Appendix D3a: Updated Archaeological Assessment/Addendum (2017 revision)

ARCHAEOLOGICAL IMPACT ASSESSMENT

THE PROPOSED DISSELFONTEIN KEREN ENERGY SOLAR PLANT NEAR HOPETOWN, NORTHERN CAPE PROVINCE

Portion 8 of the Farm Disselfontein No. 77

Assessment conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999)

Prepared for:

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MARCH
2017

Executive summary

Introduction

ACRM was appointed to conduct an Archaeological Impact Assessment (AIA) for the proposed construction of a 5MW Photovoltaic (PV) Energy Generation Facility on Portion 8 of the Farm Disselfontein No. 77, near Hopetown in the Northern Cape Province.

The study site is located ± 21kms west of Hopetown, on the tar road to Douglas.

The site for the proposed development is covered in dense stands of Acacia, and virtually impenetrable Swarthak vegetation, although large swathes of grassland vegetation occur in places. Apart from existing infrastructure, including overhead powerlines/servitudes and the Eskom Disselfontein substation, the site is vacant. A few random pits have been excavated in the south, and there is a large open quarry alongside the tar road.

A specialist archaeological study on the Remainder of Farm 77 was undertaken in 2012 by the contracted archaeologist, but the footprint area for the proposed Disselfontein PV facility has now been moved, necessitating a new Heritage Impact Assessment (HIA).

The development proposal

The development entails the construction of solar panels/modules covering a footprint area of ± 20ha The PV panels will be raised above the ground, and mounted on pedestals drilled and set into the ground. Apart from trenches for underground cables, limited bedrock excavations are envisaged. The excavations for the footings are about 1.5m in diameter and so the actual ground disturbance is quite contained. Some vegetation will need to be cleared from the site. Associated infrastructure includes internal access roads, underground cables, transformer pads, a switching station, a maintenance shed, and a temporary construction campsite. The electricity generated from the project will be fed directly into the national grid via the Eskom Disselfontein substation which is located 250m north of the proposed PV facility.

The AIA forms part of the Environmental Basic Assessment process that is being conducted by EnviroAfrica.

Aim of the HIA

The overall purpose of the HIA is to assess the sensitivity of archaeological resources on the proposed development site, to determine the potential impacts on such resources, and to avoid and/or minimise such impacts by means of management and/or mitigation measures.

Findings

A site assessment took place on the 23rd February, in which the following observations were made:

Thirty-three archaeological occurrences, numbering more than 120 stone artefacts were recorded across the proposed development site. All of the occurrences were mapped

using a hand held GPS unit. Most of the remains comprise isolated finds spread thinly and unevenly over the surrounding landscape, but dispersed scatters of tools were also recorded on alongside the powerline servitude, and in the south, in the open grassland vegetation. An ephemeral scatter of Early Stone Age flakes, bifaces, cores and chunks alongside the eastern boundary of the study site, possibly indicates a low intensity activity area. However, no evidence of any human settlement was found and most of the remains most likely represent discarded flakes and flake debris.

The majority (more than 90%) of the archaeological remains are assigned to the Middle Stone Age (MSA), while small numbers of Later Stone Age (LSA), and Early Stone Age (ESA) lithics, including a handaxe and bifaces, were also recorded. Chunky, weathered retouched blade tools of the Fauresmith MSA were also encountered. The presence of different types of tools from all three periods of the South African Stone Age reflects the wide range and diversity of tools that are known to occur in the Northern Cape Province.

The majority of the Disselfontein stone implements are in quartzite and indurated shale, with the remainder in porphyry and chalcedony (0.5%). No tools in banded ironstone (a favoured raw material on Stone Age sites in the Northern Cape) were found.

Frequencies of formal retouched tools are also very low (less than 8%), and comprised a few MSA points, two scrapers and a LSA step-flaked adze. MSA points were most likely hafted onto shafts of wood and used as spears or stabbing tools, while adzes (woodworking tools) and scrapers (presumably skin cleaning tools) are reminiscent of the LSA. No pottery, ostrich eggshell or bone was found.

Grading of the archaeological resources

As archaeological sites are concerned, the occurrences are lacking in context, and the relatively small numbers and isolated context in which they were found, means that the remains have been rated as having low (Grade 3C) significance.

Conclusion

The results of the study indicate that the proposed construction and operation of the Disselfontein PV facility on Farm 77/8 near Hopetown will not have an impact of great significance on these, and potentially other archaeological remains that might be exposed or uncovered.

It is maintained that the study, including the results of the 2012 study, has captured a good record of the archaeological heritage across a large (± 40ha) portion of Farm 77.

Indications are that in terms of the archaeological heritage, the proposed activity is viable, and no fatal flaws have been identified.

The impact significance of the proposed construction of the Keren Energy Disselfontein PV facility on significant archaeological heritage, is therefore assessed as LOW.

Recommendations

1. No archaeological mitigation is required prior to development activities commencing.

2. If any unmarked human remains, or ostrich eggshell caches, for example, are exposed or uncovered during excavations these must immediately be reported to Heritage Western Cape (Ms Natasha Higgit 021 462 4509), or the contracted archaeologist (Jonathan Kaplan 082 321 0172).

3. The above recommendations must be incorporated into the Environmental Management Plan (EMP) for the proposed development.

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1. INTRODUCTION

ACRM was appointed by EnviroAfrica on behalf of Keren Energy Disselfontein (Pty) Ltd to conduct an Archaeological Impact Assessment (AIA) for the proposed construction and operation of a 5MW Photovoltaic (PV) Energy Generation Facility on Portion 8 of the Farm Disselfontein No. 77 near Hopetown (Thembelihle Municipality) in the Northern Cape (Figures 1 & 2).

The site for the proposed development is located 21kms northwest of Hopetown, on the tar road to Douglas.

EnviroAfrica is the appointed independent Environmental Assessment Practitioner (EAP) responsible for facilitating the Environmental Basic Assessment process.

2. THE DEVELOPMENT PROPOSAL

The development entails the construction of solar panels/modules covering an estimated footprint area of about 20ha (Figure 3). The PV panels will be raised about 2m above the ground, mounted on pedestals drilled and set into the ground. Apart from trenches for underground cabling, limited bedrock excavations are envisaged. The excavations for the footings are about 1.5m in diameter and so the actual ground disturbance is quite limited. Some vegetation will need to be cleared from the site. Associated infrastructure includes internal access roads, trenches for cables, transformer pads, switching stations, a maintenance shed, and a temporary construction campsite. The electricity generated from the project will be fed directly into the national grid at the Eskom Disselfontein which is located 250m north of the proposed PV facility.

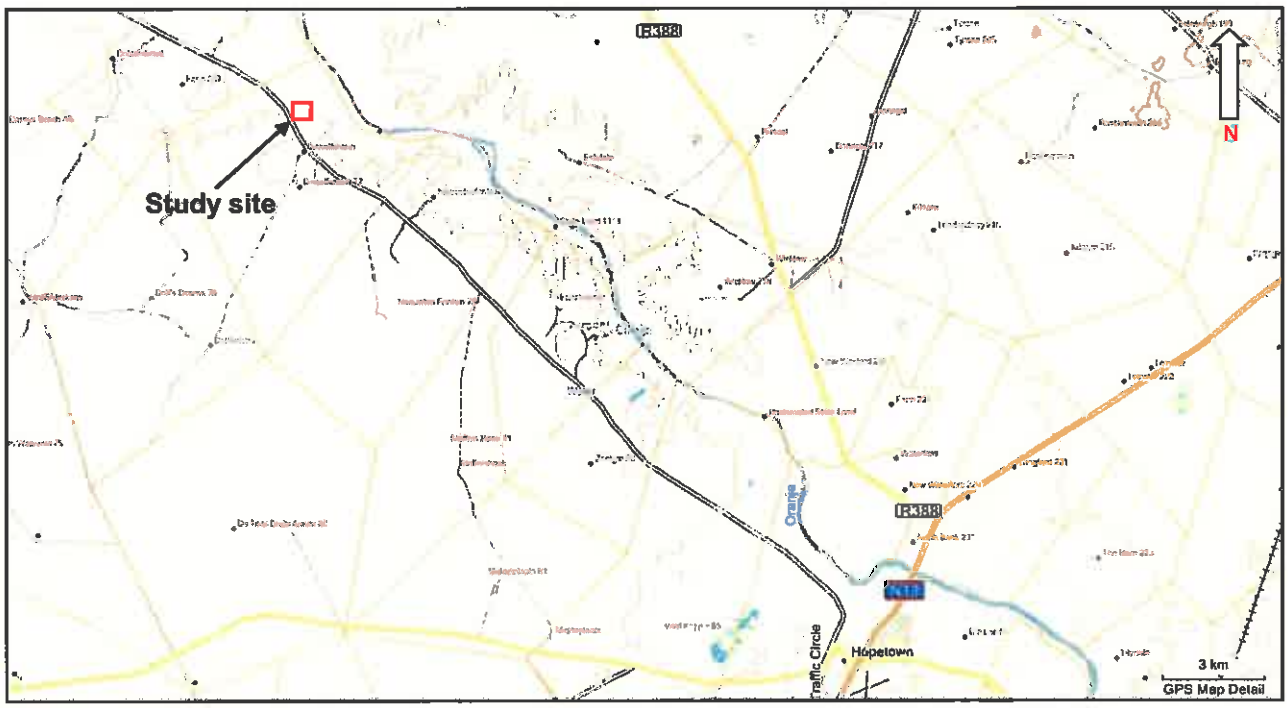

Figure 1. Locality Map

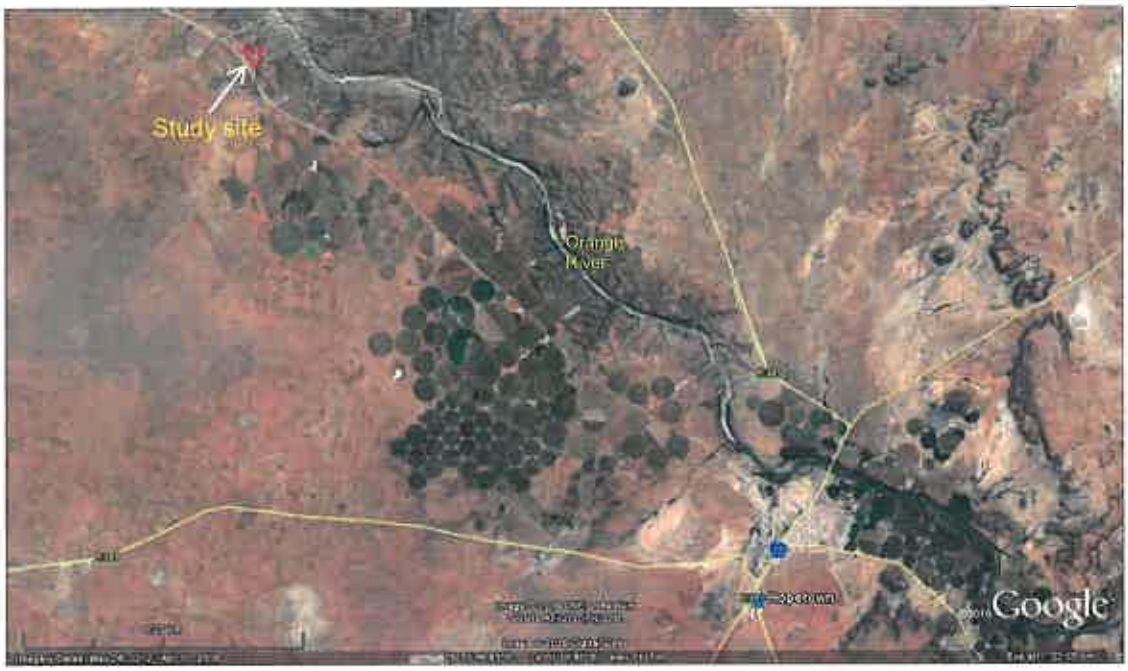

Figure 2. Google satellite map indicating the location of the proposed PV facility (red polygon) in relation to Hopetown

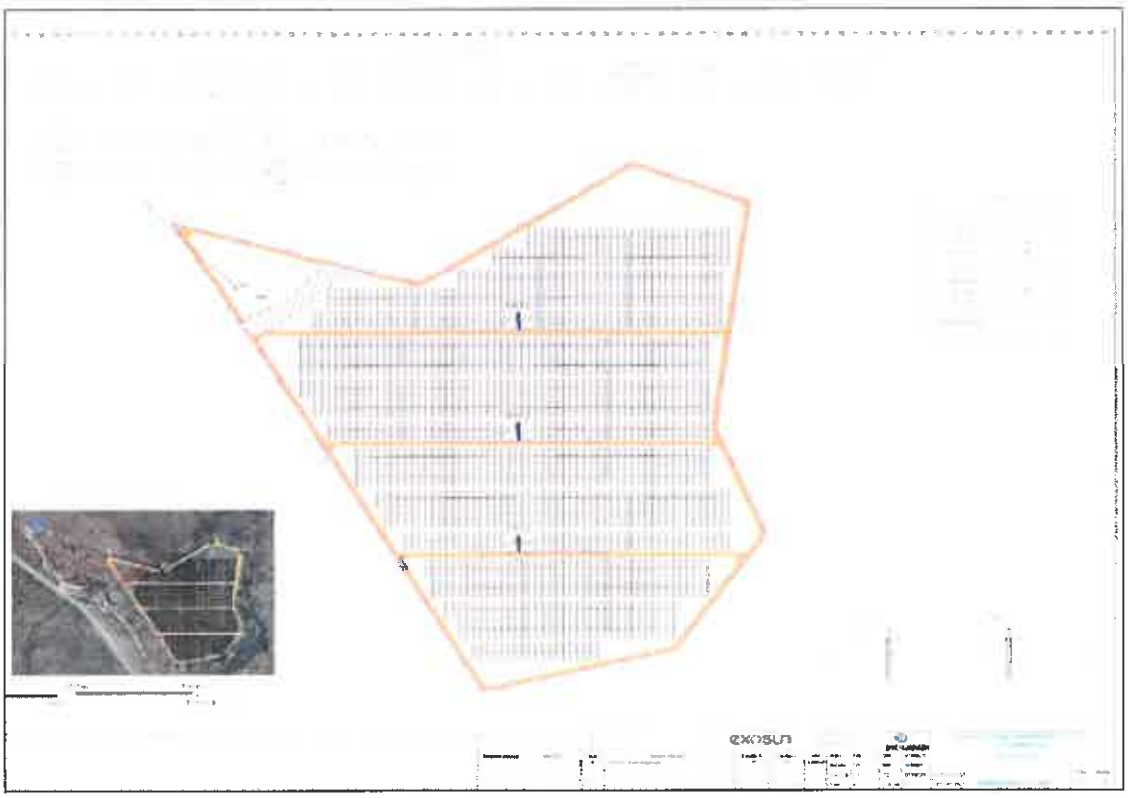

Figure 3. Disselfontein Solar Energy Farm: Proposed layout plan

3. HERITAGE LEGISLATION

The National Heritage Resources Act (NHRA No. 25 of 1999) protects archaeological and palaeontological sites and materials, as well as graves/cemeteries, battlefield sites and buildings, structures and features over 60 years old.

The South African Heritage Resources Agency (SAHRA) administers this legislation nationally, with Heritage Resources Agencies acting at provincial level. According to the Act (Sect. 35), it is an offence to destroy, damage, excavate, alter of remove from its original place, or collect, any archaeological, palaeontological and historical material or object, without a permit issued by the SAHRA or applicable Provincial Heritage Resources Agency, *viz.* Heritage Western Cape (HWC).

Notification of SAHRA is required for proposed developments exceeding certain dimensions (Sect. 38), upon which they will decide whether or not the development must be assessed for heritage impacts (an HIA) that may include an assessment of archaeological (a AIA) or palaeontological heritage (a PIA).

4. 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 be impacted by the proposed development;

- Indicate any constraints that would need to be taken into account in considering the development proposal;

- Identify any `No-Go` areas;

- Address Cumulative Impacts, and

- Recommend mitigation/management action

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The proposed Disselfontein PV site is located 21kms west of Hopetown on the tar road to Douglas. Hopetown is ±150kms southwest of Kimberly on the N12. The site is located ± 250m south of the Eskom Disselfontein substation (Figures 4-8). The Orange River is located 1.5kms to the east. The western portion of the property, alongside the tar road, is severely degraded (powerline, servitude & gravel road), and covered in dense stands of thorny Acacia. There is a large quarry near the entrance to the property. Some random pits have been excavated in the south. The remainder of the study site is infested with thorny Swarthaak and Acacia vegetation, although large swathes of grassland vegetation occur in the south. The substrate comprises mostly shallow red sands, with occasional patches of quartz and calcrete gravels. Small outcroppings of dolerite occur sporadically across the eastern portion of the site. The site is mostly level, but slopes to

the east alongside a non-perennial stream. There are no significant landscape features on or within the proposed footprint area. Farm No. 77 is currently zoned for agriculture.

Surrounding land use is agriculture. Large centre pivots dominate the agricultural landscape further south toward Hopetown. Apart from the Eskom infrastructure, there are no other buildings, structures or features on or close to the proposed development site.

Figure 4. Google Earth satellite map illustrating the proposed footprint area for the Disselfontein PV facility

Figure 5. View of the site facing north. Arrow indicates the Eskom Disselfontein sub-station

Figure 6. View of the site facing north west

Figure 7. View of the site facing north

Figure 8. View of the site facing north

6. STUDY APPROACH

6.1 Method of survey

The purpose of the HIA is to assess the sensitivity of archaeological resources in the study area, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures

A field assessment of the proposed development site was undertaken on February 24th 2017. A track path of the survey was captured (Figure 9). Archaeological remains documented were mapped using a hand-held GPS unit set on the map datum WGS84.

A literature survey was carried out to assess the heritage context surrounding the proposed development site.

6.2 Constraints and limitations

Most of the proposed development site is covered in very thorny and virtually impenetrable Swarthaak, and thorny acacia vegetation, resulting in very poor archaeological visibility. Large swathes of grassland vegetation occur in the centre of the site and in the south, where archaeological visibility is good.

6.3 Identification of potential risks

Archaeological resources (i. e. stone tools) will be impacted by the proposed development, but the overall numbers are relatively small and widely dispersed over the landscape. Apart from trenches for underground cables, limited bedrock excavations are envisaged. The solar panels will be raised above the ground and mounted on small footings drilled and set into the ground. The excavations for the footings are about 1.5m in diameter and so the actual ground disturbance will be quite limited.

6.4 Results of the desk top study

According to the SAHRIS website, several archaeological studies have been undertaken in the Hopetown area. A single, MSA flake/blade was found near the Hopetown Sewerage Works (Rossouw & Groenewald 2003), while sporadic finds of patinated MSA blades, flakes, pointed flakes, retouched and utilized flakes were recorded on the Farm Vluytjeskraal east of Hopetown, alongside the R369 (Opperman 2012). Van Ryneveld (2005) also recorded MSA flakes, blades, cores and formal tools during an assessment for a proposed mining right permit of the Farm Ettrick alongside the Orange River north east of Hopetown. And Morris (2011) recorded low density scatters of MSA implements and fine line rock engravings on the Farm Gannahoek N12 near Hopetown.

Rock engravings have been also recorded on Thomas's Farm about 30kms north east of Hopetown on the N12/Hopetown-Kimberley road, where a cache of buried ostrich eggshells, dating to the late 19th/early 20th Century, was excavated by Henderson (2001, 2002). According to Henderson (2001), a late 19th Century date would be consistent with the presence of San Bushman recorded by 19th Century travellers to the interior.

Buried ostrich eggshell containers have also been uncovered on several farms in the Douglas area, about 70kms north of Hopetown (Morris 2005). Such containers, some of them with mastic spouts were used to store water, as well as specularite which is a mineral pigment applied in cosmetic and ritual contexts (Morris 1992).

A baseline study of the (then) proposed Disselfontein solar energy farm in 2012 mapped 30 archaeological occurrences, numbering more than 150 stone implements. The majority of the remains were dominated by MSA implement, with much smaller numbers of LSA and ESA lithics occurring (Kaplan 2012). The remains were spread thinly and unevenly over the surrounding landscape. No activity areas were identified, and few formal tools were found, suggesting that most the finds comprised flakes and flake debris. No pottery, bone or ostrich eggshell was found either. It was maintained that the study captured a good record of the archaeological heritage present on the site.

7. FINDINGS

Thirty-three archaeological occurrences, numbering more than 180 stone implements, were recorded during the 2017 field assessment (Figure 9).

A spreadsheet of waypoints and a description of the archaeological are presented in Table 1

As indicated above, archaeological visibility was low, as much of the study site is infested with thorny Swarthaak and Acacia vegetation. However, low density scatters of tools (Sites 1401, 1421 & 1431) were recorded on the red cover sands alongside the powerline servitude in the north, and in the south among the grassland vegetation. The overall pattern of distribution however, is that of mostly isolated tools spread very thinly and unevenly over the surrounding landscape, with a few, sporadic finds of tools occurring in places (e.g. Site 1451-1471, 1481, 1531, 1541, 1611 & 1651).

Clusters of small dolerite boulders are scattered across the eastern portion of the site, but no rock engravings or scratchings were found. A few isolated hornfels flakes and

chunks were counted among boulders and there is also evidence that some of the stone has also been heavily flaked.

More than 90% of the archaeological remains are assigned to the Middle Stone Age (MSA), while small numbers of Later Stone Age (LSA) and Early Stone Age (ESA) remains, including several bifaces (Sites 1521 & 1641) and a handaxe (Site 1501), was also recorded. Chunky, weathered retouched blade tools of the Fauresmith MSA were also noted. The presence of different types of tools from all three periods of the South African Stone Age reflects the wide range, diversity and variability of tools that are known to occur in the Northern Cape Province.

The majority of the remains are in quartzite and indurated shale, with the remainder in chalcedony (less than 0.5%) and porphyry, while most of the large ESA tools are weathered and abraded indurated shale. Interestingly, no tools in banded ironstone were found suggesting such sources were located some distance away. Banded ironstone is common on many sites in the Northern Cape, close to Orange River, and was a favoured raw material of Stone Age hunter-gatherers.

A possible low-intensity, ESA knapping area (Sites 1561, 1571 & 1581) was recorded on the rocky slopes alongside the non-perennial steam which defines the eastern boundary of the proposed footprint area. This dispersed scatter comprised a few isolated weathered and abraded flakes, flaked boulders, chunks, and several bifaces. No handaxes or cleavers were found.

Frequencies of formal retouched tools are very low (less than 8%), and comprised a few pointed MSA flakes (Site 1571 & 1581), one scraper (Site 1571), and a LSA indurated shale step-flaked adze (Site 1531). MSA points were hafted onto shafts of wood and used as spears or stabbing tools, while adzes (woodworking tools) and scrapers (presumably skin cleaning tools) are reminiscent of the LSA.

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

No graves or typical grave markers were found in the proposed footprint area.

A collection of tools and the context in which some of the remains were found are illustrated in Figures 10-23.

7.1 Significance of the archaeological remains

As archaeological sites are concerned, the occurrences are lacking in context as no organic remains such as bone, pottery or ostrich eggshell was found.

The relatively small numbers, isolated, dispersed and sporadic context in which they were found mean that the remains have been rated as having low (Grade 3C) significance.

Figure 9. Waypoints of archaeological finds and track paths (in white). Red polygon is the proposed footprint area

Site	Name of farm	Let/long	Description of finds	Grading	Suggested mitigation
	Disselfontein No. 77/8				
1401		S29° 28.516' E23° 54.563'	Dispersed scatter of retouched and modified/utilized flakes, blade tools, chunks on soft red sands in powerline servitude. Fairly widespread. Mostly in indurated shale, porphyry	3C (low)	None required
1421		S29° 28.505' E23° 54.576'	Dispersed scatter of tools, same as above, on red sands in servitude. Flakes, chunks in porphyry, indurated shale, also weathered flakes, cortex flake and chunks	3C (low)	None required
1431		S29° 28.478' E23° 54.573'	Dispersed scatter, same as above, in servitude, on red sands, large quartzite MSA flake, MSA porphyry flakes, smaller flakes and chunks, weathered indurated shale flakes,	3C (low)	None required
1441		S29° 28.473' E23° 54.597'	Low density, dispersed scatter on red sands, between powerline servitude and small drainage channel/stream, occasional flake, chunk, blade mainly in quartzite. Possible quartzite anvil.	3C (low)	None required
1451		S29° 28.495' E23° 54.620'	Dispersed scatter of a few tools on	3C (low)	None required

			patch of small pebbles, mainly indurated shale, including weathered indurated shale, and chunks/flaked chunk. Scatter of dolerite cobbles on thin gravels among dense acacia. A few isolated tools, but no engravings.		
1461		S29° 28.529' E23° 54.650'	Patch of quartz pebbles, a few isolated tools, weathered MSA in indurated shale, possibly ESA as well. Lots of dolerite cobbles, but no engravings. Dense acacia bush	3C (low)	None required
1471		S29° 28.544' E23° 54.650'	Dispersed scatter of a few isolated tools on pebble gravels and red sands dense acacia bush	3C (low)	None required
1481		S29° 28.542' E23° 54.713'	A few weathered MSA indurated shale and quartzite flake on stony gravel surface and dolerite cobbles surrounded by thick acacia bush. No engravings were found	3C (low)	None required
1491		S29° 28.639' E23° 54.708'	2 large weathered MSA indurated shale flake.	3C (low)	None required
1501		S29° 28.666' E23° 54.690'	ESA handaxe	3C (low)	None required
1511		S29° 28.645' E23° 54.714'	Several weathered indurated shale MSA flakes, retouched point and core, a few quartzite MSA fakes, on red sands surrounded by acacia bush	3C (low)	None required
1521		S29° 28.628' E23° 54.724'	ESA biface	3C (low)	None required
1531		S29° 28.606' E23° 54.739'	Dispersed scatter of LSA indurated shale flakes, on pebble surface. Long thin indurated shale bladelet, surrounded by thick impenetrable acacia bush	3C (low)	None required
1541		S29° 28.497' E23° 54.811'	Dispersed scatter of a few large quartzite flakes, bifacial weathered flake/point, large weathered ESA indurated shale flake, on open patch of sand and surface stone, small pieces of limestone, and dolerite boulders surrounded by dense bushes and trees. Large ESA weathered core/boulder	3C (low)	None required
1551		S29° 28.447' E23° 54.838'	Chunk, flake, weathered indurated shale flake, large chunk/core (?ESA) on red sands surrounded by very dense acacia bush	3C (low)	None required
1561		S29° 28.499' E23° 54.857'	Large ESA flake, large core/chunk, chunk on rocky stony slopes alongside dry stream bed – dense acacia directly alongside stream	3C (low)	None required
1571		S29° 28.549' E23° 54.854'	Large, weathered ESA core, flaked boulders, large flake in weathered indurated shale, 2-3 MSA quartzite flakes, indurated shale **scraper**,	3C (low)	None required

			and point, LSA flake on rocky, hilly slopes, dolerite cobbles. No engravings found		
1581		S29° 28.542' E23° 54.709'	Low level scatter – quartzite MSA flakes, chunk, core, large weathered indurated shale ESA flake/flaked cobble,	3C (low)	None required
1601		S29° 28.566' E23° 54.659'	Low level scatter of a few large weathered ESA and MSA flakes & chunks on gravel patch surrounded by thorny Swarthaak vegetation	3C (low)	None required
1611		S29° 28.592' E23° 54.642'	Chunk, possible indurated shale LSA adze, hammer-stone, several MSA quartzite flakes, large weathered ESA flake on stony patch of ground/red sands surrounded by thorny Swarthaak vegetation.	3C (low)	None required
1631		S29° 28.657' E23° 54.763'	Occasional quartzite MSA flake in twee-spoor track and dispersed scatter in grassland vegetation	3C (low)	None required
1641		S29° 28.670' E23° 54.904'	ESA biface	3C (low)	None required
1651		S29° 28.653' E23° 54.809'	Small scatter comprising a few quartzite MSA flakes, weathered indurated shale flakes on small stony patch of gravel. Snapped chalcedony retouched flaked, retouched quartzite flake, large indurated shale retouched blade/flake. Scatter of dolerite but no engravings found	3C (low)	None required
1661		S29° 28.728' E23° 54.830'	Thin scatter of tools on stony slope alongside stream, dense Swarthaak vegetation, ESA flake, retouched indurated shale flake, quartzite flake and chunk	3C (low)	None required
1671		S29° 28.709' E23° 54.792'	A few isolated quartzite & indurated shale flakes on red sands	3C (low)	None required
1681		S29° 28.713' E23° 54.803'	Quartzite flake on red sands	3C (low)	None required
1691		S29° 28.724' E23° 54.801'	Quartzite flake on red sands	3C (low)	None required
1701		S29° 28.691' E23° 54.770'	Dispersed scatter of quartzite MSA flakes and chunks on patch of red sands surrounded by grassland vegetation	3c (low)	None required
1711		S29° 28.708' E23° 54.754'	Dispersed scatter of quartzite MSA flakes, incomplete quartzite MSA point, hammer-stone, weathered indurated shale flake surrounded by thick grassland vegetation	3C (low)	None required
1721		S29° 28.751' E23° 54.751'	Dispersed scatter of a few quartzite MSA flakes, weathered indurated shale chunky MSA flakes on larger patch of red sand surrounded by thick grassland vegetation	3C (low)	None required
1731		S29° 28.754' E23° 54.688'	MSA quartzite flakes and chunk on	3C (low)	None required

			stony rock ground in powerline servitude		
1741		S29° 28.680' E23° 54.704'	Quartzite MSA flake chunk on stony compact ground alongside powerline servitude	3C (low)	None required

Table 1. Spreadsheet of waypoints and description of archaeological finds

Figure 10. Sites 1401 & 1421. Scale is in cm

Figure 11. Site 1401. Context in which the remains were found

Figure 12. Site 1431. Scale is in cm

Figure 13. Site 1611

Figure 14. Collection of tools. Scale is in cm

Figure 15. Site 1521. Scale is in cm

Figure 16. Site 1501. Scale is in cm

Figure 17. Site 1641. Scale is in cm

Figure 18. Site 1561.

Figure 19. Site 1571

Figure 20. Site 1571. Scale is in cm

Figure 21. Site 1651

Figure 22. Site 1611. Scale is in cm

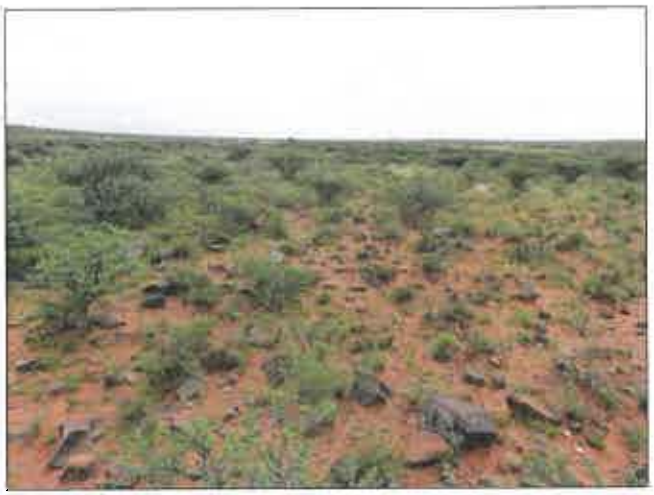

Figure 23. Site 1651

Figure 24. Site 1651 Scale is in cm

Figure 25. Site 1701

Figure 26. Site 1701

Figure 27. Site 1711

8. CUMULATIVE IMPACTS ON ARCHAEOLOGICAL HERITAGE

According to the Department of Environmental Affairs (DEA) Renewable Energy EIA Application Database for renewable projects (new builds)[1], there are four more renewable energy (RE) projects planned within a 30km radius of Disselfontein. However, despite the presence of the other RE sites in the region, it will not impact on archaeological resources in the proposed Disselfontein PV facility.

9. CONCLUSION

Construction and operation of the proposed Keren Energy Disselfontein Solar Energy Plant on Farm 77/8 will have a limited impact on archaeological heritage. However, it is maintained that the study, including the results of the 2012 study done by the contracted archaeologist, has captured a good record of the archaeological heritage across a large (40ha) portion of the farm.

The impact significance of the proposed construction of the Keren Energy Disselfontein PV facility on significant archaeological heritage is therefore assessed as LOW.

Indications are that in terms of the archaeological heritage, the proposed activity is viable, and no fatal flaws have been identified.

1 https://dea.maps.arcgis.com/apps/webappviewer/index.html?id=b8452ef22aeb4522953f1fb10e6dc79e

10. RECOMMENDATIONS

With regard to the proposed construction and operation of the Keren Energy Disselfontein Solar Energy Plant on Portion 8 of Farm No. 77, the following recommendations are made:

1. No archaeological mitigation is required prior to development activities commencing.

2. If any unmarked human remains, or ostrich eggshell caches, for example, are exposed or uncovered during excavations these must immediately be reported to Heritage Western Cape (Ms Natasha Higgit 021 462 4509), or the contracted archaeologist (Jonathan Kaplan 082 321 0172).

3. The above recommendations must be incorporated into the Environmental Management Plan (EMP) for the proposed development.

11. REFERENCES

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Appendix D3a: Archaeological Assessment
(Original report)

ARCHAEOLOGICAL IMPACT ASSESSMENT THE PROPOSED DISSELFONTEIN KEREN ENERGY SOLAR PLANT NEAR HOPETOWN NORTHERN CAPE PROVINCE

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On behalf of:

KEREN ENERGY DISSELFONTEIN (PTY) LTD

By

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MARCH
2012

Executive summary

The Agency for Cultural Resource Management was appointed to conduct an Archaeological Impact Assessment (AIA) for the proposed construction of a 10 MW Concentrated Photovoltaic (CPV) Energy Generation Facility on the Remainder Farm 77 near Hopetown in the Northern Cape.

The study site for the proposed Disselfontein Solar Energy Plant is located alongside a gravel road, about 23 kms northwest of Hopetown. The Orange River is located about 1.5 kms to the east of the property. The site is fairly level. The western portion alongside the road is quite degraded and covered in dense stands of thorny acacia. The area across the eastern and northern portions, are literally infested with impenetrable Swarthok vegetation. There are several stream channels that intersect the site in the north and down the centre. Apart from existing Eskom infrastructure that includes several powerline servitudes, the Disselfontein substation, and gravel access road, there are no old buildings, structures or features within the footprint area.

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 AIA forms part of the Environmental Basic Assessment process that is being conducted by EnviroAfrica cc.

A 1-day, foot survey of the proposed 20 ha footprint area was undertaken by J. Kaplan on 5 March 2012, in which the following observations were made:

Thirty-two archaeological occurrences were recorded with a hand held GPS device. Most of the remains were found alongside the Eskom servitudes that cross the footprint area in several places. More than 95% of the tools are assigned to the Middle Stone Age (MSA), but a few Early Stone Age implements were also found that included several sub-bifaces and at least two handaxes. A range of different types of MSA flake and blade tools were counted, reflecting the range and variability of tools that occur in the Northern Cape Province. Most of the MSA lithics comprise triangular shaped flakes, chunks, retouched and utilised flakes and blades. Apart from a few chalcedony and chert flakes, more than 98% of the tools are in fine grained quartzite and weathered indurated shale. This is in stark contrast to several other proposed solar farms that were recently assessed by the archaeologist in the northern and western parts of the province, where the majority of the tools are almost exclusively in banded ironstone. Frequencies of formal retouched tools are low, and include only a few bifacial pointed flakes, and several retouched blades and points. No scrapers were found, but several side retouched flakes were counted, that could have been used as scraping tools. It is assumed that most of the pointed flakes were hafted onto shafts of wood and used as spears or stabbing tools.

As archaeological sites are concerned, the occurrences are lacking in context as no organic remains such as bone, pottery or ostrich eggshell was found. The relatively small numbers isolated and dispersed context in which they were found means that the remains have been rated as having low (Grade 3C) significance.

The results of the study indicate that the proposed development of the Disselfontein Solar Energy Plant will not have an impact of great significance on these and potentially other archaeological remains. The study has captured most of the archaeological heritage that is representative of the site.

Indications are that in terms of the archaeological heritage, the proposed activity is viable and no fatal flaws have been identified.

With regard to the proposed development of the Keren Energy Disselfontein Solar Energy Plant on Remainder Farm 77, the following recommendations are made:

1. No further archaeological mitigation is required.

2. Should any unmarked human burials/remains or ostrich eggshell 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

1.1 Background and brief

Keren Energy Disselfontein (Pty) Ltd appointed the Agency for Cultural Resource Management to conduct an Archaeological Impact Assessment (AIA) for the proposed construction of a 10 MW Concentrated Photovoltaic (CPV) Energy Generation Facility on Remainder Farm 77 near Hopetown in the Northern Cape (Figures 1 & 2).

The proposed development is situated within the Thembelihle Municipality. The subject property is zoned for Agriculture use and is owned by the J D Ferreira Family Trust.

The proposed development entails the construction of about 140 CPV solar panels covering a footprint area of 20 ha. The CPV panels will be mounted on pedestals drilled and set into the ground (Figure 3). Extensive bedrock excavations are not envisaged, but some vegetation will need to be cleared from the site. Associated infrastructure includes single track internal access roads, trenches for underground cables, transformer pads, a switching station, a maintenance shed, and a temporary construction camp. The electricity generated from the project will be fed into the national grid at the Eskom Disselfontein 132/22 Kv sub station which is situated on the proposed site, alongside the minor gravel road.

The AIA forms part of the Environmental Basic Assessment process that is being conducted by EnviroAfrica 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)).

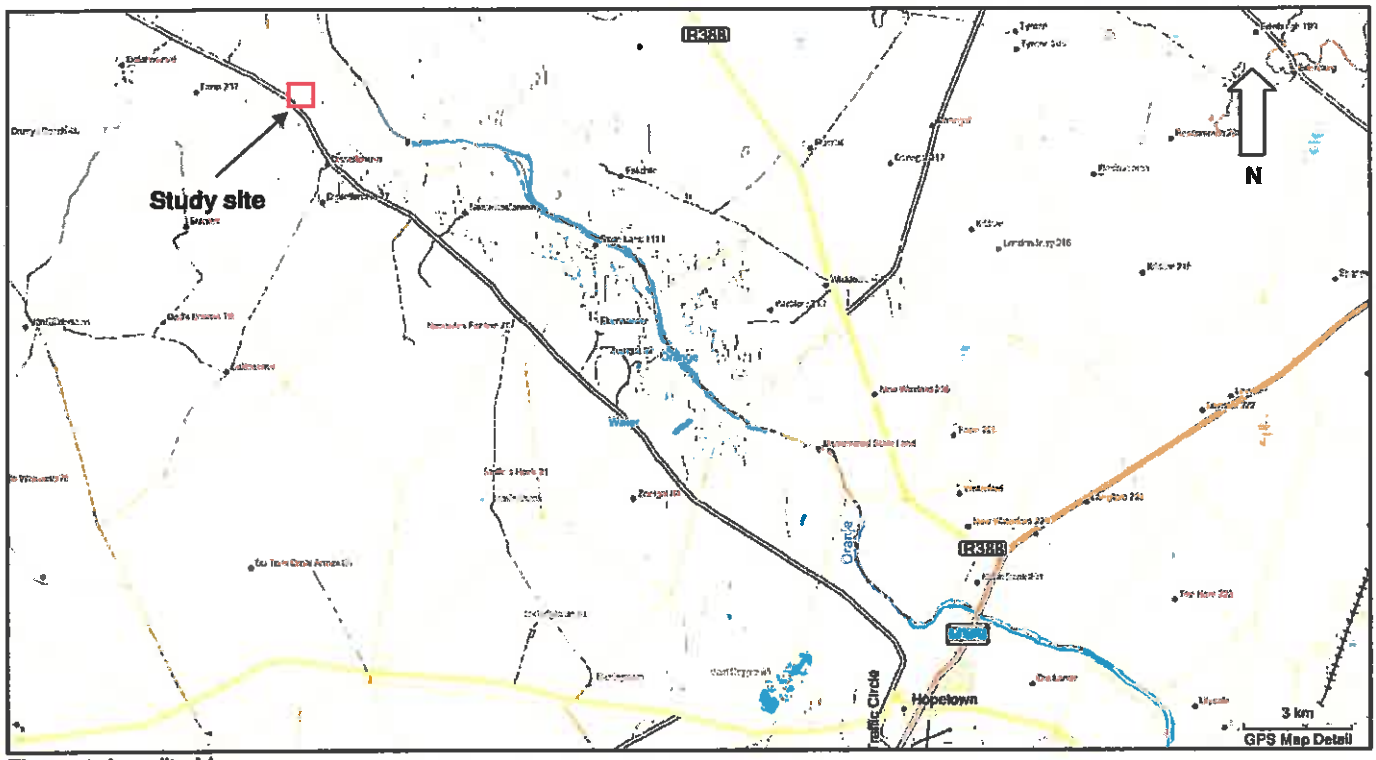

Figure 1. Locality Map

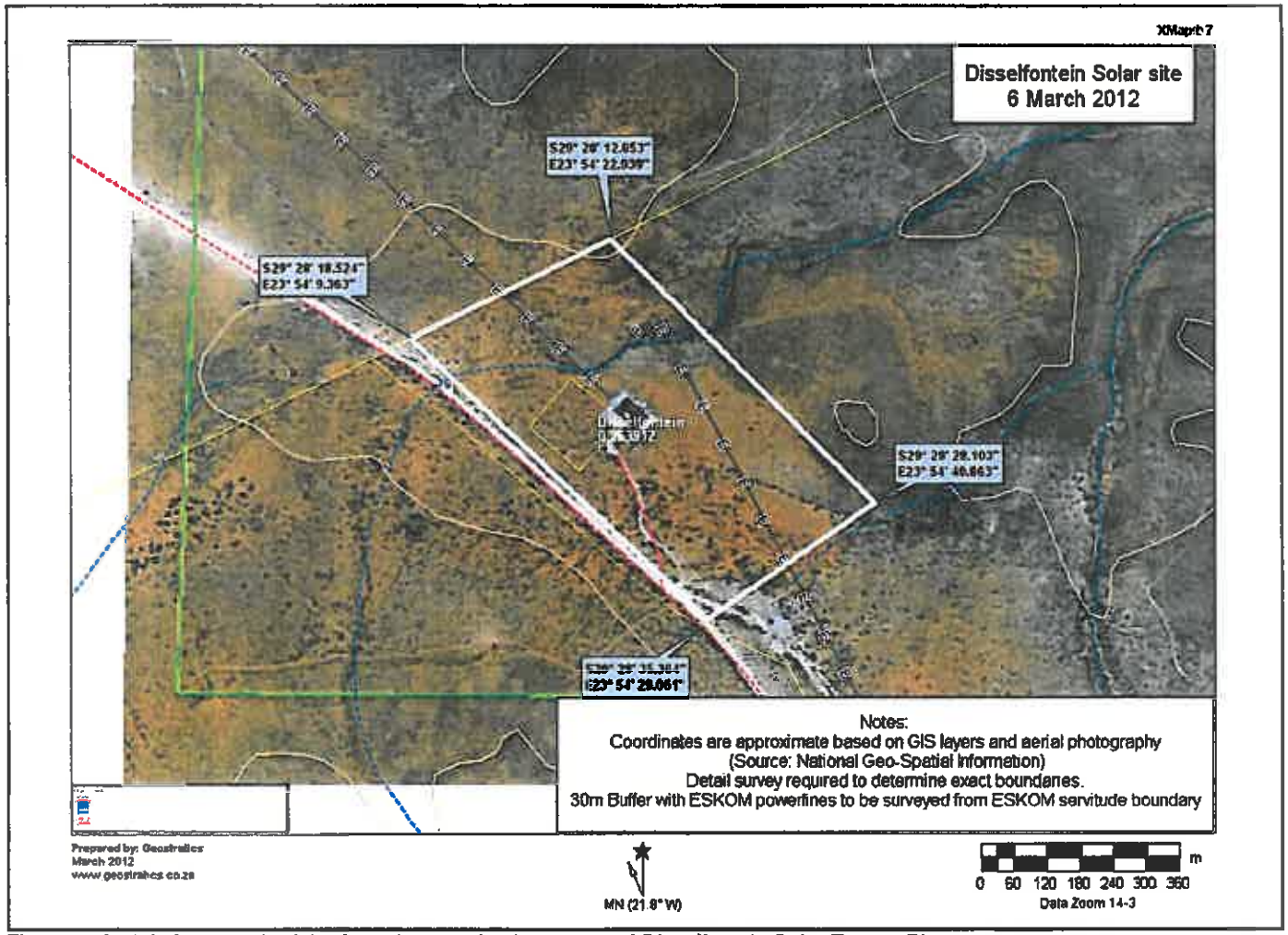

Figure 2. Aerial photograph of the footprint area for the proposed Disselfontein Solar Energy Plant

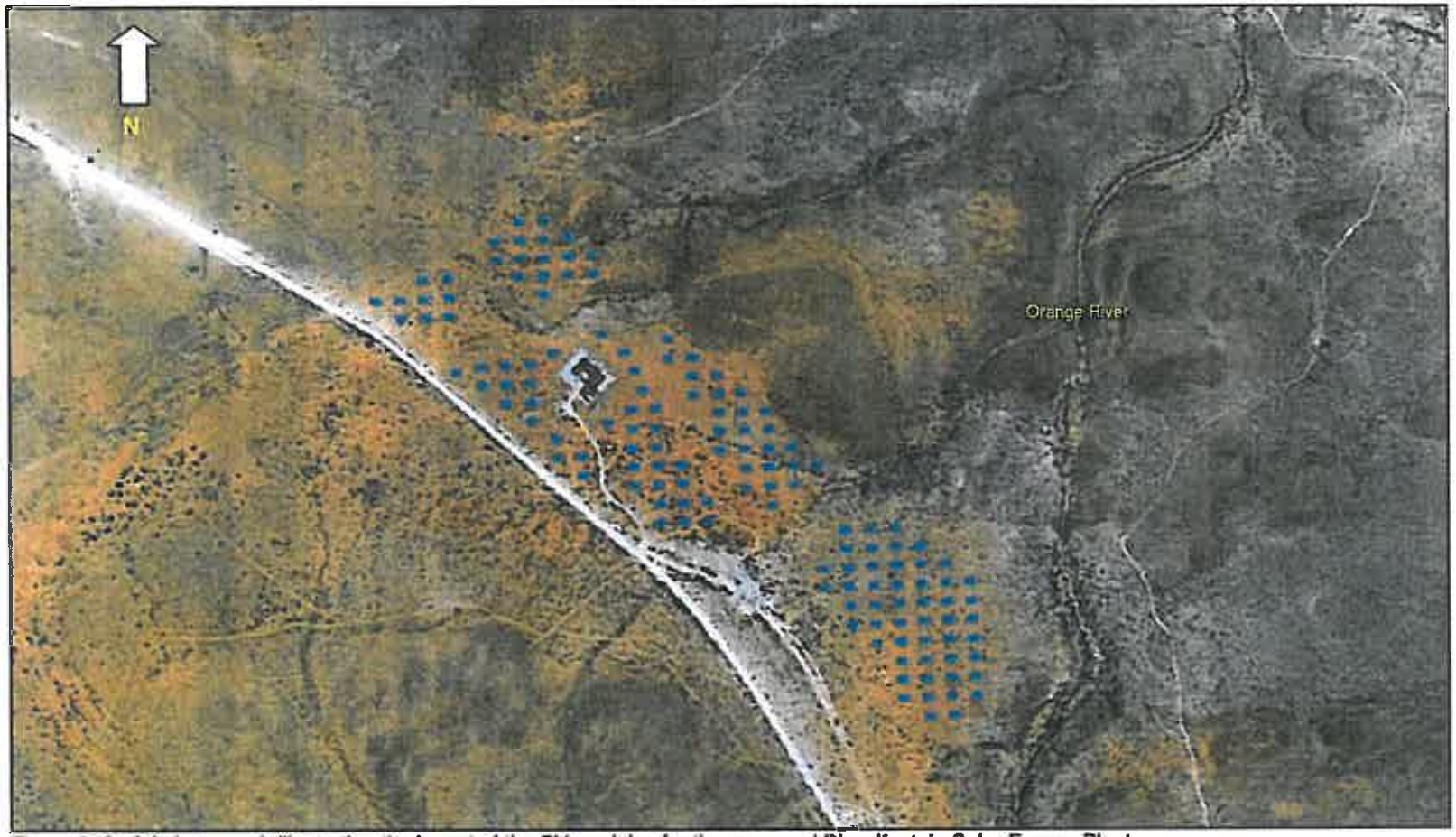

Figure 3. Aerial photograph illustrating the layout of the PV modules for the proposed Disselfontein Solar Energy Plant

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, trenches for 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 Disselfontein Solar Energy Plant is illustrated in Figure 4.

The proposed site is located about 23 kms northwest of Hopetown. Hopetown is about 150 kms southwest of Kimberly on the N12. The subject property is located alongside a minor gravel road, directly adjacent the Disselfontein substation. The Orange River is located about 1.5 kms to the east of the property. The proposed site is fairly level. A large swathe of grassland vegetation covers the central portion of the site (Figures 5 & 6), while the western portion alongside the gravel road is fairly degraded and covered in dense stands of thorny acacia with open spaces occurring in the north (Figure 7). The eastern and northern portions are overlain by shallow soils and extensive exposures of dolerite which are infested with extremely thick, thorny Swarthok vegetation (Figures 8 & 9). There are several non-perennial streams that intersect the site; in the north and one through the centre of the property alongside the Eskom servitude. There are no significant landscape features on or within the proposed footprint area. The land is currently zoned for agriculture. Surrounding land use is agriculture and vast tracks of vacant land. Centre pivots vegetation is extensive further south toward Hopetown. Apart from the Eskom infrastructure, there are no old buildings, structures, features, public memorials or monuments on or close to the proposed site.

There are no visible graves on the proposed site.

Figure 4. Location of the proposed Disselfontein Solar Energy Plant

Figure 5. View of the site facing north west. Note the strip of grassland vegetation

Figure 6. View of the site facing south. Note the grassland vegetation and red sands alongside (i. e. east of) the drainage channel

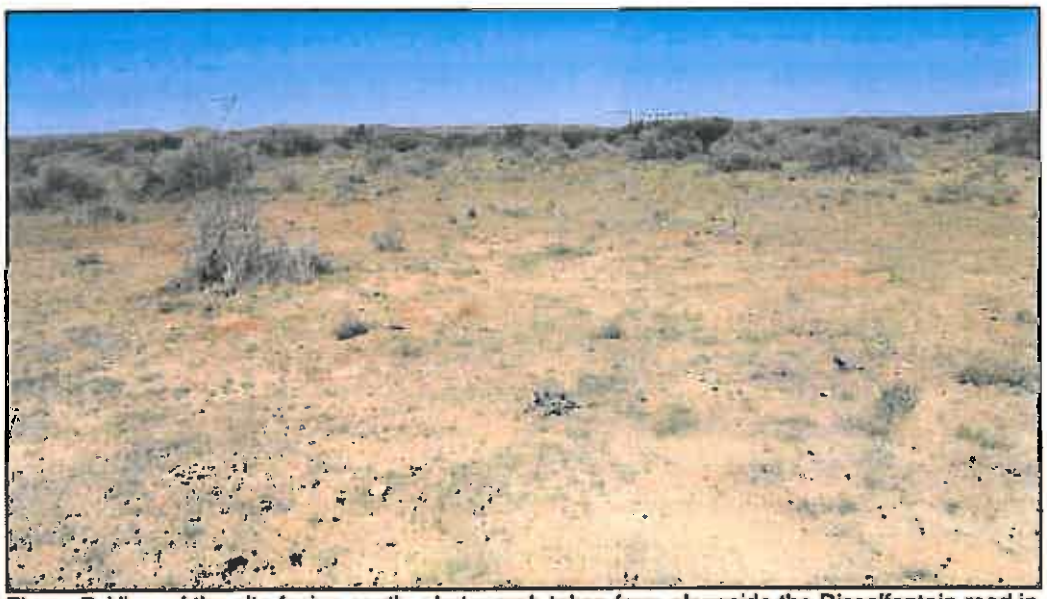

Figure 7. View of the site facing south. photograph taken from alongside the Disselfontein road in the far north western corner of the footprint area.

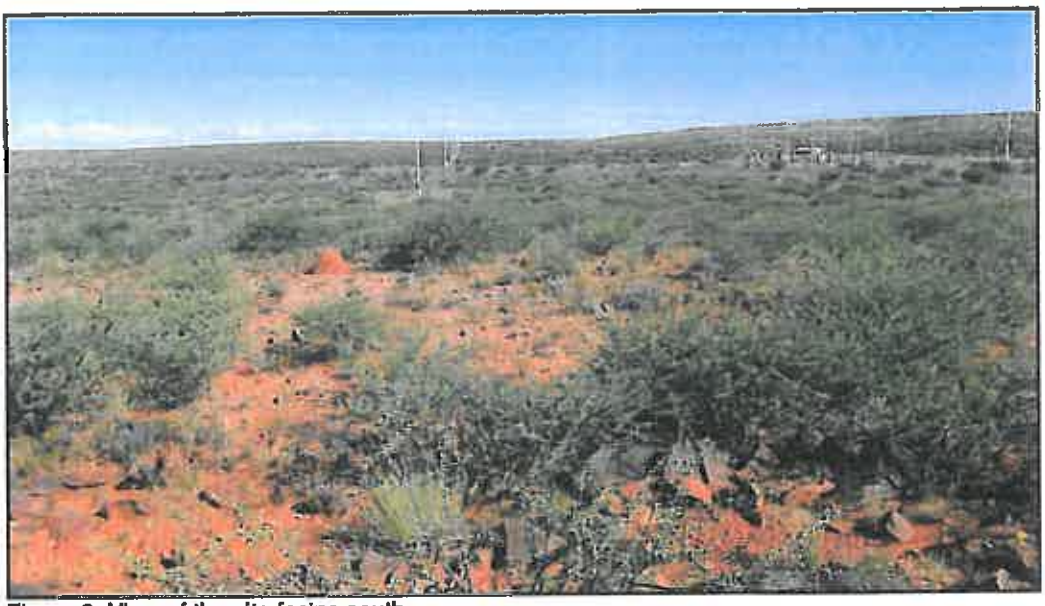

Figure 8. View of the site facing south

Figure 9. View of the site facing south. Note the dense Swarthok vegetation which covers a large portion of the footprint area

5. STUDY APPROACH

5.1 Method of survey

A ground survey of the proposed site was undertaken by J. Kaplan on 5 March, 2012. Archaeological occurrences were documented and mapped using a hand-held Garmin Oregon 300 GPS unit set on the map datum WGS 84.

A track path of the archaeological survey was also created (refer to Figure 10).

A desk top study was done.

5.2 Constraints and limitations

A large portion of the proposed site in the north and east is covered in extremely thorny and virtually impenetrable Swarthok vegetation, resulting in very poor archaeological visibility. Visibility alongside the western half was much better, even though portions of the site in the south are covered in dense stands of thorny acacia. Visibility was very good in the central portion, which is covered in grassland vegetation, where most of the archaeological remains were documented.

5.3 Identification of potential risks

Pre-colonial archaeological heritage (i. e. stone implements) will be impacted by the proposed development, but the numbers are relatively small and occur mostly within the Eskom servitude. Apart from trenches for underground cabling, limited bedrock excavations are envisaged. The solar panels will be raised about 2 m above ground and mounted on small footings drilled and set into the ground. The excavations for the footings are about 1-1.5 m in diameter and so the actual ground disturbance will be quite limited and contained.

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 et al (1995:240) "thousands of square kilometres of Bushmanland are covered by a low density lithic scatter". As far as can be established, no archaeological work has been done in Hopetown, but it is interesting to note that rock engravings have been recorded on Thomas' Farm about 30 kms from Hopetown on Kimberly-Hopetown road where a cache of buried ostrich eggshells, dating to possibly the late 19th or early 20th Century, were also excavated by Zoe Henderson (2001, 2002). According to Henderson, a late 19th Century date would be consistent with the presence of San (Bushman) recorded by 19th Century travellers to the interior.

Buried ostrich eggshell containers have also been uncovered on several farms in the Douglas area, about 70 kms north of Hopetown (Morris 2005). Such containers, some of them with mastic spouts were used to store water, as well as specularite which is a mineral pigment applied in cosmetic and ritual contexts (Morris 1992).

6. FINDINGS

Thirty-two archaeological occurrences were recorded with a hand held GPS device (Figure 10).

A spreadsheet and a description of the archaeological finds located during the study are also presented in Table 2 in Appendix I.

The majority of the remains occur in, and alongside the Eskom servitudes that cross the footprint area of the property in a number of places. These include a low density scatter of flakes and chunks west of the small stream (209 & 210), and several low density scatters to the east of the stream that cuts through the central portion of the site (211-22 & 222). Most of the archaeological remains were documented in this central area, on patches of stony ground and red sands, covered in grassland vegetation either side of a large Eskom servitude (refer to Figures 5 & 6).

A range of different types of implements were found on the site, reflecting the variability and range of tools that occur in the Northern Cape Province. Most of the tools are assigned to the Middle Stone Age (MSA), but a few ESA elements were also found, including two handaxes and several sub-biface tools (212, 216 & 221). Most of the MSA lithics comprise unmodified triangular shaped flakes, including chunks, retouched and utilised flakes, and a number of blades. At least seven round quartzite cores and two flat (prepared) quartzite cores were also found.

Apart from a few chalcedony/chert flakes, that included a very low density scatter of tools on a patch of orange sand in the eastern portion of the footprint area (238), more than 98% of the tools are in fine grained quartzite and weathered indurated shale. This is in stark contrast to several other proposed solar farms that were recently assessed by the archaeologist in the northern and western parts of the province, where the majority of the tools were almost exclusively in banded ironstone.

Frequencies of formal tools are low, and include a few bifacial pointed flakes, and partially retouched blades and points, including a large blade with step/adze retouch. It is assumed that most of the pointed flakes were hafted onto shafts of wood and used as spears or stabbing tools. No scrapers were found, but several side retouched flakes were noted, that could have been used as scraping tools. .

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

A collection of tools and the context in which some of them were found are illustrated in Figures 11-21.

No visible graves were found on the proposed site.

No rock engravings were found among numerous small outcroppings of dolerite that were searched alongside the northern boundary of the proposed site.

No old buildings, structures, or features, old equipment, public memorial or monuments occur in the footprint area.

Figure 10. The proposed Keren Energy Disselfontein Solar Energy Park: Waypoints of archaeological finds

Figure 11. 209-210. Scale is in cm

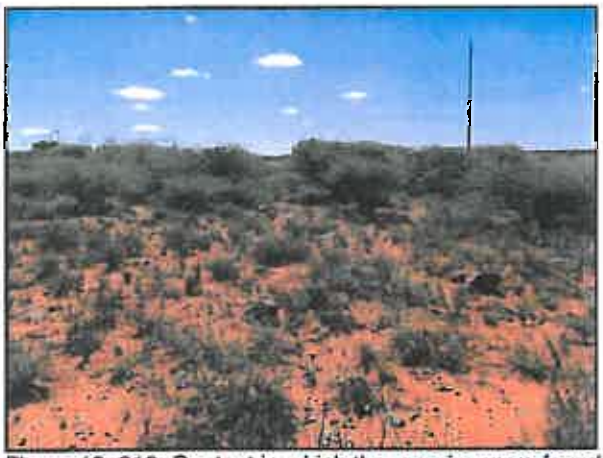

Figure 12. 210. Context in which the remains were found

Figure 13. 212. Scale is in cm

Figure 14. 216. Scale is in cm

Figure 15. 217. Scale is in cm

Figure 16. 216. Context in which the tools were found

Figure 17. 220 Context in which the tools were found

Figure 18. 211-220 & 222. Scale in cm

Figure 19. 211-220, & 222. Scale is in cm

Figure 20. 238. Scale is in cm

Figure 21. 238 context in which the tools were found

6.1 Significance of the archaeological remains

As archaeological sites are concerned, the occurrences are lacking in context as no organic remains such as bone, pottery or ostrich eggshell was found. The relatively small numbers isolated and dispersed context in which they were found mean that the remains have been rated as having low (Grade 3C) significance.

7. ASSESSMENT OF IMPACTS

In the case of the proposed Disselfontein Solar Energy Plant near Hopetown it is expected that the overall impact on important archaeological remains will be low (Table 1).

Apart from trenches for underground cables, limited bedrock excavations are envisaged. The solar panels will be raised about 2 m above ground and mounted on small footings drilled and set into the ground. The excavations for the footings are about 1.5 m in diameter and so the actual ground disturbance will be quite limited and contained

It is also important to note that the majority of the lithics were recorded in the Eskom servitudes.

Potential impacts on archaeological heritage	
Extent of impact:	Site specific
Duration of impact;	Permanent
Intensity	Low
Probability of occurrence:	Probable
Significance without mitigation	Low
Significance with mitigation	Negative
Confidence:	High

Table 1. Assessment of archaeological impacts.

8. CONCLUSION

It is maintained that development of the proposed Keren Energy Disselfontein Solar Energy Plant on Remainder Farm 77 will have a limited impact on archaeological heritage resources.

The AIA has captured most of the archaeological heritage that is present on the site, although it should be remembered that a large portion of the footprint area is covered in dense Swarthok vegetation.

Indications are, however, that in terms of the archaeological heritage, the proposed activity is viable and no fatal flaws have been identified.

9. RECOMMENDATIONS

With regard to the proposed construction and operation of the Keren Energy Disselfontein Solar Energy Plant on Remainder Farm 77 near Hopetown, the following recommendations are made:

1. No further archaeological mitigation is required.

2. Should any unmarked human burials/remains or ostrich eggshell 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

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.

Henderson, Z. 2002. A dated cache of ostrich-eggshell flasks from Thomas` Farm, Northern Cape Province, South Africa. South African Archaeological Bulletin 57:38-40

Morris, D. 2005. Further evidence of spouts on ostrich eggshell containers from the Northern Cape, with a note on the history of anthropology and archaeology at the McGregor Museum, Kimberley. South Africa Archaeological Bulletin 60:112-114

Morris, D. 2002. Another spouted ostrich eggshell container from the Northern Cape, South African Archaeological Bulletin 57:41

Appendix I

238		S29 28.328 E23 54.565	3-4 chert flakes and 2-3 MSA quartzite flakes on small patch of gravel/sand surrounded by dolerite outcropping
239		S29 28.356 E23 54.612	X 2 MSA quartzite flakes in small footpath
240		S29 28.391 E23 54.603	MSA quartzite flake

Table 2. The proposed Disselfontein Solar Energy Plant: spreadsheet of waypoints and description of archaeological finds