Physical address:	23 Dover Road, Muizenberg, 7945			
Postal address:	23 Dover Road, Muizenberg			
Postal code:	7945	Cell:	083 272 3225	
Telephone:	021 788 1025	Fax:	n/a	
E-mail:	jayson@asha-consulting.co.za			

2. DECLARATION BY THE SPECIALIST

I, JAYSON ORTON, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

ASHA CONSULTING (PTY) LTD

Name of Company:

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, JAYSON ORTON, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

ASHA CONSULTING (PTY) LTD

Name of Company

22-06-2021

Date

7755826.

Signature of the Commissioner of Oaths

2021-06-22.

Date

SOUTH AFRICAN POLICE SERVICE
KIRSTENHOF SAPS
2021 -06- 22
CSC
SUID-AFRIKAANSE POLISIEDIENS