

# ARCHAEOLOGICAL IMPACT ASSESSMENT

**THE PROPOSED GREEN CONTINENT PARTNERS 75 MW  
PHOTOVOLTAIC ELECTRICITY GENERATION FACILITY ON  
PORTION 8 OF THE FARM OLYVENKOLK NO. 187  
KENHARDT DISTRICT  
NORTHERN CAPE PROVINCE**

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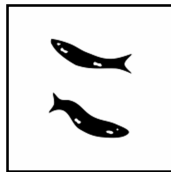
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### **Executive summary**

ACRM was requested by Eco Impact Legal Consulting to conduct an Archaeological Impact Assessment (AIA) for a proposed 75 MW commercial Photovoltaic (PV) Electricity Generation Facility on Portion 8 of the Farm Olyvenkolk No. 187 near Kenhardt in the Northern Cape Province.

The site for the proposed solar energy facility is located about 37 kms south west of Kenhardt on the gravel road (P2988) to Pofadder. The proposed activity entails the construction of blocks of photovoltaic solar panels covering an area of about 156 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, and a small substation. Apart from the substation, extensive bedrock excavations are not envisaged. The electricity that will be generated from the project will be fed directly into the national grid at Eskom Aries substation which is located about 4 kms to the south, via a new, ± 2.5 km long 132 kV powerline. The proposed facility will use the old Sishen Saldanha railway line construction camp located alongside P2988, as a temporary construction camp site.

The AIA forms part of the Environmental Impact Assessment (EIA) process that is being conducted by independent environmental consultants, Eco Impact.

A 2½ day survey of the proposed activities was undertaken by J. Kaplan, in which the following observations were made:

- Eighty-five archaeological occurrences (numbering more than 500 stone implements) were documented on the proposed site.
- The majority of the finds are assigned to the Middle Stone Age (MSA), where most of the tools comprise triangular shaped flakes, chunky blades, flaked chunks, and round, and flatter worked out cores. Some of the pointed flakes and blades are utilized, and/or retouched on one or both sides. No formal tools such as scrapers or unifacial/bifacial points were found, however. More than 90% of the tools are made in locally available quartzite, with smaller numbers in indurated shale.
- A small clustering of implements was recorded in the footprint area of the proposed solar energy farm.
- Smaller numbers of Early Stone Age (ESA) tools were documented, including a few large flakes in quartzite, as well as larger numbers of large, heavily weathered and patinated retouched flakes in hornfels/indurated shale. At least five bifaces/handaxes were also recorded.
- Later Stone Age (LSA) tools including flakes and chunks in chalcedony, banded ironstone and opaline, and one opaline scraper were encountered, but the numbers are very small.
- No organic remains such as bone, pottery or ostrich eggshell was found.

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- A, in-situ scatter of about 80 MSA lithics, including unmodified and modified flakes, blades, round and flat cores, chunks, a hammerstone, and anvil were located in the proposed powerline servitude.
- Small numbers of MSA tools, including one ESA biface, were encountered in the proposed footprint area for the substation, but these occur in a very isolated and disturbed context.
- No graves were found in the proposed application area.
- No rock engravings were found in the proposed footprint area.
- No stone walling, structures such as kraals, or any old buildings occur in the proposed footprint area.

While the low density scatter of tools is relatively rich in quantity, they are poor in terms of information that can be constructed from them. Apart from the small scatter of MSA implements alongside the drainage channel in the powerline servitude, and an apparent clustering of tools in the footprint area of the proposed solar energy facility, there is no clear patterning in the distribution of any of the finds, where many of the implements are of mixed age and found on eroded surfaces. In addition, the finds are all lacking in context as no organic remains such as pottery or bone, or ostrich eggshell was found. As a result the archaeological remains have been rated as having medium to low (Grade 3C) significance.

It should be noted that the archaeological heritage documented on Farm 187/8, is identical to that which was encountered on Farm 187/12, located directly alongside the proposed site, as well as on Portions 7 and 3 of Farm 187, where three more solar energy farms are proposed.

It is maintained that the study has therefore captured good information on the archaeological heritage present that is representative of the proposed solar energy site, and surrounding areas on Olyvenkolk 187.

Indications are that the proposed development of a 75 MW commercial solar energy facility on Farm 187/8 near Kenhardt will not have an impact of great significance on the archaeological heritage.

In archaeological terms, no fatal flaws have been identified and the project is deemed to be viable.

The following recommendations are however, made:

1. The placement of the pylons must not impact on the scatter of tools (Site 598) documented in the proposed powerline servitude. The archaeological site must be fenced off prior to any construction work commencing. Fencing must be done in consultation with, and under supervision of the archaeologist.

Archaeological Impact Assessment proposed 75 MW Solar Energy Farm on Farm 187/8 near  
Kenhardt

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 Kathryn Smuts 021 462 4502). Burials and ostrich eggshell caches must not be removed or disturbed until inspected by the archaeologist.

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## 1. INTRODUCTION

Eco Impact Legal Consulting, on behalf of Green Continent Partners requested that the Agency for Cultural Resource Management (ACRM) conduct an Archaeological Impact Assessment (AIA) for a proposed 75 MW commercial Photovoltaic (PV) Electricity Generation Facility on Portion 8 of the Farm Olyvenkolk No. 187 near Kenhardt (KAI!GARIB Municipality) in the Northern Cape Province (Figures 1 & 2).

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 site for the proposed solar energy farm is located about 37 kms south west of Kenhardt on the gravel road (P2988) to Pofadder, where three more solar energy farms are planned. The proposed activity entails the construction of blocks of photovoltaic solar panels covering an area of about 156 ha (Figure 3). The PV panels will be mounted on pedestals drilled and set into the ground. Associated infrastructure includes single track internal access roads, underground cables, and a small substation. Apart from the substation, extensive bedrock excavations are not envisaged, but some vegetation will need to be cleared from the site. The electricity that will be generated from the project will be fed directly into the national grid at Eskom Aries substation which is located about 4 kms to the south, via a new,  $\pm 2.5$  km long 132 kV powerline. The proposed facility will use the old Sishen Saldanha railway line construction camp located alongside the P2988, as a temporary construction camp site. An AIA of the proposed construction camp was undertaken in 2011 (Kaplan 2011a).

The AIA forms part of the Environmental Impact Assessment (EIA) process that is being conducted by independent environmental consultants, Eco Impact.



Figure 1. Locality map



Archaeological Impact Assessment proposed 75 MW Solar Energy Farm on Farm 187/8 near Kenhardt

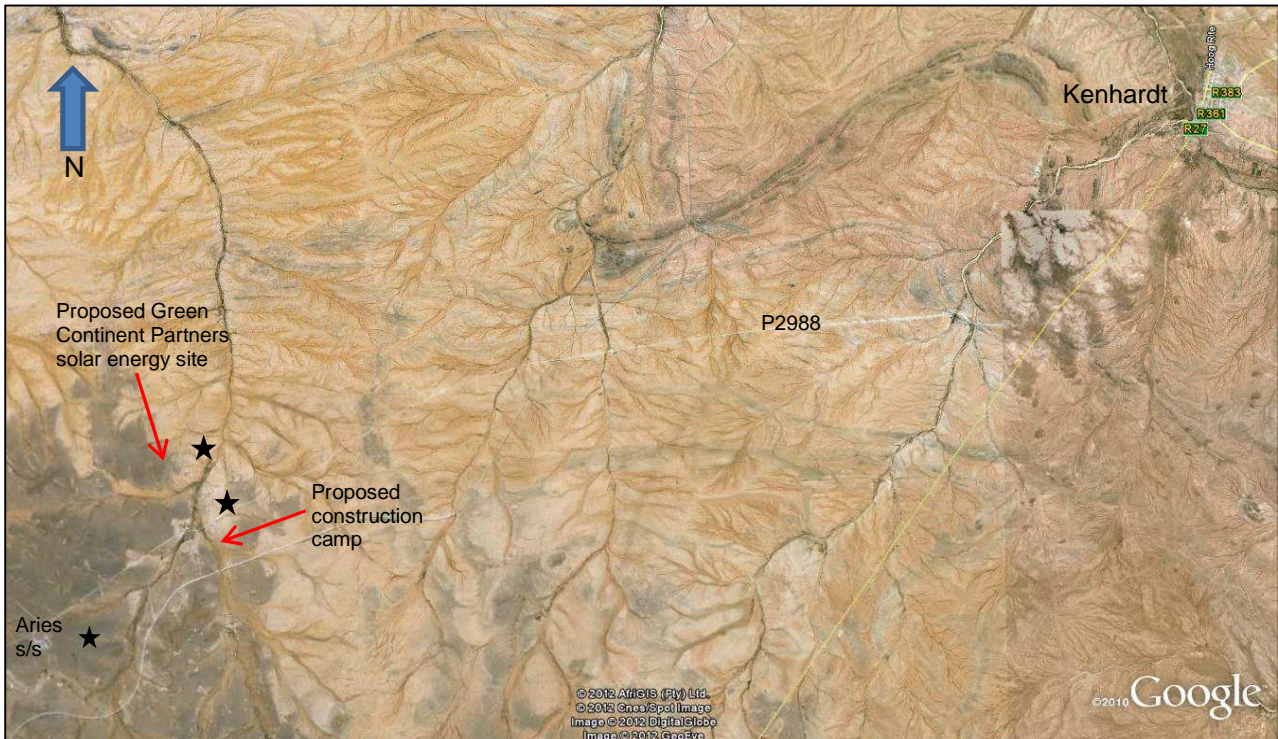


Figure 2. Google satellite photograph illustrating the location site of the proposed Green Continent Partners 75MW solar energy farm (SEF) on Olyvenkolk 187/8. The stars indicate the position of three more SEFs on Farm 187

## 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 m<sup>2</sup> 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)).

### 3. TERMS OF REFERENCE

The terms of reference for the specialist archaeological study are as follows:

- Determine whether there are likely to be any important archaeological resources that may be impacted by the proposed project, including the erection of the PV solar panels, internal access roads, underground cables and associated infrastructure;
- Indicate any constraints that would need to be taken into account in considering the development proposal;
- Identify sensitive archaeological areas, and
- Recommend any further mitigation action.

### 4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The site for the proposed solar energy farm is situated approximately 37 kms south west of Kenhardt, on the gravel road (P2988) to Pofadder and about 4 kms north of the Eskom Aries substation. Kenhardt is about 700 kms from Cape Town, and about 200 kms south west of Upington. The total area of Olyvenkolk 187 is 2200 ha, while Farm 187/8 measures about 1420 ha in extent. Existing infrastructure on Farm 187 includes a gravel landing strip, farm house and outbuildings, and the partly decommissioned Sishen-Saldanha construction camp located alongside P2988. The predominant land use is grazing (sheep).

The actual site for the proposed Green Continent Partners solar energy facility is located about 2 kms northwest of the farmhouse which is situated directly alongside the gravel road. The proposed study site is located against a gentle east-facing slope with the Aries substation visible on the horizon, south west of the site. The landscape is typical of the broader region within which the study area is located. The slopes of the site, particularly the north facing slopes, as well as the flat elevated ridge, are covered in small round dolerite boulders. Drainage channels on the northern and southern boundary drain toward the east, which eventually feeds into the catchment of the Graafwatersrivier, a non-perennial river north of the study area. The surrounding veld is open with sparse grass cover dominated by Bushmanland Basin Shrubland. There are no significant landscape features on the proposed site, but the elevated ridge does provide commanding views of the surrounding terrain and landscape (Figures 4-9).

The site for the proposed substation is located alongside, and to the south of a small drainage channel close to the proposed SEF site (refer to Figure 3). The footprint area is heavily overgrazed and covered in reddish brown windblown sands, and fluvial sediments (Figures 10 & 11).

According to Almond (2011), the site (i. e. Olyvenkolk) for the proposed solar energy farm site is directly underlain by Permocarboniferous glacial-related sediments of the Dwyka Group (Mzibane Formation) that are generally of low palaeontological sensitivity. Quaternary aeolian sediments of the Gordonina Formation (Kalahari Group) as well as



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alluvial gravels and calcretes, both of low palaeontological sensitivity, may also be encountered near-surface in the study area.

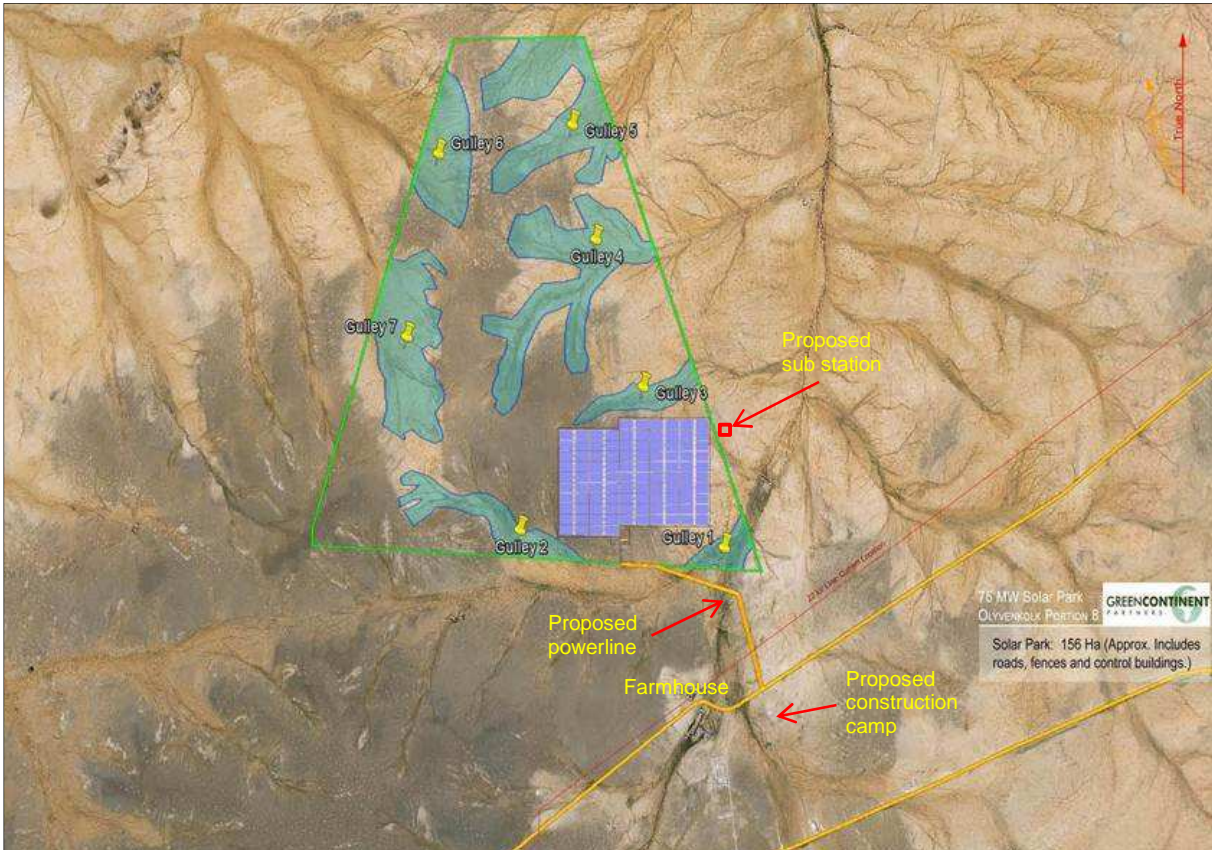


Figure 3. The site for the proposed Green Continent Partners solar energy farm and the layout of the solar panels. Blue areas are drainage channels including the 32 m buffer.



Figure 4. View of the site facing north east



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Figure 5. View of the site facing east



Figure 6. View of the site facing south east



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Figure 7. View of the site facing south



Figure 8. View of the site facing west from the top of the flat elevated ridge.



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Figure 9. View of the site facing south from the top of the flat elevated ridge



Figure 10. View of the proposed substation facing south. Note the red windblown sands

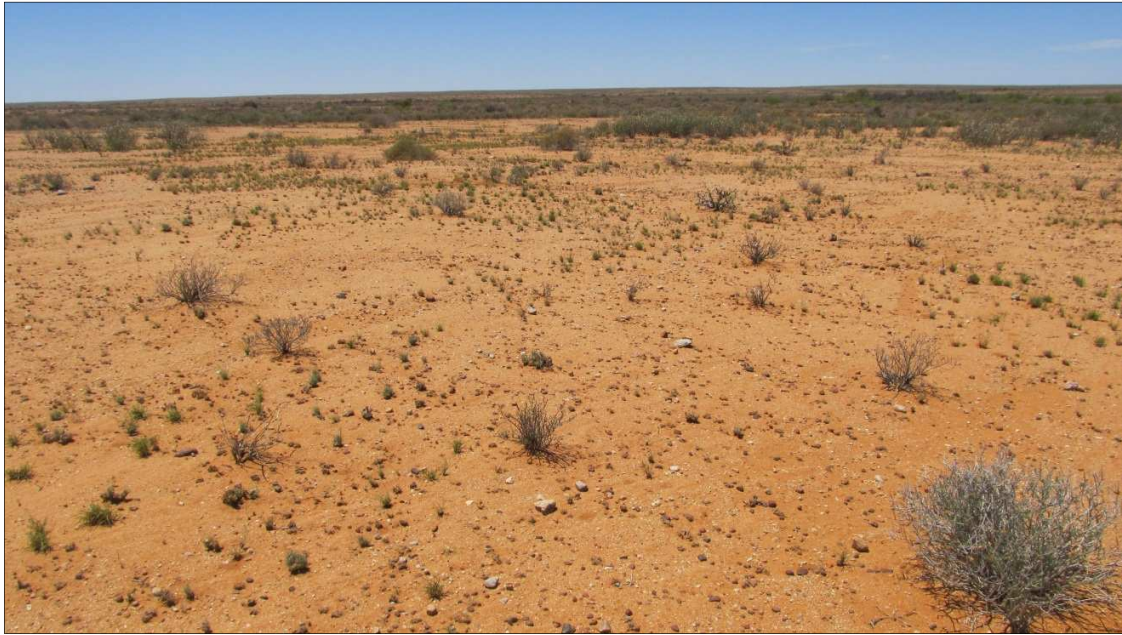


Figure 11. View of the proposed substation facing north east

## 5. STUDY APPROACH

### 5.1 Method of survey

A 2½ day site visit was undertaken, that was designed to assess the archaeological sensitivity of a proposed 75 MW solar energy site. A larger area than the proposed 156 ha footprint area was walked and searched by the archaeologist. Many of the larger dolerite boulders on the wide elevated ridge were also searched for rock engravings.

The proposed footprint area for the substation, as well as the ± 2.5 km long powerline route was also searched for archaeological remains.

Archaeological occurrences identified during the study were mapped on Google Earth using a hand held GPS device set on the map datum WGS 84. Not all archaeological remains (i. e. stone implements) were point plotted, however. A track path of the survey was also created (refer to Figure 37 in Appendix II).

The site visit took place on the 31<sup>st</sup> October, and 01 and 02<sup>nd</sup> November, 2012.

A desk top study was also conducted.

The archaeologist consulted with Dr David Morris of the McGregor Museum in Kimberley.

Heritage resources are graded following the system established by Winter & Baumann (2005) in the guidelines for involving heritage practitioners in EIAs (Table 1).

Grade	Level of significance	Description
1	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
2	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
3A	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3A heritage resources.
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources

Table 1. Grading of heritage resources (Source: Winter & Baumann 2005)

## 5.2 Constraints and limitations

There were no constraints associated with the study. There is very little natural vegetation covering the footprint area and consequently archaeological visibility was very good.

## 5.3 Identification of potential risks

A small scatter of MSA tools, including flakes, blades, cores, an anvil, and hammerstone was recorded during the walk through survey of the proposed powerline route. While some mitigation will be required, the site has been rated as having medium to low (Grade 3C) significance.

## 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 Beaumont and Vogel (1994:240) “thousands of square kilometres of Bushmanland are covered by a low density lithic scatter”.

Work done by Kiberd (2002, 2006) near Copperton, about 120 kms south east of Kenhardt, recovered archaeological material that included large numbers of Later Stone Age (LSA) tools, Middle Stone Age (MSA) lithics with fauna and Early Stone Age (ESA) tools and fauna in a stratigraphic context, including a possible hearth, which may be older than 300 000 years. Work done by Kaplan (2012a, b) in Kakamas and Keimoes north of Kenhardt documented mostly LSA tools in banded ironstone, with smaller numbers of ESA and MSA lithics in quartzite and indurated shale.

Relatively large numbers of LSA implements were encountered in the road reserve, during a survey for a proposed water supply pipeline between Keimoes and Kenhardt, where smaller numbers of MSA and ESA tools were also documented (Kaplan 2008).



Webley and Halkett (2010) report that a few quartz chunks were found during a survey of a proposed electrical substation near Kenhardt.

Importantly, and for the purpose of this study, several thousand, MSA tools, including flakes, cores, blade tools, points, and scrapers were documented during Scoping and AIA's for two solar energy facilities, located on Portions 3 and 7 of Farm 187 (Kaplan 2011a, b, c). A rare, hollow-based bifacial point was also found on 187/7 (Kaplan 2011b). Hollow-based points have only been documented from two cave sites in KwaZulu Natal (Kaplan 1998, Wadley 2005) and are dated to about 40 000 years ago. Microscopic analysis and the morphology of the tools suggest that they were cutting implements, but that some may also have been hafted with plant twine and mastic and used as spear points. Large, heavily weathered and patinated indurated shale ESA flakes were also encountered during the study, including several quartzite bifaces (handaxes). Identical lithics, including a large stone knapping site, and LSA scatter with pottery and ostrich eggshell, were also encountered during an AIA for a proposed solar energy facility on Farm 187/12 (Kaplan 2012c), undertaken at the same time as the current study.

The northern Karoo (or Bushmanland) was also one of the last regions of the Cape Province to be settled by early European farmers, partly because it is so dry and partly because it was so far from Cape Town and produce markets. The result was that it became a last outpost of the /Xam Bushman who still hunted and gathered there in the last decades of the 19<sup>th</sup> Century (Deacon 1986; Morris 1989). Research undertaken by Janette Deacon (1996) suggests that the 'Grass Bushmen' may have lived between Kenhardt and Brandvlei, while the 'Flat Bushmen' lived between Vanwyksvlei and Kenhardt. LSA (or Wilton) microlithic stone implements, pottery and ostrich eggshell litter the occupation areas visited by Deacon (1986) in her quest to locate sites described by /Xam informants in the 1870's and 1880's. Many of the sites visited were documented in this vast, seemingly featureless region, close to pans, springs, and among sand dunes near dry river beds, while the round dolerite boulders scattered over the flat landscape and on mountain tops and kopjes contain many different types of rock engravings. Rock engravings also occur on several farms in Kenhardt which have been visited by the archaeologist in 2011 and 2012.

## **6. FINDINGS**

A spreadsheet of the waypoints and a description of the archaeological finds are presented in Table 1 in Appendix I. Archaeological occurrences were mapped with a hand held GPS unit (refer to Figures 36 & 37 in Appendix II), but individual tools were not point plotted.

### **6.1 Proposed solar farm**

Eighty archaeological occurrences (numbering more than 400 stone implements) were documented in the 156 ha footprint area for the proposed Green Continent Partners, solar energy farm on Farm 187/8.

The majority of the finds are assigned to the MSA, but a small number of ESA tools were also encountered. Only a few LSA flakes and chunks in chalcedony, banded iron stone and opaline were found, including a red opaline scraper (574).



MSA lithics typically comprise triangular shaped flakes with convergent dorsal scars, chunky blades, flaked chunks/minimal cores, round, irregular and flatter (worked out) cores. A number of broken/snapped flakes and blades were also noted. Some of the pointed flakes and blades are utilized, and/or retouched, on one or both sides, but no formal tools such as scrapers or unifacial/bifacial points were found. With regard to raw material frequencies, more than 90% of the MSA tools are made in quartzite, with the remainder in indurated shale.

Most of the MSA remains comprise single, isolated occurrences that are spread very thinly and unevenly over the surrounding rocky landscape, but a few diffuse or low density scatters of tools were also documented. For example there appears to be a clustering of implements (532, 538-540 & 542) among a fairly extensive wash of quartz gravels surrounded by a natural arc of softer, weathered basalts on the mid/upper slopes overlooking the eastern portion of the proposed site (Figure 22). The implements include mainly unmodified flakes, a few retouched flakes, a pointed flake, chunks, blades, and round and flat irregular cores, in quartzite, and a single chunk in banded ironstone. Several large ESA flakes in indurated shale, as well as a single ESA biface were also encountered.

A small, diffuse scatter of about 25 lithics (573) including quartzite flakes and several blades, snapped and broken flakes, chunky flakes and a broken core were also encountered on the rocky south facing slopes overlooking the drainage channel.

Smaller numbers of ESA tools were also documented in the proposed footprint area, including a few large flakes in quartzite, as well as larger numbers of large, heavily weathered and patinated retouched flakes in hornfels/indurated shale. The majority of these tools (all single occurrences) were found on the extremely stony slopes overlooking the drainage channel across the northern portion of the proposed site (refer to Figures 13 & 19), and are also spread very thinly and unevenly across the landscape (refer to Figures 14, 16, 18, 24 & 26). Large weathered, retouched flakes in indurated shale were also recorded elsewhere on Farm 187 (Kaplan 2011a, b & c).

With regard to formal retouched ESA tools, five bifaces/handaxes (520, 522, 531, 535 & 540), were encountered.

Most of the tools recorded on Olyvenkolk 187/8, are identical to those recorded during AIAs for two other proposed solar farms on Portions 3 and 7 of Farm 187, that are dominated by MSA elements, with smaller numbers of ESA tools and a few LSA lithics (Kaplan 2011a, b, c).

Identical implements to those described above were also documented during a survey of Farm 187/12, which was conducted at the same time as the current study (Kaplan 2012c).

A collection tools located during the survey and the context in which some of the remains were found is illustrated in Figures 12-29.



Figure 12. Collection of tools. Scale is in cm



Figure 15. Context in which some of the tools were found



Figure 13. Context in which some of the tools were found



Figure 16. Collection of tools. Scale is in cm



Figure 14. Collection of tools. Scale is in cm



Figure 17. Collection of tools. Scale is in cm





Figure 18. Collection of tools. Scale is in cm



Figure 21. Collection of tools. Scale is in cm



Figure 19. Context in which some of the tools were found



Figure 22. Clustering of tools around an outcropping of basalt. Note the extensive wash of quartz.



Figure 20. collection of tools. Scale is in cm



Figure 23. Collection of tools. Scale is in cm





Figure 24. Collection of tools. Scale is in cm



Figure 27. Collection of tools. Scale is in cm



Figure 25. Context in which the tools were found



Figure 28. Collection of tools. Scale is in cm



Figure 26. Collection of tools. Scale is in cm



Figure 29. Collection of tools. Scale is in cm



## 6.2 Proposed substation

A very diffuse scatter of implements (mainly single, isolated occurrences), dominated by MSA elements was documented in the footprint area for the proposed substation. The receiving environment, located alongside a drainage channel is heavily overgrazed and covered in mainly fluvial sediments and reddish windblown sands. A few patches of quartzite stone occur in places but there are large areas where very little surface stone is present. The tools comprise mainly triangular shaped flakes, chunks, and a few round and flatter worked out cores. Some snapped and broken flakes were also counted. No MSA formal tools were found. One ESA biface (582) was found, however (Figures 30 & 31). More than 96% of the tools found are in quartzite, with the remainder in indurated shale. No LSA tools or any organic remains were found. All of the remains occur in a disturbed context.



Figure 30. Collection of tools from the proposed substation. Scale is in cm



Figure 31. Collection of tools from the proposed substation. Scale is in cm

## 6.3 Proposed powerline

A portion of the land (on Farm 187/3) over which the proposed  $\pm 2.5$  km long, 132 kV overhead powerline crosses, has already been searched by the archaeologist where a relatively large number of MSA lithics were documented and described (Kaplan 2011a).

A low density scatter of triangular-shaped MSA flakes, blades, cores and chunks, in quartzite, indurated shale and opaline were also encountered on very stony gravels alongside the main gravel access road leading from the farmhouse, to the proposed powerline servitude (Figures 32 & 33).

A few single, isolated MSA flakes and chunks were encountered in the proposed powerline servitude, of which about 500 m comprises an old gravel landing strip. A small, concentrated, *in-situ* scatter (Site 598) of about 70 MSA implements was also documented alongside a drainage channel, in the landing strip, over which the proposed powerline will have to cross (Figure 34 and refer to Figure 37). The tools here include mainly unmodified and a few modified flakes, blades, round and flatter worked out cores, chunks, flaked chunks a hammerstone and anvil (Figure 35). No formal tools such as scrapers or points were found. A diffuse scatter of flake tools, cores and chunks occurs



close by, scattered about, which may be associated with the larger, more coherent scatter.



Figure 32. Collection of tools alongside the gravel road. Scale is in cm



Figure 34. Site 598 alongside the drainage channel in the powerline servitude/gravel landing strip



Figure 33. Collection of tools alongside the gravel road. Scale is in cm



Figure 35. Site 598. Anvil and flake tools

#### 6.4 Significance of the archaeological remains

While the low density scatter of tools is relatively rich in quantity, they are poor in terms of information that can be constructed from them. Apart from the scatter of MSA implements (Site 598) alongside the drainage channel in the powerline servitude/landing strip, and an apparent clustering of tools (Site 532 & 573) in the footprint area of the proposed solar energy facility, there is no clear spatial patterning in the distribution of any of the finds, where many of the implements are of mixed age and found on eroded surfaces. In addition, all of the finds are lacking in context as no organic remains such as pottery or bone, or ostrich eggshell was found. As a result the archaeological remains have been rated as having medium to low (Grade 3C) significance.

It should be noted that the archaeological heritage documented on Farm 187/8, is identical to that which was encountered on Farm 187/12, located directly alongside the proposed site (Kaplan 2012c), as well as on Portions 7 and 3 of Farm 187, where three more solar energy farms are planned (Kaplan 2011a, b, c).

### **6.5 Graves**

No graves were found in the proposed application area.

### **6.6 Engravings**

No rock engravings were found in the footprint area for the proposed solar energy farm. While the wide, elevated ridge of the proposed site is covered in large amounts of heavily patinated small and a few large dolerite boulders, none showed any evidence of having been engraved, scratched or pecked

### **6.7 Structures**

No stone walling, structures such as kraals, or any old buildings or built features occur in the footprint area of the proposed solar energy facility, on the site for the proposed substation, or in the powerline servitude.

## **7. PREDICTED IMPACTS**

In the case of the proposed Green Continent Partners solar energy facility on Farm 187/8 near Kenhardt, it is expected that the proposed development will not result in any highly significant impacts to the archaeological heritage.

The study has shown that archaeological occurrences do occur in the proposed footprint area, but that the density of remains is overall quite low, and the form and types of tools are fairly homogenous across a vast expanse of space that is not only limited to the proposed solar energy site.

## **8. CONCLUSION**

It is maintained that the study has captured good information on the archaeological heritage present that is representative of the proposed site, and surrounding areas.

Indications are that the proposed development of a 75 MW commercial solar energy facility on Farm 187/8 near Kenhardt will not have an impact of great significance on the archaeological heritage

In archaeological terms, no fatal flaws have been identified.



## **9. RECOMMENDATIONS**

With regard to the proposed development of the Green Continent Partners 75 MW solar energy facility on the Farm Olyvenkolk 187/8 near Kenhardt, the following recommendations are made:

1. The placement of the pylons must not impact on the scatter of tools (Site 598) documented in the proposed powerline servitude. The archaeological site must be fenced off prior to any construction work commencing. Fencing must be done in consultation with and under supervision of the archaeologist.

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 Kathlyn Smuts 021 462 4502). Burials and ostrich eggshell caches must not be removed or disturbed until inspected by the archaeologist.

## 10. REFERENCES

Almond, J. 2011. Palaeontological Impact Assessment – Desk top study the proposed Solar Cape Photovoltaic Energy Generation Facility near Kenhardt Northern Cape Province. Report prepared for Cape Lowlands Environmental Services Nature Viva cc.

Beaumont, P.B. & Vogel, J.C. 1984. Spatial patterning of the ceramic Later Stone Age in the Northern Cape Province, South Africa. In: Hall, M., Avery, G., Avery, D.M., Wilson, M.L. & Humphreys, A.J.B. (eds) *Frontiers: southern African archaeology today*: 80-95. Oxford: British Archaeological Reports International Series 207.

Deacon, J. 1996. Archaeology of the Flat and Grass Bushmen. In Deacon, J. & Dowson, T. (Eds) *Voices from the Past: /Xam Bushmen and the Bleek and Lloyd Collection*. Pp. 245-270. Witwatersrand University Press: Johannesburg.

Deacon, J. 1986. 'My place is the Bitterpits': the home territory of Bleek and Lloyd's /Xam San informants. *African Studies* 45: 135-155.

Kaplan, J. 2012a. Archaeological Impact Assessment the proposed Keren Energy Keimoes Solar Plant on Erf 666, Keimoes Northern Cape Province. Report prepared for EnviroAfrica. Agency for Cultural Resource Management.

Kaplan, J. 2012b. Archaeological Impact Assessment the proposed Keren Energy Kakamas Solar Farm on Erf 1654 Kakamas Northern Cape Province. Report prepared for EnviroAfrica. Agency for Cultural Resource Management.

Kaplan, J. 2012c. Archaeological Impact Assessment the proposed Wine Estate Capital Management 75 MW Photovoltaic Energy Generation Facility on Portion 12 of Farm Olyvenkolk 187, Kenhardt District, Northern Cape Province. Report prepared for Eco Impact. Agency for Cultural Resource Management.

Kaplan, J. 2011a. Archaeological Impact Assessment the proposed Solar Cape 10 MW photovoltaic energy generation facility on Farm 187/3 near Kenhardt, Northern Cape Province. Report prepared for Cape Lowlands Environmental Services. Agency for Cultural Resource Management.

Kaplan, J. 2011b. Archaeological Impact Assessment the proposed Solar Cape 100MW photovoltaic energy generation facility on Farm 187/7 near Kenhardt Northern Cape Province. Report prepared for Cape Lowlands Environmental Services. Agency for Cultural Resource Management.

Kaplan, J. 2011c. Addendum to report. Archaeological Impact Assessment the proposed Solar Cape 100 MW photovoltaic energy generation facility on Farm 187/7 near Kenhardt Northern Cape Province. Report prepared for Cape Lowlands Environmental Services. Agency for Cultural Resource Management.

Kaplan, J. 2008. Phase 1 Archaeological Impact Assessment proposed construction of a water treatment plant and supply pipeline from Keimoes to Kenhardt, Western Cape Province. Report prepared for EnviroAfrica. Agency for Cultural Resource Management.

Kaplan, J. 1990. The Umhlatuzana Rock Shelter sequence. 100 000 years of Stone Age history. *Natal Museum Journal of Humanities* 2:1-94.

Kiberd, P. 2002. Bundu Farm Pan, Northern Cape. *The Digging Stick* 19 (3):5-8. South African Archaeological Society.

Kiberd, P. 2006. Bundu Farm: A report on archaeological and palaeoenvironmental assemblages from a pan site in Bushmanland, Northern Cape, South Africa. *South African Archaeological Bulletin* 61 (184):189-201.

Morris, D. 1990. "Etchings" and "Intaglios" in the Upper Karoo: Part 1: The engravings at Springbok Oog. In: Beaumont, P. & Morris, D. (Compilers). *Guide to Archaeological sites in the Northern Cape*. Prepared for the South African Association of Archaeologists post-conference excursion: 9<sup>th</sup>-13<sup>th</sup> September 1990.

Morris, D. 2007a. Archaeological Specialist Input with respect to upgrading railway infrastructure on the Sishen-Saldanha Ore Line: borrow pits at Loop 16.

Wadley, L. 2005. A typological study of the final Middle Stone Age stone tools from Sibudu Cave, KwaZulu-Natal. *South African Archaeological Bulletin* 60:51-63

Webley, L & Halkett, D. 2010. An Archaeological Impact Assessment (Report 4): Proposed construction of a substation between Aries-Garona and associated loop in and loop out lines, north west of Kenhardt in the Northern Cape. Report prepared for Nzumbululo Heritage Solutions. Archaeology Contracts Office, University of Cape Town.

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Appendix I

Spreadsheet of waypoints and description of archaeological finds

Archaeological Impact Assessment proposed 75 MW Solar Energy Farm on Farm 187/8 near Kenhardt

Site	Name of Farm	Lat/long	Description of finds
	Olyvenkolk No. 187/8		
514		S29 26.483 E20 50.391	Low density scatter of quartzite flakes, chunks some weathered indurated shale chunks, flaked cobbles alongside drainage channel, on extensive gravels
515		S29 26.458 E20 50.365	Weathered indurated shale flake, 7 quartzite flakes on extensive stone gravels including flaked chunk/ minimal core. Quartzite flake, chunk, core, large weathered retouched indurated shale flake, indurated shale blade, large flakes cobble
516		S29 26.393 E20 50.306	Low density scatter including flakes, large flaked cobble/ minimal core, chunks, very weathered indurated shale flake
517		S29 26.371 E20 50.284	MSA quartzite flake
518		S29 26.437 E20 50.297	Extension of 515 over the fence including 7 chunks, flakes and indurated shale flake
519		S29 26.431 E20 50.251	Quartzite flakes alongside drainage channel, chunks, flaked chunk, weathered indurated shale flake
520		S29 26.448 E20 50.234	<b>Quartzite ESA biface</b> , plus several flakes
521		S29 26.421 E20 50.152	Low density scatter on edge of drainage channel including quartzite flakes, weathered indurated shale flake and chunk, weathered indurated shale blade
522		S29 26.482 E20 50.116	Chunk, blade tool in weather indurated shale, 1 <b>ESA biface</b> , on very stony north facing slopes
523		S29 26.445 E20 50.069	Very stony slopes alongside drainage channel including indurated shale flake, quartzite chunk, and several flakes
524		S29 26.508 E20 50.054	Very stony north facing slopes alongside fence; weathered indurated shale flake, quartzite chunk and flakes
525		S29 26.464 E20 50.008	Weathered indurated shale flake, quartzite hammerstone, large quartzite flake , chunk smaller flake, alongside drainage channel
526		S29 26.505 E20 49.965	Weathered indurated shale flake
527		S29 26.523 E20 49.881	Large weathered indurated shale flake, smaller quartzite flakes, blade tool, very stony slopes along the fence line all the way down to the drainage channel
528		S29 26.605 E20 49.792	Low density scatter on extensive stony ground/slopes, including a few flakes and chunks in quartzite and indurated shale
529		S29 26.599 E20 49.973	Same as above including quartzite and indurated shale chunks, disc core
530		S29 26.662 E20 50.053	Diffuse scatter of a few quartzite flakes and chunks
531		S29 26.745 E20 50.005	Diffuse scatter of a few quartzite flakes and chunk, including <b>1 biface</b>
532		S29 26.630 E20 50.056	Natural outcropping of softer basalt,

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			extensive wash of quartz, with a low density scatter of tools including quartzite flakes, 2 round cores, several blade tools, 1 flat core, 1 large core, chunky flakes and few weathered indurated shale flakes
533		S29 26.572 E20 50.070	Flat core and flaked chunk
534		S29 26.492 E20 50.245	Flat core
535		S29 26.529 E20 50.358	Chunky indurated shale flake, large round core, large weathered indurated shale flake on washed gravels near drainage channel, <b>1 Biface/ handaxe</b>
536		S29 26.577 E20 50.243	Flake and chunk
537		S29 26.585 E20 50.152	Quartzite flakes and chunks on stony slopes
538		S29 26.625 E20 50.083	See 532 - Low density scatter of quartzite flakes, chunk, core, retouched flake, weathered indurated shale flake, weathered core, retouched flake, pointed flake, <b>banded ironstone</b> chunk
539		S29 26.645 E20 50.060	Same as above
540		S29 26.595 E20 50.036	Same as above including weathered <b>biface</b> , weathered indurated shale pointed flake
541		S29 26.566 E20 50.016	Same as above, including chunks, flakes, round core, weathered indurated shale flake
542		S29 26.622 E20 50.016	Large round core, and flakes
543		S29 26.691 E20 50.068	Quartzite flakes
544		S29 26.749 E20 50.082	Flake
545		S29 26.761 E20 50.066	2 large flakes
546		S29 26.767 E20 49.928	Flake and 7 chunks
547		S29 26.741 E20 49.841	Low density scatter of flakes, including <b>retouched flake</b> , chunks, on very stony ground south of stone beacon, also large flaked cobble, small core and blade
548		S29 26.784 E20 49.903	Broken flake and chunk
549		S29 26.825 E20 49.981	3 flakes, 1 round core, flaked chunk
550		S29 26.815 E20 49.923	Large burnished indurated shale flake, 7 quartzite flakes on stony ground
551		S29 26.749 E20 49.824	Large blade, 7 chunks and flakes, large weathered indurated shale flake on stony ground
552		S29 26.771 E20 49.873	Large side struck quartzite flake and chunky flake
553		S29 26.847 E20 50.064	Large flake and large indurated shale flake
554		S29 26.856 E20 50.101	Quartzite flakes
555		S29 26.841 E20 49.975	Large flake and chunk
556		S29 26.810 E20 49.890	Low density scatter of a few flakes and chunks - same as above
557		S29 26.758 E20 49.802	Core, chunk and weathered quartzite blade
558		S29 26.820 E20 49.873	Flat core, quartzite flake, flaked chunk, and flakes on stony ground
559		S29 26.904 E20 50.015	Weathered indurated shale <b>retouched</b> flake, chunky blade, and quartzite flakes
560		S29 26.920 E20 50.059	Low density scatter including a few quartz flakes and chunk, weathered indurated shale flake
561		S29 26.841 E20 49.822	Quartzite flakes, chunks, flaked chunk,

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			weathered indurated shale flake
562		S29 26.764 E20 49.792	Isolated quartzite flakes, chunks, weathered indurated shale flake
563		S29 26.773 E20 49.776	Large flat quartzite flake indurated shall chunk on stony ground
564		S29 26.828 E20 49.800	Quartzite flakes, 2 weathered indurated shale flakes
565		S29 26.866 E20 49.850	Low density scatter including quartzite flakes, chunks, small flat flake, pointed chunky blade
566		S29 26.939 E20 49.911	Chunky flake, flaked chunk, flake/ blade near drainage channel
567		S29 26.920 E20 49.843	Weathered indurated shale core
568		S29 26.874 E20 49.822	Flake
569		S29 26.842 E20 49.803	Large weathered indurated shale flake, large weathered retouched indurated shale flake, 2 flaked chunks and 3 quartzite flakes
570		S29 26.844 E20 49.765	Large <b>pointed retouched quartzite flake</b> , about 8 smaller flakes, chunk and 2 cores
571		S29 26.898 E20 49.800	Flake
572		S29 26.898 E20 49.801	Large utilised and retouched indurated shale flake, core, chunk and 7 quartzite flakes
573		S29 26.847 E20 49.783	Scatter of about 25 quartzite flakes and several blades, including snapped and broken flakes, chunky flakes and broken core on south facing rocky slopes overlooking drainage channel
574		S29 26.927 E20 49.919	<b>Red opaline scraper</b>
575		S29 26.780 E20 50.013	<b>Retouched pointed blade</b>
576		S29 26.737 E20 49.971	Flat disc core, 7 quartzite flakes and chunks, weathered indurated shale flake
577		S29 26.697 E20 49.858	Large flake, large core, flaked chunk, smaller flakes on flat stony ground
578		S29 26.649 E20 49.792	Low density, diffuse scatter, including a few quartzite flakes chunk, flaked chunk, large chunk
579		S29 26.693 E20 50.187	Low density diffuse scatter including a handful of quartzite flakes, chunks, large flake, weathered indurated shale blade
580		S29 26.863 E20 50.161	7 flakes and chunks alongside eastern boundary
581		S29 26.617 E20 50.334	Quartzite flake and core, quartz flake, side retouched quartzite flake on stony ground along eastern boundary
582 substation		S29 26.616 E20 50.401	Broken retouched flake, 2 quartzite flakes, 2 indurated shale flakes, <b>1 biface</b> , 1 round core, 1 flat worked out core
583 substation		S29 26.629 E20 50.400	Snapped flake/ blade, chunk and retouched quartzite flake
584 substation		S29 26.640 E20 50.397	Large flake, chunk and blade
585 substation		S29 26.800 E20 50.477	Prepared core
586		S29 25.602 E20 50.895	Large flake, 2 flakes, flaked chunk
587		S29 26.881 E20 50.022	Occasional flake &/or chunk and core on elevated ridge – west of stone beacon



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588		S29 26.826 E20 49.843	Occasional flake &/or chunk and core on elevated ridge – west of stone beacon
589		S29 26.786 E20 49.798	Occasional flake &/or chunk and core on elevated ridge west of beacon
590		S29 26.715 E20 49.796	Occasional flake &/or chunk and core on elevated ridge west of beach
591		S29 26.658 E20 49.788	Occasional flake &/or chunk and core on elevated ridge west of beach
592		S29 26.683 E20 49.760	Occasional flake &/or chunk and core on elevated ridge west of beacon
593		S29 26.734 E20 49.751	Occasional flake &/or chunk and core on elevated ridge west of beacon
594		S29 26.671 E20 49.676	Occasional flake &/or chunk and core on elevated ridge west of beacon
595		S29 26.747 E20 49.653	Occasional flake &/or chunk and core on elevated ridge west of beacon
596		S29 26.624 E20 49.536	Occasional flake &/or chunk and core on elevated ridge west of beacon
597		S29 26.888 E20 49.572	Occasional flake &/or chunk and core on elevated ridge west of beacon
<b>598</b>		S29 27.301 E20 50.159	Concentrated scatter of about 60 MSA lithics alongside drainage channel, in powerline servitude/gravel airstrip, including mostly unmodified but some modified flakes, chunks, blade tools, small and larger round cores, <b>anvil and hammerstone</b> . Diffuse scatter of tools also lying scattered about, which may be associated. No formal tools found. No organic remains

Table 1. Spreadsheet of waypoints and description of archaeological finds

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Appendix II

Trackpaths and waypoints of archaeological finds.

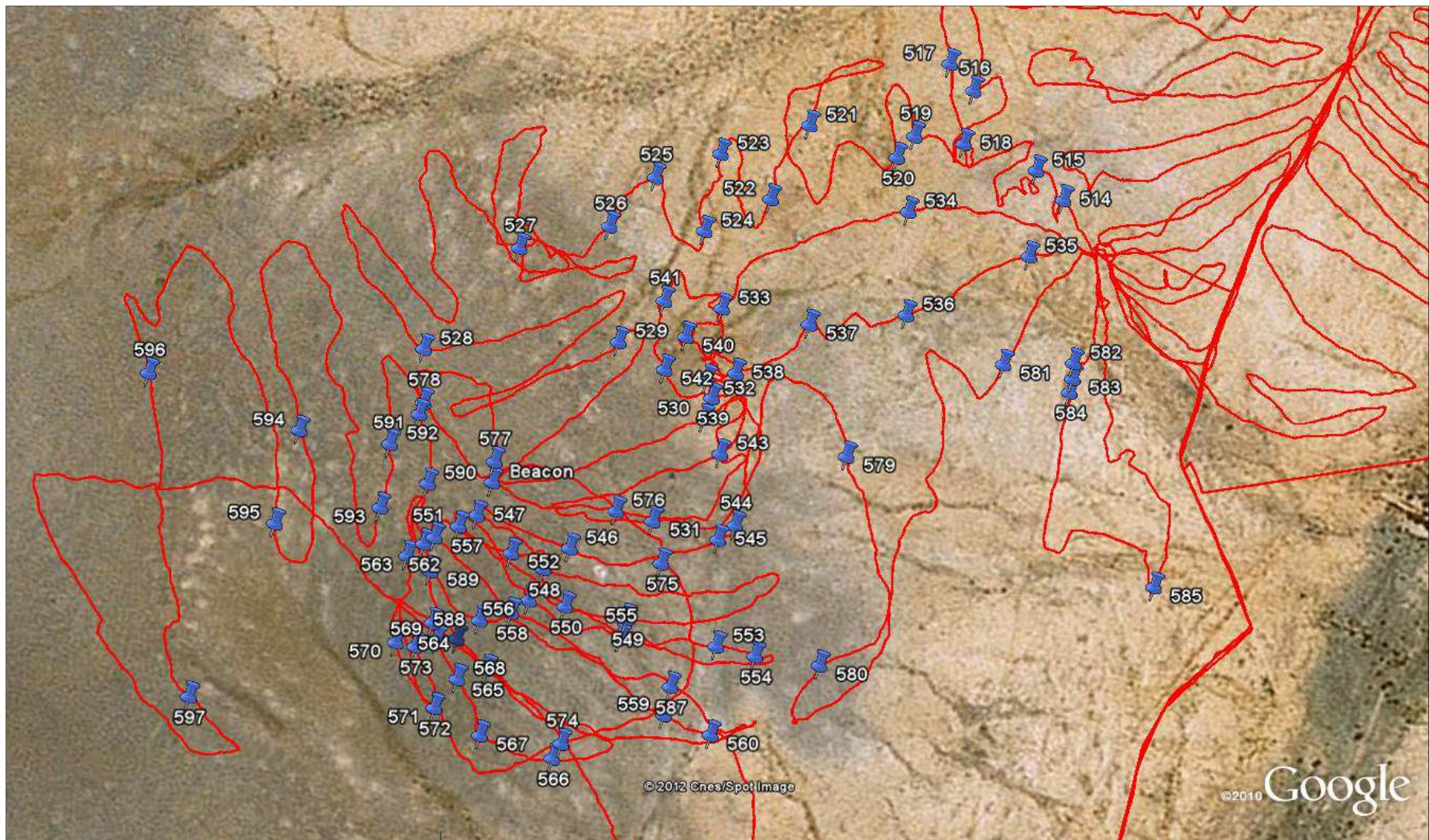


Figure 36. Trackpaths and waypoints of archaeological finds.



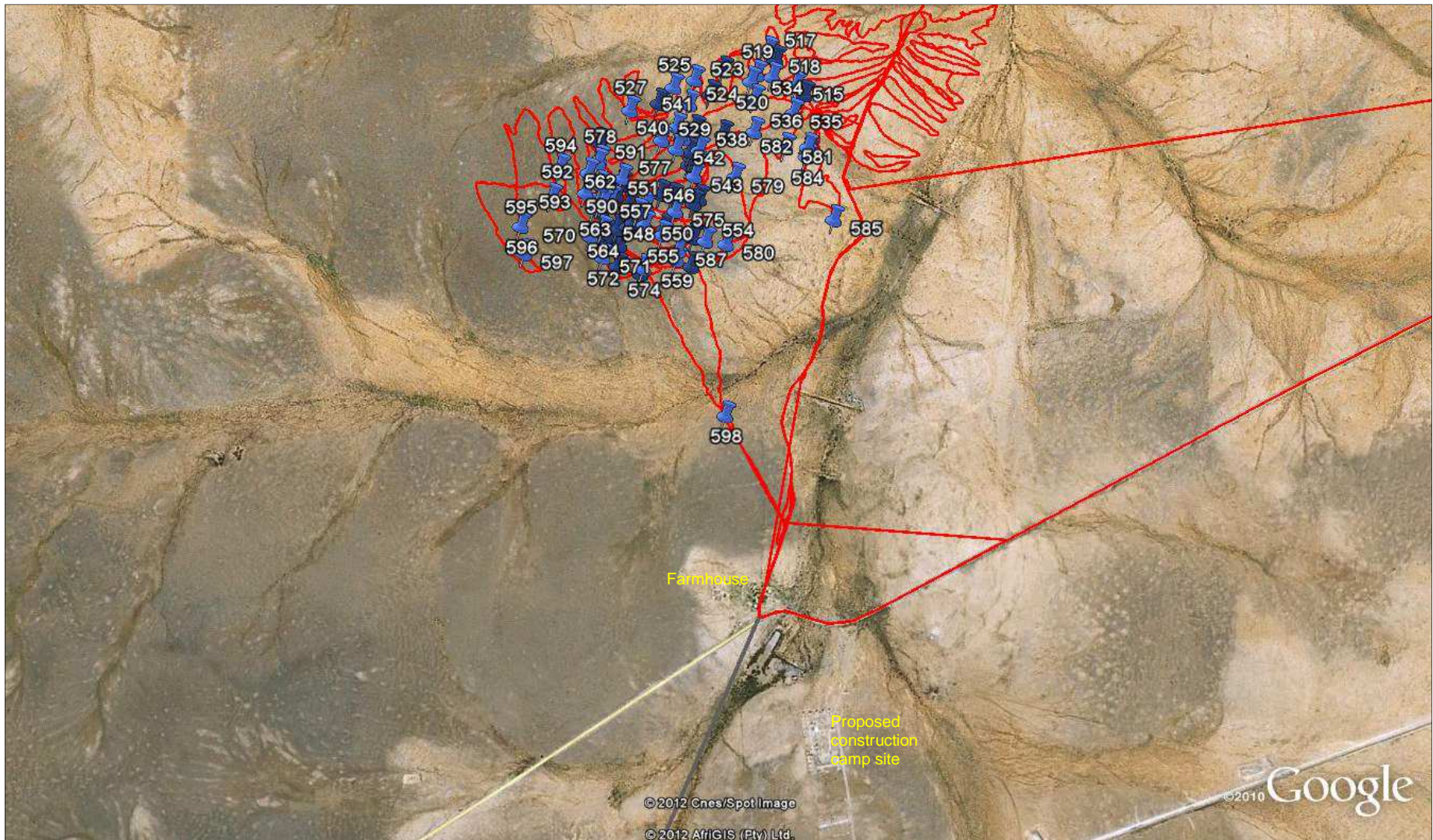


Figure 37. Track path and waypoint of archaeological finds. Note Site 598 in the proposed powerline servitude