DECLARATION BY THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS
Specialist Archaeological Assessment

Archaeological Impact Assessment: proposed photovoltaic power generation facility in De Aar, Northern Cape.

Declaration

I ...**Will Archer**....., as the appointed independent specialist hereby declare that I:

• acted as the independent specialist in the compilation of this report;

• regard the information contained in this report as it is encompassed by my specialist study to be true and correct, and

• do not have, and will not have, any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• have and will not have any vested interest in the proposed activity proceeding;

• have disclosed to the EAP any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010, and any specific environmental management act;

• have provided the EAP with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and

• am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543, 2010.

Executive summary

DJ Environmental Consultants, on behalf of Mulilo Renewable Energy appointed Will Archer – in collaboration with Jonathan Kaplan (Agency for Cultural Resource Management) - to conduct an Archaeological Impact Assessment for a proposed photovoltaic (PV) power generation facility in De Aar in the Northern Cape Provence. The footprint of the identified location for the proposed construction is 400 X 400m. The proposed facility will generate an estimated 20 MW of energy and an overhead power-line will connect with the national transmission grid via Hydra substation in De Aar.

The aim of this survey was to:

- Identify archaeological material that may be impacted on by the construction and implementation of the proposed development.
- Preliminarily assess the likely antiquity and spatial integrity of identified archaeological material as well as the likelihood of *in situ* archaeological deposits occurring in the vicinity of the proposed development.
- Assess the sensitivity of potentially impacted archaeological material.
- Use this information to advise relevant authorities regarding the significance and degree of prospective negative impact arising from the proposed development.
- Make recommendations regarding future mitigation of these impacts.

The archaeological study entailed the following:

- A one day survey of the identified footprint which included (1) making technological observations of individual artefacts and (2) collecting spatial information regarding the extension and spatial integrity of lithic scatters identified within the footprint as well as (3) mapping broadly where identified lithic scatters were at their densest.

The following findings were made:

- Substantial Stone Age archaeological materials were identified within the footprint.
- All identified archaeological materials were Hornfels lithic artefacts.

- Archaeological materials are densest in the western portions of the footprint where exposure regularly exceeds 2 artefacts per meter squared.
- The identified lithics are potentially an extension of scatters identified in an AIA of a previously designated locality for this development (DANW10 and DANW11) (Kaplan, 2010) (see below).
- The identified lithics share some contextual as well as technological characteristics with artefacts within the above mentioned sites (DANW10 and DANW11) (Kaplan, 2010).
- The identified lithics have a mosaic of technological characteristics that suggest the scatters are multi-component.
- The majority of identified artefacts were heavily patinated, suggesting that they have been exposed to natural processes for substantial periods of time. However double-patina on several artefacts suggests multiple episodes of individual artefact use.
- All identified lithics are *ex situ*.
- No *in situ* deposits exist in the proposed development footprint.
- There is no potential for obtaining absolute dates of the identified archaeological material.
- The identified archaeological material has limited research value.

The Archaeological Impact Assessment has shown that the proposed development will impact negatively on archaeological heritage remains, and that archaeological mitigation action will be required prior to any construction activities commencing.

In terms of archaeological heritage, the proposed activity is viable. Although impacts are expected to be negative – given the limited research potential of the exposed scatters – these impacts could be fairly easily and effectively mitigated.

The following recommendations are made:

- No archaeological excavations are required to mitigate these sites.
- A reflective sample of artefacts from identified scatters should be shot out with a total station and collected for technological analyses.

- A spatial sampling strategy should be devised where evenly spaced locations 40-50 meters apart can be identified across the western half of the footprint where artefacts are exposed.
- 5 by 5 meter squares should be set-up at each of these locations and all artefacts within these squares should be shot out with a total station and collected for basic technological analyses off site. The spatial data may indicate if and where activity areas such as knapping locations are present.
- Standard technological and morphometric data should be collected on the shot out finds.

Introduction

DJ Environmental Consultants, on behalf of Mulilo Renewable Energy appointed Will Archer – in collaboration with Jonathan Kaplan (Agency for Cultural Resource Management) - to conduct an Archaeological Impact Assessment for a proposed photovoltaic (PV) power generation facility on the farm 145/2 in De Aar, Northern Cape Provence. The proposed development is situated within the Emathanjeni Local Municipality. The footprint of the identified location for the proposed construction is 400 X 400m. The proposed facility will generate an estimated 20 MW of energy and an overhead power-line will connect with the national transmission grid via Hydra substation in De Aar.

Jonathan Kaplan conducted an earlier Archaeological Impact Assessment of a previous location designated for this development, and identified 2 archaeological sites (DANW10 and DANW11) (Kaplan, 2010). Due to (1) the range of artefacts present and (2) the nature of the proposed construction, the identified sites were deemed as being in danger of negative impacts from the proposed development (Kaplan 2010). The original location (Figure 1) designated for the proposed development was approximately 1km NNE of the current preferred location (hereafter the 'original location'), and these sites occur within this footprint. Due to the negative impacts identified in the original AIA (Kaplan, 2010), the current location was chosen as a potential alternative for this development (the 'current location' refers to the location with which this AIA is concerned). This clarification of referential terminology for different proposed development locations will become apparent in the methodology section of this report.

The aim of this study was to locate and map archaeological material that may be impacted by the construction and implementation of the proposed project, to assess the significance of the impacts and to propose measures to mitigate these impacts. The study entailed a one day survey of the identified footprint. This included making (1) technological observations of individual artefacts and (2) collecting spatial

information regarding the extension and spatial integrity of lithic scatters as well as (3) mapping where identified lithic scatters are at relatively higher density within the footprint.

Terms of reference

The terms of reference for this archaeological study were to:

- Identify archaeological material that may be impacted on by the planning, construction and implementation of the proposed development.
- Preliminarily assess the likely antiquity and spatial integrity of identified archaeological material as well as the likelihood of in situ archaeological deposits occurring in the vicinity of the proposed development.
- Assess the sensitivity of potentially impacted archaeological material.
- Use this information to advise relevant authorities regarding the significance and degree of prospective negative impact arising from the proposed development.
- Make recommendations regarding future mitigation of these impacts.

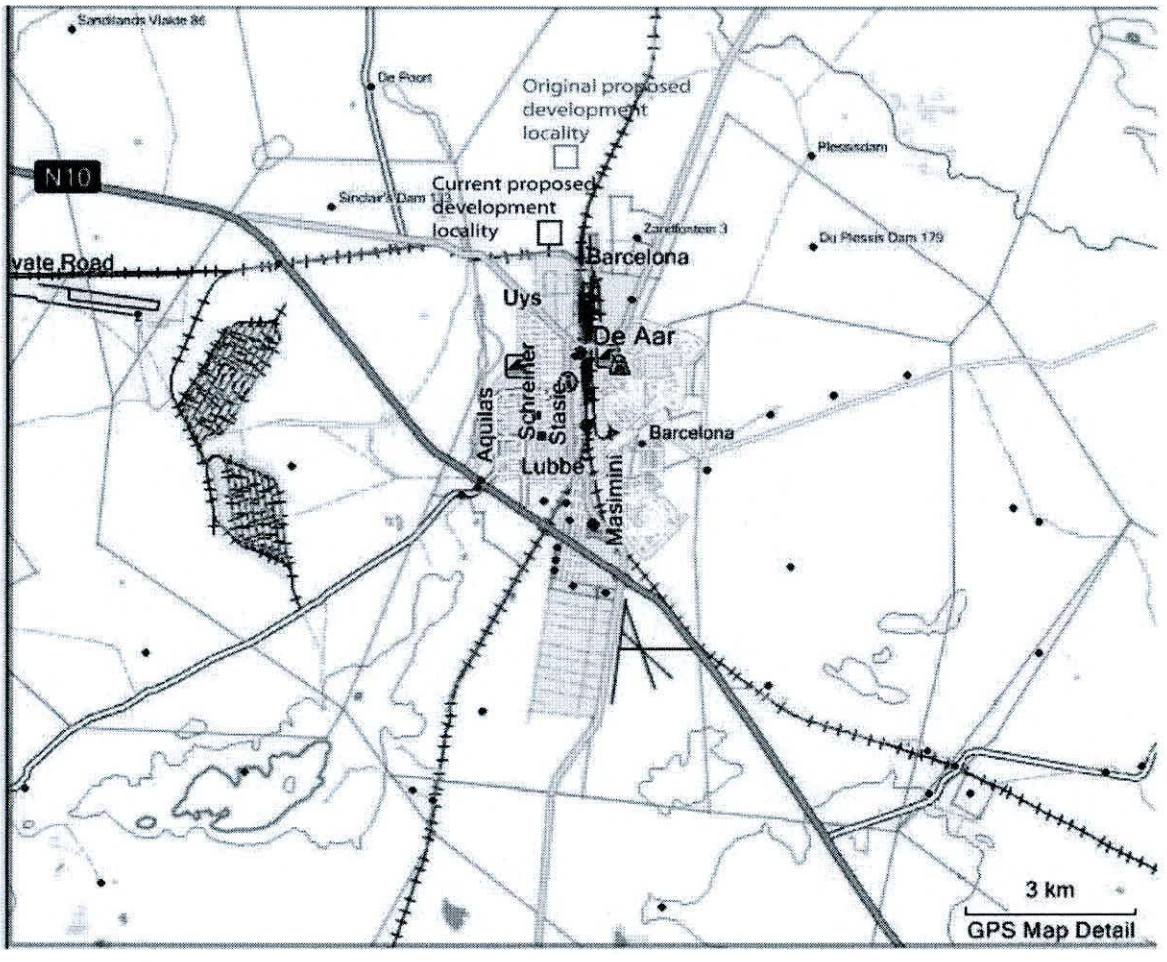


Figure 1: Locality map with the original location in purple and the current location in red.

Figure 2: Current location designated for proposed development (outlined in white).

The study sites

The proposed development is located in De Aar in the Northern Cape Provence (Figures 1 and 2, and refer to figure in appendix). The current zoning of the affected property is for agriculture. The proposed development locality is in close proximity to the western terraces of the Brak river, approximately 0.5 kilometres from the outskirts of the town and 0.5 kilometers from the Brak river main channel. The presence of silty sand at some places in the eastern portion of the footprint suggests that fluvial sediment may have been deposited when the river was flooding at some stage in the past.

Extensive bioturbation – predominantly aardvark burrowing – is evident across the property; however no artefacts were observed in the excavated sediments alongside these burrows. Archaeological visibility at the site localities is reasonably good and exposed artefacts are likely to have deflated down onto the current land surface through a dual process of recurring (1) potential low-energy flood wash and (2) intensive overgrazing whereby roots of grass and shrubs are extracted by grazers

(probably goats) and topsoil as well as sandy overburden (Figure 6) is removed through both Aeolian and fluvial processes. Given the proximity of the footprint to the current river channel (2) is likely to be the dominant process accounting for the exposure of artefacts.

Artefacts in the uppermost soils consequently sink down onto a single resistant land surface (Figures 3, 4 and 5). Interestingly, as one moves westwards within the footprint – and away from the river where one would expect grass and shrub cover to increase and, contingently, artefactual visibility decrease – artefacts seem to occur at relatively higher densities (Figures 7 and 8). The apparent greater exposure of scatters in the western part of the footprint may relate to (1) spatially preferential grazing habits of domestic stock within the development footprint or (2) variability in landscape use (patterns of tool manufacture and use) by Stone Age hominins responsible for tool discard within the footprint.

Figure 3: A typical erosional artefact baring surface with exposed artefacts high-lighted in blue.

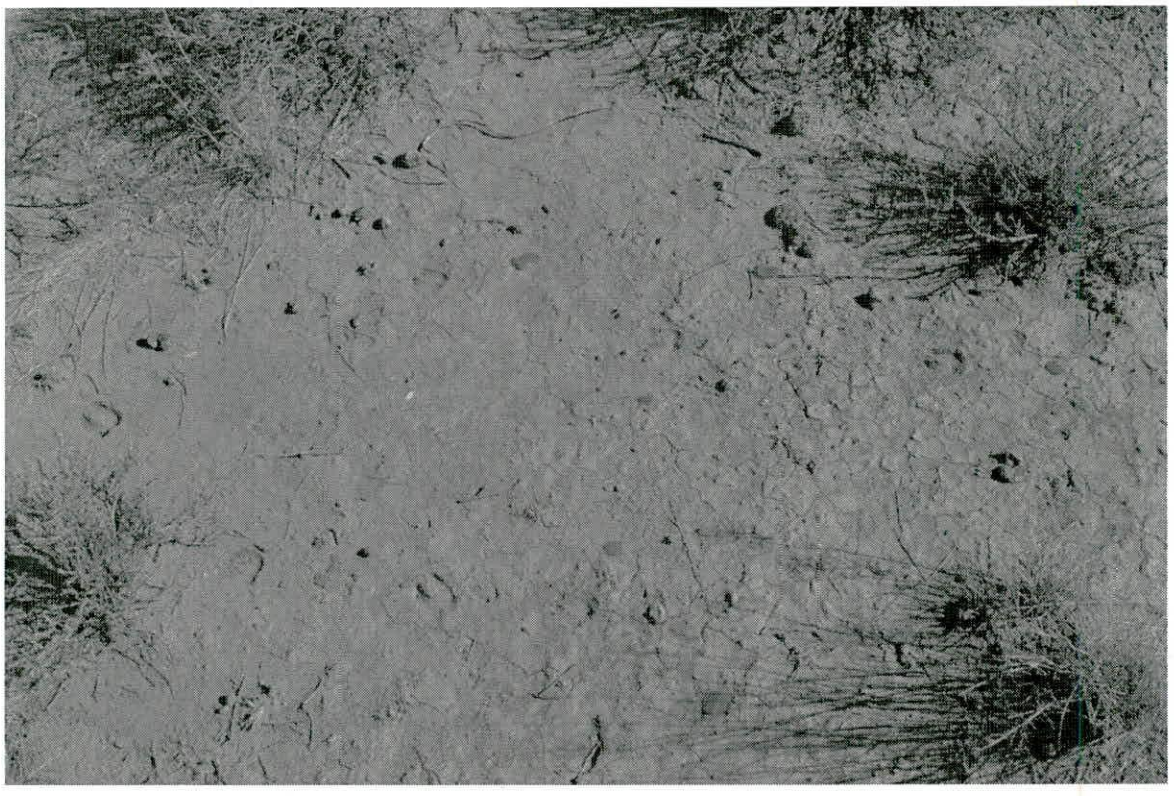


Figure 4: A typical erosional artefact baring surface with exposed artefacts high-lighted in red.

Figure 5: A typical erosional artefact baring surface with exposed artefacts high-lighted in yellow.

Figure 6: a sandy erosional surface prior to topsoil deflating.

Methodology

A one day visit to the prospective development locality was completed. The prospective footprint area was saved on a GPS prior to the initiation of the survey, and the survey was conducted in accordance with this referential framework. Waypoints were taken at points within the footprint where artefacts exceeded two per square meter (Figure 7). These localities are considered to be relatively high density within the context of the footprint. Artefacts were photographed at numerous places. However photographic recording focussed on diagnostic or particularly informative specimens as well as informative depositional/erosional contexts. All artefacts identified were not photographed or recorded and no morphometric technological data was collected. The survey focussed on portions of the footprint where visibility was at its highest.

Due to the proximity of the footprint to the 'original location' (+- 1km between them) - and the sites identified therein - particular attention was paid to technological, techno-economic and depositional similarities between artifacts identified at the 'current location' and those identified within the 'original location'. The logic behind this approach was that:

(1) if identified artefacts are similar in terms of their technological and contextual characteristics between these two localities,

(2) given that a mitigation procedure had already been established for the 'original location',

(3) This would suggest similar mitigatory measures would be suitable for artefacts within the 'current location'.

I believe that the methodology adopted for the survey of the proposed development locality has captured good information on the archaeological heritage present. The survey was conducted on the 30th of June, 2012.

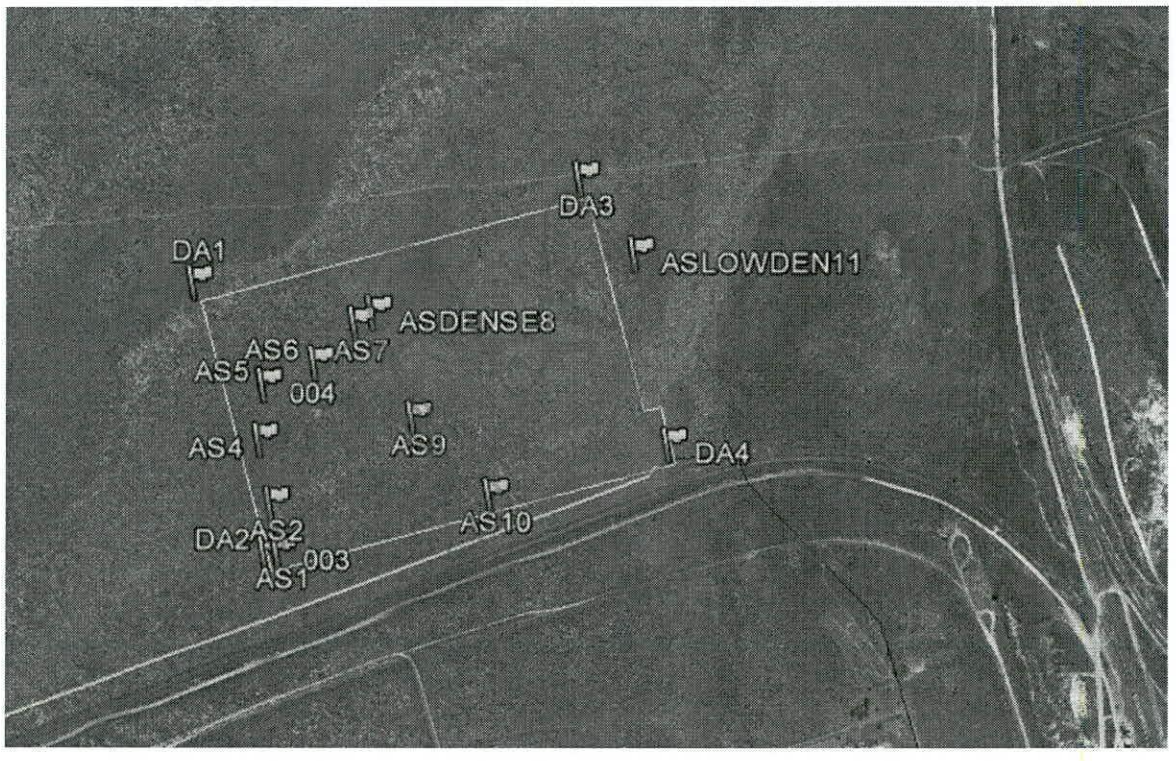


Figure 7: Reconstructed track log in red. Waypoints marked AS 1-11 represent artefact scatters where artefact density exceeded 2 per square meter. Notice the higher density of the AS waypoints in the western half of the footprint. Waypoint marked ASDENSE8 represents a scatter where density exceeded 5 artefacts per square meter. Although ASLOWDEN11 was originally identified as a low density location, that location was later identified as having >2 artefacts per square meter.

Constraints and limitations

Generally there were no constraints or limitations associated with data collected and presented in this report. Bush cover inhibited the locating of artefacts in various parts of the study site.

Findings

Investigation of scatters identified within this study treat them as a single site due to (1) the proximity of individual scatters to one another, (2) the relatively continuous exposure of artefacts across the western part of the development footprint and (3) the technological and typological similarity between artefacts across the whole footprint.

All identified artefacts were found *ex situ*. The artefacts occur in a deflated context and potentially have moved substantially both vertically as well as laterally since their time of original deposition (e.g. Figures 3-5). However the distances individual artefacts – and individual scatters - have moved potentially varies substantially for taphonomic reasons that need further spatial data to clarify. The artefacts where found relatively continuously distributed across a large area (Figures 7 and 8).

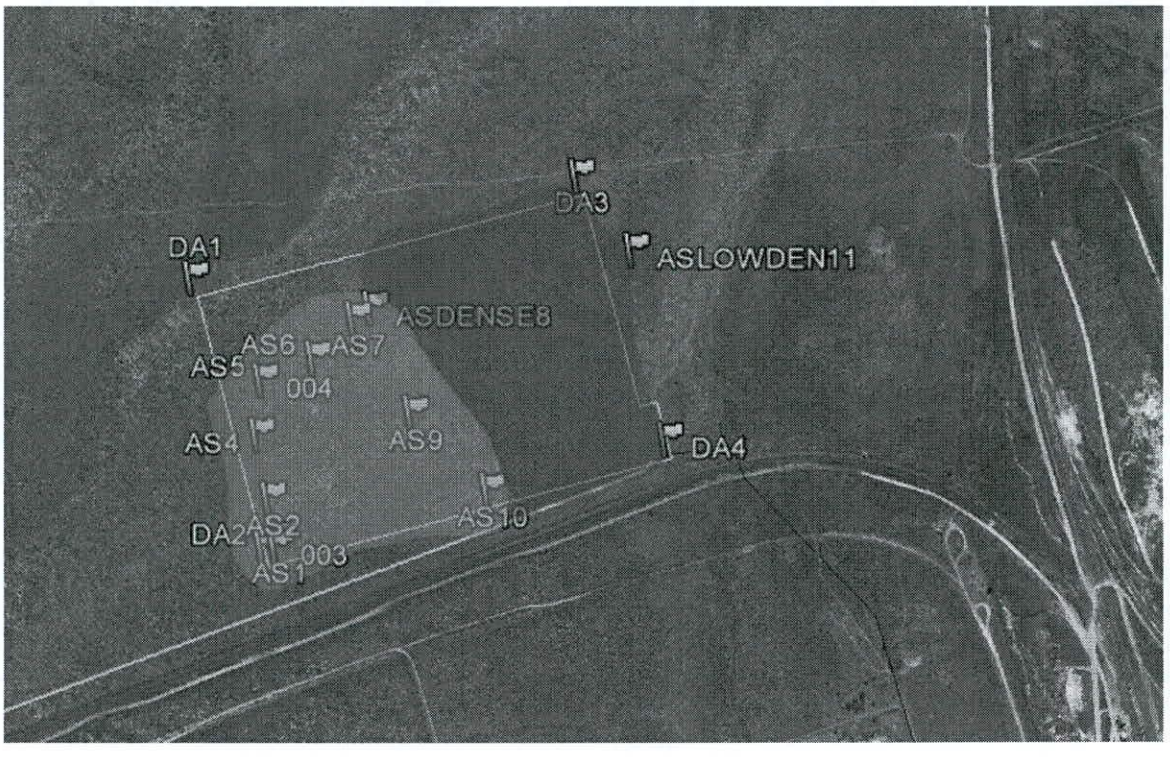


Figure 8: A density map based on field observations, showing the portion of the footprint with the higher density of artefact scatters in green and the portion of the footprint with lower densities in blue.

All lithics were produced on the same raw-material- Hornfels (indurated shale) - and were generally extensively patinated. Dual-patina occurred on a number of pieces which suggests multiple temporal waves of occupation/episodes of landscape use (Figure 9).

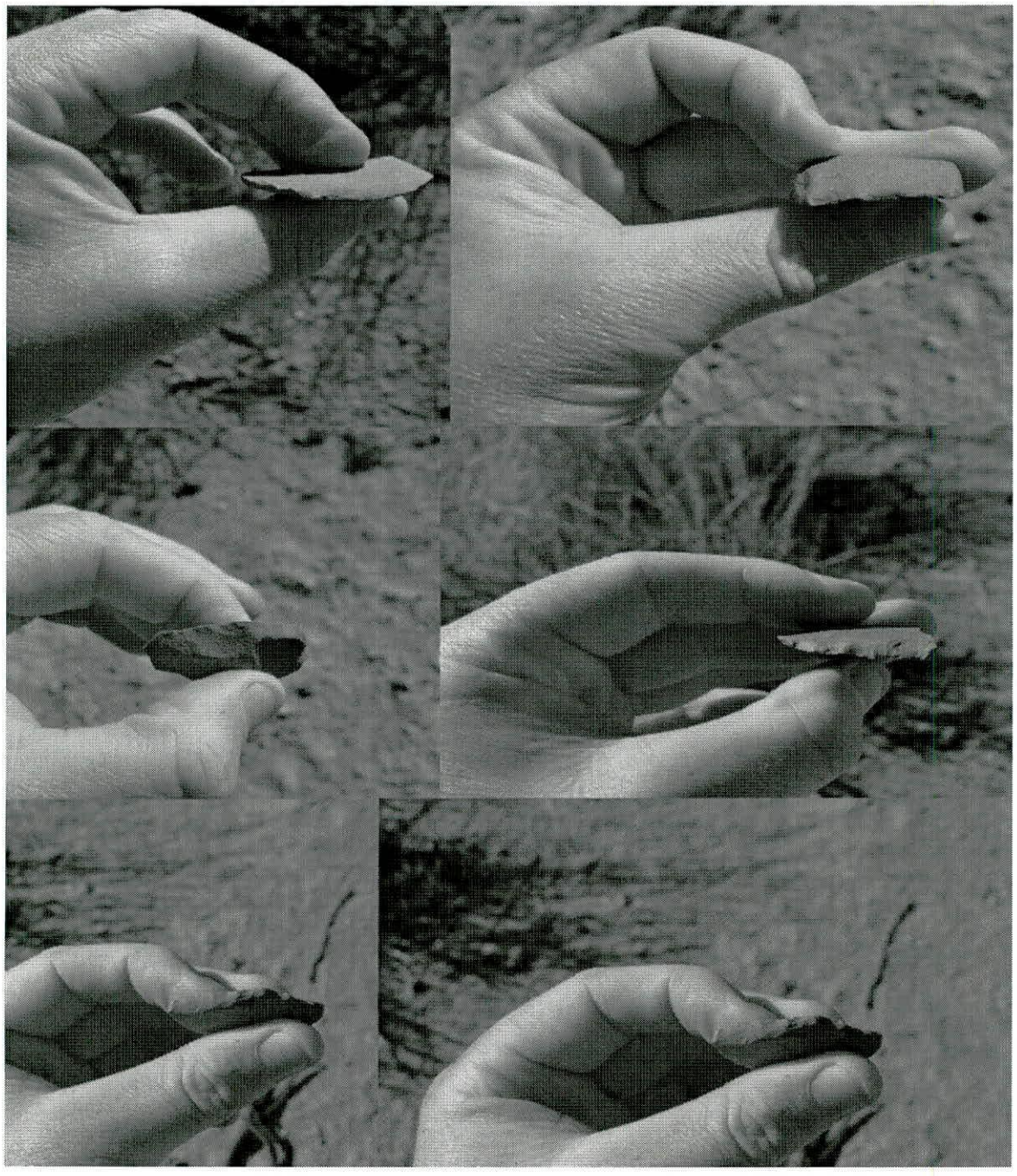


Figure 9: Numerous examples of scavenged flakes that have a double patina, suggestive of scavenging in the Later Stone Age.

The assemblage is generally relatively amorphous and contains no typological markers or formal tools with 3 exceptions:

(1) A reworked bifacial point was identified at the locality marked AS10 (Figure 10). The piece had clearly once been a Middle Stone Age Bifacial Point but had been scavenged in later periods and subjected to numerous episodes of reworking and use that were un-associated with its original manufacture.

(2) Two preferential Levallois cores (Figure 13). The cores had both been exhaustively reduced. However the last phase of removals showed clear preparation scars related to the shaping of core exploitation surface convexity. Many of the preparation scars were truncated by the removal of the preferential product (the Levallois flake). Note that due to how extensively these cores have been reduced, they look fairly atypical of Levallois. Given the paucity of prepared cores in the Later Stone Age, these artefacts also probably either relate to (a) a Middle Stone Age occupation of the landscape or (b) scavenging of raw-material for use in later periods.

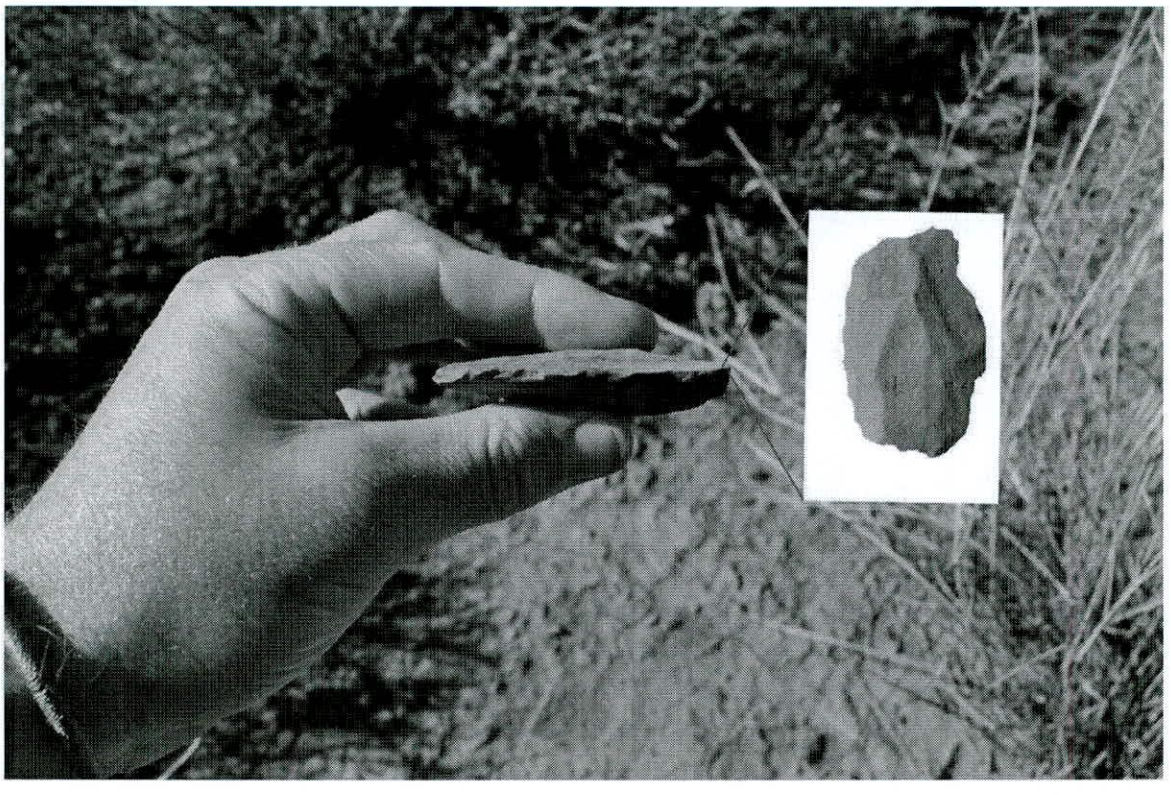


Figure 10: The re-worked bifacial point. The overall morphology of the point no longer resembles a point due to extensive reworking.

A high frequency of flakes have cortex and there are also nodules of unworked raw-material across the western portion of the footprint which suggests that the way in

which lithics were produced could be relatively expedient in places. However the extensive weathering of high numbers of artefacts makes diagnosis of whether certain pieces are manuports or simply artefacts that have been weathered beyond recognition, reasonably difficult.

Numerous bi-directionally worked cores were identified (Figure 12), and the presence of prepared platforms (facettes) (Figure 11) on some of the flakes suggests that there may be a Middle Stone Age occupation of this part of the landscape. However the numerous flakes with double patina suggest that raw-material provisioning strategies in the more recent – Later Stone Age - occupation of this locality, may explain why these earlier artefacts are there.

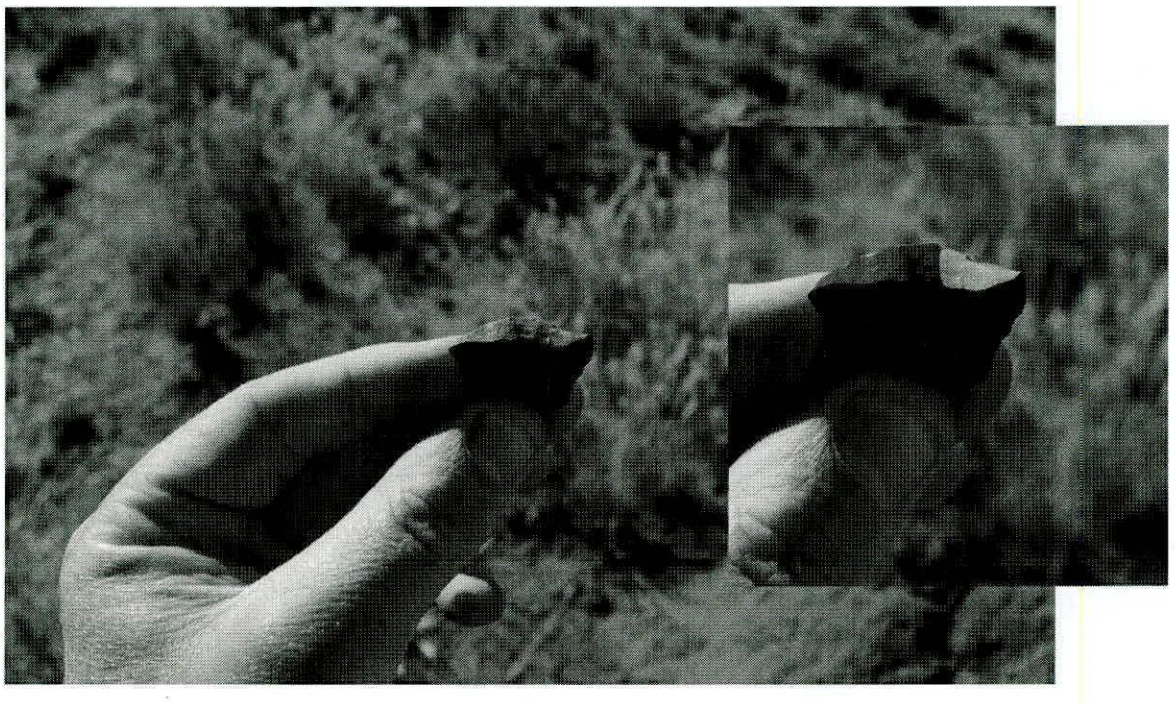


Figure 11: Flake with a prepared platform.

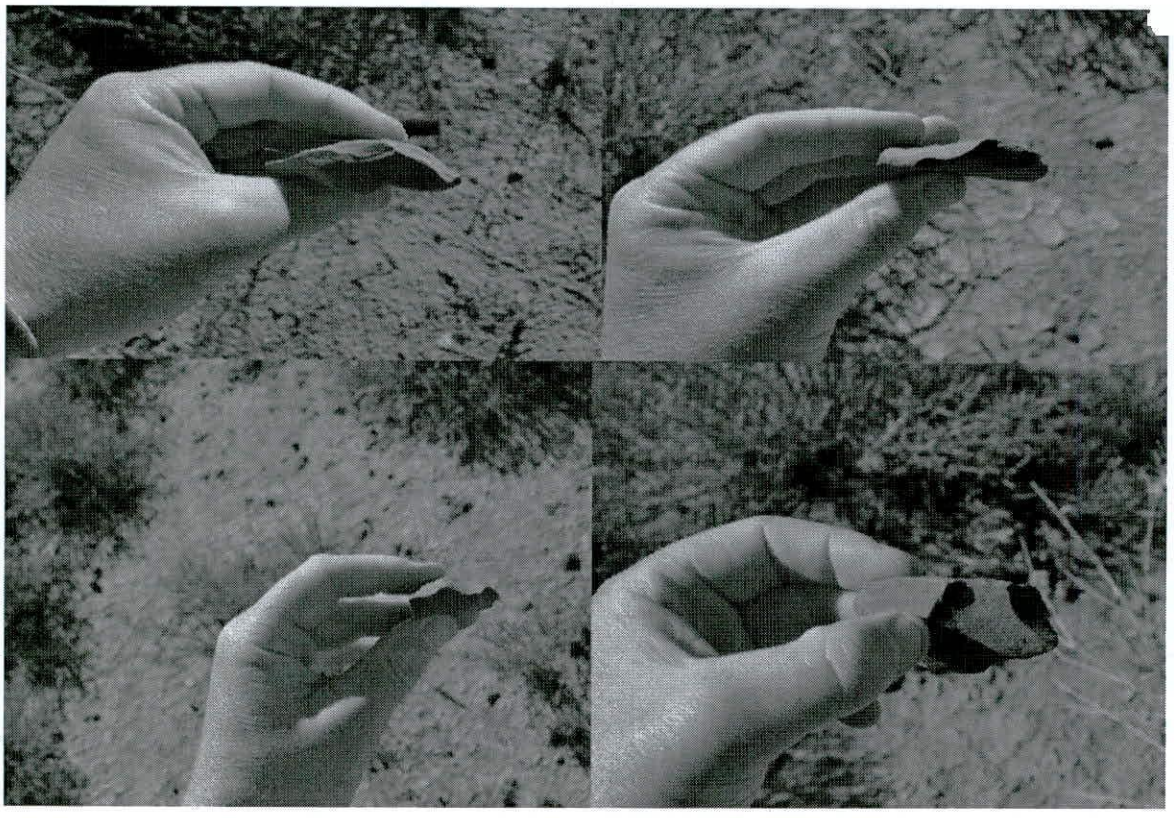


Figure 12: Bi-directionally worked cores (on Hornfels) identified at 4 different locations within the proposed development footprint.

Figure 13: Two views of a Levallois core (Hornfels) with the preferential removal high-lighted in blue. The identifiable preparation scars that are truncated by the removal of the Levallois flake are highlighted in purple and yellow.

No potential for (1) in situ archaeological deposits or (2) dating of the site was identified. This site is deemed as having relatively *low significance* relative to the big

questions in Stone Age archaeology. The suggestion of (1) above was reinforced by observations of several aardvark burrows across the site locality, the excavated sediments from which yielded no artefacts.

Impact statement

The archaeological Impact Assessment has shown that the proposed development of a 20 MW photovoltaic power generation facility will impact on archaeological heritage remains in the western part of the footprint (shaded in green, Figure 4). This impact is negative and should be mitigated.

Recommendations

The following recommendations are made:

A reflective sample of artefacts from the western portion of the site footprint should be shot out with a total station and collected for technological analyses.

A spatial sampling strategy should be devised where evenly spaced locations 40-50 meters apart are identified across the area where artefacts are exposed. 5 by 5 meter squares should be set-up at each of these locations and all artefacts within these squares should be shot out with the total station and collected for basic technological analyses off site. Taphonomic and behavioural hypotheses could be tested using the generated spatial data. The spatial data will also indicate if and where activity areas such as knapping locations are present.

Standard technological and morphometric data should be collected on the shot out finds.

Due to the *ex situ* nature of artefacts within the footprint, no excavation should be required.

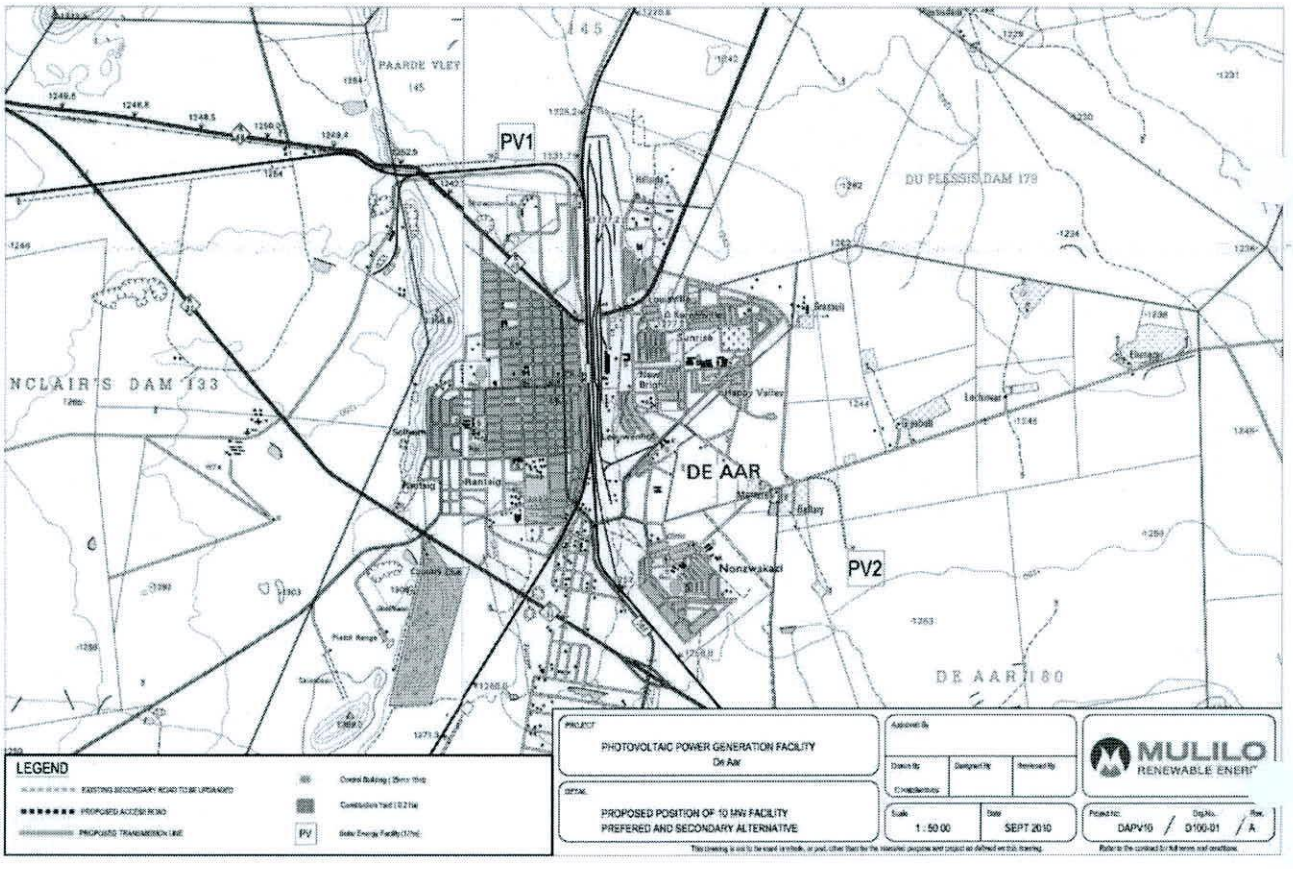
Conclusion

Data collected in this survey suggest that in terms of archaeological heritage, the proposed activity is viable. While impacts are expected to be negative, these can be effectively mitigated.

References

Kaplan, J. 2010. Archaeological Impact Assessment. Proposed Photovoltaic Power Generation Facility in De Aar, Northern Cape.

Appendix



De Aar Photovoltaic Power Generation Facility (PV1)

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Province: **Northern Cape**.....

AUTHOR(s): Mr Jonathan Kaplan.

TITLE: Archaeological Scoping Study Of Two Proposed Wind Farm Sites (Nama East And Nama West) Near Springbok, Northern Cape Province

EIA CONSULTANTS: DJ Environmental

DATE: (month & year): **May 2010** .....

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