

**ARCHAEOLOGICAL IMPACT ASSESSMENT
THE PROPOSED KWHEZA POWER PHOTOVOLTAIC
ENERGY GENERATION FACILITY NEAR PRIESKA
NORTHERN CAPE PROVINCE**

Prepared for:

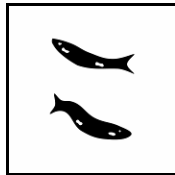
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Executive summary

The Agency for Cultural Resource Management was requested by Cape Lowlands Environmental Services cc to conduct an Archaeological Impact Assessment for the proposed construction and operation of a 8 Mega Watt commercial Photovoltaic (PV) Energy Generation Facility near Prieska in the Northern Cape Province.

The site for the proposed Kweza solar farm is located alongside the R357 about 3 kms south east of Prieska on the road to Douglas. The land is Prieska Commonage and is currently zoned for Agriculture use. The proposed site comprises a flat, featureless piece of vacant land with the existing Eskom overhead electricity power lines being the only infrastructure within close proximity to the site. The Eskom Burchell sub-station is also located directly north of the proposed solar energy farm. The proposed development site is covered in dense natural vegetation and dry grass and is surrounded by vast tracts of similarly vacant agricultural land.

The proposed activity entails the construction of blocks of photovoltaic solar panels covering an area of about 20 ha. The PV panels will be mounted on pedestals drilled and set into the ground. Associated infrastructure includes single track internal access roads, underground cables, a switching station and temporary construction camp. The electricity that will be generated from the project will be fed directly into the national grid at the nearby Eskom Burchell substation.

In terms of Section 38 (1) (c) (iii) of the National Heritage Resources Act 1999 (Act 25 of 1999), an Archaeological Impact Assessment of the proposed project is required if the footprint area of the proposed development is more than 5000 m².

The Archaeological Impact Assessment forms part of the Environmental Basic Assessment process that is being conducted by independent environmental consultants, Cape Lowlands Environmental Services cc.

The aim of the study is to locate and map archaeological sites/remains that may be impacted by the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate the impacts.

A 1 day, foot survey of the proposed footprint area was undertaken by the archaeologist.

The following observations were made:

- More than 150 mostly single, dispersed Later Stone Age archaeological occurrences were mapped with a hand held GPS unit. Less than a dozen Middle Stone Age flakes and cores were counted. Two very small scatters of artefacts were found in the Eskom servitude that is situated outside the proposed development footprint. No evidence of any factory or workshop site, or the result of any human settlement was identified. No organic remains were found. Most of the tools comprise flakes, blades, chunks and cores that occur on exposed patches of gravel and pebble stone surrounded by dense vegetation and long dry grass. Frequencies of formal retouched tools are very low, but many of the flakes and blade tools have been retouched and utilised on one or both sides. Of the formal retouched tools; four convex scrapers, two side scrapers, one end scraper, two adzes, one backed flake and one retouched bladelet were

encountered. One possible Natural Backed Knife (NBK) was also found. While a few of the implements are in quartzite, banded ironstone and indurated shale, more than 99% of the tools are in fine grained chalcedony.

As archaeological sites are concerned, the occurrences are lacking in context. While the random scatters of tools are relatively rich in quantity, they are poor in terms of information that can be constructed from them. No organic remains such as bone, pottery or ostrich eggshell was found. As a result the remains have been rated as having low archaeological significance.

No colonial heritage resources were noted.

There are no graves with headstones or any burial ground or cemetery on the affected property.

In terms of the built environment, the area has no significance.

It is maintained that the Archaeological Impact Assessment has captured good information on the archaeological heritage present and that the study has identified no significant impacts to pre-colonial archaeological material that will need to be mitigated prior to proposed development activities.

The results of the AIA indicate that the proposed development of the Kwheza solar power generation facility near Prieska will not have an impact of great significance on these and potentially other archaeological remains.

Indications are that in terms of archaeological heritage, the proposed activity is viable.

In archaeological terms, no fatal flaws have been identified.

With regard to the proposed development of the Kwheza solar farm near Prieska in the Northern Cape, the following recommendations are made:

1. No archaeological mitigation is required.
2. Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (SAHRA) (Att Ms Mariagrazia Galimberti 021 462 4502). Burials, etc must not be removed or disturbed until inspected by the archaeologist.

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1. INTRODUCTION

Cape Lowlands Environmental Services, on behalf of Kwheza Power (Edms) Bpk requested that the Agency for Cultural Resource Management conduct an Archaeological Impact Assessment for the proposed construction and operation of a 8 Mega Watt (MW) Photovoltaic (PV) Energy Generation Facility near Prieska in the Northern Cape (Figure 1). The proposed development is situated within the Siyathemba Municipality. The affected property is currently zoned Agriculture and referred to as Prieska Commonage.

The Northern Cape has the highest levels of Solar Irradiance in South Africa, which makes the location of the proposed development ideal for solar energy generation. The renewable energy industry is currently experiencing an explosive growth worldwide. In South Africa, while such energy sources are not expected to replace the country's traditional reliance and dependency on coal-generated power, the National Energy Regulator of South Africa (NERSA) has published a favourable feed-in tariff structure for renewable energy that allows for independent clean energy producers to invest in renewable energy resources. The growing alternative energy industry is considered to be of national importance in anticipation of its contribution to electricity supply and reduced reliance of non-renewable energy sources.

It is in this context that the applicant (Kwheza Power) proposes to construct solar energy facility near Prieska. The proposed activity entails the construction of approximately 12 blocks of photovoltaic solar panels. Each block consists of panels mounted on pedestals in clusters of two blocks, with a 5 m management road around each block. Six group stations will be constructed in the middle of the facility. Electricity generated from each solar panel will be transported via underground cables to the Main Station. From the Main station the electricity generated will be transported to the existing Eskom power via a cable of not bigger than 22 kV to the Burchell substation next to the site. An on-site generator transformer will facilitate the connection between the solar energy facility and the Eskom power station and electricity grid. The facility will link into the existing Eskom lines immediately north and west of the proposed site which feeds directly into the Burchell Rural 132/11 kV substation to the north. The proposed access road to the facility will be less than 200 metres in length and will be an unsurfaced road, that links to the existing Eskom roads on site, which has direct access to the R357 road to Prieska.

Extensive bedrock excavations are not envisaged, but some vegetation will need to be cleared between the rows of solar panels to allow access for maintenance purposes.

The footprint area that is required for the proposed project is about 20 ha in extent but the land (Prieska Commonage) on which the facility will be developed is nearly 17 000 ha in extent.

The AIA forms part of the Environmental Basic Assessment process that is being conducted by independent environmental consultants Cape Lowlands Environmental Services cc.

The aim of the study is to locate and map archaeological sites/remains that may be impacted by the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate the impacts.

2. HERITAGE LEGISLATION

The National Heritage Resources Act (Act No. 25 of 1999) makes provision for a compulsory Heritage Impact Assessment (HIA) when an area exceeding 5000 m² is being developed. This is to determine if the area contains heritage sites and to take the necessary steps to ensure that they are not damaged or destroyed during development.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

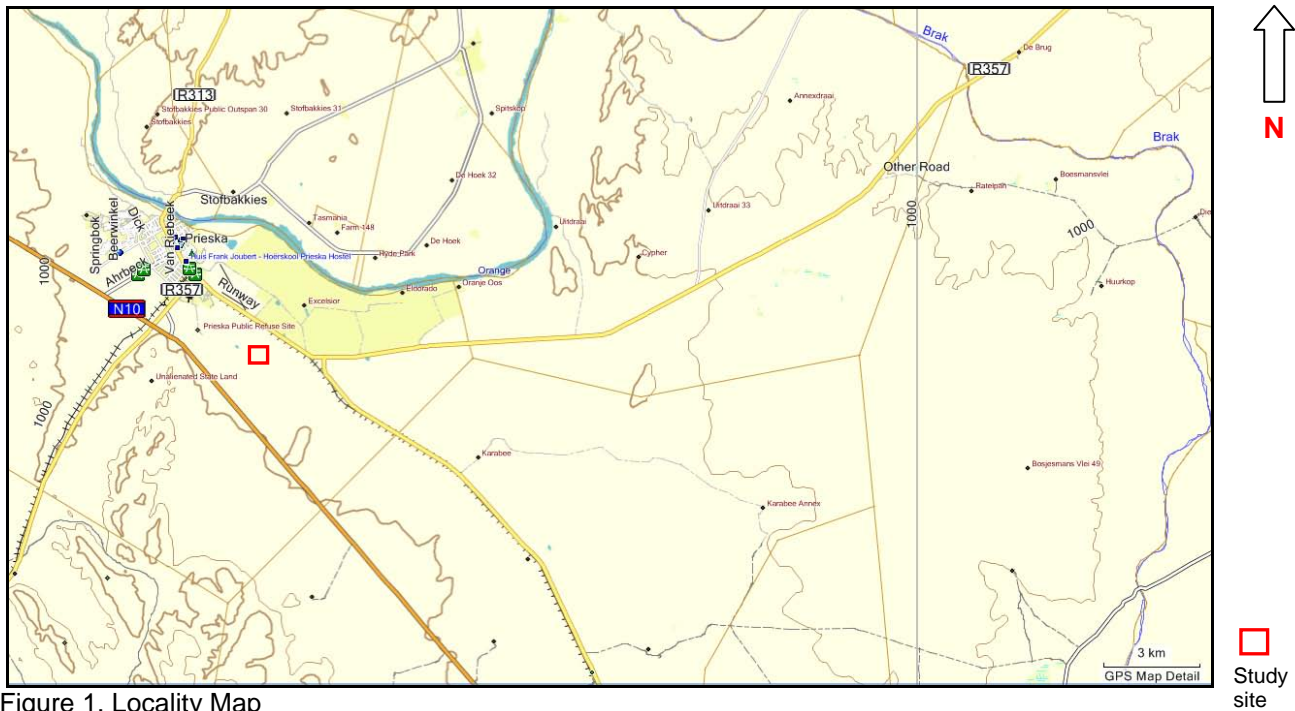


Figure 1. Locality Map

3. TERMS OF REFERENCE

The terms of reference for the study were to.

- Determine whether there are likely to be any important archaeological resources that may potentially be impacted by the proposed project, including the erection of the solar panels, internal access roads, underground cables, and any other associated infrastructure;

- Indicate any constraints that would need to be taken into account in considering the development proposal;
- Identify potentially sensitive archaeological areas, and
- Recommend any further mitigation action.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

An aerial photograph indicating the location site of the proposed Kweza solar farm is illustrated in Figures 2 & 3. The site for the proposed facility is located alongside (i.e. south of) the R357, about 3 kms south east of Prieska on the road to Douglas. The proposed site is located within a rural cultural landscape. The study area comprises a flat, featureless piece of vacant land, with the existing Eskom electricity grid and power lines being the only developments within close proximity to the site. The Eskom Burchell sub-station is located directly north of the proposed site. There are no water bodies such as springs or pans, drainage lines or any other significant landscape features present on the proposed site. Drainage lines to the east and west of the site divert the flow of the surface water in a northerly direction towards the Orange River which is about 3.5km north east of the site. The site is covered in dense natural vegetation and dry grass, with sporadic trees occurring in places. Surrounding land use is mainly vacant agricultural land, and the proposed site is bordered by vast tracts of similar natural veld (Figures 4-9). There are no graves with headstones or any burial ground or cemetery on the affected property.



Figure 2. Aerial photograph of the proposed site in relation to Prieska



Figure 3. Aerial photograph of the proposed site



Figure 4. View of the site facing north east. Note the open patches of compact gravel and stone. The veld is covered with thick dry grass.



Figure 5. View of the site facing south



Figure 6. View of the site facing south east



Figure 7. View of the site facing south



Figure 8. View of the site facing south



Figure 9. View of the site facing north. Arrow indicates the Burchell substation

5. STUDY APPROACH

5.1 Method of survey

A 1 day, foot survey of the proposed footprint area was undertaken.

The site visit and assessment took place on the 19th July, 2011 and a number of archaeological observations were made.

All archaeological occurrences documented during the study were mapped in-situ using a hand-held Garmin Oregon 300 GPS unit set on the map datum WGS 84¹.

A desk top study was also done.

¹ Do to a corrupted file, all waypoints for this study have been lost

5.2 Constraints and limitations

A large portion of the footprint area is covered in very thick bush and long dry grass, resulting in poor archaeological visibility. However, access over the study site was fairly good, and the archaeologist was able to cover much of the affected property.

5.3 Identification of potential risks

Pre-colonial archaeological remains will be impacted by the proposed activity, but it is maintained that the AIA has captured a good record of the archaeological heritage present on the proposed site.

Apart from underground cabling, and removal of some vegetation between PV modules, limited bedrock excavations are envisaged. The solar panels will be raised above ground, and mounted on small footings drilled into the ground. Prieska Commonage is almost 17 000 ha in extent and the footprint area (20 ha) for the proposed facility represents only 0.1% of the total land coverage of the property.

5.4 Results of the desk top study

The archaeology of the Northern Cape is rich and varied covering long spans of human history. According to Morris (2010), the vicinity near Prieska includes well known Middle and Later Stone Age (LSA) sites along the Orange River, and a small shelter on Prieska Kop. Morris (2010) also documented surface scatters of mostly Later Stone Age and some Middle Stone Age tools during an assessment for a proposed new cemetery at Prieska.

At Bundu near Copperton (about 60 west of Prieska), a series of dried up deflated pans have been excavated by Kiberd (2002, 2006). Pans would have acted as focal points for grazing animals, but also a source of water. A complex series of sedimentary features and horizons in these pans may be broadly coeval with periods of climatic change in the region (Kiberd 2006). Archaeological material was recovered from throughout the sedimentary sequence. Large numbers of Later Stone Age tools occur on the surface of the pan and within the upper red sands and include micro-lithic tools, while below the red sands, Middle Stone Age (MSA) lithics mainly in quartzite, and preserved fauna were found. Early Stone Age (ESA) tools, preserved fauna and even the possible discovery of an ESA hearth, which may be older than 300 000 years, was also excavated. Kaplan (2010) also undertook an archaeological impact assessment of a proposed solar power farm near Copperton, where large numbers of Later and Middle Stone Age material were documented.

6. FINDINGS

More than 150 archaeological occurrences were mapped by the archaeologist. While these were initially captured with a hand held GPS unit, all the waypoints were unfortunately lost due to a corrupted file. A description of each of the archaeological finds located during the study is, however, presented in Table 1 in the Appendix.

The majority of the archaeological observations include single and dispersed occurrences of stone tools, but sometimes two or three implements were found less than 1 m apart, on hard patches of gravel and stone pebbles. Only two small scatters of tools

(750 & 767) was found in the Eskom servitude near the western boundary of the proposed development site, but this scatter and all of the preceding finds (745-766) were documented outside the footprint area for the proposed solar farm.

More than 95% of the lithics are assigned to the Later Stone Age, where these types of tools are spread randomly and unevenly over the surrounding landscape. There does not appear to be any spatial distribution or integrity to the finds and they manifest as mostly single occurrences. A description of the finds indicate that more than 95% of the tools are dominated by lithics that are assigned to the Later Stone Age, and are characterised by many utilised and retouched flakes and chunks (including retouched pieces) and flaked chunks/minimal cores. At least 13 round, and flat (worked out) cores were found. No hammerstones were noted over the area searched.

More than 99% of the tools found are in fine grained chalcedony, and only a very small number are in quartzite and (weathered) indurated shale and banded ironstone. Many of the tools are also heavily burnished indicating that they have lain on the surface for many hundreds, perhaps thousands of years.

The percentage frequency of formal retouched tools found is very low. Of the formal tools counted, only four convex scrapers (789, 820, 857 and 879), one end scraper (863) and two side scrapers (839 & 851) were documented during the study. Two adzes (865 & 884) and four flakes with step/adze flaking (782, 804, 828 & 841) were also counted. One backed flake (781) and one retouched bladelet (861) were found. Perhaps the most interesting find is a possible Natural Backed Knife (899) or NBK. At Elands Bay on the Cape west coast, NBKs have been found in levels dating from about 18000 to about 9000 years ago (Parkington 1984). An interesting feature of the sample of tools documented is the number (n = 14) of chunky, heavily retouched and/or utilised rectangular-shaped blades.

In addition to the above, a few enigmatic 'tools' were also found, illustrating the range and types of tools that are often encountered in the field, that do not conform to the recognised Later Stone Age nomenclature.

Only eight MSA flake tools were documented during the study, including one blade (801) and three utilised and/or retouched pointed flakes (805, 842 & 856). Only one MSA quartzite core (831) was encountered during the study. One LSA flake on a re-used MSA flake (787) was also found.

No evidence of any factory or workshop site, or the result of any human settlement was identified over the footprint area covered by the archaeologist, although it should be remembered that much of the surface area is covered with dense natural veld.

No organic remains such as bone, pottery or ostrich eggshell was found.

No colonial heritage resources were noted.

A collection of tools documented during the study and the context in which some of them were found are illustrated in Figures 10-21.



Figure 10. Collection of stone tools. Scale is in cm



Figure 13. Context in which the tools were found



Figure 11. Collection of stone tools. Scale is in cm



Figure 14. Collection of tools. Scale is in cm



Figure 12. Collection of stone tools. Scale is in cm



Figure 15. Collection of tools. Scale is in cm



Figure 16. Context in which the tools were found



Figure 19. Collection of stone tools. Scale is in cm



Figure 17. Collection of stone tools. Scale is in cm



Figure 20. Natural Backed Knife (899). Scale is in cm



Figure 18. Scale is in cm

6.1 Significance of the archaeological remains

Nearly 200 stone implements were counted during the Archaeological Impact Assessment of the proposed Kweheza Solar Power Project near Prieska. While several low density scatters of tools were documented during the study, the majority of the implements comprise, single, isolated occurrences that are spread randomly over the surrounding landscape. No evidence of any factory or workshop site, or the result of any human settlement was identified.

As archaeological sites are concerned, the occurrences are therefore lacking in context, and there does not appear to be any spatial integrity to the finds. While the scatters of tools are relatively rich in quantity, they are poor in terms of information that can be constructed from them. No organic remains such as bone, pottery or ostrich eggshell was found. As a result, the occurrences have been rated as having low archaeological significance.

In terms of the built environment, the area has no significance.

7. PREDICTED IMPACTS

In the case of the proposed Kweheza PV Energy Facility near Prieska, it is expected that some archaeological impacts will occur during the construction phase of the proposed project, but that the overall impact on important heritage resources will be low.

While it is likely that additional tools will be exposed during vegetation clearing operations, as well as uncovered during lying of underground cables, it is anticipated that such finds will not be very different from those already documented and described above.

8. CONCLUSION

It is maintained that the Archaeological Impact Assessment has captured good information on the archaeological heritage present and that the study has identified no significant impacts to pre-colonial archaeological material that will need to be mitigated prior to proposed development activities.

The results of the AIA indicate that the proposed development of the Kweheza solar power generation facility near Prieska will not have an impact of great significance on these and potentially other archaeological remains.

Indications are that in terms of archaeological heritage, the proposed activity is viable.

In archaeological terms, no fatal flaws have been identified.

9. RECOMMENDATIONS

With regard to the proposed construction and operation of a, 8 MW solar energy facility near Prieska in the Northern Cape, the following recommendations are made:

1. No archaeological mitigation is required.
2. Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (SAHRA) (Att Ms Mariagrazia Galimberti 021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.

10. REFERENCES

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Appendix

Archaeological study proposed 8 MW solar farm near Prieska in the Northern Cape

Name of Site	Name of Farm	Lat/Long	Finds
Kwheza Solar Power Farm	Prieska Commonage		
745			Retouched flake
746			Flake
747			Retouched flake
748			Retouched flake
749			Large retouched chunk
750			Thin scatter of flakes, chunks in Eskom servitude.
751			Core
752			Large retouched flake
753			Large chunk
754			Flake
755			Flake
756			Large flake, and 2 retouched flakes
757			Flake
758			Chunk
759			Retouched flake
760			Core and retouched flake
761			Large utilised and retouched blade
762			X 3 retouched flakes
763			Triangular shaped MSA chunky flake
764			Large adze-like blade
765			Retouched chunk
766			Flake, chunk and retouched flake
767			Thin, dispersed scatter of flakes and chunks on open patches of gravel alongside Eskom servitude
768			Large, retouched quartzite flake
769			Chunk and flake
770			Retouched flake
771			Core
772			Banded ironstone core (flat)
773			Large chunk/ minimal core
774			Utilised flake
775			Retouched flake
776			Flake
777			Chunk
778			Large retouched blade
779			Indurated shale flake
780			Long, utilised pointed flake/blade
781			Backed flake , flake and chunk
782			Chunky flake with step flake
783			Retouched flake
784			Chunk and core
785			Utilised flake, retouched flake, and retouched broken flake
786			Flake and chunk
787			Re-used MSA flake
788			Flaked chunk and large blade/flake
789			Chunk and convex scraper

Archaeological study proposed 8 MW solar farm near Prieska in the Northern Cape

790			Large chunk/ minimal core
791			Thin, miscellaneous retouched flaked chunk
792			Chunk, large chunk/ core
793			Flaked chunk
794			Chunk
795			Flake
796			Core
797			Small chunk
798			MSA snapped and retouched blade
799			Core
800			Chunky retouched blade
801			Large, utilised and retouched blade , and large indurated shale MSA blade
802			Small chunk
803			Minimal core
804			Large weathered concave step retouched flake in indurated shale
805			Utilised and retouched MSA point
806			Chunk
807			Large chunk/ minimal core
808			Retouched flake blade
809			Large flat flaked chunk/ core
810			Large chunky flake and large flaked chunk
811			Large flake
812			Large flake
813			Large flake
814			Square shaped core
815			Flat retouched flake/core
816			Long, flattish retouched & utilised blade
817			Retouched flake
818			Thin flake
819			Partially retouched flake and chunk
820			Large convex scraper
821			Flaked chunk
822			Chunk
823			Small, double sided retouched flake
824			Retouched chunk/blade
825			Large, broken indurated shale chunk/flake
826			Retouched blade
827			Flake and broken core
828			Chunk and large flake with step-flaking
829			Retouched flake blade
830			Chunk
831			Chunky retouched flake
832			Flat retouched flake
833			Double sided retouched blade
834			Chunk
835			Flat, round, retouched and utilised flake, and retouched flake
836			Retouched flake
837			Weathered indurated shale utilised flake
838			Retouched flake
839			Side scraper
840			Large chunky flake

Archaeological study proposed 8 MW solar farm near Prieska in the Northern Cape

841			Large chunky flake with step flaking
842			MSA unifacial pointed flake
843			X 2 retouched chunks
844			Small flake
845			Chunk
846			Flake and 2 chunks
847			Triangular-shaped flake
848			Flake
849			Small chunk
850			Retouched flake
851			Retouched flake/ side scraper
852			Large, retouched chunk
853			Chunky retouched flake
854			Large, chunky retouched flake
855			Chunk and core
856			MSA pointed retouched flake
857			Small, convex scraper
858			Weathered retouched flake
859			X 2 flakes, and chunk on stony gravel patch
860			X 2 retouched flakes
861			Retouched bladelet
862			Chunk
863			Retouched flake/ end scraper
864			Large chunk
865			Adze
866			X 2 retouched flakes
867			Retouched chunk/ minimal core & large retouched/utilised chunky flake
868			Chunky retouched/utilised flake & utilised flake
869			Large flat retouched chunk
870			Retouched flake
871			Large round quartzite core (burnished cortex) - ?MSA
872			Large weathered quartzite chunk
873			MSA flake
874			Retouched flake
875			Large flat retouched chunk
876			Chunky retouched flake
877			Large chunky flat retouched blade
878			Large triangular shaped partially retouched MSA flake
879			High backed convex scraper
880			Retouched chunk
881			Chunk
882			MSA retouched chunky flake
883			Retouched flake
884			Chunky adze
885			Large retouched flake
886			Small retouched flake and large end retouched flake
887			X 2 large retouched chunks and round core
888			Chunky, retouched/utilised flake blade
889			Thin, broken utilised/retouched blade
890			X 2 retouched flakes

Archaeological study proposed 8 MW solar farm near Prieska in the Northern Cape

891			Retouched chunk and 1 flake
892			Weathered indurated shale flake
893			Utilised flake
894			Cortex flake
895			Retouched flake
896			Large chunky flake
897			Large chunky retouched flake
898			Weathered indurated shale retouched flake
899			Possible Natural Backed Knife (NBK)
900			Minimal core /chunk

Table 1. Description of archaeological finds