THE BASIC ASSESSMENT FOR THE PROPOSED KOMAS WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR KLEINSEE IN THE NORTHERN CAPE PROVINCE.

APPENDIX C.6

Heritage Assessment (including Archaeology, Cultural Landscape and Palaeontology)





HERITAGE IMPACT ASSESSMENT: BASIC ASSESSMENT FOR THE PROPOSED KOMAS WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR KLEINSEE, NAMAKWA MAGISTERIAL DISTRICT, NORTHERN CAPE PROVINCE

SAHRA Case No.: TBC

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

Report for:

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On behalf of:

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Final report: 19th October 2020

EXECUTIVE SUMMARY

ASHA Consulting (Pty) Ltd was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed construction and operation of the Komas Wind Energy Facility (WEF) on Portion 1 of the Farm Zonnekwa 326, Portions 2, 3 and 4 of Zonnekwa 328 and Portion 4 of Kap Vley 315 near Kleinsee in the Northern Cape Province. The mid-point of the development is located at approximately S29° 50' 20" E17° 17' 40".

The proposed project would include up to 50 wind turbines along with associated roads, hardstands, offices an on-site Substation, Battery Energy Storage System (BESS), laydown area and a 132 kV power line which will be assessed as part of a separate Basic Assessment (BA) process.

The study area is an undulating, sandy coastal plain with a light vegetation covering. Dune ridges occur with deflation hollows generally located along the crests of these ridges. Infrastructure is absent aside from a few gravel roads through the area, occasional power lines and some farmsteads. The proposed site falls within a Renewable Energy Development Zone (REDZ) i.e. the Springbok REDZ (REDZ 8), but no renewable energy facilities have yet been constructed in the area.

The vast majority of impacts would occur during construction. Palaeontological resources are likely to consist of isolated bones and their locations cannot be predicted. Any fossils present could be of high significance and, if found and reported, impacts are expected to be of **low positive** significance after mitigation. This is because of the difficulty of finding fossils outside of the development context – their recovery would be a benefit to science. The region is well-known for its very high density of archaeological sites but their number and significance often decreases away from the coast. The survey revealed many small Later Stone Age archaeological sites with occasional historical artefacts also present. None of these was of high cultural significance and the WEF has avoided all known sites. Although it is possible that some sites were missed during the survey, these are likely to be less important ones and would be easily recorded during a pre-construction survey. Because of the ease with which mitigation can be effected, the impacts are expected to be of **very low negative** significance after mitigation. Although culturally important, graves are very unlikely to be impacted and their locations generally cannot be predicted. The impact significance is therefore expected to be **very low negative**. Impacts to the cultural landscape cannot be mitigated because of the size of the turbines but the expected impacts would be of **moderate negative** significance. There are no fatal flaws associated with the proposed development of the Komas WEF. Impacts during operation and decommissioning would be of equal or lesser significance. Cumulative impacts are again similar, except that cumulative impacts to archaeology are considered to be of **moderate negative** significance after mitigation, because there is the possibility that a large number of sites could be lost with extensive development of the area.

It is recommended that the proposed Komas WEF should be authorised, but subject to the following conditions which should be incorporated into the Environmental Authorisation (EA):

- A chance fossil finds procedure needs to be incorporated into the Environmental Management Programme (EMPr);
- A pre-construction survey should be commissioned to check for any remaining archaeological sites that might have been missed during the original survey. Mitigation would then be suggested if required;
- Landscape scarring must be kept to an absolute minimum; 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, i.e. Ngwao-Boswa Ya Kapa Bokoni and the South African Heritage Resources Agency (SAHRA), 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

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

Handaxe: A bifacially flaked, pointed stone tool type typical of the Early Stone Age.

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.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

CSIR: Council for Scientific and Industrial Research

CRM: Cultural Resources Management

EA: Environmental Authorisation

ECO: Environmental Control Officer

EMPR: Environmental Management Programme

ESA: Early Stone Age

GPS: global positioning system

GP: General Protection

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

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

WEF: Wind Energy Facility

Compliance with Appendix 6 of the 2014 EIA Regulations

Requirements of Appendix 6 – GN R326 (7 April 2017)	Addressed in the Specialist 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;	Section 1.4 Appendix 1
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix 2
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.3
(cA) an indication of the quality and age of base data used for the specialist report;	Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Sections 7.3, 7.1.4, 7.4
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 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;	Section 3
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying alternatives;	Section 1.1.3 & 5 [no alternatives]
g) an identification of any areas to be avoided, including buffers;	Section 11
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 11
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3.6
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 5
k) any mitigation measures for inclusion in the EMPr;	Section 9
l) any conditions for inclusion in the environmental authorisation;	Section 12
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 9
n) a reasoned opinion- i. whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity and 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;	Section 11.1 & 12
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not Applicable
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not Applicable
q) any other information requested by the competent authority.	Not Applicable
2. Where a government notice gazetted by the Minister provides for any	Part A of the Assessment

protocol of minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply	Protocols published in Government Notice No. 320 on 20 March 2020 is applicable (i.e. Site sensitivity verification requirements where a specialist assessment is required but no specific assessment protocol has been prescribed). See Appendix 3.

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1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed construction of the Komas Wind Energy Facility (WEF) on Portion 1 of the farm Zonnekwa 326, Portions 2, 3 and 4 of Zonnekwa 328 and Portion 4 of Kap Vley 315 (Figures 1 & 2). The mid-point of the development is located at approximately S29° 50’ 20” E17° 17’ 40”.

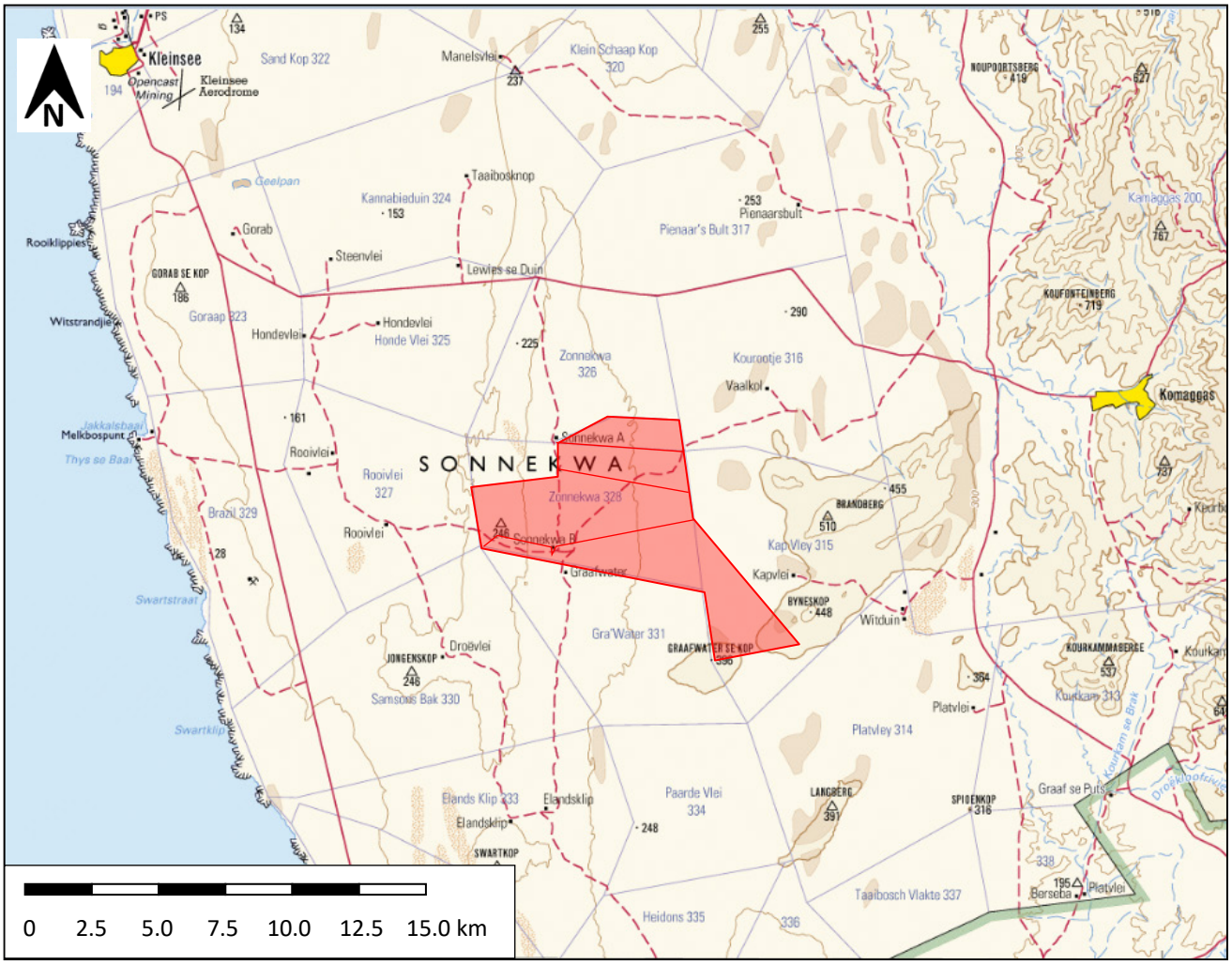

Figure 1: *Extract from 1:250 000 topographic map 2916 showing the location of the site (red polygons show the four properties). Source: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.*

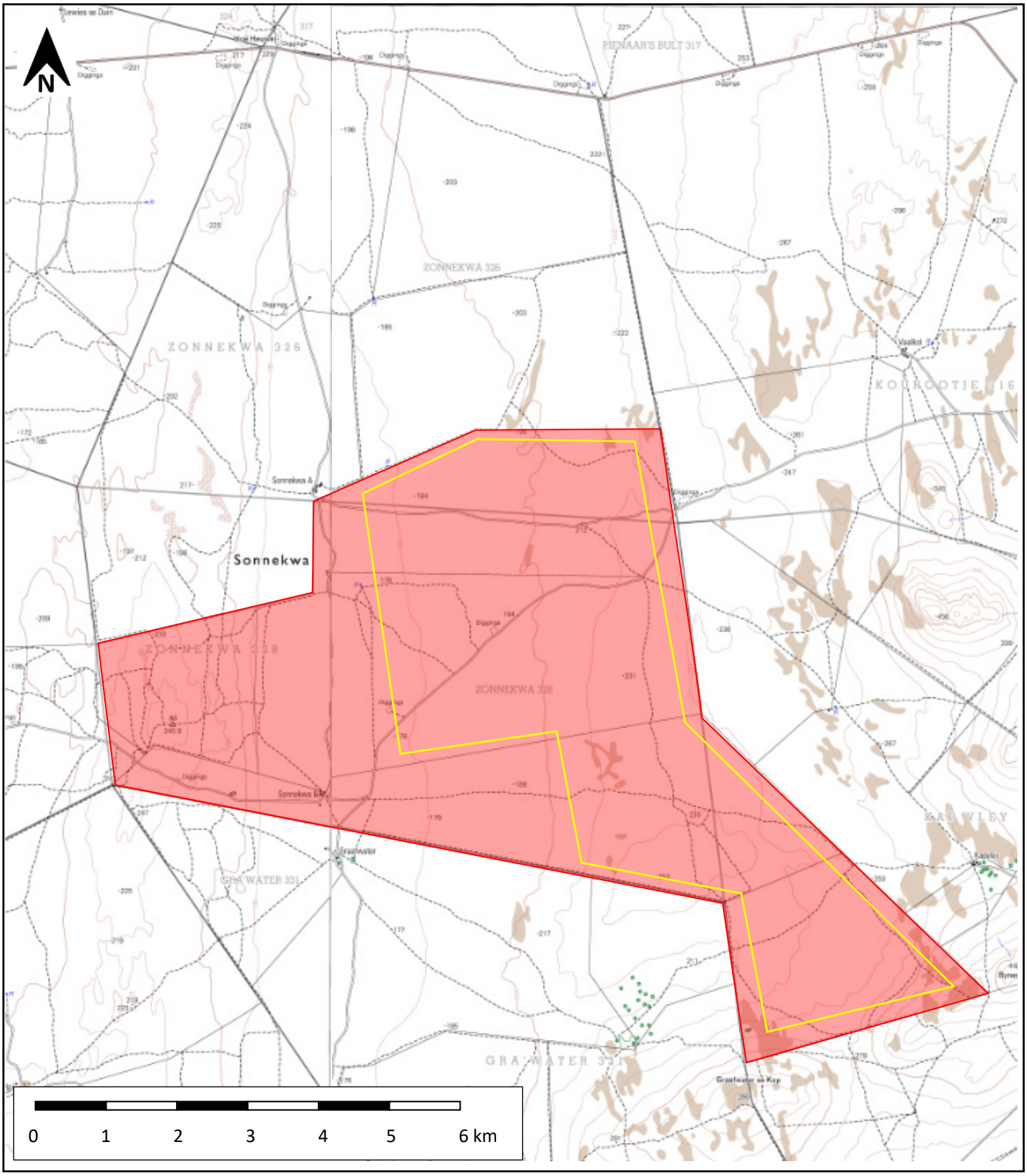

Figure 2: *Extract from 1:50 000 topographic maps 2917CC and 2917CD showing the location of the affected farm portions (red polygon) and application site (yellow polygon). Source: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.*

1.1. The proposed project

1.1.1. Project description

The proposed WEF development would be on a site measuring approximately 5 070 ha in extent and would include the following components:

- Up to 50 wind turbine generators (WTGs) with a maximum capacity of up to 300MW.
- Turbines with a hub height of up to 200m and a rotor diameter of up to 200m.
- Hardstand areas of approximately 1 500m^2 per turbine.
- Temporary construction laydown and storage area of approximately 4 500m^2 per turbine.
- Medium voltage cabling connecting the turbines will be laid underground.
- A 33/132kV on-site substation (SS) to feed electricity generated by the proposed Komas WEF into the national grid.
- A Lithium-ion Battery Energy Storage comprising of several utility scale battery modules within shipping containers or an applicable housing structure on a concrete foundation alongside the SS. BESS capacity to be up to 300MW/1200MWh and structure up to 10 m high.
- Internal roads with a width of up to 10 m providing access to each turbine, the BESS, on-site SS and laydown area. The roads will accommodate cable trenches and stormwater channels (as required) and will include turning circle/bypass areas of up to 20m at some sections during the construction phase. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
- A temporary construction laydown/staging area of approximately 4.5 hectares (ha) which will also accommodate the operation and maintenance (O&M) buildings.
- Galvanised steel fencing of up to 3 m high around the SS and buildings.

The BESS and 33/132kV on-site SS will be located within a 4ha battery and substation complex to allow for micro-siting of the BESS components and to a accommodate internal roads (as required), a temporary construction laydown area and a firebreak around the BESS footprint.

The proposed grid infrastructure including an Eskom Switching SS, 132kV gridline and collector SS (if required) will be assessed as part of a separate basic assessment (BA) process.

1.1.2. Identification of alternatives

Only one site has been selected for assessment for the WEF. The site is partially constrained by surrounding projects and is within a Renewable Energy Development Zone (REDZ). Only one technology type (onshore wind) was selected because the site is best suited to wind energy development. Only one layout is assessed, but it must be noted that this layout was revised after the specialist field surveys in order to have as little impact as possible The project site and location were screened and assessed in detail in order to develop the proposed Komas WEF. The determination of the development footprint within the sites was determined through detailed sensitivity screening which was done by the specialists on the team to identify possible areas that should be avoided by the proposed development (i.e. exclusion zones or no-go areas). These no-go areas have been excluded from the proposed development footprints. The specialist assessments

and studies have highlighted sensitive features within the original development footprint, and thus the footprint has been revised to avoid such features. Following the exclusion of the required sensitive areas, sufficient developable area is still available on the site which does not compromise the current ecological integrity of the site. There are two on-site BESS and SS complex location alternatives which have been assessed (i.e. Option 1 and Option 2). The No-Go alternative has also been assessed.

1.1.3. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant since excavations for foundations may impact on archaeological and/or palaeontological remains, while the 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 a field survey of the site and to provide heritage sensitivity mapping to aid development of a low impact project layout. ASHA was also asked to source a palaeontological specialist study for the project. All data collected from the field survey and from a desktop study were to be used in the production of a Heritage Impact Assessment (HIA) report that assessed the final project layout generated by the developer.

The specific Terms of Reference of the HIA comprise the following:

Archaeology and Cultural Landscape:

- Comply with the Assessment Protocols that were published on 20 March 2020, in Government Gazette 43110, GN 320. This specifically includes Part A, which provides the Site Sensitivity Verification Requirements where a Specialist Assessment is required but no Specific Assessment Protocol has been prescribed.
- Provide a Site Sensitivity Verification Report based on the requirements documented in the Assessment Protocols published on 20 March 2020, in Government Gazette 43110, GN 320.
- Compile a Heritage Impact Assessment in compliance with Appendix 6 of the 2014 NEMA EIA Regulations (as amended). The Specialist Assessment must also be in adherence to any additional relevant legislation and guidelines that may be deemed necessary.
- The specialist must undertake a site visit in order to identify the sensitivity and land-use of the project area, and to verify and confirm this against the findings of the National Screening Tool.
- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area. Specify set-backs or buffers, and provide clear reasons for these recommendations.
- Provide sensitivities in KMZ or similar GIS format.
- Describe and map the heritage and features of the site and surrounding area. This is to be based on desktop reviews, fieldwork, available databases, findings of the REDZ Phase 1 SEA (DEA 2015), and findings from other heritage studies in the area, where relevant. Include reference to

the grade of heritage feature and any heritage status the feature may have been awarded. The assessment must also consider the maps generated by the National Screening Tool.

- Map heritage sensitivity for the site. Clearly show any "no-go" areas in terms of heritage (i.e. "very high" sensitivity), and provide recommended buffers or set-back distances. Indicate which very high sensitivity areas are regarded as complete no-go areas.
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the full scope of heritage features, including archaeology, palaeontology and the cultural-historical landscape, as required by heritage legislation. Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology must follow that as provided by the CSIR.
- Liaise with the relevant authority (i.e. SAHRA) in order to obtain a letter of approval, comments or a Permit in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999), including Regulations issued thereunder, as applicable.
- Provide recommendations with regards to potential monitoring programmes.
- Determine mitigation and/or management measures which could be implemented to as far as possible reduce the effect of negative impacts and enhance the effect of positive impacts. Also identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This must be included in the Environmental Management Programme (EMPr).
- Incorporate and address all review comments made by the Project Team (CSIR and Project Applicant) during the various revisions of the specialist report.
- Incorporate and address all issues and concerns raised by Stakeholders, Competent Authority, I&APs and the public during the Public Participation Process (e.g. following the review of the Draft BA Report or where relevant and applicable).
- Review the Generic EMPr Substations (GN 435) and confirm if there are any specific environmental sensitivities or attributes present on the site and any resultant site specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, provide a list of these specific impact management outcomes and actions.

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 Environment, Forestry and Fisheries (DEFF) who will review the 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.

2. HERITAGE LEGISLATION

The National Heritage Resources Act (NHRA) No. 25 of 1999 protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: palaeontological, prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old;
- 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 follow:

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, Section 3(3) describes the reasons a place or object may have cultural heritage value; some of these 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 Section 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, 1998 (Act No. 107 of 1998), as amended (NEMA) the project is subject to a BAR. 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 DEFF.

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. This literature included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS). The 1:50 000 and 1:250 000 topographic maps and the historical aerial images were sourced from the Chief Directorate: National Geo-Spatial Information. Data were also collected via a field survey.

3.2. Field survey

The site was subjected to a detailed foot survey on 6th,7th, 10th and 11th January 2020. This was during summer 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.

3.3. Specialist studies

Most aspects of heritage are discussed by the present author within the HIA. However, a palaeontological specialist was commissioned to provide a separate report on the potential palaeontological impacts. This report dealt with two WEFs and two powerlines, although the four projects are all being submitted as separate Basic Assessments. This combined approach to the palaeontology is because the expected palaeontology and potential impacts are similar throughout the area. The report is contained in Appendix 4.

3.4. Impact assessment

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

3.5. Grading

Section 7 of the NHRA provides for the grading of heritage resources into those of National (Grade 1), Provincial (Grade 2) and Local (Grade 3) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade 1 and 2 resources are intended to be managed by the national and provincial heritage resources authorities, while Grade 3 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 Section7(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 GPA (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GPC (low significance, requires no further action).

3.6. Assumptions and limitations

The study is carried out at the surface only and hence any completely buried archaeological sites will not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. Due to the large size of the site it was not possible to cover the site comprehensively. Although the survey targeted areas that looked most likely to host archaeological resources, some of these may have been missed.

Cumulative impacts are assessed by adding expected impacts from this proposed development to existing and proposed developments with similar impacts in the vicinity. It is assumed that the list of projects provided for the assessment is correct.

3.7. Consultation processes undertaken

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of an EIA 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.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The site is in a rural area and is included within the Springbok REDZ 8. It is serviced only by gravel roads and infrastructure aside from farm buildings and occasional powerlines is lacking (Figure 3). The main land use in the area is small stock grazing, but along the coast to the west and northwest and along the Buffels River to the north mining for diamonds has occurred for nearly a century. The Komaggas Communal Reserve lies a short distance to the east of the study area.

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

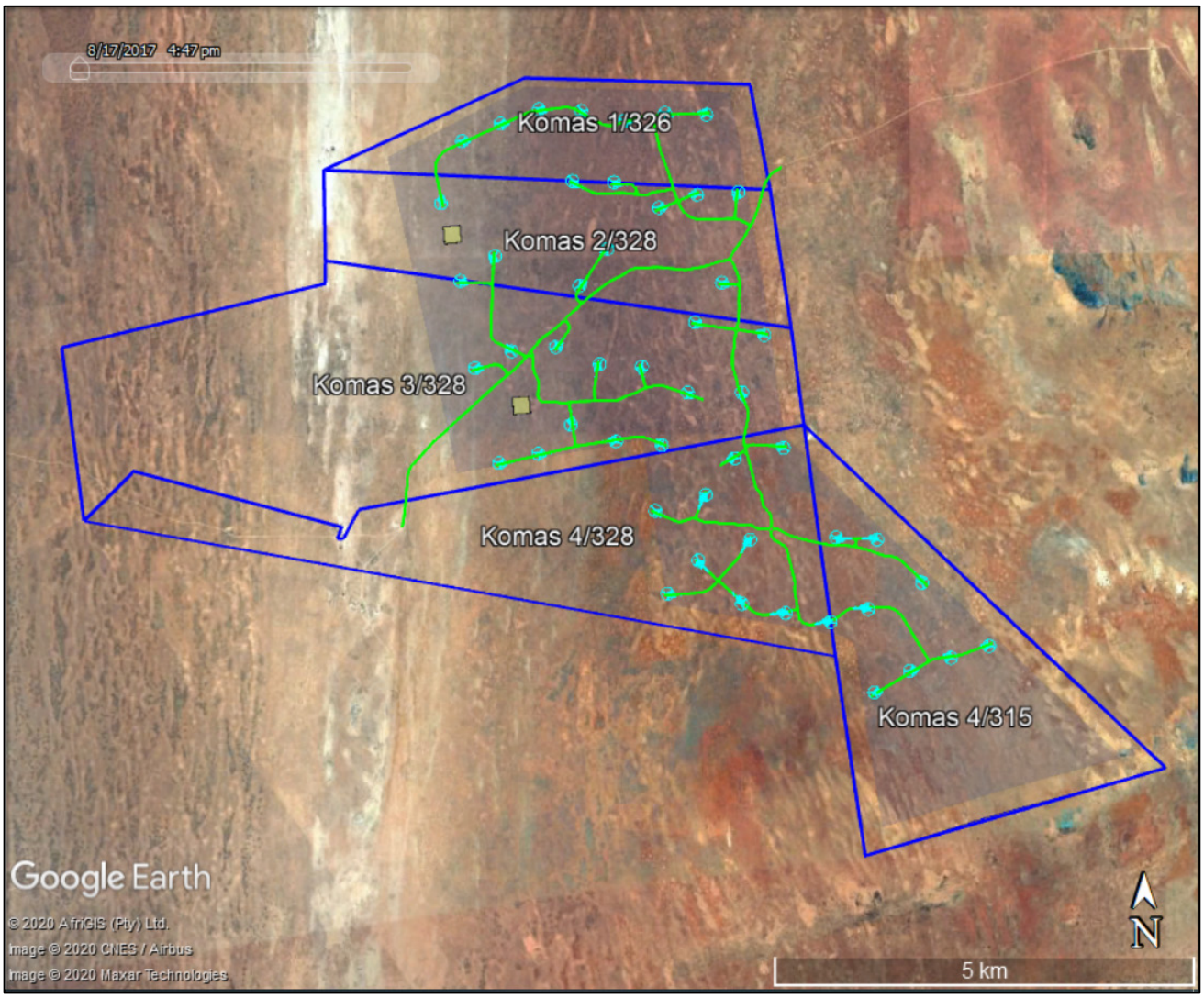

Figure 3: *Aerial view of the study area showing the farm portions (blue polygons) and wind farm study area (blue shading) within their undeveloped rural context. Project roads (green lines) and turbines (turquoise) are indicated. A gravel road is visible running through the northern part of the site from southwest to northeast and is to be upgraded as part of the proposal. Key landscape features are the elongated, pale-coloured, calcrete-floored shallow valley passing the western edge of the study area and the ridge of Byneskop and Graafwater se Kop (running parallel to the southern edge of the study area and extending out of view towards the east [just above the scale bar]).*

4.2. Site description

The study area is largely an undulating sandy plain – the Namaqualand Sandveld – but has several distinct dune ridges that run south to north, especially in the western part of the site. The dunes are covered in vegetation, but many open spaces and some deflation hollows are present. An elongated low-lying area, referred to here as the Zonnekwa Valley, runs between two of these dune ridges through the western part of the overall site but just outside the western edge of the study area. The extreme south-eastern edge of the site and study area just encroach on the (at this point) low ridge of Byneskop and Graafwater se Kop. This ridge extends north-eastwards away from the study area to eventually join the far taller Brandberg, a rocky hill that has been surmounted by wind-blown dune sand. Figures 4 to 9 show views of the study area, highlighting its features.

Figure 4: *View towards the south across the northern part of the study area showing the undulating sandy plain with a deflated area in the foreground.*

Figure 5: *View towards the southeast showing an example of a dune that has a deflation hollow on its crest.*

Figure 6: *View towards the southeast through the eastern part of the study area. The Graafwater se Kop ridge forms part of the skyline with the more distant Langberg rising behind it in mid-picture.*

Figure 7: *View towards the east showing a prominent dune with a deflation hollow on its crest. Byneskop rises in the background to the left (outside the study area).*

Figure 8: View towards the northeast from a deflation hollow on the slopes of Graafwater se Kop. Byneskop and Brandberg lie in the distance.

Figure 9: *View towards the west in the northern part of the study area showing a large dune cordon west of the site (skyline). The shallow calcrete-floored valley (arrowed) lies just below this ridge.*

5. FINDINGS OF THE HERITAGE STUDY

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

5.1. Palaeontology

Pether (2020:i) notes that "the affected surficial formations include Holocene dunes of the Hardevlei Formation and earlier late Quaternary coversands of the Koekenaap Formation. Beneath these unconsolidated sands are compact, pedogenically-altered aeolianites termed the Dorbank Formation which are fossil dune plumes of later mid-Quaternary age." Between two large dune ridges in the western part of the site (but just outside the study area) is a low-lying, calcrete-floored non-depositional area – referred to as the Zonnekwa Valley. The bedrocks (only exposed in the extreme southeast of the study area) are very altered ancient quartzites and schists of the Springbok Formation and are entirely unfossiliferous.

The aeolian formations (Hardevlei and Koekenaap) are assumed to contain the typical fossil content seen in similar deposits elsewhere. The most common fossils are related to the ambient fossil content of dune sands, i.e. land snails, tortoise shells and mole bones. The bones of larger animals (e.g. antelopes, zebra, rhinos) are sparse, but occur more often on the palaeosurfaces between the major formations where they are enclosed in palaeosols and pedocretes. They can also occur on less easily visible palaeosurfaces within formations and particularly within the dorbank. The calcrete-floored Zonnekwa Valley likely hosted pans during wetter periods and some pan deposits – or fossil bones eroded from such deposits – may still be present in places. Large caches of bones can be found in old burrows and were collected by hyaenas (Pether 2020).

Although Pether (2020) considers fossil finds to be unlikely, he does note that any finds made could be scientifically significant in the interpretation of the local geological stratigraphy.

5.2. Archaeology

5.2.1. Desktop study

Early Stone Age (ESA) materials in Namaqualand have mostly been found fairly close to the coastline and are often found in the same contexts as Middle Stone Age (MSA) artefacts. Halkett (2002) reported a large scatter of ESA artefacts from Kleinsee, while Orton and Webley (2012b) found ESA and MSA artefacts associated with fossil bones on the high ground to the north of the Buffels River, northeast of Kleinsee. Much further south, in the Western Cape, Hart and Halkett (1994) excavated an ESA sample adjacent to a quarried silcrete outcrop, while not far away Orton (2017) found extensive scatters of ESA material – including abundant handaxes – at the interface of the dorbank and aeolian cover sands. Some 20 km north of Kleinsee, Orton and Halkett (2006) described an extensive silcrete outcrop that displayed evidence of quarrying. There were scatters of ESA and MSA artefacts located across the outcrop. Further inland, to the southeast of the present study area, Morris and Webley (2004) reported scatters of ESA artefacts, including handaxes, amongst sand dunes on the coastal plain and around pans.

Middle Stone Age material is generally more commonly reported, but further inland, probably only because the landscape is less eroded and deflated there, it tends to occur as isolated artefacts or as very ephemeral scatters. To the northwest of Komaggas Dreyer (2002) reported MSA artefacts on quartzite and hornfels associated with river gravel about 1 km from the Buffels River. Van Pletzen-Vos and Rust (2011) found MSA quartz artefacts on the western and northern outskirts of Komaggas. In the Kamiesberg Mountains, Howieson's Poort-type implements belonging to the MSA were found in Keurbos Cave some 15km north-east of Garies (Webley 1992), while MSA implements were found in excavations at a small rock shelter called Wolfkraal close to Kharkams (Webley 1984). Near Garies in central Namaqualand, Webley and Halkett (2010) reported on an MSA factory site on Swartkop, an outcrop of dark, fine-grained rock which appears to have been targeted by prehistoric populations. Closer to the coast Orton and Halkett (2005) found some Howieson's Poort bifacial points associated with shell in a dunefield to the southwest of the present study area, but the relationship between the shell and artefacts might be spurious. Halkett and Hart (1997) and Jerardino *et al.* (1992) reported scatters of MSA artefacts north of Kleinsee and at the Groen River Mouth respectively.

Later Stone Age (LSA) material is regularly found throughout Namaqualand. The coastal and near-coastal areas, however, have by far the greatest number of reported sites (Dewar 2008; Orton 2012). Many thousands of shell middens and scatters occur along the coast, some of them preserving rich assemblages of cultural materials and food remains. While these focus on the area within about 2 km to 3 km of the coast, shell scatters have been found along the Buffels River up to 10 km inland (Orton & Webley 2012b) as well as immediately to the west of the present study area and some 12 km from the coastline (Orton 2019). Almost all sites are open sites with just one coastal rock shelter known to contain LSA deposits (Webley 1992. 2002). Other sites on the coastal plain are often deflation hollows of varying size (Orton 2019a, 2019b, 2019c, 2019d). Orton (own data) has observed many sites in the white dunefield known as Witduin located 5 km east of the south-eastern corner of the study area. Inland the best sites tend to be rock shelters with the majority of other sites being relatively ephemeral open artefact scatters. Most work in the inland region has been done by Webley (1986, 1992, 2007) with a focus on rock shelters. Although not common, rock art has been recorded at various locations in the central part of Namaqualand (Orton 2013; Morris & Webley 2004). Orton (2013) ascribes the geometric rock art designs to Khoekhoe herders. Southeast of the present study area, in the Namaqualand National Park, both representational and geometric rock art sites were recorded (Morris & Webley 2004).

The last 2000 years are especially important for archaeological research in Namaqualand. Archaeological sites from this period with pottery are reported from a number of sites and are believed to be associated with the introduction of herding and/or pastoralism to the region some 2000 years ago. The region is known to be important in terms of the beginnings of herding, but the details of how it happened are still highly contested (Orton 2015). The archaeology supports the historic information that pastoralist groups (the ancestors of the Little Namaqua Khoekhoen) were occupying this area at and before the time of colonial contact.

Several other surveys have been conducted away from the coastline and in close proximity to the present study area. Magoma's (2016) linear survey passing the western edge of the study area yielded only isolated artefacts, while further to the west and closer to the coast Orton and Webley (2012a) found large numbers of LSA sites spread across the landscape. To the east of the present study area, Orton (2018) found a number of LSA sites on the ridges of the inselberg formed by

Brandberg, Byneskop and Graafwater se Kop. The sites consisted only of stone artefacts. Finally, Orton's (2019c, 2019d) surveys just north and west of the study area yielded many small LSA sites with their size, density and shell content generally reducing towards the east. The sites were strongly focused on dune ridges. Figure 10 shows the distribution of archaeological sites known to the author in the vicinity of the wind farm site.

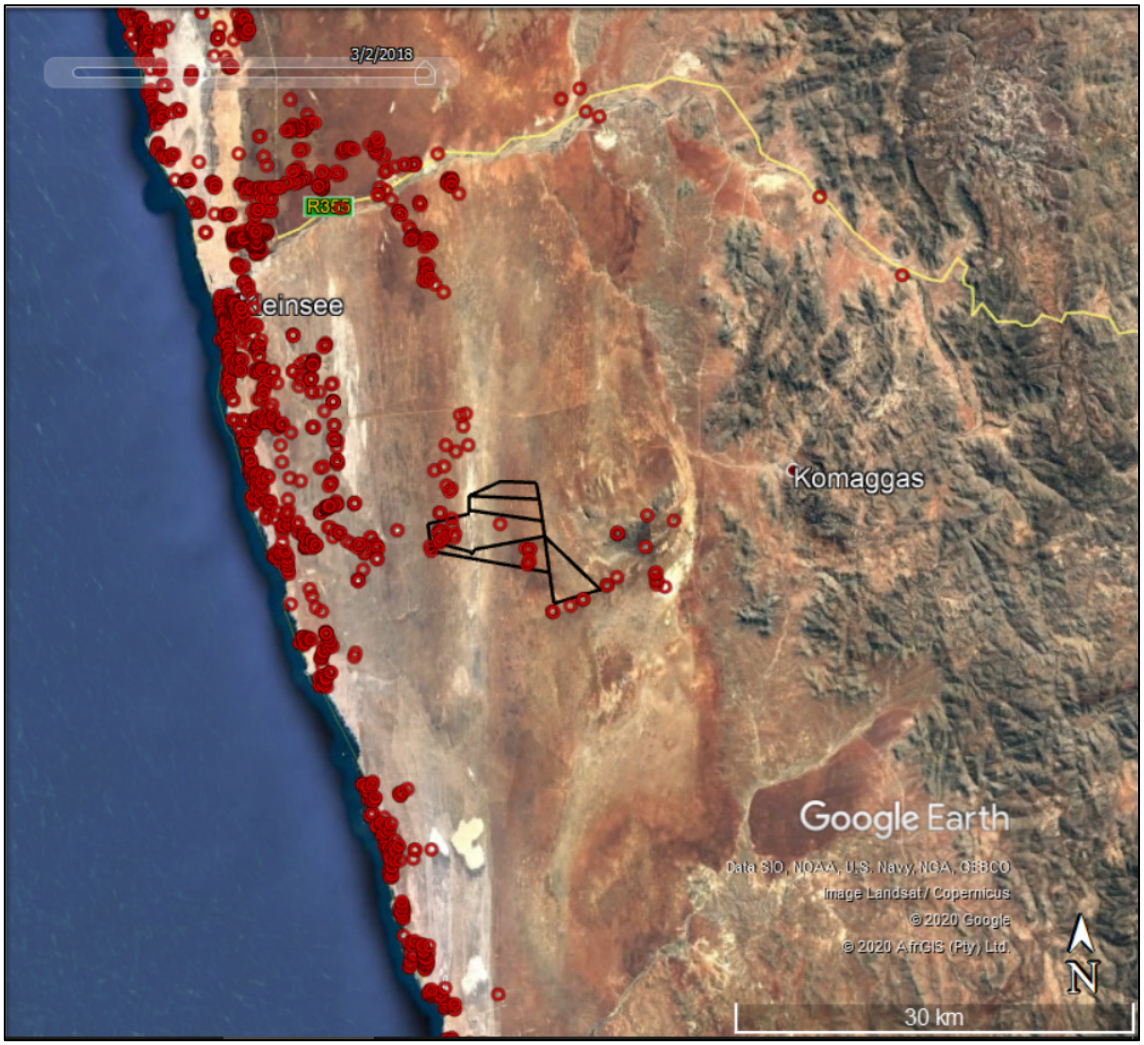

Figure 10: *Map showing the distribution of local archaeological sites known to the author. The wind farm site is shown by the black polygons.*

5.2.2. Site visit

The survey revealed many archaeological sites scattered throughout the study area but clearly located in some areas and absent from others (Figure 11). The low-lying Zonnekwa Valley lacks sites, but a few deflation hollows due occur in dunes along its eastern periphery. The vast majority of sites were located in deflation hollows or deflating areas on the crests of dunes. Table 1 lists the sites and descriptions, and illustrations of some of the sites follow.

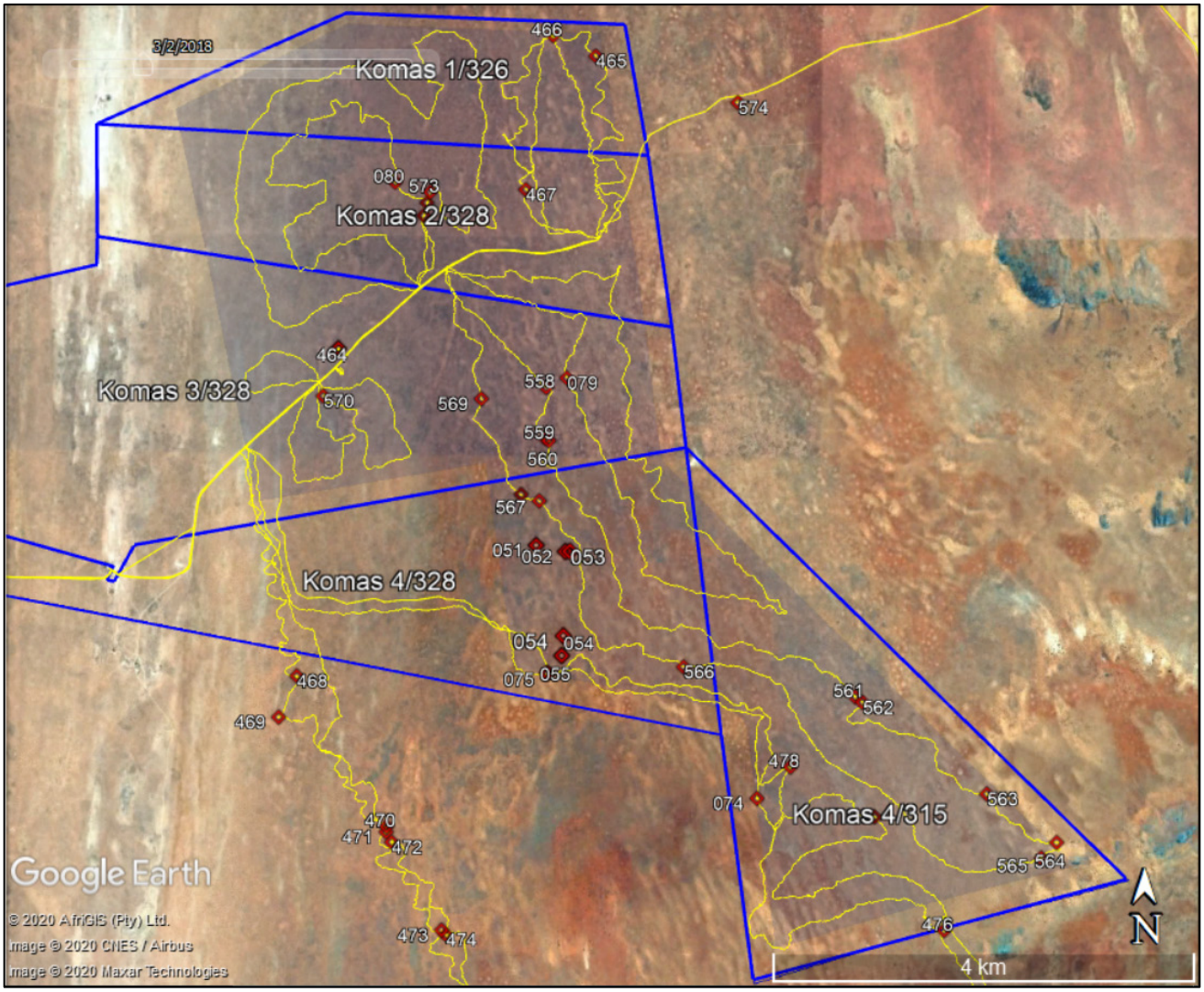

Figure 11: *Aerial view of the study area showing all sites recorded during the survey (numbered red symbols). A few sites from earlier work are also included where these fall within the present study area. The blue shaded area denotes the WEF study area, while the blue polygons are the farm portion boundaries. The yellow lines are the survey tracks.*

Table 1: *List of archaeological sites recorded during the survey (includes some sites from earlier work).*

Way point	Site name	GPS co-ordinates	Description	Significance / Grade	Mitigation requirement
051	ZN2018/014	S29 51 04.2 E17 17 28.4	A deflation hollow with a light artefact scatter in the eastern side and only very ephemeral artefacts over the rest. It has quartz and CCS artefacts. Recorded (but not reported) in 2018.	Low-medium GPB	**2 hours**
052	ZN2018/015	S29 51 06.1 E17 17 38.8	A deflation hollow with a light artefact scatter over most of its floor but one moderate density patch. It includes artefacts in quartz and CCS and also a quartzite anvil. Recorded (but not reported) in 2018.	Low-medium GPB	**2 hours**
053	ZN2018/016	S29 51 06.0 E17 17 40.5	A deflation hollow with a light artefact of quartz, CCS and quartzite as well as a grooved lower grindstone. Also some glass present. Recorded (but not reported) in 2018.	Low-medium GPB	**2 hours**
054	ZN2018/017	S29 51 32.1 E17 17 38.1	A deflation hollow with a light quartz scatter over most of its floor but with one moderate density path in the eastern side. Recorded (but not reported) in 2018.	Low-medium GPB	**2 hours**
055	ZN2018/018	S29 51 38.2 E17 17 37.5	A small deflation hollow with an ephemeral quartz scatter in it. Recorded (but not reported) in 2018.	Low GPC	---
074	KAP2020/001	S29 52 22.1 E17 18 47.1	Deflation hollow of 15 x 40 m. Light scatter of quartz flaked artefacts and quartzite manuports. Recorded (but not reported) in 2018.	Very low GPC	---
075	ZN2018/019	S29 51 43.5 E17 17 33.2	Deflation hollow of 50 x 70m. Light scatter of quartz, CCS, quartzite, 'other' faked artefacts and some quartzite manuports. There is a grooved lower grindstone with two very short grooves on one face and one very short groove on the back. Also a hammerstone/single platform core. Recorded (but not reported) in 2018.	Low-Medium GPB	**4 hours**
079	ZN2020/001	S29 50 12.5 E17 17 39.2	Deflation hollow of 15 x 20 m. Scatter of quartz and CCS flaked artefacts, ostrich eggshell and some glass.	Low GPC	---
080	ZN2020/002	S29 49 11.9 E17 16 37.8	A deflating area on a dune top with a scatter of quartz flaked artefacts and some quartzite manuports. Also a shotgun cartridge.	Very low GPC	---
464	ZN2018/013	S29 50 03.4 E17 16 17.6	Deflation hollow of 15 x 30 m. Scatter with LSA and historical materials including quartz and CCS flaked artefacts, some *Cymbula granatina* shell (minimal), ostrich eggshell, granite manuports, glass, wire, bullet cartridges and bone.	Low-Medium GPB	**4 hours**
465	ZK2020/001	S29 48 33.1 E17 17 49.4	Deflated area of 10 x 15 m on a dune ridge. Scatter of quartz and CCS flaked artefacts, quartzite manuports, ostrich eggshell and *Aulacomya ater* shell (looks quite fresh, probably just one shell and located at north end of the site). There is a brown Talana bottle on the ridge about 10 m off the site.	Low-Medium GPB	**2 hours**
466	ZK2020/002	S29 48 26.7 E17 17 34.2	Deflation hollow of 30 x 40 m. Scatter of quartz, CCS (x1), silcrete (x1) flaked artefacts, a quartzite hammerstone/upper grindstone and some quartzite manuports.	Low-Medium GPB	**2 hours**
467	ZN2020/003	S29 49 14.4 E17 17 24.5	Deflation hollow of 25 x 40 m. Light scatter of quartz, quartzite (x1) and CCS (x5) flaked artefacts. There are two subscatters: quartz in the west of the hollow and quartz and CCS in the southeast.	Low GPC	---
477	KAP2020/004	S29 52 27.1 E17 19 28.3	Two isolated potsherds on a low dune ridge.	Very low GPC	---
478	KAP2020/005	S29 52 12.1 E17 18 58.8	Small scatter of historical wine bottle fragments (x5).	Very low GPC	---
558	ZN2020/004	S29 50 15.4	Deflation hollow of 20 x 40 m. Scatter of quartz and	Low-Medium	**4 hours**

Way point	Site name	GPS co-ordinates	Description	Significance / Grade	Mitigation requirement
		E17 17 31.9	CCS flaked artefacts as well as quartzite manuports and ostrich eggshell fragments over a wide area.	GPB	
559	ZN2020/005	S29 50 31.2 E17 17 31.7	A light ostrich eggshell scatter but one fragment is burnt showing anthropogenic involvement (i.e. a camp fire).	Very low GPC	---
560	ZN2020/006	S29 50 31.9 E17 17 32.9	Deflation hollow of 20 x 40 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports, a hammer stone/upper grindstone and plenty of ostrich eggshell fragments.	Low-Medium GPB	**6 hours**
561	KAP2020/006	S29 51 50.4 E17 19 21.5	Deflation hollow of 15 x 20 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports.	Low-Medium GPB	**6 hours**
562	KAP2020/007	S29 51 52.1 E17 19 24.1	Deflation hollow of 15 x 25 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---
563	KAP2020/008	S29 52 19.6 E17 20 07.4	Deflation hollow of 20 x 25 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports.	Low-Medium GPB	**2 hours**
564	KAP2020/009	S29 52 34.1 E17 20 31.5	Deflation hollow of 40 x 80 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports. There are three clusters in the northern end of the deflation hollow with minimal artefacts in the southern end.	Low-Medium GPB	**2 hours**
565	KAP2020/010	S29 52 38.9 E17 20 26.2	Deflation hollow of 10 x 15 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---
566	ZN2020/007	S29 51 41.5 E17 18 20.8	Deflation hollow of 30 x 40 m. Scatter of quartz and CCS flaked artefacts as well as quartzite manuports.	Low-Medium GPB	**8 hours**
567	ZN2020/008	S29 50 50.5 E17 17 29.5	Deflation hollow of 15 x 15 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---
568	ZN2020/009	S29 50 48.4 E17 17 23.0	Deflation hollow of 25 x 40 m. Ephemeral scatter of quartz and CCS flaked artefacts. There are two quartzite manuports, one silcrete flake and one pot sherd just over the northern crest of the deflation hollow.	Very low GPC	---
569	ZN2020/010	S29 50 18.9 E17 17 08.8	Deflation hollow of 25 x 40 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---
570	ZN2020/011	S29 50 18.1 E17 16 12.1	Deflation hollow of 8 x 30 m. Ephemeral scatter of quartz and CCS flaked artefacts.	Very low GPC	---
571	ZN2020/012	S29 49 22.3 E17 16 48.1	Deflation hollow of 30 x 100 m. Light quartz flaked artefact scatter throughout the southern part of the deflation hollow. Also a hammer stone/upper grindstone, a lower grindstone with a groove on both sides and a piece of 'fishing club' quartzite (outcrop known to occur at the Kleinsee Angling Club). The middle part of the deflation hollow has a scatter of quartz, CCS and silcrete flaked stone artefacts.	Low-Medium GPB	**8 hours**
572	ZN2020/013	S29 49 18.3 E17 16 49.2	The northern end of the above deflation hollow has a scatter of quartz and CCS flaked stone artefacts, two quartzite lower grindstones with hollows on both sides (one on a sub-rounded block, one on a beach cobble), a hammer stone ('sausage-shaped stone') and some ostrich eggshell fragments.		
573	ZN2020/014	S29 49 15.0 E17 16 50.4	Deflation hollow of 10 x 15 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---
574	KOU2020/001	S29 48 47.7 E17 18 39.9	Deflation hollow of 15 x 10 m. Ephemeral scatter of quartz flaked artefacts.	Very low GPC	---

All the sites consisted of scatters of stone artefacts, sometimes with a few other items as well. The vast majority were LSA occurrences in deflation hollows. Figures 12 to 23 show examples of these deflation hollow sites and some of the finds they contain. None of the hollows were especially

dense (compared to deflation hollows in other areas). Aside from stone artefacts, some sites contained ostrich eggshell fragments in variable quantities. Pottery, bone and marine shells were very rare, each being recorded in only one or two instances. In places there were also some historical items such as ceramics, glass and pieces of metal (Figures 22 to 23). All of these were no older than the late 19th century and some were likely early 20th century in age and likely relate to shepherds using the landscape.

Figure 12: *A large deflation hollow at ZK2020/002 (waypoint 466) in the far north.*

Figure 13: *Marine shell fragments on the surface of ZN2018/013 (waypoint 464).*

Figure 14: *View of the dune top on which the deflation hollow at ZN2020/004 (waypoint 558) lies.*

Figure 15: *The surface of the ZN2020/004 (waypoint 558) deflation showing flaked stone artefacts and ostrich eggshell fragments.*

Figure 16: *The deflation hollow at ZN2020/006 (waypoint 560).*

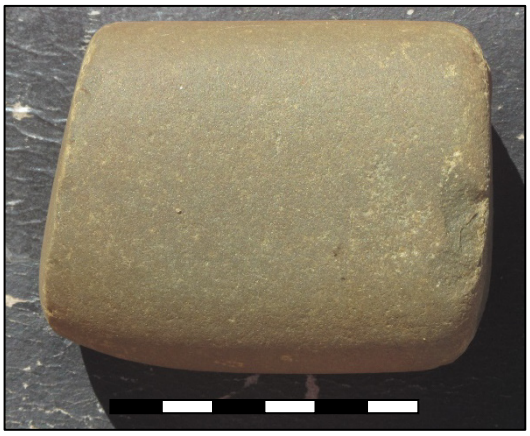

Figure 17: *A hammerstone/upper grindstone with very heavily worn ends from ZN2020/006 (waypoint 560). Scale in cm.*

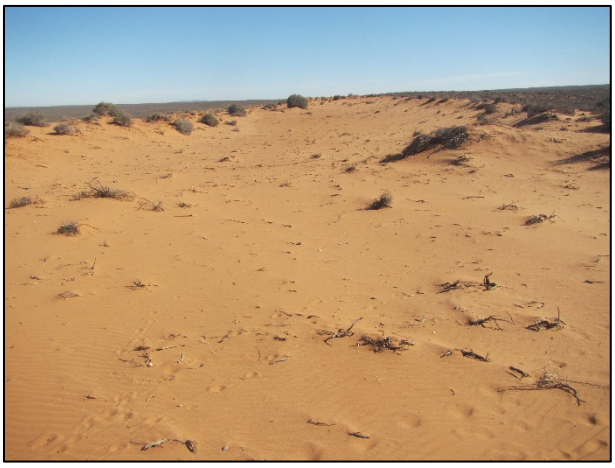

Figure 18: *The deflation hollow at ZN2020/012 (waypoint 571) which contained multiple components.*

Figure 19: *One face of a broken lower grindstone with a prominent groove on it. The reverse face has a shallower groove. Scale in cm.*

Figure 20: *Lower grindstone with two grooves on one face and another on the opposite face from ZN2018/019 (waypoint 075).*

Figure 21: *Two small pot sherds from KAP2020/004 (waypoint 477). Scale in cm.*

Figure 22: *Historical wine bottle fragments from KAP2020/005 (waypoint 478). Scale in cm.*

Figure 23: *Isolated glass medicine bottle from the southern part of the study area.*

5.3. Graves

No graves were seen anywhere in the study area but a single modern grave is known to occur just outside the study area near its north-western corner. It is not a heritage resource. Unmarked precolonial graves can occur almost anywhere and their locations cannot be predicted.

5.4. Historical aspects and the Built environment

5.4.1. Desktop study

Namaqualand is quite remote, poorly watered and relatively unproductive from an agricultural point of view. As a result, it does not have as deep a history as many other parts of South Africa. Although the little settlement of Grootmis just inland of Kleinsee and the mission station at Komaggas date back into the 19th century, the larger towns of Kleinsee and Koingnaas – both originally developed as 'company towns' – relate to 20th century diamond mining.

Grootmis was historically important because it had water. An annotation on a 1907 British Military map states that Grootmis had an unlimited water supply (Source: Pietermaritzburg Archives). The very large number of shell scatters found in the area by Orton and Webley (2012b) suggests that this water source had been available for some time. It probably stopped yielding water when De Beers dammed the river and commenced with the abstraction of water.

Komaggas (Camaggas) is first mentioned by Gordon in 1779. Komaggas (the farm is spelled Kamaggas, a form that also appears on some early maps) received a Certificate of Occupation on 9 November 1843, granting the Cloete family the right of occupation on the land.

There are various oral accounts of the relationship between Ryk Jasper Cloete and the Nama kaptein kXurib who used the Komaggas Fountain as his main water source. Bregman (2010) suggests that Cloete acquired the land through his marriage to the kaptein's daughter. Jasper Cloete utilised land up to the Orange River to graze his stock. A mission station of the London Missionary Society (LMS) was set up at Komaggas in 1829 and the farm was surveyed in 1831. It became a station of the Rhenish Missionary Society in 1843 and then the N.G. Church from 1936 (Raper n.d.).

Bregman (2010) provides a list of the farms surrounding and in the vicinity of Komaggas, including the date that they were first registered. Farms to the west of Komaggas were granted to colonists under quitrent title only after 1855. Mining companies were seeking land in the area because of the commencement of copper mining. Closer to the coast, the dry plains between the Swartlintjies and Buffels Rivers were left open as Crown Land – this is the zone in which the present study area lies. Despite the increasing private ownership of farms in the area over time, herders from Komaggas were still able to access grazing lands outside of the reserve because the farms were not completely fenced and access was gained at certain places. However, they had no formal title to the land.

In 1925 diamonds were discovered on the farm Oubeep, south of Port Nolloth, and in 1926 at Kleyne Zee, both by Jack Carstens. Mining commenced at the latter in 1927 and the town of Kleinsee was soon established (Rebelo 2003). Much of the coastline was then bought up for diamond mining and access for grazing was closed.

5.4.2. Site visit

The site visit showed the site to be in a very remote area with little infrastructure. The study area lacks any sign of development aside from the gravel road passing through its northern part, although some recent/historical materials (see above) did betray a historical presence on the land. Four farmsteads occur in the vicinity, but none are within the study area. One lies just outside the site (700 m from the edge of the study area) to the northwest, two lie to the west of the study area (1.5 and 1.9 km from the study area) with one of these being inside the site and the last is east of the site some 1.5 km outside the study area. They have been considered during other assessments and, while some structures have been found from aerial photography to be greater than 60 years of age, it is clear that none of them are of much heritage significance (Orton 2019c, 2019d). Two are shown in Figures 24 and 25.

Figure 24: *Farm house on Farm 128/4 to the west of the site (photographed in 2018).*

Figure 25: *One of the houses on Farm 326/0 to the northwest of the site (photographed in 2018).*

About 9 km and more to the east of the site, many small stock posts occur in the Komaggas Reserve. They generally have temporary structures, and sometimes caravans, as well as wire stock pens. Although these sites are modern, they are reminders of an important historical way of life practised by local Nama herders for at least the last two centuries since missionaries encouraged settlement. This effectively makes the Komaggas Reserve a living heritage site. Prior to this, the people would have been far more mobile and would likely have moved over greater distances.

5.5. Cultural landscapes and scenic routes

The site is situated in a remote location and, being only very minimally developed, the cultural landscape is largely considered a natural landscape rather than a rural one. The exception, of course, is the mining landscape located along the coast where the human imprint is far greater. Natural heritage also requires consideration because of the visual amenity provided by aesthetically pleasing landscapes. Aside from rare structures, the only other anthropogenic features on the landscape are farm tracks/roads and fences, along with occasional borrows pits alongside the larger gravel roads. The landscape conveys a sense of remoteness and inhospitability that is a result of the very frequent strong winds, the low scrubby vegetation and seemingly endless sand flats and dunes. While most of the broader landscape is fairly flat with the tallest anthropogenic features being wind pumps (aside from the mine dumps further afield), inselbergs occur to the east and southeast of the site forming a long ridge (the southern limit of the project will be about 1.8 km from this ridge). Another prominent inselberg (Langberg) lies several kilometres to the southeast. The escarpment edge lies further to the east with these inselbergs effectively being outlying hills at the base of the escarpment.

The archaeological cultural landscape should also be considered, although it is not typically visible to the lay person. This cultural landscape consists of a multitude of individual archaeological sites classifiable as a Type 3 precolonial cultural landscape (Orton 2016). Figure 26 shows another view of Figure 13 but with the newly reported sites (identified during the site visit) added onto it. It is clear that with wider survey this landscape would be shown to host many more sites, although densities would naturally reduce away from the sea. The obvious exception here is Witduin 6 km to

the east which, because of its water supply, contains an extremely high density of archaeological sites.

It is important to note that the study area lies within a REDZ and that renewable energy facilities are therefore expected to be focussed in this area. A number of renewable energy facilities are proposed and authorised within 50 km of the proposed Komas WEF site (see the list of projects in Table 6 and Figure 28 of the cumulative impact section) and with construction, would add a new 'layer' to the cultural landscape which will intensify the presence of industry and infrastructure development in the area. Also, the 400 kV Eskom power line has been authorised and will be constructed in the near future.

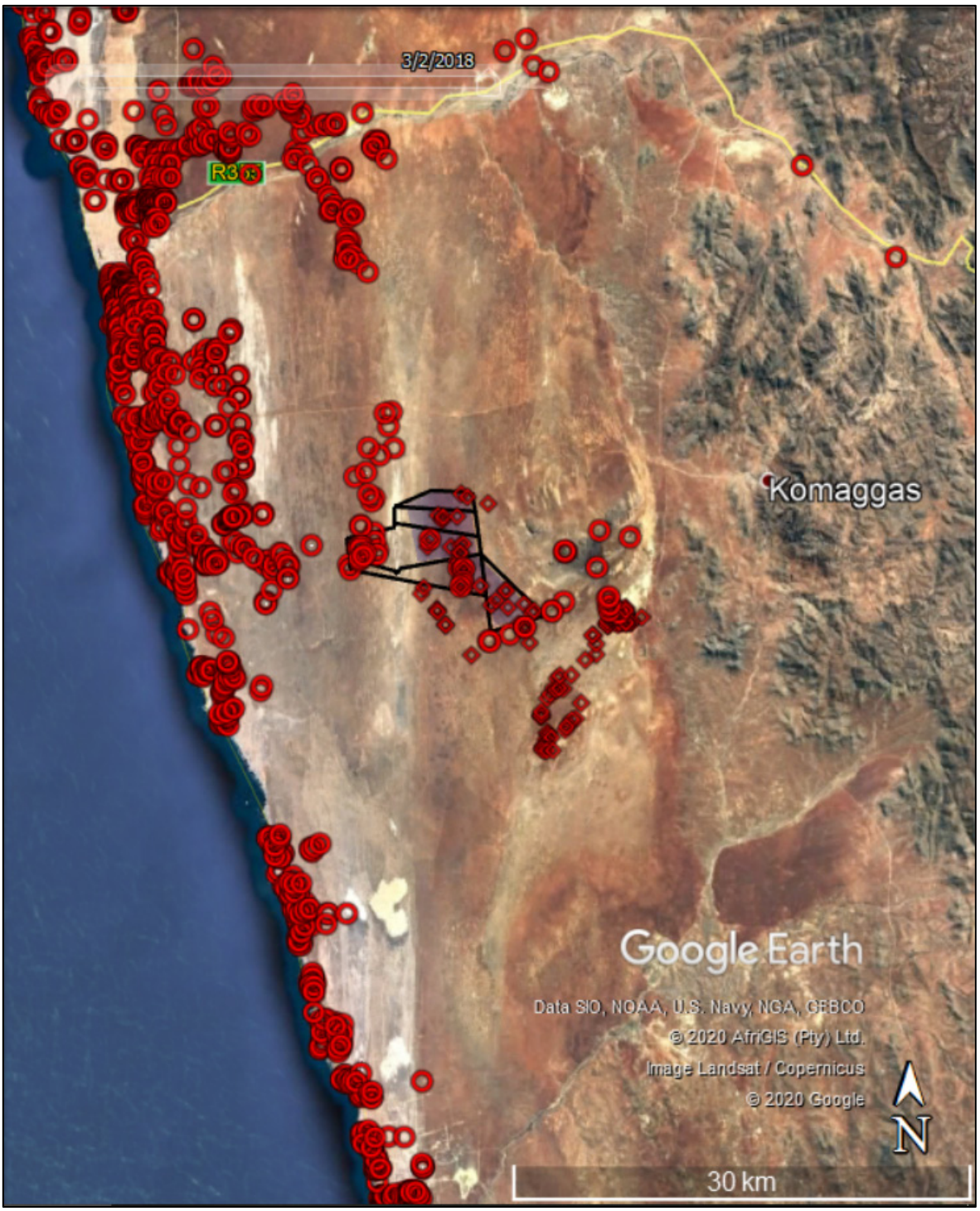

Figure 26: *Aerial view of the study area and wider surroundings showing previously known archaeological resources (red circles) as well as those discovered during the survey (including finds in another wind farm site and the power line corridor which will be reported on separately).*

5.6. 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 Section 3(3) of the NHRA (see Section 2 above).

Any fossil bones found would have high cultural significance for their scientific value and would be rated as 'GPA' resources.

The archaeological resources on site are deemed to have low-medium cultural significance for their scientific value. Those more important sites are assigned a field rating of 'GPB', but many others are considered to be 'GPC'. No archaeological sites were rated 'GPA'.

Graves (older than 60 years) are deemed to have high cultural significance for their social value but none are yet known from the study area. They would be allocated a rating of IIIA.

The built environment is deemed to be of low cultural significance for its architectural, historical and social values.

The historical/recent cultural landscape is deemed to have low-medium cultural significance for its aesthetic value but the archaeological cultural landscape is of medium significance for its scientific value and could be assigned a field rating of IIIB.

Heritage resources are mapped by grade in Figure 27.

5.7. Summary of heritage indicators

Palaeontological resources may be present beneath the surface anywhere in the study area. Although accidental impacts cannot be avoided, the chance finding of any fossil bones should be reported so that further actions can be taken if required and so minimise the intensity of the impact.

- Indicator: The intensity of impacts to palaeontological resources should be minimised.

Archaeological materials are widespread across the study area but many are of low significance. Impacts can be readily avoided due to the ease with which sites can be located at the surface.

- Indicator: Impacts to significant archaeological resources should be minimised.

Although the cultural landscape is generally not of very high significance, impacts to the landscape should be minimised where possible. Because turbines cannot be hidden, the reduction of landscape scarring at ground level becomes the most important aspect of this.

- Indicator: Landscape scarring should be minimised through disturbance of the minimum required footprint.

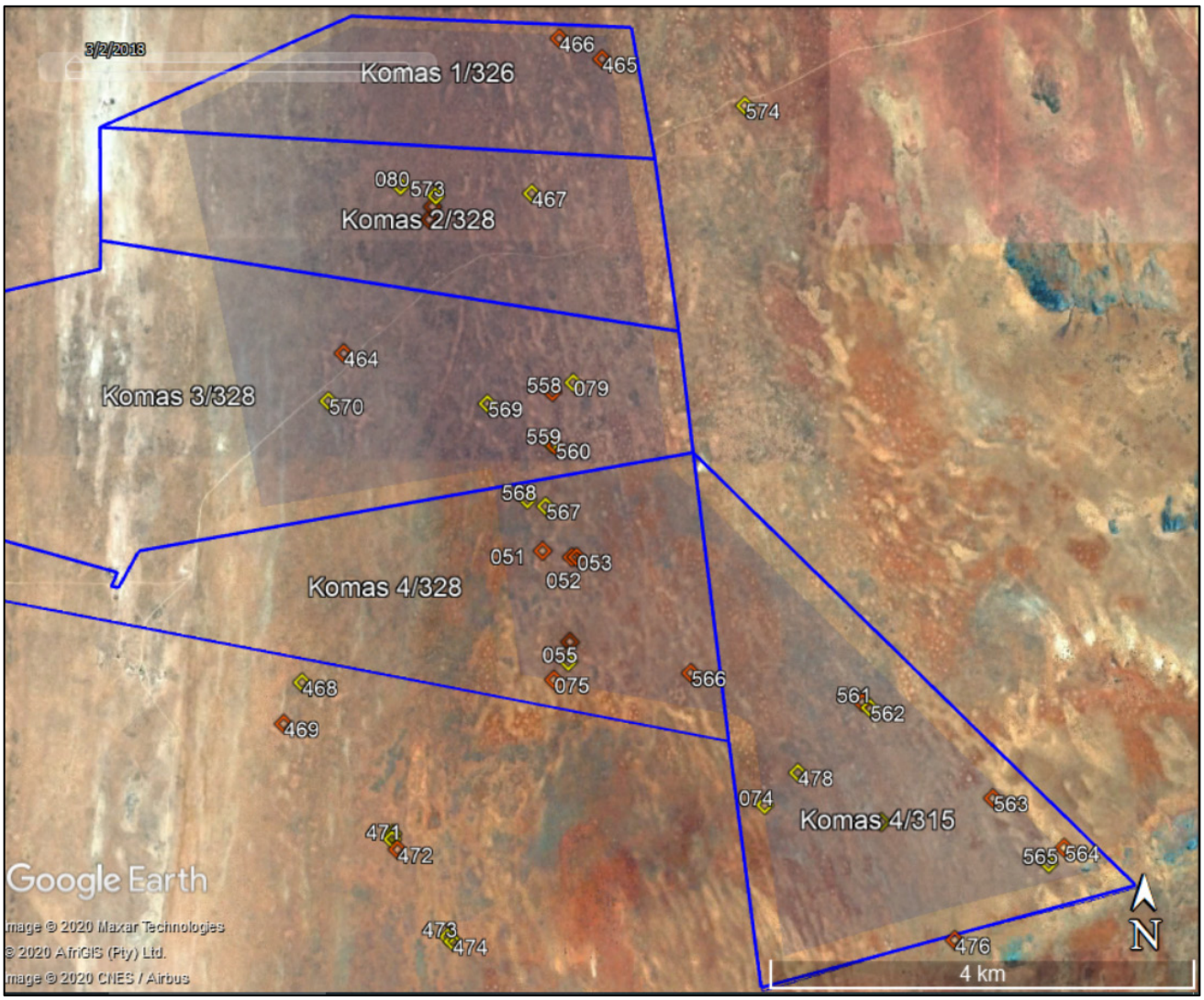

Figure 27: *Aerial view of the Komas WEF study area showing the distribution of archaeological sites by grade. Orange = GPB, yellow = GPC. Note that buffers are not shown as they would be hidden by the symbols and numbers.*

6. ISSUES, RISKS AND IMPACTS

6.1. Summary of issues identified

The potential heritage issues identified include:

- The damage and/or destruction of fossil bones;
- The damage and/or destruction of archaeological sites;
- The damage and/or destruction of graves; and
- Impacts to the cultural landscape.

No specific consultation has been undertaken in the preparation of this report.

6.2. Identification of potential impacts/risks

The potential impacts identified during the assessment are:

Construction Phase

- Impacts to palaeontology;
- Impacts to archaeology;
- Impacts to graves; and
- Impacts to the cultural landscape.

Operational Phase

- Impacts to the cultural landscape.

Decommissioning Phase

- Impacts to the cultural landscape.

Cumulative impacts

- Impacts to palaeontology;
- Impacts to archaeology; and
- Impacts to the cultural landscape.

7. IMPACT ASSESSMENT

Please note that the only alternatives provided for assessment are the two on-site BESS and on-site SS complex locations. No heritage impacts are expected at either location and the assessments below thus apply equally to either the Option 1 or Option 2 BESS and on-site SS complex location alternative. There is no preference between Option 1 and Option 2, and therefore both alternatives are acceptable from a heritage perspective.

7.1. Direct Impacts

7.1.1. Construction Phase

Impacts to palaeontology

Impacts to palaeontological resources would occur as a result of earthmoving and excavations for roads, foundations and electrical cables. Fossils can be moved from their original contexts and can be damaged or destroyed. Their context is often as important as the bones themselves. Because fossils are expected to be very sparsely distributed in the ground with a very low probability of impacts actually occurring, the impacts are only expected to be of **low negative** significance. If fossil bones are successfully spotted, reported and studied they would make a positive contribution to science. Nevertheless, because of the difficulty of spotting bones, it is still expected that most fossils would not be seen during excavation and with even a few being found the post-mitigation significance is expected to be **low positive** (Table 2).

Impacts to archaeology

Impacts to archaeological resources on site would occur as a result of earthmoving and excavations for roads, foundations and electrical cables. Archaeological sites and the materials they contain can be damaged or destroyed. Because the distribution of most archaeological sites is known and all these have been avoided by the proposed facility layout (two buffers have been slightly transgressed by WEF roads), the impacts are only expected to be of **low negative** significance. It is still possible that some sites might have been missed but these are likely to be less important ones. A pre-construction survey will be required to locate these sites and mitigation measures will need to be proposed and effected where necessary. If this is successfully carried out, the post-mitigation significance is expected to be **very low negative** (Table 2).

Impacts to graves

Impacts to graves would occur as a result of earthmoving and excavations for roads, foundations and electrical cables. Graves can be damaged or destroyed. Although the distribution of graves can never be determined from the surface, the probability of graves being present and impacted is so small that the impact significance is expected to be **very low negative**. If graves are found, reported and rescued then the impacts would still be **very low negative** significance (Table 2).

Impacts to the cultural landscape

The cultural landscape would be impacted through the introduction of incompatible elements and construction activity. Wind turbines are industrial-type structures which contrast strongly with the remote, rural/natural setting of the study area. It is noted, however, that the area does fall within the Springbok REDZ 8 which means that, although no WEFs have yet been built, such impacts are to be expected in the future. Nevertheless, the impacts to the landscape are considered to be of **moderate negative** significance. It is not possible to hide or screen such large structures which means that no mitigation measures will ever reduce the significance of the impacts. Mitigation measures should aim to reduce the amount of land that gets disturbed and scarred because in this dry climate rehabilitation will be slow. The post-mitigation significance will remain at the **moderate negative** level (Table 2).

7.1.2. Operation Phase

Impacts to the cultural landscape

The presence of the large turbines in the landscape would continue to provide visual impacts that cannot be mitigated. However, once all the construction activity is over and the facility is in operation the impacts will likely be of **low negative** significance. No mitigation measures are applicable to the operation phase and the significance thus remains **low negative** (Table 3).

7.1.3. Decommissioning Phase

Impacts to the cultural landscape

During this phase the impacts would be very similar to the construction phase impacts and would be as a result of both the wind turbines and the construction equipment on site to decommission the facility. The significance of impacts would likely be **moderate negative**. Once more, impacts cannot be mitigated to the degree that their significance will be reduced. Nevertheless, mitigation should aim to ensure the best possible rehabilitation of the site in order to reduce long term landscape scarring. The significance of impacts post mitigation would still be **moderate negative** (Table 4).

7.1.4. Cumulative Impacts

Several other renewable energy facilities (nine WEFs and two solar PV) have been proposed in the surrounding area (Figure 28 & Table 6). Although this may mean that more impacts to palaeontology and archaeology are anticipated, there is also the likelihood that there will be a gain in terms of the state of knowledge of these disciplines if mitigation measures are successfully applied. The nature and expected sparse distribution of palaeontological heritage resources is expected to be fairly consistent across the wider area and the same mitigation is required throughout (i.e. application of a chance finds procedure). For archaeology, there is also consistency in the nature of sites but the density increases on dune ridges located closer to the sea. Once more, mitigation measures are the same throughout (i.e. pre-construction survey with excavation of any significant sites still found to be within the final construction footprint. The significance of impacts is expected to be the same as that for the construction phase with a **low positive** impact to palaeontology and a **very low negative** impact to archaeology. Once more, because of the very sparse distribution of graves in the wider landscape, the impacts are expected to be **very low negative**. Impacts to the landscape would increase slightly as a result of multiple WEFs being constructed in the area. It is likely that the cumulative impacts to the landscape would be at least **moderate negative** through all phases of the development. There are no feasible mitigation measures to reduce impacts to the landscape.

7.2. The No-Go alternative

The No-Go option would entail the site staying as it currently is. This means its continued use for small stock grazing and the continued natural erosion, weathering and trampling by animals. Palaeontological resources would not likely be affected because significant fossils will remain buried, but archaeological materials would suffer very minimal impacts. The landscape would remain unchanged. Overall, the significance of impacts related to the no-go option is considered to be **very low negative**.

7.3. Existing impacts to heritage resources

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering, erosion and trampling that will affect fossils and archaeological materials.

7.4. 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. Because of the height of the majority of the proposed Komas WEF development, such an impact is unavoidable but can be tolerated because it is reversible. However, it is noted that the site falls within a REDZ which will help to protect other areas from such visual intrusions and that much landscape scarring has already occurred in the past to the north and northwest through mining.

Table 2: *Impact assessment summary table – Construction Phase direct impacts.*

Aspect/ Impact pathway	Nature of potential impact/risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Potential mitigation measures	Significance of impact/risk = consequence x probability		Ranking of residual impact/risk	Confidence level
										Without mitigation /management	With mitigation /management (residual risk/impact)		
CONSTRUCTION PHASE													
Clearing of site and excavation of foundations and trenches and contextual/visual impacts	**Loss of palaeontological resources**	Negative	Local	Permanent	Moderate	Unlikely	Non-reversible (fossils cannot be recreated)	High	Monitoring, inspection, sampling, curation as required	Low -	Low +	4	High
	Loss of archaeological resources on site	Negative	Site	Permanent	Moderate	Unlikely	Non-reversible (archaeological resources cannot be recreated)	High	Pre-construction survey, sampling and curation as required	Low -	Very low -	5	High
	Loss of graves	Negative	Site	Permanent	Extreme	Extremely unlikely	Non-reversible (graves cannot be recreated)	High	Protect and report graves found during construction so they can be rescued.	Very low -	Very low -	5	High
	Impacts to the cultural landscape	Negative	Local	Medium term	Substantial	Very Likely	Moderate (landscape can be rehabilitated but scars will remain long term)	Low	Minimise area disturbed	Moderate -	Moderate -	3	High

Table 3: *Impact assessment summary table – Operation Phase direct impacts.*

Aspect/ Impact pathway	Nature of potential impact/risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Potential mitigation measures	Significance of impact/risk = consequence x probability		Ranking of residual impact/risk	Confidence level
										Without mitigation /management	With mitigation /management (residual risk/impact)		
OPERATION PHASE													
Contextual/visual impacts	**Impacts to the cultural landscape**	Negative	Local	Long term	Moderate	Very Likely	Moderate (landscape can be rehabilitated but scars will remain long term)	Low	None	Low -	Low-	4	High

Table 4: *Impact assessment summary table – Decommissioning Phase direct impacts.*

Aspect/ Impact pathway	Nature of potential impact/risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Potential mitigation measures	Significance of impact/risk = consequence x probability		Ranking of residual impact/risk	Confidence level
										Without mitigation /management	With mitigation /management (residual risk/impact)		
DECOMMISSIONING PHASE													
Contextual/visual impacts	**Impacts to the cultural landscape**	Negative	Local	Medium term	Substantial	Very Likely	Moderate (landscape can be rehabilitated but scars will remain long term)	Low	Minimise area disturbed	Moderate -	Moderate -	3	High

Table 5: *Impact assessment summary table – Cumulative impacts*

Aspect/ Impact pathway	Nature of potential impact/risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Potential mitigation measures	Significance of impact/risk = consequence x probability		Ranking of residual impact/risk	Confidence level
										Without mitigation /management	With mitigation /management (residual risk/impact)		
CONSTRUCTION PHASE													
Clearing of site and excavation of foundations and trenches and contextual/visual impacts	**Loss of palaeontological resources**	Negative	Local	Permanent	Moderate	Unlikely	Non-reversible (fossils cannot be recreated)	High	Monitoring, inspection, sampling, curation as required.	Low -	Low +	4	High
	Loss of archaeological resources	Negative	Site	Permanent	Substantial	Unlikely	Non-reversible (archaeological resources cannot be recreated)	High	Pre-construction survey, sampling and curation as required.	Moderate -	Very low -	5	High
	Loss of graves	Negative	Site	Permanent	Extreme	Extremely unlikely	Non-reversible (graves cannot be recreated)	High	Protect and report graves found during construction so they can be rescued.	Very low -	Very low -	5	High
	Impacts to the cultural landscape	Negative	Local	Medium term	Substantial	Very Likely	Moderate (landscape can be rehabilitated but scars will remain long term)	Low	Minimise area disturbed.	Moderate -	Moderate -	3	High

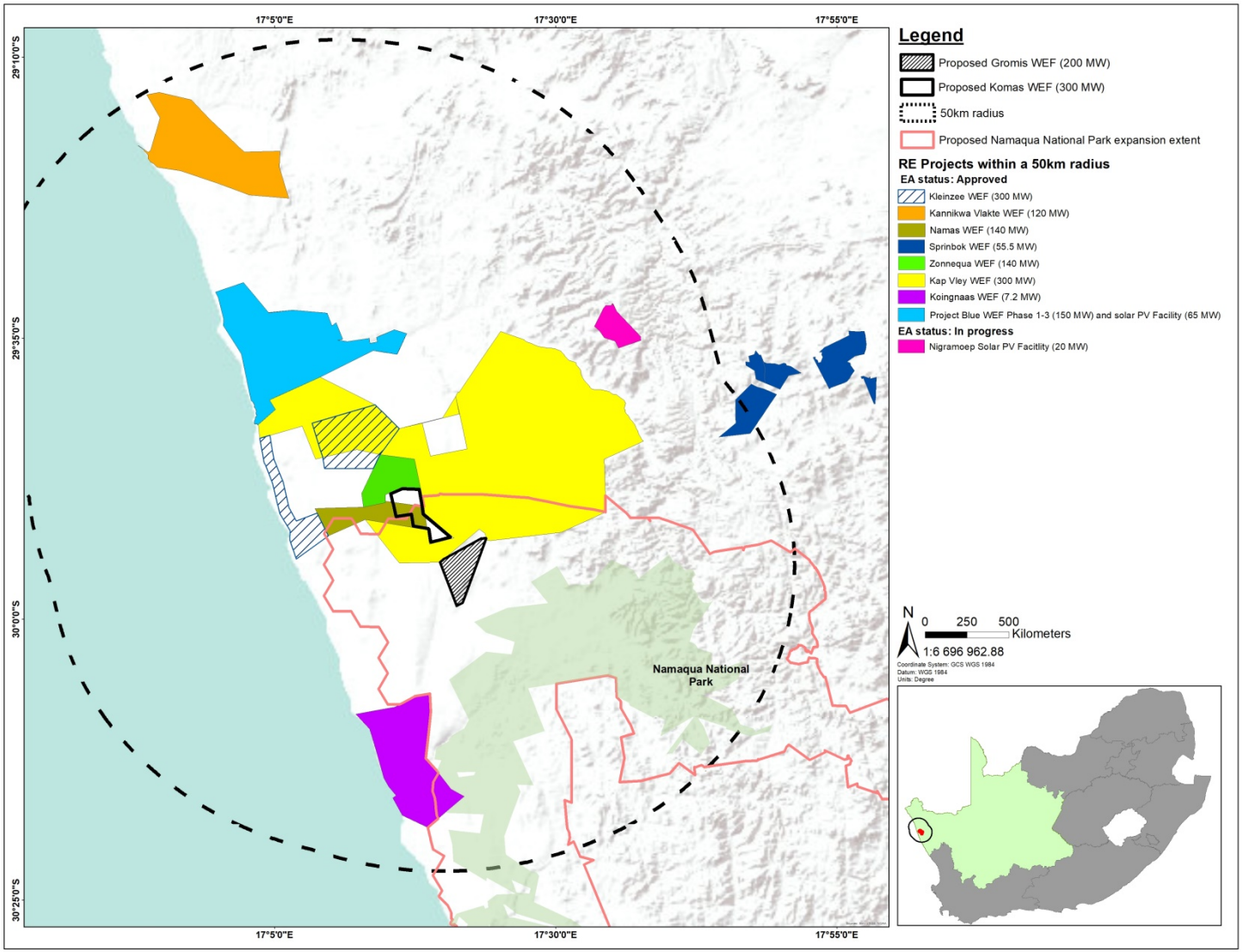

Figure 28: *Map showing the other renewable energy facilities within a 50 km radius of the proposed Komas WEF site.*

Table 6: *Renewable energy facilities proposed within a 50 km radius of the proposed development.*

DEA REFERENCE NUMBER	PROJECT TITLE	APPLICANT	EAP	TECHNOLOGY	MEGAWATT	STATUS
12/12/20/2331/1 12/12/20/2331/1/AM1 12/12/20/2331/2 12/12/20/2331/3	Project Blue Wind Energy Facility Near Kleinsee within the Namakwa Magisterial District, Northern Cape Province. (Phase 1-3)	Diamond Wind (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind and Solar PV	150 MW Wind 65 MW Solar PV	Approved
12/12/20/2212	Proposed 300 MW Kleinzee WEF in the Northern Cape Province.	Eskom Holdings SOC Limited	Savannah Environmental Consultants (Pty) Ltd	Wind	300 MW	Approved
14/12/16/3/3/2/1046	The proposed Kap Vley WEF and its associated infrastructure near Kleinzee, Nama Khoi Local Municipality, Northern Cape Province.	Kap Vley Wind Farm (Pty) Ltd	Council for Scientific and Industrial Research	Wind	300 MW	Approved
14/12/16/3/3/1/1971	Proposed Namas Wind Farm near Kleinsee, Namakwaland Magisterial District, Northern Cape.	Genesis Namas Wind (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Approved
14/12/16/3/3/1/1970	Proposed Zonnequa Wind Farm near Kleinsee, Namakwaland Magisterial District, Northern Cape.	Genesis Zonnequa Wind (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	140 MW	Approved
12/12/20/2154	Proposed construction of the 7.2 MW Koingnaas Wind Energy Facility Within The De Beers Mining Area on the Farm Koingnaas 745 near Koingnaas, Northern Cape Province.	Just PalmTree Power Pty Ltd	Savannah Environmental Consultants (Pty) Ltd	Wind	7.2 MW	Approved
12/12/20/1807	Proposed establishment of the Kannikwa Vlakte wind farm.	Kannikwa Vlakte Wind Development Company Pty Ltd	Galago Environmental cc	Wind	120 MW	Approved

DEA REFERENCE NUMBER	PROJECT TITLE	APPLICANT	EAP	TECHNOLOGY	MEGAWATT	STATUS
12/12/20/1721 12/12/20/1721/AM1 12/12/20/1721/AM2 12/12/20/1721/AM3 12/12/20/1721/AM4 12/12/20/1721/AM5	The proposed Springbok Wind Energy facility near Springbok, Northern Cape Province.	Mulilo Springbok Wind Power (Pty) Ltd	Holland & Associates Environmental Consultants	Wind	55.5 MW	Approved
TBA	The proposed Gromis WEF and associated infrastructure near Kleinsee in the Northern Cape Province.	Genesis ENERTRAG Gromis Wind (Pty) Ltd	Council for Scientific and Industrial Research	Wind	200 MW	In process
14/12/16/3/3/1/416	Nigramoep Solar PV Solar Energy Facility on a site near Nababeep, Northern Cape.	South African Renewable Green Energy (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Solar PV	20 MW	In process

8. LEGISLATIVE AND PERMIT REQUIREMENTS

This report will need to be approved by SAHRA. There are no further legislative requirements for the approval process but if archaeological mitigation is needed then the appointed archaeologist will need to apply for and be granted a permit from SAHRA to do the work. This work must be carried out well in advance of construction to ensure that there is enough time for SAHRA to approve this work before construction commences.

9. ENVIRONMENTAL MANAGEMENT PROGRAMME INPUTS

Impact	Mitigation / management objectives & outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Impacts to fossils					
Damage or destruction of fossils.	Locate, protect, report and rescue fossils in excavations through implementation of a fossil finds procedure.	Ensure that project staff and Environmental Control Officer (ECO) are aware of the possibility of seeing fossil bones.	Inform staff and carry out inspections of excavations.	Whenever on site (at least weekly).	ECO
Impacts to archaeology and graves					
Damage or destruction of archaeological sites.	Locate and sample sites before disturbance.	Pre-construction survey.	Appoint archaeologist to conduct survey.	Once-off.	Project developer
Damage or destruction of graves.	Minimise damage to graves discovered accidentally.	Reporting chance finds.	Inform staff and carry out inspections of excavations.	Whenever on site (at least weekly).	ECO
Impacts to the cultural landscape					
Visible landscape scarring.	Minimise landscape scarring.	Ensure disturbance is kept to a minimum and does not exceed project requirements.	Monitoring of surface clearance.	As required.	ECO

10. 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.

Impacts to heritage resources are not likely to be of high significance and many can be easily mitigated. The benefit of providing more electricity to help grow South Africa's economy is a considerable one and this is considered to outweigh the negative impacts to heritage that might occur.

11. CONCLUSIONS

The main identified issues are the potential impacts to fossils, archaeological sites and the cultural landscape. Mitigation of the first two impacts can be easily effected and, in any case, fossils are not very likely to be found. The landscape can only be mitigated at the site-specific level with the broader impacts deemed unmitigable. This impact is not of high significance, especially given the project location within a REDZ. Table 7 lists the heritage indicators proposed in Section 5 and shows how they have been or will be responded to. None of them remain problematic. There are no fatal flaws and the proposed Komas WEF development is acceptable from a heritage perspective, subject to the implementation of the recommended mitigation measures.

Table 7: *Heritage indicators and design responses.*

Indicator	Project Response
The intensity of impacts to palaeontological resources should be minimised.	Design response not possible, but monitoring of excavations will help reduce the intensity of impacts during construction.
Impacts to significant archaeological resources should be minimised.	Layout designed to avoid known sites and a pre-construction survey will identify any remaining impacts that might occur and make recommendations for their mitigation.
Landscape scarring should be minimised through disturbance of the minimum required footprint.	Design response not possible, but monitoring of site clearance will ensure that only the required areas are disturbed.

Figure 29 shows the distribution of archaeological sites with 50 m buffers around the waypoints (this accounts for the diameter of the site plus a buffer of at least 30 m). Buffers around known archaeological sites have been respected in all but two cases and no further buffers require implementation. The two cases are sites of very low significance and the sites themselves would still not be impacted. After the conclusion of this assessment some changes to the layout were made. Rather than updating the report at such a late stage, Figure 30 shows the final preferred layout and it is confirmed here that this layout is completely acceptable from a heritage point of view and that it would not alter the conclusions or recommendations of this report. Layout changes have no bearing on palaeontology and thus no changes are required to the palaeontological heritage specialist study.

12. RECOMMENDATIONS

It is recommended that the proposed Komas WEF should be authorised but subject to the following conditions which should be incorporated into the Environmental Authorisation:

- A chance fossil finds procedure needs to be incorporated into the EMPr;
- A pre-construction survey should be commissioned to check for any remaining archaeological sites that might have been missed during the original survey. Mitigation would then be suggested if required;
- Landscape scarring must be kept to an absolute minimum; 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.

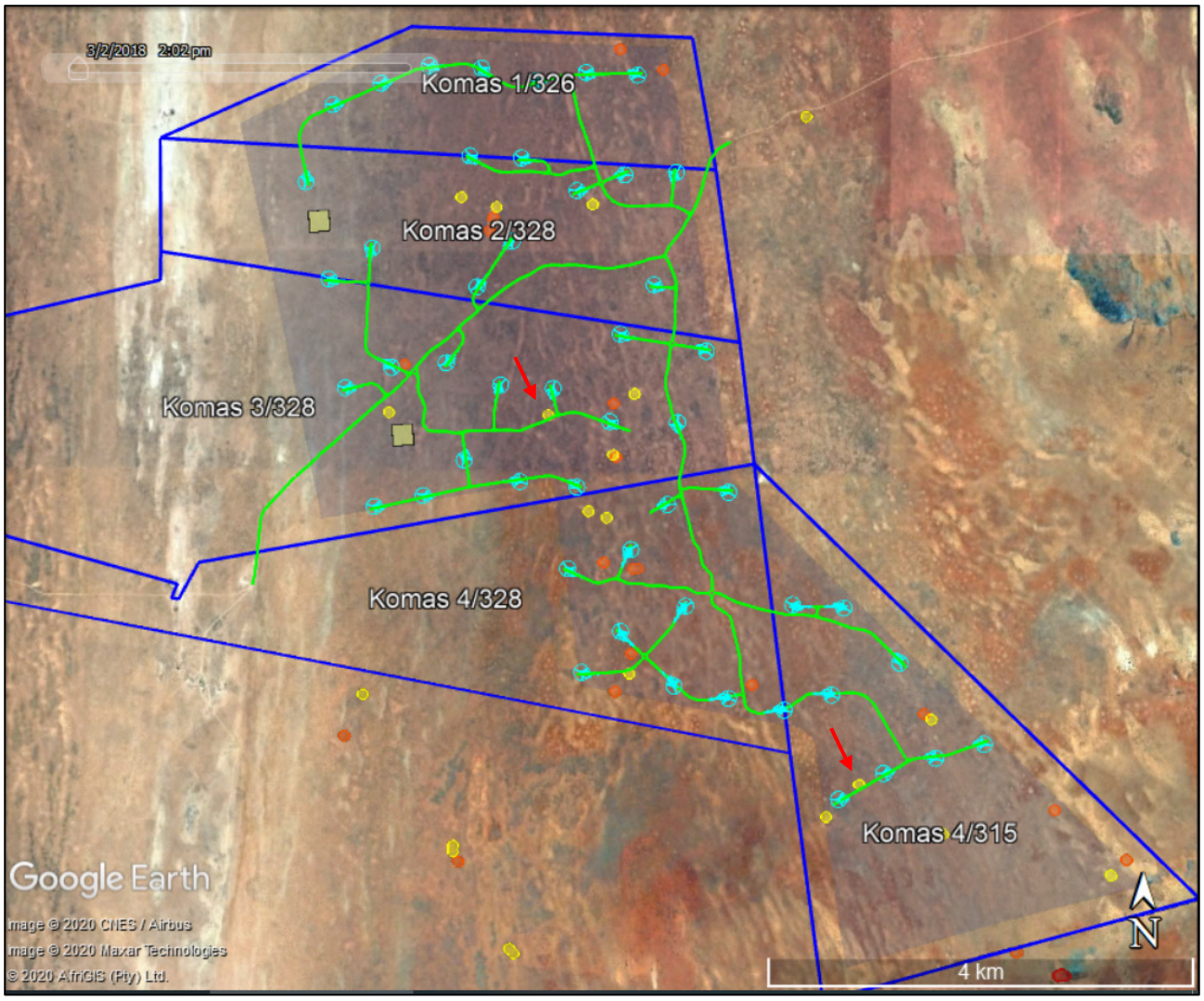

Figure 29: *Aerial view of the Komas study area showing the distribution of archaeological sites by grade and including their buffers. Orange = GPB, yellow = GPC. All waypoints are buffered by 50 m which allows for the size of the site plus at least a 30 m buffer. The WEF is shown by green lines (roads) and turquoise symbols (turbines). The two locations where buffers are intersected are highlighted by red arrows.*

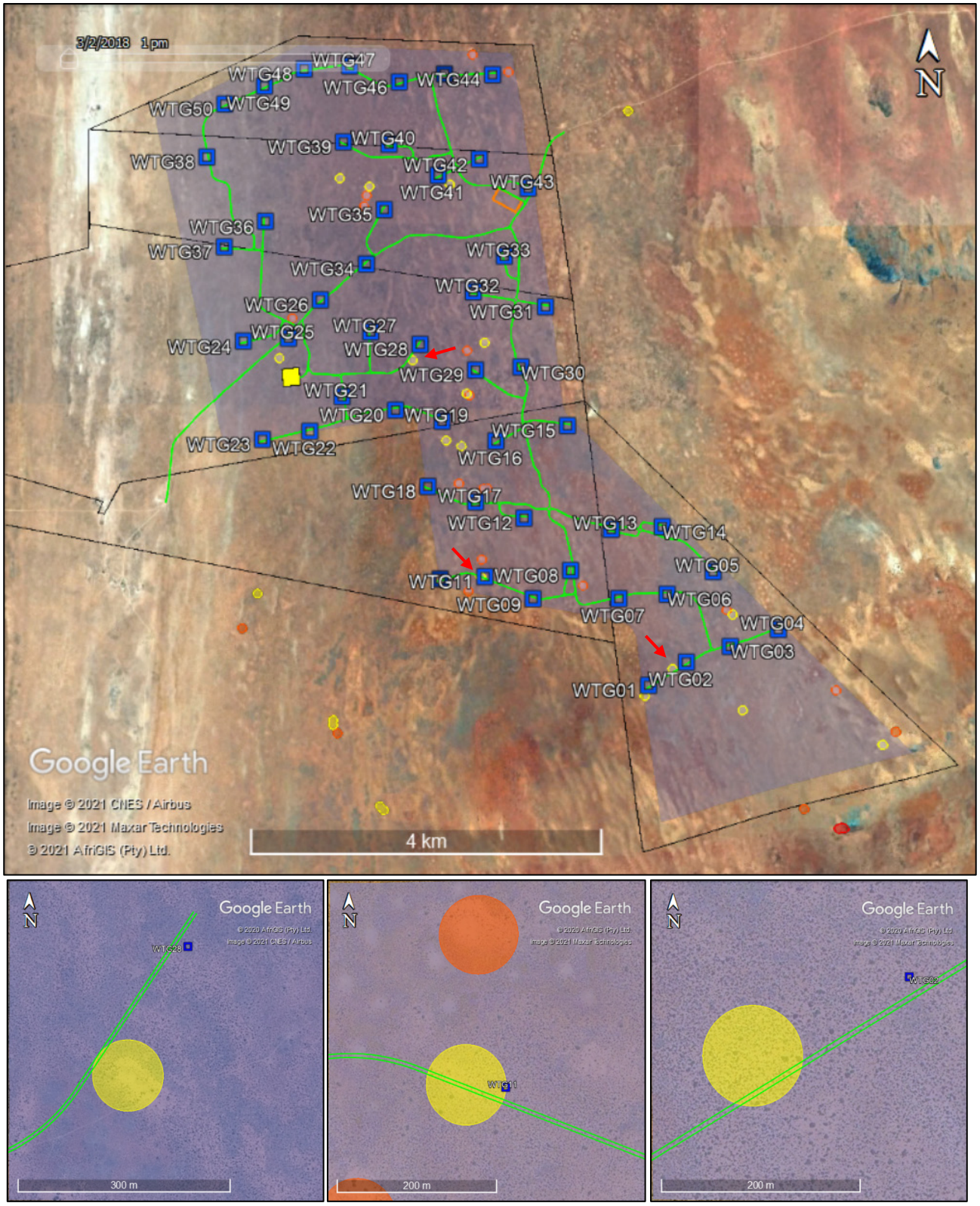

Figure 30: *Aerial view of the Komas study area showing the final layout relative to heritage resources (key as per Figure 29). Only the preferred BESS and SS complex site is shown (yellow square) and the expanded laydown area is shown by the orange rectangle near WTG43. The three smaller maps show the places where heritage buffers are intersected by the layout.*

12.1. Reasoned opinion of the specialist

Given that no significant impacts are expected and that mitigation of any potential impacts to archaeological and palaeontological resources can easily be effected before or during construction, it is the opinion of the heritage specialist that the project may be authorised in full. Both BESS and on-site SS complex site options (Option 1 and Option 2) are acceptable from a heritage perspective and either option may be developed.

13. REFERENCES

Deacon, H.J. 2004. Specialist report Heritage Impact Assessment Kornavlei Prospecting, near Komaggas, Northern Cape. Unpublished report for Site Plan Consulting.

Department of Environmental Affairs. 2015. Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa. CSIR Report Number: CSIR/CAS/EMS/ER/2015/0001/B. Stellenbosch.

Dewar, G. 2008. *The archaeology of the coastal desert of Namaqualand, South Africa: a regional synthesis*. Oxford: British Archaeological Reports International Series 1761.

Dreyer, C. 2002. Archaeological assessment of the proposed upgrading of the road (DR2955) between Springbok and Komaggas, Northern Cape. Unpublished report for Cebo Environmental Consultants.

Halkett, D. 2002. An analysis of a randomly collected Early Stone Age artefact assemblage from the Sandkop mining area, Kleinzee, Namaqualand. Unpublished report prepared for De Beers Namaqualand Mines. University of Cape Town: Archaeology Contracts Office.

Halkett, D. J. & Hart, T. J. G. 1997. An archaeological assessment of the coastal strip, and a proposed heritage management plan for: De Beers Namaqualand Mines. Unpublished report prepared for De Beers Consolidated Mines NM. University of Cape Town: Archaeology Contracts Office.

Hart, T.J.G. & Halkett, D. 1994. Report on Phase 2 archaeological excavations at the Namakwasands project (first phase) Vredendal District Namaqualand. Unpublished report prepared for Namakwa Sands Ltd. University of Cape Town: Archaeology Contracts Office.

Jerardino, A.M., Yates, R., Morris, A.G. & Sealy, J.C. 1992. A dated human burial from the Namaqualand coast: observations on culture, biology and diet. *South African Archaeological Bulletin* 47: 75–81.

Magoma, M. 2016. Phase 1 Archaeological and Cultural Heritage Impact Assessment specialist report for the proposed 400kV power line from the existing Eskom Juno substation to the existing Gromis substation in the Western and Northern Cape Provinces respectively. Unpublished report for Eskom Holdings Ltd.

Morris, D. & Webley, L. 2004. Cultural History in and adjacent the Namaqua National Park. Unpublished SANParks report.

Nienaber, G.S. & Raper, P.E. 1977. *Toponymica Hottentotica*. Naamkunderrks Nr 7. Raad vir Geesteswetenskaplike Navorsing: Pretoria.

Orton, J. 2012. Late Holocene Archaeology in Namaqualand, South Africa: hunter-gatherers and herders in a semi-arid environment. Unpublished D.Phil. thesis: University of Oxford.

Orton, J. 2013. Geometric rock art in Western South Africa and its implications for the spread of early herding. *South African Archaeological Bulletin* 68: 27-40.

Orton, J. 2015. The introduction of pastoralism to southernmost Africa: thoughts on new contributions to an ongoing debate. *Azania: Archaeological Research in Africa* 50: 250-258.

Orton, J. 2016. Prehistoric cultural landscapes in South Africa: a typology and discussion. *South African Archaeological Bulletin* 71: 119-129.

Orton, J. 2017. Archaeological mitigation at the Tronox Namakwa Sands Mine, Vredendal Magisterial District, Western Cape. Unpublished report prepared for Tronox Mineral Sands (Pty) Ltd. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J. 2018. Heritage Impact Assessment: Scoping and Environmental Impact Assessment for the proposed Kap Vley Wind Energy Facility, Namakwaland Magisterial District, Northern Cape Province: EIA Phase Report. Unpublished report prepared for CSIR. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J. 2019a. Heritage Impact Assessment: proposed grid connection infrastructure for the Namas Wind Farm near Kleinsee, Namakwaland MagisteriaL District, Northern Cape. Unpublished report prepared for Savannah Environmental (Pty) Ltd. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J. 2019b. Heritage Impact Assessment: proposed grid connection infrastructure for the Zonnequa Wind Farm near Kleinsee, Namakwaland MagisteriaL District, Northern Cape. Unpublished report prepared for Savannah Environmental (Pty) Ltd. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J. 2019c. Heritage Impact Assessment: proposed Namas Wind Farm near Kleinsee, Namakwaland MagisteriaL District, Northern Cape. Unpublished report prepared for Savannah Environmental (Pty) Ltd. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J. 2019d. Heritage Impact Assessment: proposed Zonnequa Wind Farm near Kleinsee, Namakwaland MagisteriaL District, Northern Cape. Unpublished report prepared for Savannah Environmental (Pty) Ltd. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J. & Halkett, D. 2005. A report on the archaeological mitigation program at De Beers Namaqualand Mines, August to September 2004. Unpublished report prepared for De Beers Consolidated Mines NM. University of Cape Town: Archaeology Contracts Office.

Orton, J. & Webley, L. 2012a. Heritage impact assessment for the proposed ESKOM Kleinsee Wind Energy Facility, Namakwaland Magisterial District, Northern Cape. Unpublished report prepared for Savannah Environmental (Pty) Ltd. Diep River: ACO Associates cc.

Orton, J. & Webley, L. 2012b. Heritage impact assessment for the proposed Project Blue Wind Energy Facility, Kleinzee, Namakwa Magisterial District, Northern Cape. Unpublished report prepared for Savannah Environmental (Pty) Ltd. Diep River: ACO Associates cc.

Pether, J. 2020. Palaeontological Impact Assessment: proposed Enertrag SA Komas and Gromis wind energy facilities substations and powerlines Nama Khoi Municipality, Namakwaland Magisterial District, Northern Cape. Unpubished report prepared for ASHA Consulting (Pty) Ltd. Kommetjie: John Pether.

Raper, P.E. n.d. Dictionary of southern African place names. Accessed online at https://archive.org/stream/DictionaryOfSouthernAfricanPlaceNames/SaPlaceNames_djvu.txt on 19 June 2015.

Rebelo, E. 2003. Namaqualand Mine, Northern Cape. Mining Weekly 13 March 2003. Accessed online at: http://www.miningweekly.com/print-version/namaqualand-mine-northern-cape-2003-03-13 on 27th August 2017.

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

Schaeffer, A. 2008. *Life and travels in the northwest 1850-1899: Namaqualand, Bushmanland & West Coast*. Cape Town: Yoshi Publishing.

Van Pletzen-Vos, L. & Rust, R. 2011. Phase 1 Archaeological Impact Assessment Portion 5, Farm Kamaggas No 200, Proposed Nama Khoi Cemetery. Unpublished report for PHS Consulting.

Webley, L. 1986. Pastoralist ethnoarchaeology in Namaqualand. In: Hall, M. & Smith, A.B. (eds) Prehistoric pastoralism in southern Africa. *South African Archaeological Society Goodwin Series* 5: 57–61.

Webley, L. 1992. The history and archaeology of pastoralist and hunter-gatherer settlement in the north-western Cape, South Africa. Unpublished PhD thesis: University of Cape Town.

Webley, L. 2002. The re-excavation of Spoegrivier Cave on the West Coast of South Africa. *Annals of the Eastern Cape Museums* 2: 19–49.

Webley, L. 2007. Archaeological evidence for pastoralist land-use and settlement in Namaqualand over the last 2000 years. *Journal of Arid Environments* 70: 629–640.

Webley, L. & Halkett, D. 2010. Archaeological Impact Assessment: Proposed prospecting on Portion 2 and Remainder Portion of the Farm Zankopsdrift 537, Garies, Northern Cape. Unpublished report for Sedex Minerals Pty Ltd. University of Cape Town: Archaeology Contracts Office.

APPENDIX 1 – Curriculum Vitae

Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 40 Brassie Street, Lakeside, 7945
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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 – Specialist Declaration

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

Basic Assessment for the proposed Komas Wind Energy Facility and associated infrastructure near Kleinsee in the Northern Cape Province

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:	40 Brassie Street, Lakeside, 7945			
Postal address:	40 Brassie Street, Lakeside			
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:

02-10-2020

Date

Details of Specialist, Declaration and Undertaking Under Oath

Page 2 of 3

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, JASON 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

06-10-2020

Date

Signature of the Commissioner of Oaths

2020/10/06

Date

SOUTH AFRICAN POLICE SERVICE
KIRSTENHOF SAPS
2020 -10- 06
CSC
SUID-AFRIKAANSE POLISIEDIENS
SOUTH AFRICAN POLICE SERVICE

Details of Specialist, Declaration and Undertaking Under Oath

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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	*6-7 & 10-11 January 2020*
Specialist Name	*Dr Jayson Orton & Anja Huisamen*
Professional Registration Number	*Association of Southern African Professional Archaeologists (ASAPA): 233* *Association of Professional Heritage Practitioners (APHP): 043*
Specialist Affiliation / Company	*ASHA Consulting (Pty) Ltd*

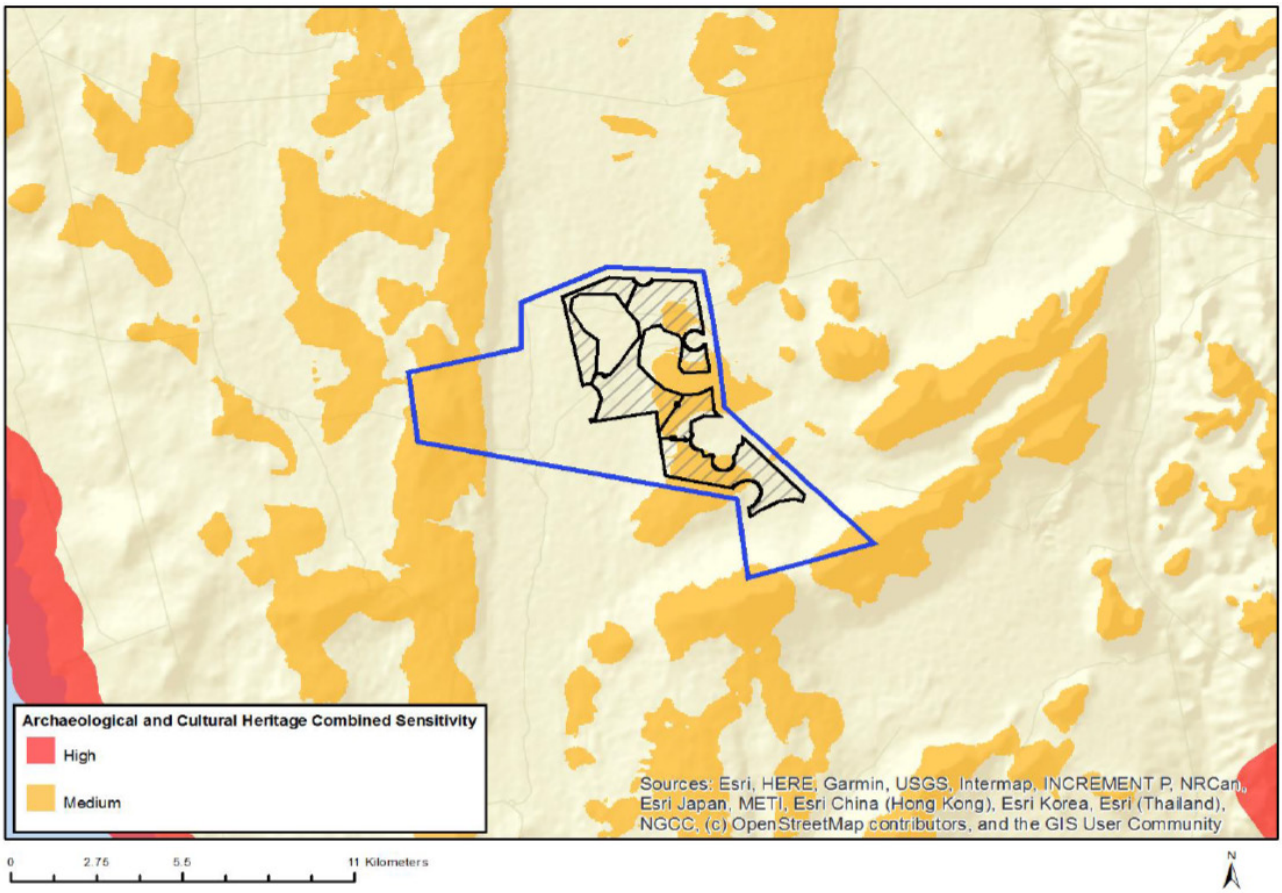

Figure A2.1: *Screening Tool map showing the site to be of medium to low 'archaeological and cultural heritage' sensitivity.*

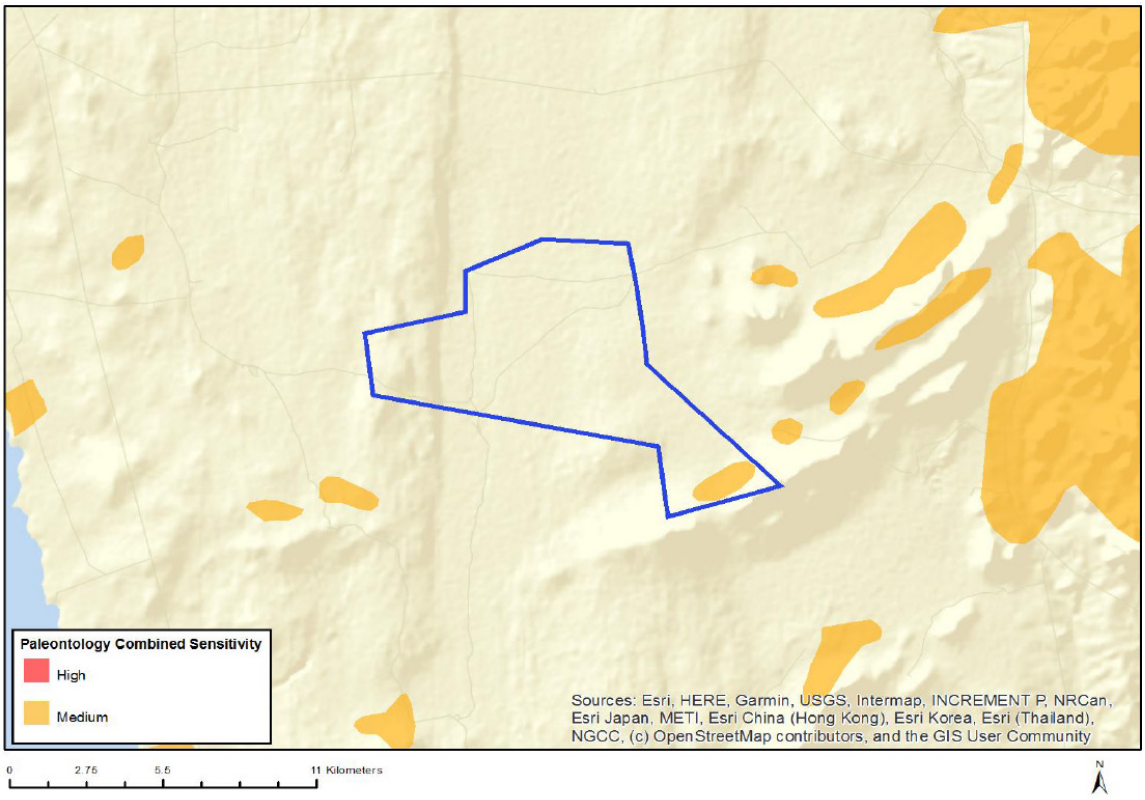

Figure A2.2: *Screening Tool map showing the site to be of medium to low 'palaeontological' sensitivity.*

<u>Method of the Site Sensitivity Verification</u>

Desktop research was conducted to determine the nature of heritage resources expected in the area. Satellite imagery was consulted to determine parts of the landscape most likely to house archaeological sites (e.g. deflation hollows).

A thorough site survey was done which attempted to cover as much land as possible and especially to target all areas noted as potentially sensitive.

A palaeontological specialist was subcontracted to provide a specialist palaeontological study which was included in the HIA report. There were no other relevant sources of information used for the site sensitivity verification.

Outcome

The archaeological survey and the site sensitivity verification showed that archaeological sites were located in very specific locations which meant that the site sensitivity is restricted to very small pockets (effectively the buffers around the culturally significant sites). While medium sensitivity is appropriate, this rating only applies to these small areas and they are spread more widely than the single patch of medium sensitivity than indicated by the Screening Tool. The Screening Tool sensitivity is thus largely correct (i.e. mostly low) but is inaccurate in the central part of the site where many small areas of sensitivity occur along a dune cordon (see Figure 28). The data supporting this conclusion are presented in Section 5 of the present report.

The palaeontological desktop study (see Appendix 4) found the study area to be of generally low sensitivity which largely confirms the screening tool map.

APPENDIX 4 – Palaeontological study

Attached as a separate document.