

# HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED GEMSBOK SOLAR PV1 FACILITY, KENHARDT MAGISTERIAL DISTRICT, NORTHERN CAPE

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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## EXECUTIVE SUMMARY

ASHA Consulting (Pty) Ltd (“ASHA”) 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 development of a 75 MW solar energy facility on the Remaining Extent of Portion 3 of Gembokbult 120 in the Kenhardt District of the Northern Cape Province. The study area lies some 30 km to the northeast of Kenhardt, in northern Bushmanland.

The site and broader environment are generally flat with occasional small pans and rocky outcrops evident in places. Vegetation is sparse and the substrate variably sandy and gravelled with the former dominating.

Archaeological material was found to occur throughout the study area but generally in very low densities. Such material is of very low significance. No mitigation is required and archaeological impacts would be of very low significance. The landscape is of generally low significance, but two small forests of quiver trees are rated as having medium significance. Landscape scarring that might occur through blasting of the extensive rocky outcrops occurring in one area would result in low significance impacts. Avoiding the trees and various rocky outcrops in the study area and keeping the facility as close to the other existing and proposed infrastructure as possible would reduce impacts to low or very low significance.

Given the generally high visibility and flatness of the landscape, it is felt that all significant heritage resources would have been found during the survey. As such, no further walk-down survey is required unless land not included in any of the assessed alternatives is later chosen for development. The preferred Gembok Solar PV1 site is currently the favoured site from a heritage point of view.

It is recommended that construction of the proposed Gembok Solar PV1 facility should be allowed to continue, since impacts to heritage resources are likely to be of very low significance. The following recommendations are made:

- Alternative 1 and the western part of Alternative 2 are best avoided if possible;
- The facility should be placed in such a way as to be as near as possible to the other existing and proposed infrastructure in the area;
- The overall disturbance footprint of the project should be kept as small as possible; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

## Glossary

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

**Cosmic landscape:** One of three archetypes of natural place developed by Norberg-Schultz (1980) and generated by the basic relationship between earth and sky. Cosmic landscapes are those with wide open spaces and little topographic relief.

**Early Stone Age:** Period of the Stone Age extending approximately between 2 million and 20 000 years ago.

**Hand-axe:** A bifacially flaked, pointed stone tool type typical of the Early Stone Age.

**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

**ASAPA:** Association of Southern African Professional Archaeologists

**CRM:** Cultural Resources Management

**EIA:** Environmental Impact Assessment

**ESA:** Early Stone Age

**GPS:** global positioning system

**HIA:** Heritage Impact Assessment

**LSA:** Later Stone Age

**MSA:** Middle Stone Age

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

**SAHRA:** South African Heritage Resources Agency

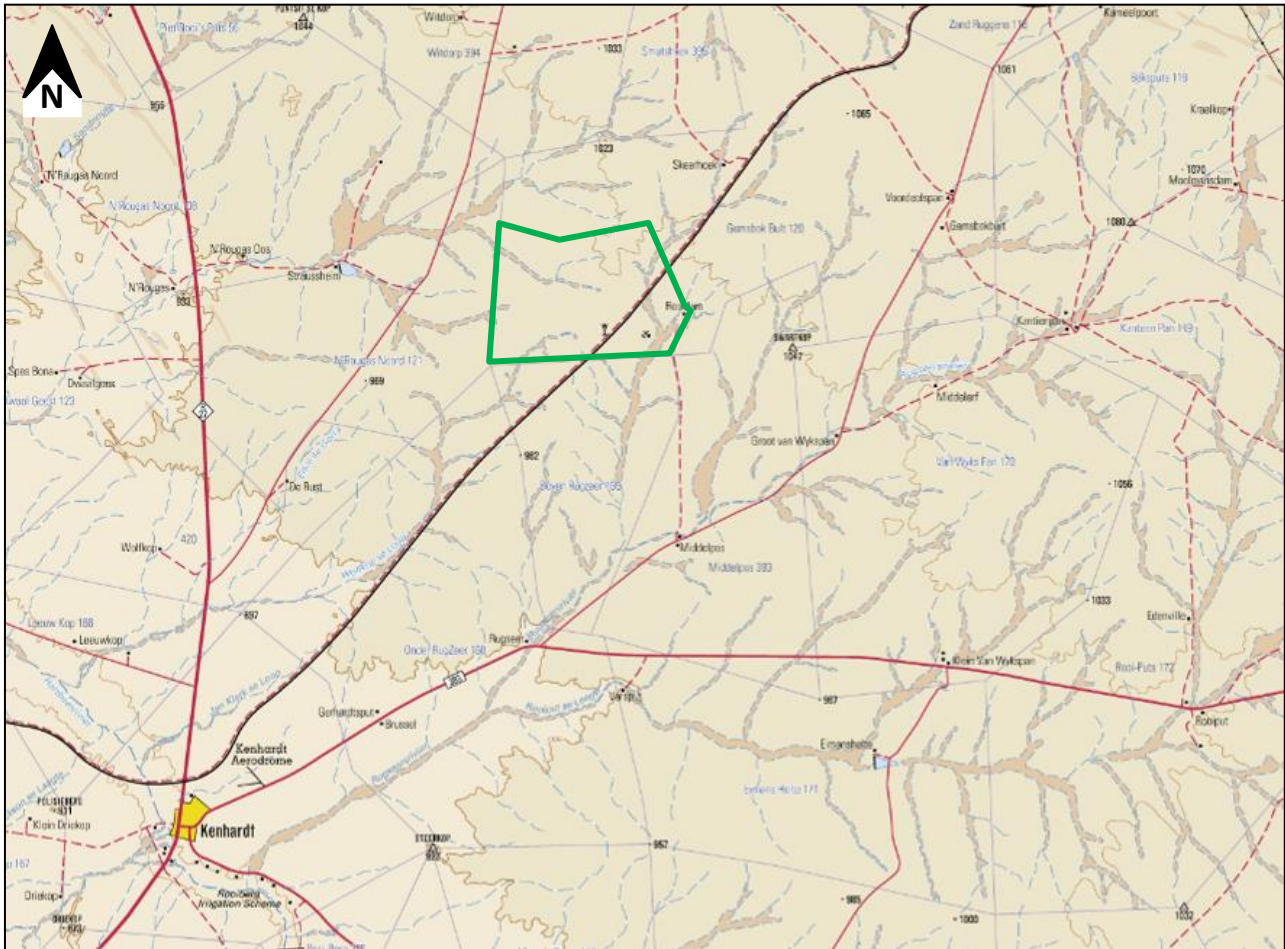
**SAHRIS:** South African Heritage Resources Information System

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# 1. INTRODUCTION

ASHA was appointed by the CSIR to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of a 75 MW solar energy facility on the Remaining Extent of Portion 3 of Gembokbult 120 in the Kenhardt District of the Northern Cape Province (Figures 1 & 2). The study area lies some 30 km to the northeast of Kenhardt, in northern Bushmanland. This project is referred to as the Gembok Solar PV1 (Department of Environmental Affairs (DEA) reference number: 14/12/16/3/3/2/710)

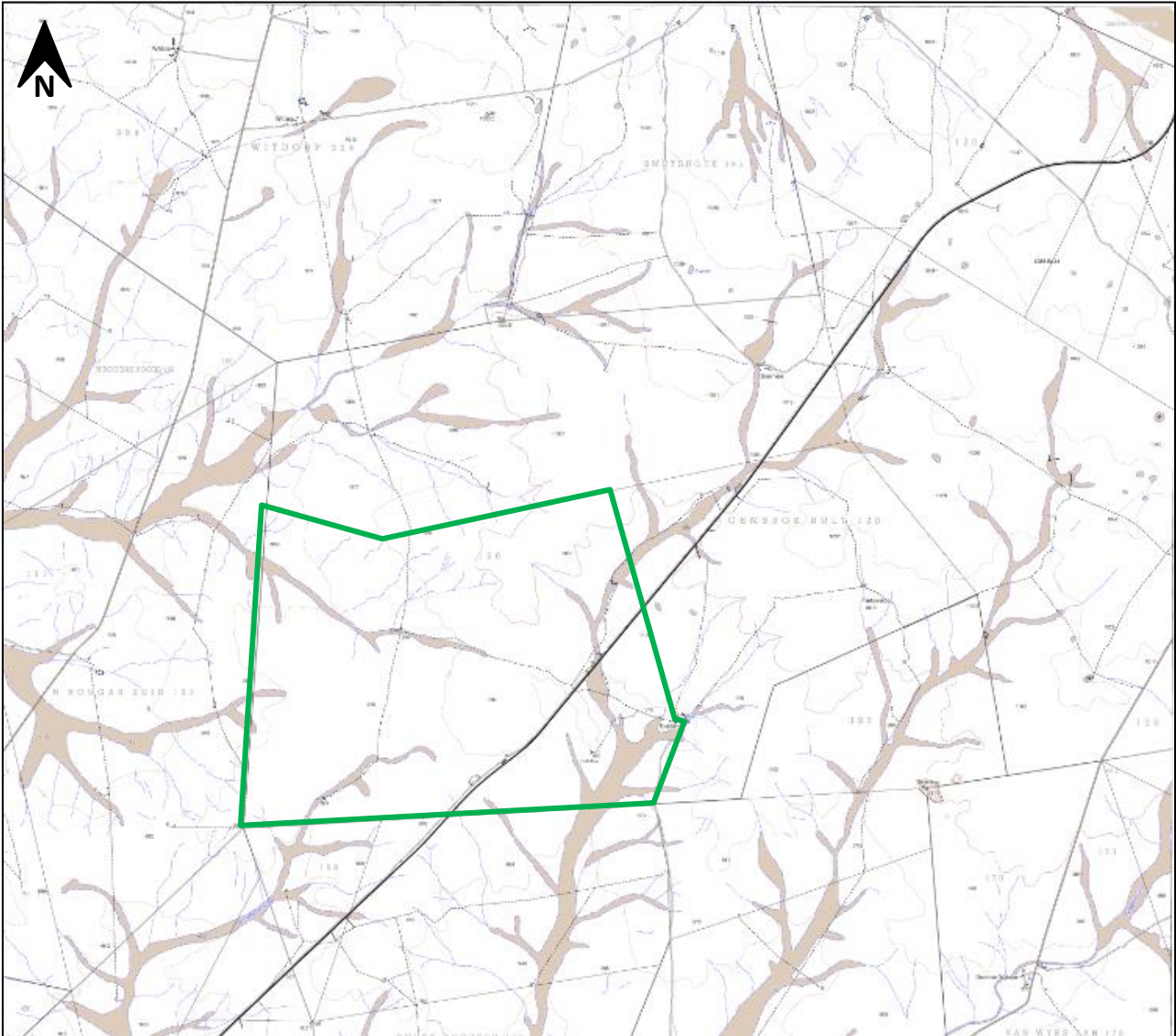


**Figure 1:** 1:250 000 map (sheet 2920) showing the location of the Remaining Extent of Portion 3 of Gembok Bult 120 (green polygon) in relation to the town of Kenhardt (Mapping information supplied by Chief Directorate: National Geo-Spatial Information. Website: [www.ngi.gov.za](http://www.ngi.gov.za)).

## 1.1. Project description

The proposed facility will occupy less than 250 hectares and will comprise of a solar field, inverter stations, cabling, operations office, substation, substation building, laydown area, 132 kV overhead distribution line, access road, water pipeline, borehole, fence, battery storage facility, and guard cabin. The facility will connect to the already authorised Eskom Nieuwehoop Substation that is to be constructed on the Remaining Extent of Portion 3 of Gembok Bult 120 farm via a 132 kV overhead line.

A preferred site has been identified as well as three alternative sites (Figure 3). It should be noted that these latter sites also serve as alternatives for a second proposed PV facility on the same land parcel. This proposed facility is known as Gemsbok Solar PV2 DEA Reference number: 14/12/16/3/3/2/711). The second facility is the subject of a separate Environmental Impact Assessment (EIA) process.



**Figure 2:** 1:50 000 map (sheet 2921AB) showing the location of the Remaining Extent of Portion 3 of Gemsbok Bult 120 (green polygon) relative to the Sishen-Saldanha Railway line that runs from northeast to southwest across the map (Mapping information supplied by Chief Directorate: National Geo-Spatial Information. Website: [www.ngi.gov.za](http://www.ngi.gov.za)).

## 1.2. Terms of reference

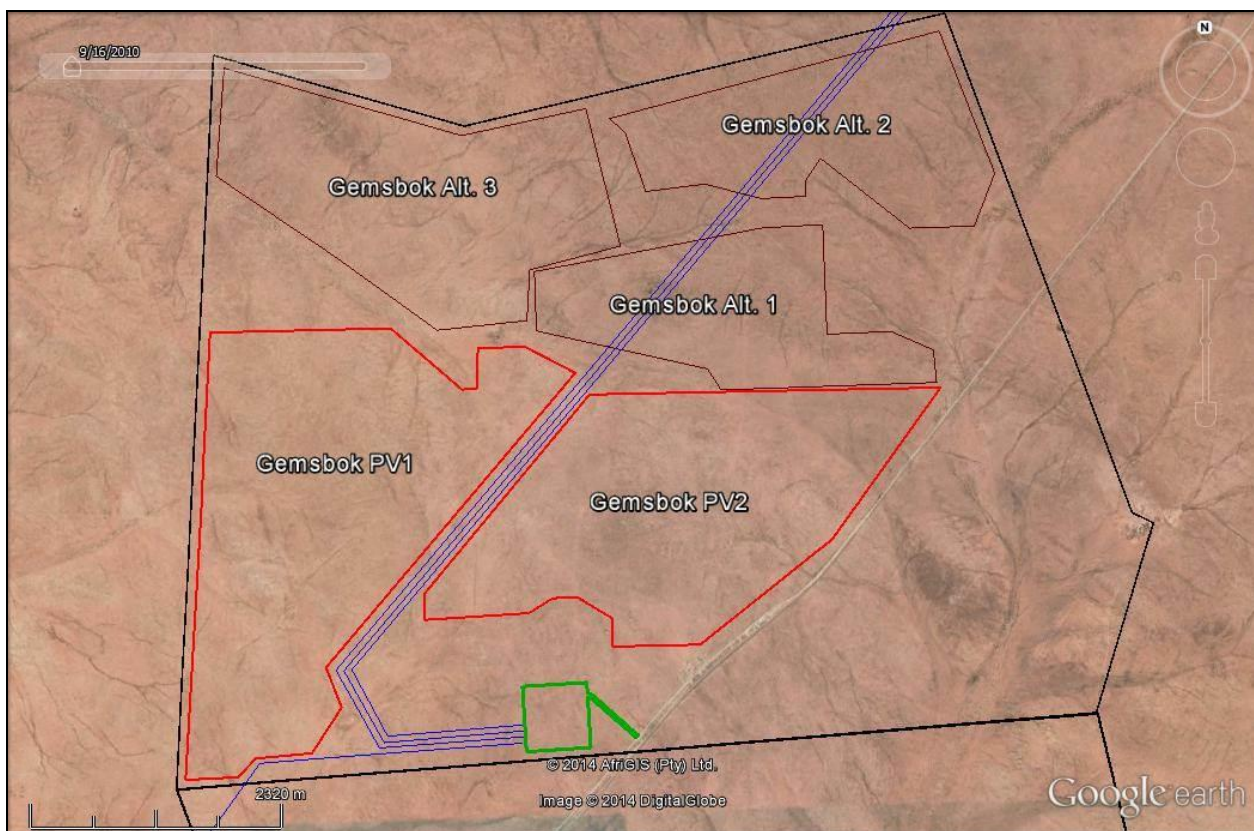
ASHA was requested to undertake an Archaeological Impact Assessment for the proposed projects. The assessment should determine the environmental risks, assess the identified impacts, highlight any potential fatal flaws that may be associated with the project and identify the preferred site based on these findings, in accordance with the requirements of the EIA Regulations for specialist studies and associated guidelines.



The report should include:

- a declaration of independence;
- details the scope of work;
- impact assessment methodology;
- baseline information;
- impact assessment, including cumulative impact assessment of existing solar PV facilities or proposed projects in the area; and
- impacts identified and management and mitigation measures to be included in the Environmental Management Programme.

Although an archaeological specialist study was commissioned, it should be noted that, following S.38(3) of the National Heritage Resources Act (No. 25 of 1999; NHRA), all heritage resources should be identified and assessed. This report thus aims to fulfil this requirement and is thus a full Heritage Impact Assessment (HIA) (excluding paleontology).



**Figure 3:** Aerial view of the study area showing the two PV facilities proposed on Gemsbok Bult (red polygons; only PV1 is assessed in this report) and the three alternative sites under consideration. The green polygon indicates the position of the already authorised Nieuwehoop Substation and the blue lines its associated power lines.

### 1.3. Scope and purpose of the report

A 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 for consideration by the DEA who will review the EIA and grant or withhold authorisation. The report will outline any 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 HIAs and archaeological specialist studies in the Western Cape and Northern Cape provinces of South Africa since 2004. He has also conducted research on aspects of the Later Stone Age (LSA) in these provinces and published widely on the topic. He is accredited with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233).

#### **1.5. Declaration of independence**

ASHA Consulting (Pty) Ltd and its consultants have no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided. A full declaration is included as Appendix 1 below.

## **2. HERITAGE LEGISLATION**

The NHRA 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;
- 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.”

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.

Section 38 (2a) states that if there is reason to believe that heritage resources will be affected then an impact assessment report must be submitted. This report fulfils that requirement.

Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to an EIA. 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 DEA.

### **3. METHODS**

#### **3.1. Literature survey**

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.

#### **3.2. Field survey**

Before the field survey, the site was carefully examined on aerial photography in order to identify any features worth checking on the ground. This was done because it can be difficult to see certain landscape features from ground level. The site and its alternatives were then subjected to surveys carried out by means of driving, cycling and walking with slightly greater emphasis placed on the preferred site. Note that two separate projects on Gemsbok Bult were assessed in the field on 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> June 2014. During the survey the positions of finds were recorded on a hand-held 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.

### **3.3. Impact assessment**

For consistency, the impact assessment was conducted through application of a methodology supplied by the CSIR.

### **3.4. Assumptions and limitations**

It was assumed that, as is the case across Bushmanland, a background archaeological scatter would be widespread across the landscape but that occupation sites would be clustered around water sources.

The study is carried out at the surface only and hence any completely buried archaeological sites will not be readily located. This would only likely be a problem in the event of major pans being present.

The study area is very large and, as such, the search path density was quite low. The focus was placed on identifying landscape features because these would have the greatest amount of heritage associated with them – this was more than adequately proved with more than 100 km of ground covered. This means that the reduction in survey intensity would not have had any impact on the outcomes of the report.

## **4. PHYSICAL ENVIRONMENTAL CONTEXT**

### **4.1. Site context**

The study area is located in a rural landscape setting where small stock grazing is the predominant land use. However, electrical infrastructure is present along the existing Sishen Saldanha Railway Line which crosses the site from northeast to southwest – all project alternatives lie to the north of the railway line. Furthermore, a new substation and associated power lines have been proposed adjacent to the southern boundary of the property, close to the railway line and service road.

### **4.2. Site description**

The site is generally very flat with the topography varying by no more than a few meters over several kilometres (Figures 4 & 5). The substrate varies with the majority being sandy (Figure 4) but gravel patches occur in places (Figure 5). Ephemeral drainage lines are present and generally identifiable only by the slightly elevated vegetation density (Figure 3). In places there are small rocky hills of a few metres in height, while quiver trees (*Aloe dichotoma*) occur in several places, particularly towards the north (Figure 6). In some areas there is much exposed bedrock (Figure 7), while occasional pans occur with one having been excavated in the past to encourage water retention (Figure 8). It should be noted that some of the ephemeral drainages have been excavated into long, completely straight furrows that lead into the excavated pan (Figure 9).



**Figure 4:** View across Remaining Extent of Portion 3 of Gemsbok Bult 120 showing the generally flat terrain. In this area there is a sandy substrate and a low rise is visible in the background.



**Figure 5:** View across the Remaining Extent of Portion 3 of Gemsbok Bult 120 showing the generally flat terrain. In this area there is gravel substrate.





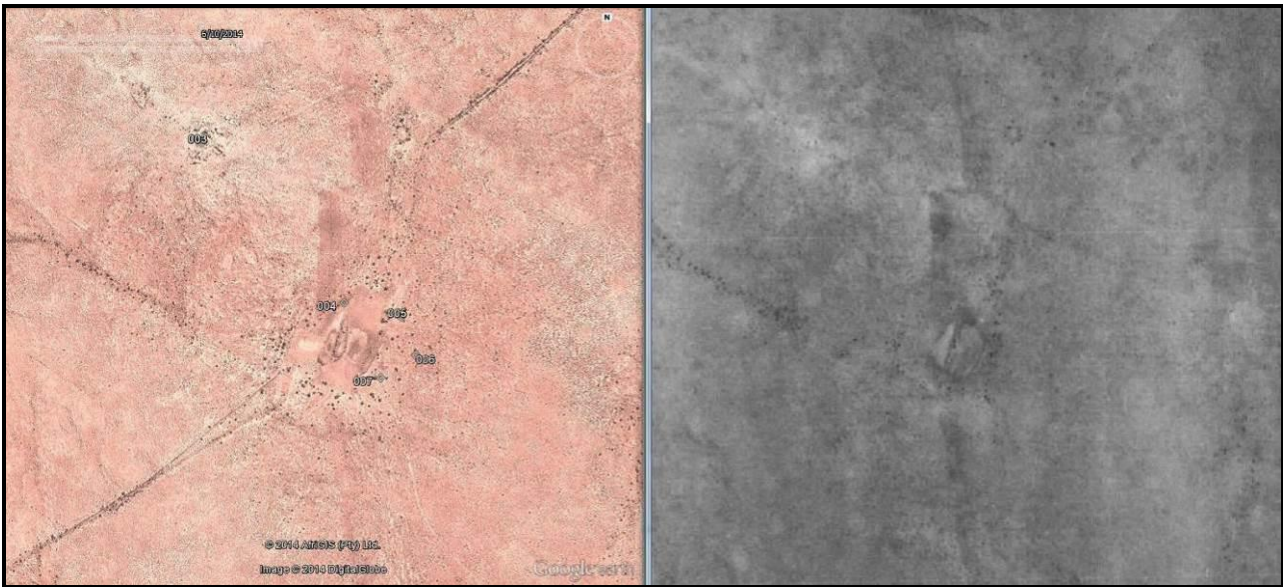
**Figure 6:** View across the Remaining Extent of Portion 3 of Gemsbok Bult 120 showing one of the low rocky hills that interrupt the skyline in places. In the foreground are three quiver trees.



**Figure 7:** Outcropping bedrock on Gemsbok Bult.



**Figure 8:** Pan deepened through excavation.



**Figure 9:** Modern and 1944 aerial views of the pan in the south-western part of the Remaining Extent of Portion 3 of Gemsbok Bult 120. The pan looks partly disturbed in 1944, but it is clear that more disturbance has taken place subsequently and that furrows have been excavated to its southwest and northeast.

## 5. CULTURAL HERITAGE CONTEXT

This section of the report establishes what is already known about heritage resources in the vicinity of the study area. What is found during the field survey may then be compared with what is already known in order to gain an improved understanding of the significance of the newly reported resources.

### 5.1. Archaeological aspects

Away from water sources, Bushmanland and the far western Karoo are generally well known to contain few archaeological sites with high research value, but background scatter artefacts are widespread, particularly in areas where gravel substrates dominate (e.g. Kaplan 2011a, 2011b, 2012a, 2012b; Orton 2011a, 2011b; Orton & Webley 2013a; Pelsler 2011; Webley & Halkett 2012). The majority of finds made in these areas pertain to the Early (ESA) and Middle Stone Ages (MSA) but occasional artefacts are no doubt more recent and ascribable to the LSA. In areas with predominantly sandy substrates, the density of background scatter is far lower (Webley & Halkett 2010a, 2010b). This pattern has been demonstrated in many impact assessments, with those from close to Kenhardt revealing particularly few sites of value. Morris (2009) has even commented that a search along the banks of the Hartebeest River close to Kenhardt, where he expected elevated frequencies of archaeological material, revealed virtually nothing. Murimbika (2008) surveyed parts of the same study area dealt with in the present report and found absolutely nothing. The pattern is thus deemed to be a robust one and is no doubt due to the lack of reliable water sources in the greater area.

Further afield, parts of Bushmanland are known to have revealed grinding hollows made in outcrops of bedrock (Morris 2013; Orton & Webley 2012a, 2012b, 2013b). These tend to occur



close to places where water may be found (small pans or streams) and, as a result, LSA artefact concentrations occur alongside them. Where suitable rock canvasses occur one can find occasional rock engravings (Morris 1988; Morris & Beaumont 1994; Rudner & Rudner 1968) and, on rare occasions, even paintings (Orton 2013, 2014; Orton & Webley 2012a; Rudner & Rudner 1968). No rock art is known from the Kenhardt area, however.

## **5.2. Historical aspects and the built environment**

Historically, the area was divided into very large farms because of the very low carrying capacity of the land. This means that historical resources generally occur in very low densities. Many farmsteads are fairly modern, dating to the 20<sup>th</sup> century and within the town of Kenhardt one can see that the earliest structures date to the early 20<sup>th</sup> century. One Provincial Heritage Site occurs in the town of Kenhardt; this is a pioneer house built in 1897 and is one of the first structures erected in the town (SAHRIS n.d.).

## **5.3. Anglo-Boer War history**

The Anglo-Boer War played an important role in the central parts of South Africa leaving many traces of its events. Block houses, battlefields and graves litter the region. Kenhardt only saw a small amount of action. On 25th February 1900 Koos Jooste and Andries de Wet occupied Kenhardt with 12 men. They fired on the town guard when ordered to halt, but eventually took over the town and locked the town officials in jail for a few days before ordering them to leave town. On 1 March 1900, 200 recruits joined the Boer forces in Kenhardt. They were addressed by Commandant Lucas Steenkamp, after which they went into training. On hearing of the British approach, a group of 130 men under Field Cornet Borrius moved to Rietfontein, 2 km south of Kenhardt, to defend the town from British forces who were on their way to the lower Orange River Valley to suppress the Boers in the area. However, before the arrival of the British, the forces at Kenhardt decided to surrender due to a decision made by a Boer war council in Upington on 20<sup>th</sup> March to disband the rebel force. By the end of March the 6 week uprising of the Cape Afrikaners in the region had ended. On 31<sup>st</sup> March the British reoccupied Kenhardt, stationing a small garrison in the town.

After a failed Boer uprising in the North Western Cape, many rebels were detained by the British and, with the jail in Upington totally full by April 1900, more than 100 rebel Boers were detained in a camp outside Kenhardt.

As part of a string of executions across the Cape, two Boer rebels, H.L. Jacobs and A.C. Jooste, were executed in Kenhardt by the British on 24 July 1901, on accusations of treason.

In January 1902 a British force of about 800 men began gathering at Kenhardt. They left on 10 January to quell the Boer force in Kakamas. On 11 January the battle of Kakamas began and ended with a victory for the Boers when the British departed on 13 January.

## 6. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project. It includes all material recorded on the Remaining Extent of Portion 3 of Gemsbok Bult 120, including within the Gemsbok Solar PV2 area, as this provides a better understanding of the heritage resources present in the overall landscape. Table 1 summarises the finds and they are discussed below. Mapping is provided in Appendix 2.

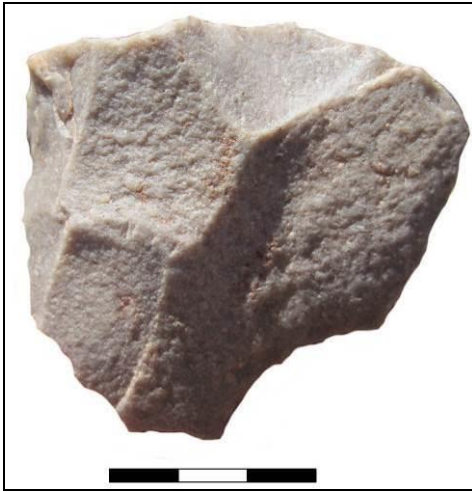
*Table 1: List of heritage resources recorded during the survey.*

Waypt	Site No.	PV area	Co-ordinates	Description	Heritage significance
001	GBB2014/001	-	S29 08 42.7 E21 20 16.0	Minimally flaked quartz outcrop.	Very low
002		PV1	S29 08 04.3 E21 18 55.0	Ephemeral artefact scatter in deflation.	Very low
003	GBB2014/002	PV1	S29 08 16.7 E21 18 38.2	Minimally flaked quartz outcrop and an excavation into a feldspar deposit on a slight hill.	Very low
004	GBB2014/003	PV1	S29 08 23.9 E21 18 45.6	Widespread but low density artefact scatter around a pan. At this point is a boulder minimally used as a lower grindstone.	Low
005	GBB2014/004	PV1	S29 08 24.6 E21 18 48.5	LSA quartz scatter near pan.	Low
006	GBB2014/005	PV1	S29 08 26.3 E21 18 49.3	LSA quartz scatter near pan.	Low
007	GBB2014/006	PV1	S29 08 27.3 E21 18 47.5	LSA quartz scatter near pan.	Low
009	GBB2014/007	PV1	S29 08 27.3 E21 18 16.6	Minimally flaked quartz outcrop.	Very low
010	GBB2014/008	PV1	S29 07 24.9 E21 18 45.4	LSA lower grindstone and ephemeral quartz scatter in sandy area.	Low
011		Edge of Alt.3	S29 05 56.1 E21 20 23.6	Quiver tree forest (natural heritage)	Medium <b>AVOID</b>
012		Alt.2	S29 05 56.5 E21 21 09.8	Quiver tree forest (natural heritage)	Medium <b>AVOID</b>
013	GBB2014/009	Edge of PV2	S29 08 33.3 E21 20 35.4	Light quartz artefact scatter alongside an excavated area that is assumed to have been a pan in the past.	Very low
014	GBB2014/010	PV2	S29 07 30.4 E21 20 34.3	Minimally flaked quartz outcrop with a background scatter of quartz in the vicinity.	Very low

Waypt	Site No.	PV area	Co-ordinates	Description	Heritage significance
015		PV2	S29 07 49.5 E21 21 49.7	Light scatter of ostrich eggshell. Nothing anthropogenic evident.	n/a
016		Alt.1	S29 06 46.9 E21 20 25.6	Green bottle glass scatter. Single bottle. Base has “& CO” at the top and “14A” at the bottom. A partial digit before the “14A” is assumed to be a “0”.	Very low
017	GBB2014/011	Alt.1	S29 06 51.8 E21 20 52.7	Small shelter beneath a boulder at the base of a rocky hill. Artefacts of quartz and hornfels (very few) and fragments of clear, green and brown glass, iron fragments. One glass fragment looks flaked. Open area in front looks like it was a historical kraal – vegetation is different. Several large oil and paraffin cans lying about.	Low
018	GBB2014/012	Alt.1	S29 06 51.3 E21 20 51.2	Light quartz artefact scatter among rocks at the base of the rocky hill.	Low
019	GBB2014/013	Alt.1	S29 06 52.5 E21 20 52.4	Light quartz artefact scatter in sandy area to the south of the rocky hill.	Low
021		Alt.2	S29 06 11.5 E21 21 04.8	Quiver tree forest (natural heritage)	Medium <b>AVOID</b>

### 6.1. Archaeology & historical stock post

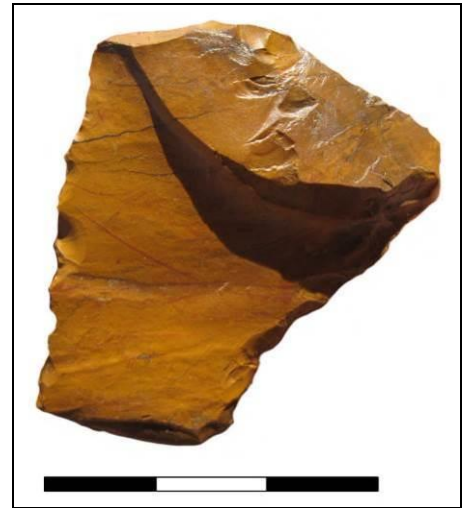
Archaeological resources of more than low significance are very rare in the study area. Background scatter artefacts are to be found throughout but are generally in lower densities than would be encountered in areas where there is more gravel present. As such, no areas of background scatter were deemed important. Almost all such artefacts were of quartz but a number in quartzite and occasional other materials were also noted (Figures 10 to 14). The majority of these artefacts appear to be MSA in age.



**Figure 10:** Quartzite flake.



**Figure 11:** Quartz (left) and quartzite (right) flakes.



**Figure 12:** Broken quartz blade. **Figure 13:** Silcrete flake. **Figure 14:** Crypto-crystalline silica flake.

A number of quartz outcrops were located and these had inevitably been flaked in the past as a source of stone for making stone artefacts. Figures 15 and 16 show an example of such a quartz quarry site.





**Figure 15:** Flaked quartz outcrop at waypoint 001. **Figure 16:** Flake scars on the quartz outcrop.

Only one pan appeared to have been present on the portion of the Remaining Extent of Portion 3 of Gemsbok Bult 120 surveyed for this project. It lies within the area of Gemsbok Solar PV1. However, this pan has been excavated out in the past in order to increase its water storage capacity and this has no doubt negatively affected the archaeology. Nonetheless, four scatters of quartz artefacts were recorded, one of them had a small boulder that had been lightly used as a lower grindstone and this no doubt indicates a recent age in the LSA. In the absence of other materials (like bone or pottery) these sites are of low significance. Figure 17 shows the context of these sites and Figure 18 the lower grindstone.



**Figure 17:** Location of LSA artefacts around the pan in the PV1 area. The excavated out pan is visible in the background.

**Figure 18:** Lower grindstone with ground area indicated.

Two rocky hills were present in the study area but the smaller of these had no associated archaeological material. The larger one, in the middle of Gemsbok Alternative 1, did have archaeology around it. Aside from two scatters of quartz stone artefacts located to the west



(waypoint 018) and south (waypoint 019) of the hill, there were the remains of a historical stock post located on the eastern side of the hill (waypoint 017). The focus of the site is a small shelter formed by a boulder at the foot of the hill (Figure 19). In this shelter there were a few stone artefacts, some bottle glass fragments and one small iron fragment (Figure 20). The area in front of the shelter has been disturbed historically and is now characterised by pioneer plant species that are very different to those in the open terrain further away (Figure 21). Scattered about this area were several metal items including fuel cans with, among other things, “Pegasus” and “Made in USA” marked on them. These no doubt reflect the flying horse of the Mobil Oil company. The stock post is 20<sup>th</sup> century in age, as indicated by its clear presence on a 1944 aerial photograph, but may have been used for some time before the photograph was taken (Figure 22).



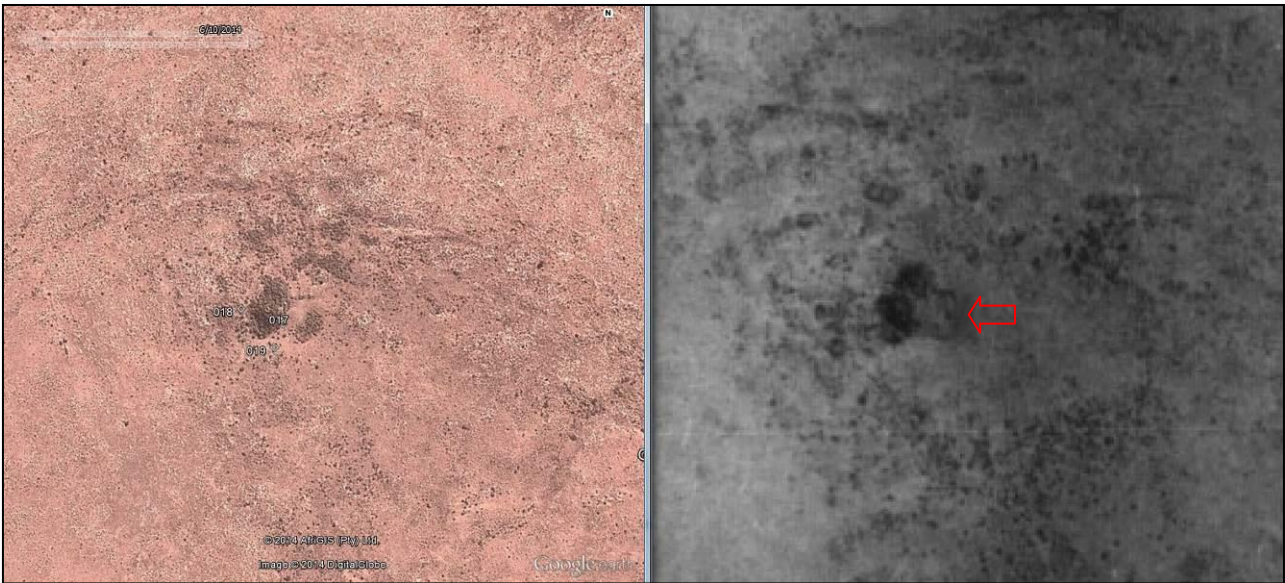
**Figure 19:** View of the small shelter alongside the historical stock post.



**Figure 20:** Stone and glass and iron artefacts from the small shelter. Scale in cm.



**Figure 21:** View towards the southwest showing the disturbed area (green pioneer plant species) where the stock post once stood.



**Figure 22:** Modern and historical aerial photographs of the rocky hill in Alternative 1 showing the location of the historical stock post to the east of the hill (red arrow).

Some historical glass fragments were found in the western part of Gemsbok Alternative 1. The main scatter (at waypoint 016) seemed to all relate to a single dark green wine bottle (Figure 23 & 24), while further away two fragments of blue bottle glass were noted (Figure 25).



**Figure 23:** Green bottle base from waypoint 16.



**Figure 24:** Green bottle glass fragments.



**Figure 25:** Blue bottle glass fragments.

## 6.2. Built environment

Aside from the farm complex located 7.0 km east of the preferred site for Gemsbok PV1, no built environment features were located on the subject property. The only built features aside from rare farm houses in the landscape as a whole are occasional wind pumps and their associated cement reservoirs. These are 20<sup>th</sup> century features.

## 6.3. Graves

Although a farm graveyard is located alongside the farm complex, no graves, graveyards or suspected graves were located on the subject property.



#### 6.4. Cultural landscape and natural heritage

The landscape of this part of Bushmanland is flat and open with little topography. It is what Norburgh-Schultz (1980) refers to as a 'cosmic landscape'. It has large skies, low skylines and a strong sense of remoteness. However, close to the Sishen-Saldanha Railway Line this character has been interrupted by the railway infrastructure and telecommunications tower with their industrial character and strong vertical elements (Figure 26).



**Figure 26:** View towards the southwest along the railway line.

At three places on the landscape (waypoints 11, 12 & 21) there are low density 'forests' of quiver trees (*Aloe dicotoma*; Figure 27). Although not particularly rare, these trees are a unique component of the Northern Cape landscape and were used in the past by the Bushmen for the manufacture of quivers for carrying their arrows; this, of course, is the origin of the name. These forests can be considered as natural heritage and their significance is underlined by the two larger forests near Kenhardt and Loeriesfontein that are advertised as tourism sites. These clusters of trees thus form an important part of the scenic value of the landscape, although it is true that in this instance they are not visible from any scenic routes.



**Figure 27:** Quiver tree 'forest' on Gemsbok Bult.

## 6.5. Summary of heritage indicators

The most dominant type of heritage resource on the property is archaeology. However, there is very little of any scientific value and even those resources clustered around the pan in the preferred site are of low significance.

The cultural landscape is very limited and has been degraded through the addition of the railway line. The proposed and authorised substation and power lines will add further electrical infrastructure to the landscape. This landscape is of little heritage value. However, the clusters of quiver trees can be seen as having some value for the contribution they make to the overall scenic value of the landscape and should be preserved.

## 7. ASSESSMENT OF IMPACTS

Only two types of heritage resources will experience impacts: archaeology and the landscape. As such, only these two aspects are assessed in this section. In both cases the impacts are first experienced at the construction phase and, any further impacts would generally be of equal or lesser severity. As such, impact assessment tables are only presented for the Construction Phase. Impacts to the landscape will become less severe after decommissioning and are discussed below.

### 7.1. Archaeology

There will be direct impacts to archaeological resources in all of the four sites under assessment but these are of generally low significance, since the resources have little or no scientific value (Tables 2 to 5). There are no fatal flaws. Because of the very low density of archaeological sites reported in the region, cumulative impacts to archaeological resources will be minimal. No mitigation or management measures are required, although in the preferred Gemsbok PV1 site it would be preferable to avoid the vicinity of the pan in order to protect what little archaeology does occur there. The same applies in the Alternative 2 site where the rocky hill should be avoided if possible. For all sites the impacts will initially occur during construction and then remain stable during the operation and decommissioning phases, i.e. no new impacts are likely to be experienced so long as no previously undisturbed areas are impacted during these later phases. None of the sites is particularly favoured over any other.

### 7.2. Cultural landscape

Direct impacts to the landscape will occur through clearing the ground and building on it, both of which will alter the character of the landscape. In some cases, particularly in Alternative 1, which includes the rocky hill with the historic stock post, some blasting of bedrock is likely to be required because of the outcrops present at the surface – this would cause additional permanent scarring of the landscape that would be difficult to rehabilitate. However, the landscape is, in general, of very limited heritage significance and is far away from any scenic routes. The clusters of quiver trees in the northern part of the property and falling within the western part of Alternative 2 and at the north-eastern edge of Alternative 3 do add character to the landscape and are best avoided. They are deemed to be of medium heritage significance, mainly on the strength of their tourism value in other areas, and impacts to them are rated as being of medium significance (Table 2). Significance with mitigation is rated as very low for alternatives located close to existing

infrastructure, while alternatives located further away are rated as having low significance impacts. There are no fatal flaws in terms of the landscape. Although cumulative impacts would occur through the construction of three similar facilities in close proximity to one another, these impacts are of low significance because of the site's remote location and the other features that compromise the landscape (railway, proposed substation and power lines). The only mitigation measures that can be suggested are to avoid the clusters of quiver trees and rocky outcrops as far as is possible. No other mitigation or management measures are suggested for the landscape besides following best practice and keeping the disturbance footprint as small as possible. The preferred site and Alternative 3 thus emerge as the favoured options in terms of landscape impacts with the preferred Gemsbok PV1 site being best because of its proximity to other industrial-type features. Note that upon decommissioning the impacts to the landscape would essentially revert to the status quo unless substantial landscape scarring was visible where blasting had taken place. Decommissioning phase impacts would thus likely have a zero intensity and have neutral status.



**Table 2:** Assessment of archaeological impacts for the Gemsbok PV1 site.

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Irreplaceability	Mitigation/Management Actions	Significance and Status		Confidence level
								Without Mitigation	With Mitigation	
<b>CONSTRUCTION PHASE</b>										
<b><i>Impacts to archaeological resources</i></b>										
Direct disturbance and/or destruction of archaeological material	Site specific	Permanent	Low	Probable	Non-reversible	High	None required, but avoiding the pan is preferable	Low Negative	Very low Negative	High
<b><i>Impacts to the cultural landscape</i></b>										
Direct impacts to the landscape through introduction of industrial type facilities	Local	Long term	Low	Definite	Reversible	Low	Try to keep development close to existing and proposed electrical infrastructure	Low Negative	Very low Negative	High

**Table 3:** Assessment of impacts for the Alternative 1 site.

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Irreplaceability	Mitigation/Management Actions	Significance and Status		Confidence level
								Without Mitigation	With Mitigation	
<b>CONSTRUCTION PHASE</b>										
<b><i>Impacts to archaeological resources</i></b>										
Direct disturbance and/or destruction of archaeological material	Site specific	Permanent	Low	Probable	Non-reversible	High	None required, but avoiding the rocky hill with a buffer of 50 m is preferable	Low Negative	Very low Negative	High
<b><i>Impacts to the cultural landscape</i></b>										
Direct impacts to the landscape through introduction of industrial type facilities, and landscape scarring through blasting of bedrock	Local	Long term	Medium	Definite	Reversible	Low	Try to avoid rocky outcrops where blasting would cause permanent landscape scarring	Medium Negative	Low Negative	High

**Table 4:** Assessment of impacts for the Alternative 2 site.

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Irreplaceability	Mitigation/Management Actions	Significance and Status		Confidence level
								Without Mitigation	With Mitigation	
<b>CONSTRUCTION PHASE</b>										
<b><i>Impacts to archaeological resources</i></b>										
Direct disturbance and/or destruction of archaeological material	Site specific	Permanent	Low	Probable	Non-reversible	High	None required	Very low Negative	Very low Negative	High
<b><i>Impacts to the cultural landscape</i></b>										
Direct impacts to the landscape through introduction of industrial type facilities and destruction of quiver tree forests.	Local	Long term	Medium	Definite	Reversible	Low	Avoid the forests of quiver trees	Medium Negative	Very low Negative	High

**Table 5:** Assessment of impacts for the Alternative 3 site.

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Irreplaceability	Mitigation/Management Actions	Significance and Status		Confidence level
								<i>Without Mitigation</i>	<i>With Mitigation</i>	
<b>CONSTRUCTION PHASE</b>										
<b><i>Impacts to archaeological resources</i></b>										
Direct disturbance and/or destruction of archaeological material	Site specific	Permanent	Low	Probable	Non-reversible	High	None required	Very low Negative	Very low Negative	High
<b><i>Impacts to the cultural landscape</i></b>										
Direct impacts to the landscape through introduction of industrial type facilities and destruction of quiver tree forests.	Local	Long term	Low	Definite	Reversible	Low	Avoid the forests of quiver trees	Low Negative	Low Negative	High

## 8. CONCLUSIONS

No highly significant heritage resources exist on any of the proposed sites, but the clusters of quiver trees in the northern part of the study area have medium heritage significance and are best avoided. The preferred site, Gemsbok Solar PV1, is thus deemed to be an excellent choice for development and is supported here. The second best site is considered to be Alternative 3 in the north-western part of the property, although keeping the facility close to the railway and electrical infrastructure would be most desirable. Alternative 1 is least preferred because of the potential landscape scarring that might occur there.

Given the generally high visibility and flatness of the landscape, it is felt that all significant heritage resources would have been found during the survey. As such, no further walk-down survey is required unless land not included in any of the assessed alternatives is later chosen for development.

## 9. RECOMMENDATIONS

It is recommended that construction of the proposed Gemsbok Solar PV1 facility should be allowed to continue from a heritage perspective, since impacts to heritage resources are likely to be of very low significance. The following recommendations are made:

- Alternative 1 and the western part of Alternative 2 are best avoided if possible;
- The facility should be placed in such a way as to be as near as possible to the other existing and proposed infrastructure in the area;
- The overall disturbance footprint of the project should be kept as small as possible; 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 (SAHRA and Ngwao-Boswa Ya Kapa Bokoni) and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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# APPENDIX 1: DECLARATION



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA


### DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

File Reference Number:	(For official use only)
NEAS Reference Number:	12/12/20/
Date Received:	DEAT/EIA/

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

### PROJECT TITLE

Proposed construction of Gemsbok PV1 75 MW Solar PV facility on the remaining extent of Portion 3 of the Farm Gemsbok Bult 120, Kenhardt, Northern Cape
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Specialist:	ASHA Consulting (Pty) Ltd		
Contact person:	Dr Jayson Orton		
Postal address:	6A Scarborough Road, Muizenberg		
Postal code:	7945	Cell:	083 272 3225
Telephone:	021 788 8425	Fax:	n/a
E-mail:	Jayson@asha-consulting.co.za		
Professional affiliation(s) (if any)	Association of Southern African Professional Archaeologists (ASAPA) CRM member No. 233.		

Project Consultant:	Council for Scientific and Industrial Research (CSIR)		
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Postal code:	7599	Cell:	0824680962
Telephone:	0218882490	Fax:	0218882693
E-mail:	Sbrink1@csir.co.za		


4.2 The specialist appointed in terms of the Regulations\_

I, JAYSON ORTON, declare that --

General declaration:

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 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

  
ASHA Consulting (Pty) Ltd

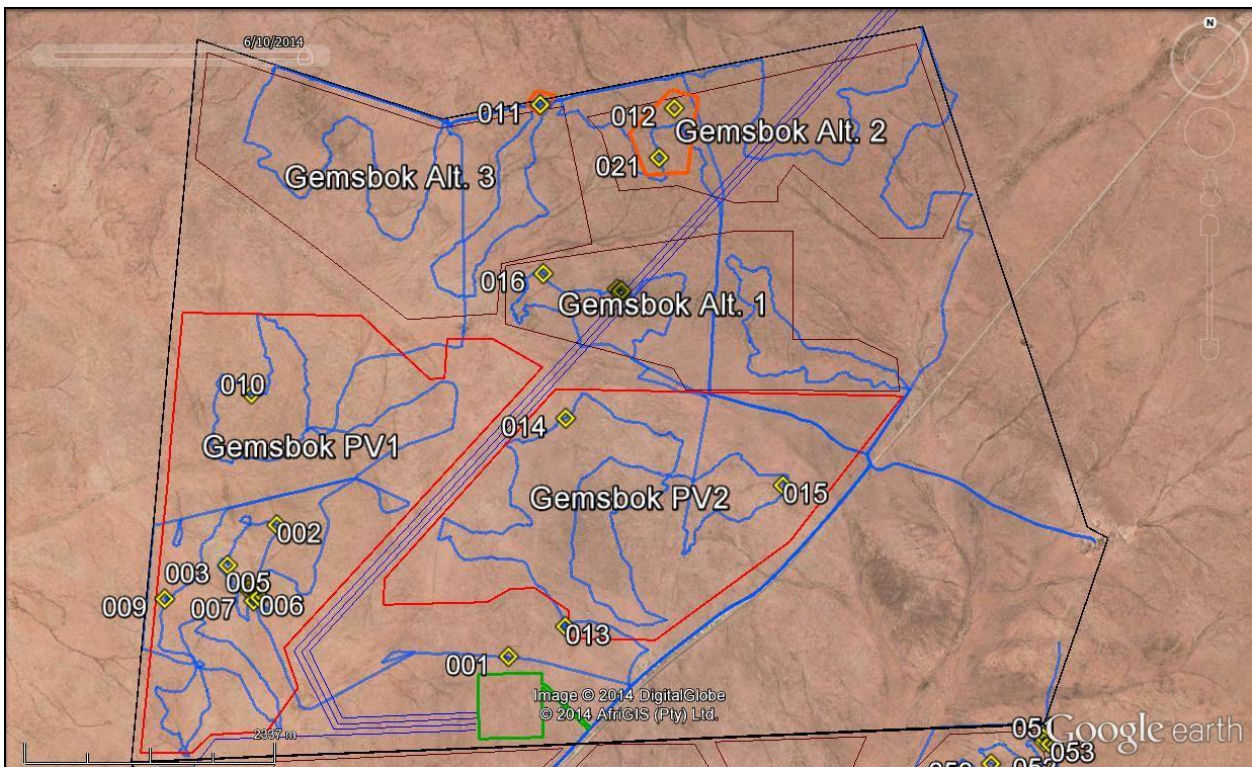
Name of company (if applicable):

Date:

04 JULY 2014



## APPENDIX 2: MAPPING

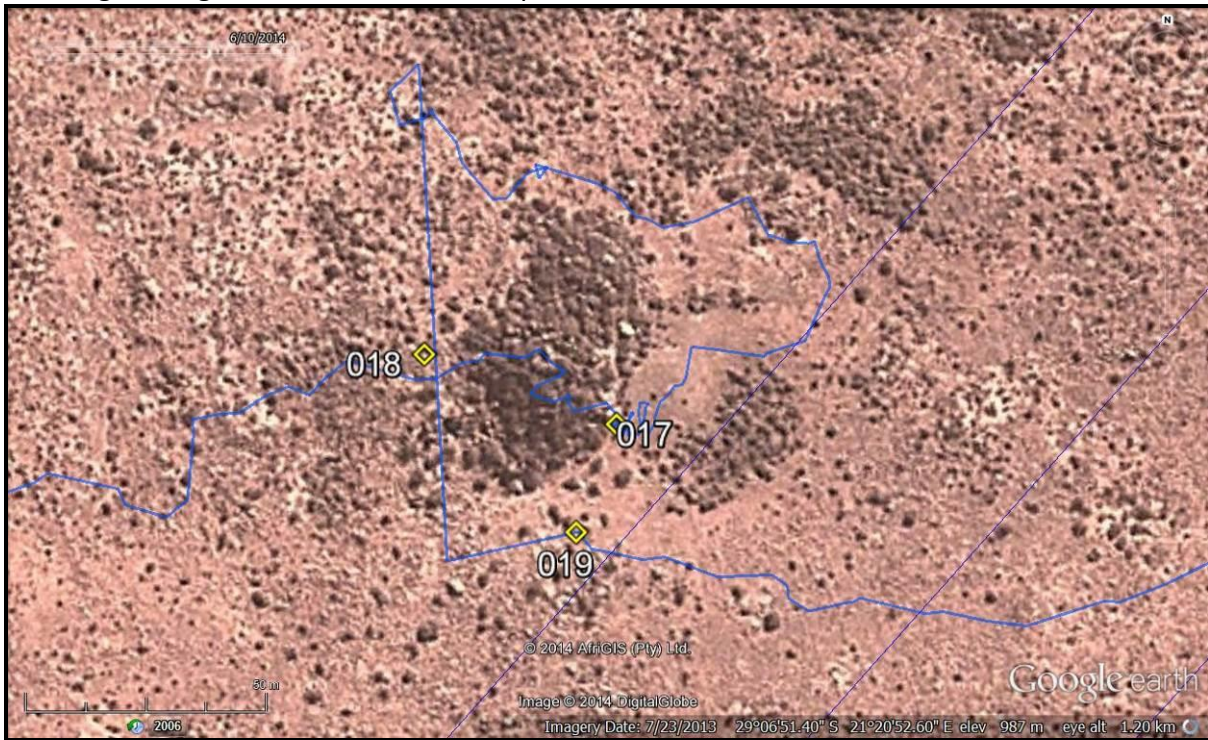


**Figure A2.1:** Aerial view of the study area showing the heritage resources located. The farm house is in the far east at the kink in the boundary line. The two orange polygons in the north indicate the quiver tree clusters.





**Figure A2.2:** Aerial view of the pan in the southern part of the preferred Gemsbok PV1 site showing heritage resources around the pan.



**Figure A2.3:** Aerial view of the rocky hill in the western part of Alternative 1 showing heritage resources located around it.