

**ARCHAEOLOGICAL IMPACT ASSESSMENT: PROPOSED
CONSTRUCTION OF HUMANSRUS SOLAR 3 ON A PORTION OF THE
FARM HUMANSRUS 147 NEAR COPPERTON, NORTHERN CAPE**

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act No 25 of 1999)

Prepared for:
Cape EAPrac
Environmental Assessment Practitioners

On behalf of:
Humansrus Solar 3 (Pty) Ltd

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EXECUTIVE SUMMARY

ACO Associates cc was appointed by Perception Planning on behalf of Cape EAPrac Environmental Assessment Practitioners for Humansrus Solar 3 (Pty) Ltd to undertake an archaeological impact assessment for the construction of Humansrus Solar 3 (75 MW PV) facility on a portion of the Farm 147, Humansrus near Copperton in the Siyathemba Municipality, Northern Cape.

Numerous renewable energy facilities are planned in the Copperton area around the substations of Cuprum and Kronos (Orton & Webley 2013a & b; Van der Walt 2013; Kaplan & Wiltshire 2011).

The study area for Humansrus Solar 3 and Humansrus Solar 4 was surveyed by Lita Webley and David Halkett on 23 October 2014. The property was accessed by the local farm roads and transects were walked across the study area.

The field assessment identified:

- A diffuse spread of ESA and MSA stone artefacts across the study area for Humansrus 3;
- There are no buildings or graveyards on the property;

Indications are that in terms of archaeological heritage the proposed activity is viable; impacts are expected to be limited and controllable.

Construction of the proposed solar facility may proceed. Either layout (Alternative 1 and Alternative 2) is acceptable.

The following recommendations should be enforced:

- If during ground clearance or construction, any dense accumulations of stone tools, particularly if they are associated with ostrich eggshell fragments, are uncovered then the ECO should report this to SAHRA (Tel: 021 462 4502);
- The appropriate recommendations will need to be implemented during the EMP should unmarked graves be encountered during construction. If any human remains are uncovered during construction, the ECO should have the area fenced off and contact SAHRA (Tel: 021 462 4502) immediately.

GLOSSARY

Archaeology: Remains resulting from human activity which is in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Early Stone Age: The archaeology of the Stone Age between 700 000 and 2500 000 years ago.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Holocene: The most recent geological time period which commenced 10 000 years ago.

Late Stone Age: The archaeology of the last 20 000 years associated with fully modern people.

Middle Stone Age: The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.

National Estate: The collective heritage assets of the Nation

Palaeontology: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Pleistocene: A geological time period (of 3 million – 20 000 years ago).

SAHRA: South African Heritage Resources Agency – the compliance authority which protects national heritage in the Northern Cape.

Structure (historic:) Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.

Acronyms

DEA	Department of Environmental Affairs
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency

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1. INTRODUCTION

ACO Associates cc was appointed by Perception Planning on behalf of Cape EAPrac Environmental Assessment Practitioners for Humansrus Solar 3 (Pty) Ltd to undertake an archaeological impact assessment for the construction of a 75 MW PV facility on a portion of the Farm 147, Humansrus near Copperton in the Siyathemba Municipality, Northern Cape (Figure 1).

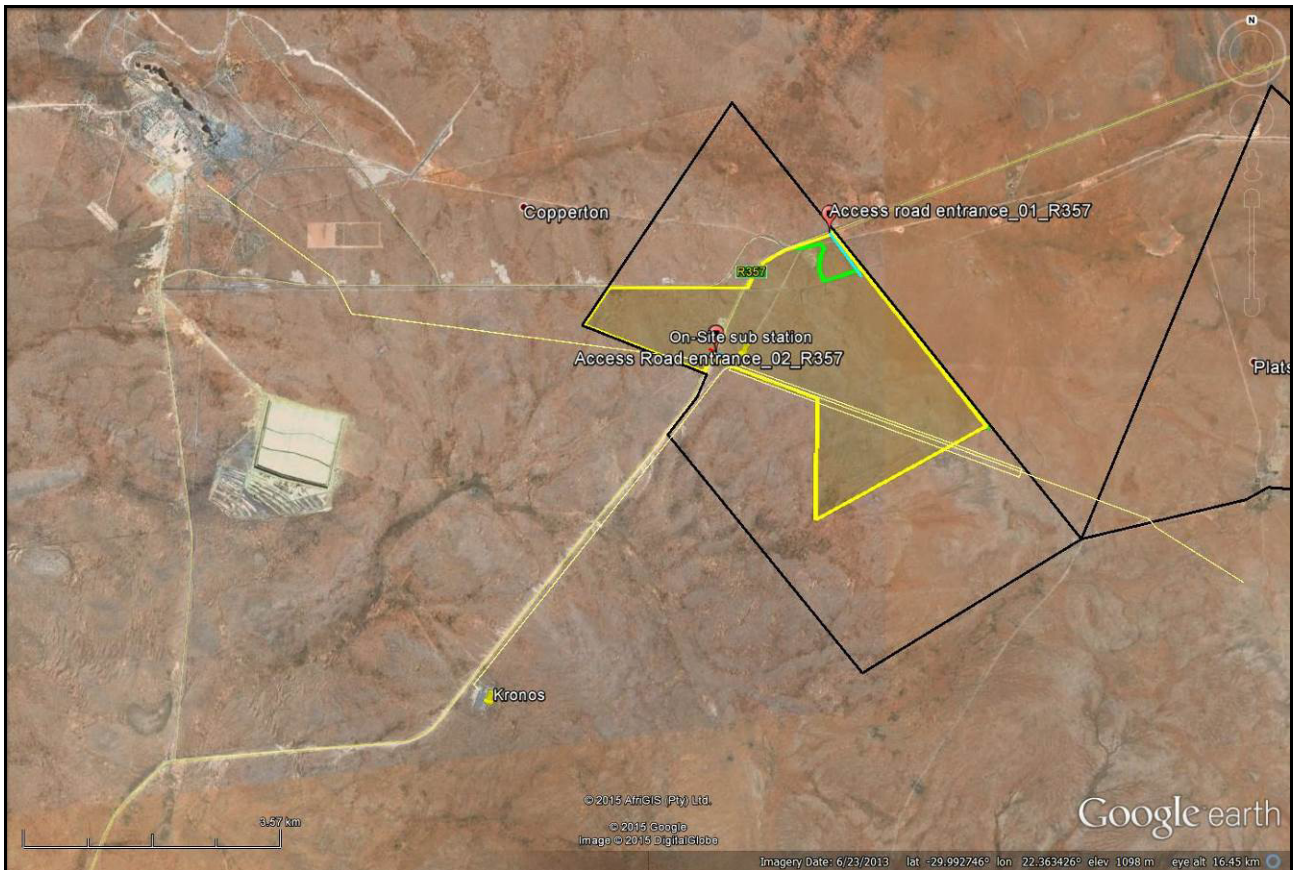


Figure 1: An aerial image of the proposed PV facility on the Farm Humansrus. The preliminary study area falls within the yellow polygon.

2. DEVELOPMENT PROPOSALS

Two alternatives have been proposed: a preferred layout (Figure 2) and an alternative layout (Figure 3).

- The preferred layout (Figure 2) will be 75MW;
- The alternative layout (Figure 3) will be 75MW.

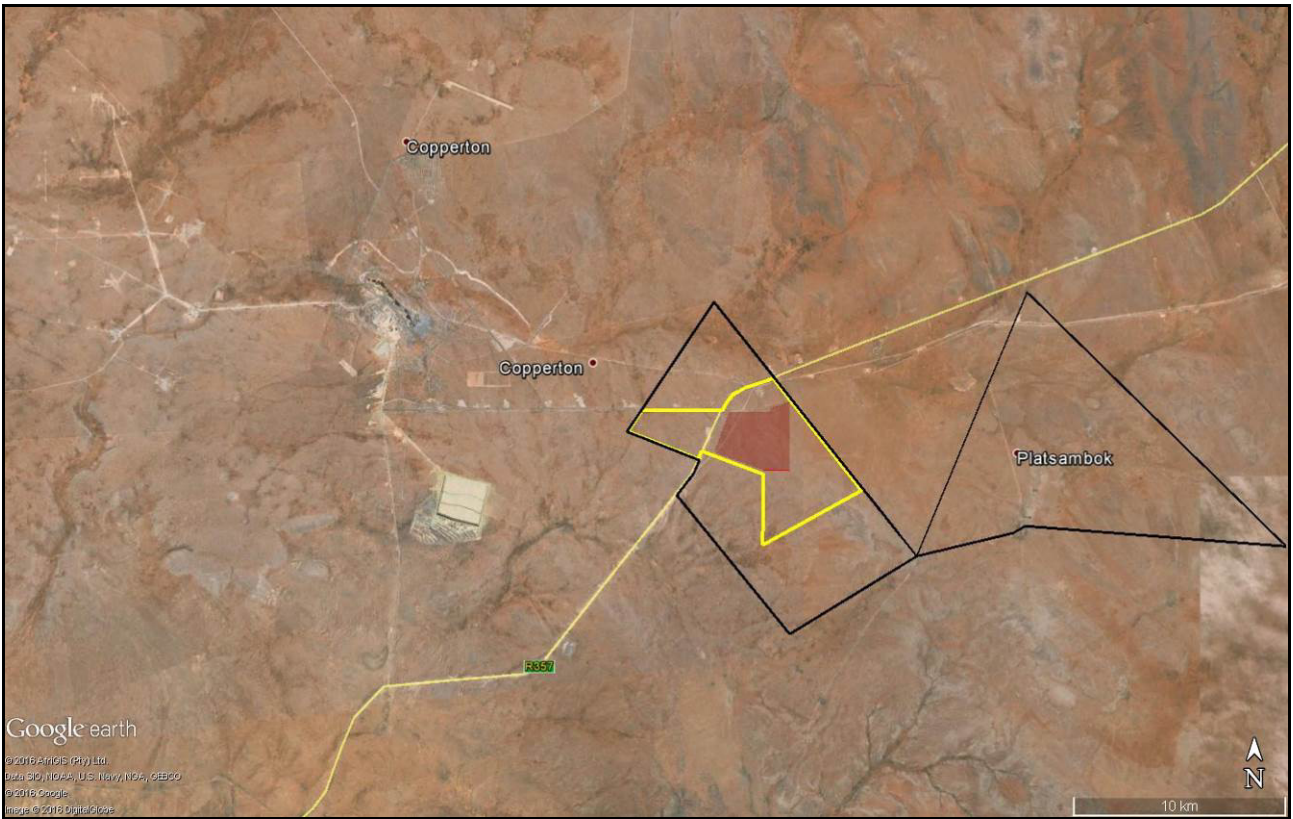


Figure 2: The preferred layout is situated within the red polygon.

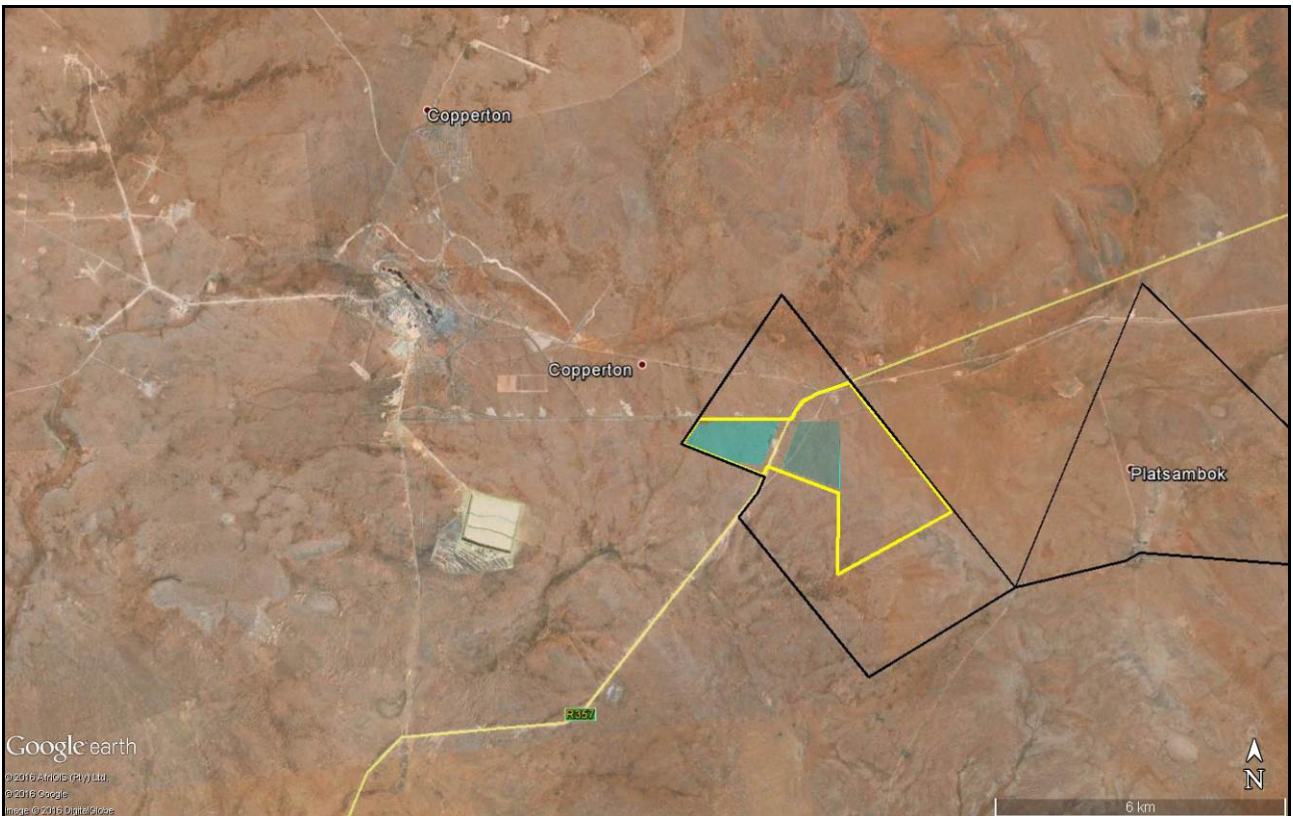


Figure 3: The alternative layout is situated within the blue polygon.

Humansrus Solar 3 (Pty) Ltd proposes to construct a 75 MW on an estimated site layout of 220ha. The solar technology will comprise PV and/or concentrated PV with fixed, single or double axis

tracking technology. The height of the facility will be less than 10m, it will be north-facing and approximately 2-5ha will be required for the laydown area.

Grid Connections:

There are two substations within the surrounding area, namely Kronos and Cuprum.

- The facility plans to connect to the Kronos substation via a self-built 132kV line;
- The 132 kV powerlines will require a servitude of less than 32m;
- The pylons will be monopole steel structures with a height of less than 25m.

Other Infrastructure:

- Auxiliary buildings of approximately 2ha in size for ablutions, workshops, storage areas and site offices, etc. Fencing height will not exceed 3m;
- Laydown areas of approximately 2-5ha will be required.

Access Roads:

- Access Road_01 is opposite the preferred Humansrus SEF 1 access road, same road access as Humansrus Solar 3.
- Access road entrance_02 from R357 same as for Humansrus Solar 3 (parallel to the Cuprum - Hydra line).
- The access roads which are not used during operation of the facility to be closed and rehabilitated;
- Access roads expected to be 6m wide but less than 8m in width.

3. HERITAGE LEGISLATION

While the National Department of Environmental Affairs is the decision making authority acting in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) and Regulations (2014), they must ensure that the evaluation of the statutorily defined broad range of heritage resources fulfils the requirements of the relevant heritage resources authority in terms of Section 38 (3) of the National Heritage Resources Act (Act 25 of 1999) (NHRA) and that any comments and recommendations of the relevant heritage resources authority with regard to proposed development have been taken into account prior to the granting of the consent.

This report is conducted in terms of Section 38 (8) of the National Heritage Resources Act, No 25 of 1999.

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)).

3.1 Archaeology & Palaeontology (Section 35(4))

No person may, without a permit issued by HWC, destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite.

Archaeological is defined as: “material remains resulting from human activity which is in a state of disuse and is in or on land and which is older than 100 years, including artefacts, human and hominid remains and artificial features and structures”.

Palaeontological is defined as: “any fossilised remains or fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace”.

3.2 Burial grounds and graves (Section 36(3))

No person may, without a permit issued by the South African Heritage Resources Authority (SAHRA), destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority.

3.3 Grading

The South African heritage resources management system is based on grading, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Table 1: Grading of Heritage Resources

Grade	Level of significance	Description
I	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
II	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
IIIa	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3a heritage resources.
IIIb	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3b heritage resources.
IIIc	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.

4. METHODOLOGY

4.1 Literature Survey

A survey of available literature was carried out during the Scoping process to assess the general heritage context of the area. A background search of other Cultural Resource Management (CRM) projects in the area was made via the South African Heritage Resources Information Systems (SAHRIS) database. Numerous impact assessments have been conducted in proximity to the proposed facility as reflected on the SAHRIS database. The following CRM reports provide valuable information on the heritage resources of the area and were consulted:

- Orton & Webley (2013a & b) have undertaken impact assessments on the farm Hoekplaas 146 and the farm Klipgats Pan 117 to the south-west of Humansrus;
- Van der Walt (2013) has assessed the farm Bosjesmansberg to the north-east of the study area;
- Kaplan & Wiltshire (2011) assessed Vogelstruisbult to the west of the study area;
- Van Ryneveld (2006) conducted an assessment on the farm Vogelstruis Bult 104 for Amber Mountain Investments interested in re-working the old mine dump and, pending the results of this activity, the re-opening of the old Copperton Mine. The mine is located to the north-west of the farm Humansrus 147.

Webley & Halkett (2014a&b) have conducted an assessment of Humansrus Solar PV 1 and Humansrus Solar PV 2 on the farm Humansrus 147 and these reports form the basis of this archaeological impact assessment. These two solar facilities have both been authorised in terms of NEMA.

The location of the other renewable (solar and wind) facilities are shown in Figure 5.

4.2 Field Survey

Lita Webley and David Halkett (2014) undertook an archaeological survey of Humansrus Solar PV 1 and Humansrus Solar PV 2 in October 2014 and recorded their tracks and sites by means of a Garmin GPS. All archaeological sites were recorded, described and photographed. The area was accessed by local farm roads but transects of the study area were also undertaken on foot. These tracks are shown on Figure 4. Webley and Halkett also drove along sections of the proposed access roads and powerline options where this was possible.

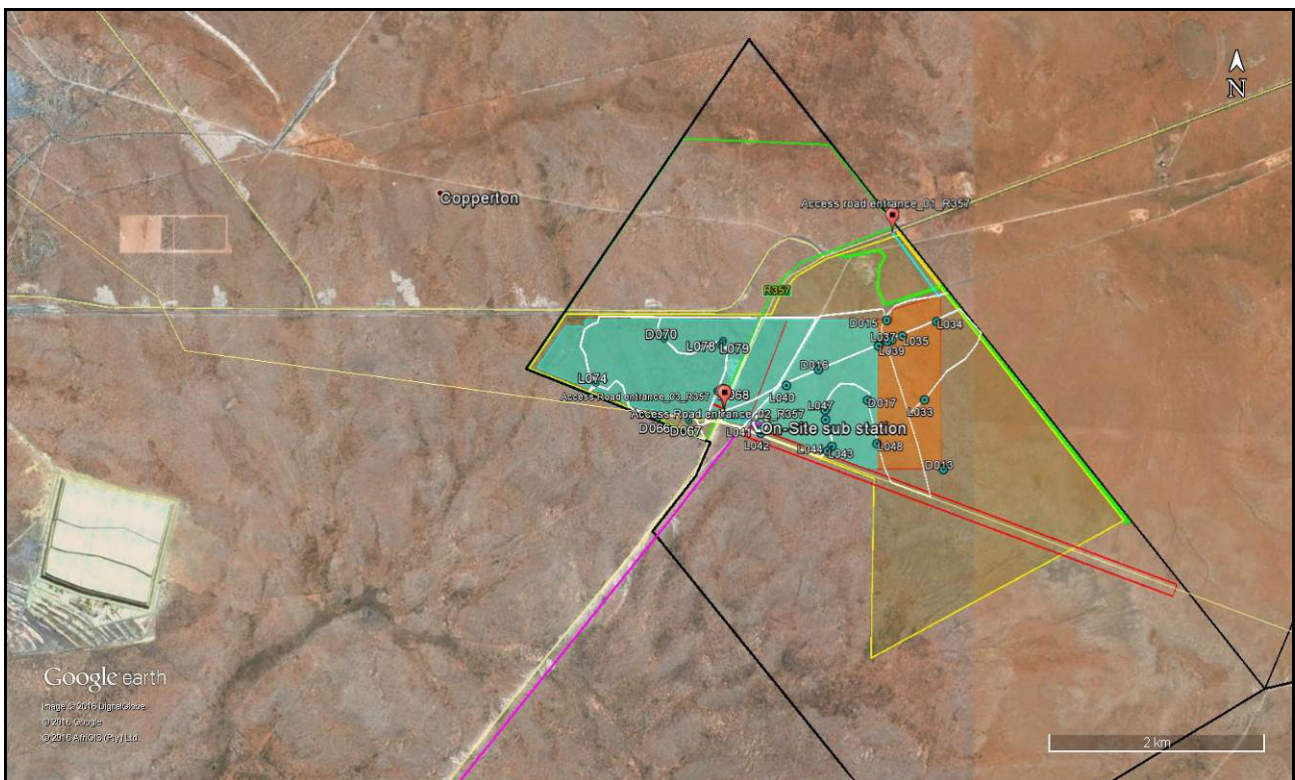


Figure 4: The sites and tracks (white lines) recorded in the study area during the field survey conducted in 2014.

4.3 Assumptions and Limitations

There are only a few farm roads and tracks which cross the facility and this makes a detailed survey difficult. We are of the opinion that our coverage of the area was sufficiently broad to identify the distribution of archaeological resources.

5. RECEIVING ENVIRONMENT

The farm Humansrus 147 comprises a generally flat landscape, with knee-high vegetation (Plate 1) and a substrate which varies between thick red soils, calcretes surfaces and gravel patches. The property is cut by the railway track to Copperton. The track is no longer functional and the rails have been removed. The southern edge of the property is bounded by the R357 and there is a powerline which crosses the western corner of the study area (Plate 2).



Plate 1: View across the study area to the north, with the Copperton mine visible in the distance.



Plate 2: View of the powerlines which cut across the western edge of the property.

5.1 Archaeological Background

The archaeological review below includes the results of the survey of the property undertaken by Webley & Halkett (2014) but also draws on the conclusions of archaeologists who have surveyed adjoining properties. Our survey tracks are reflected in Figure 4 and the list of sites within the two alternatives are provided in Table 3 at the end of the report.

Low density scatters of stone artefacts were found widely distributed across the study area. They tended to be concentrated on slightly deflated areas covered in fine gravel. Often these stone scatters occurred on surfaces underlain by calcretes exposures – i.e. north-eastern corner of the property.

Those parts of the study area under dense knee-high bush and thick sands, had much lower concentrations of artefacts. We did not record individual stone artefacts during the survey (with the exception of type artefacts such as handaxes), but denser concentrations exceeding three stone artefacts or more in a limited area were recorded as “sites”.

Early and Middle Stone Age

Orton & Webley (2013a&b) have reviewed the archaeology of the general area.

Much of the Karoo is covered by gravels that contain abundant stone artefacts in varying densities. Beaumont *et al.* (1995: 240) has declared with regard the Bushmanland area that “thousands of square kilometres of Bushmanland are covered by a low density lithic scatter”. These artefacts are generally very well weathered and mostly belong to the Early (ESA) and Middle Stone Age (MSA). Occasional Later Stone Age (LSA) artefacts are also present within this scatter. These kinds of finds were made by Kaplan (2010) and Wiltshire (Kaplan & Wiltshire 2011) on proposed PV and wind energy sites of Vogelstruis Bult to the east. Orton & Webley (2013a & b) recorded a number of handaxes across the study area. While a few were large, the majority were smaller. These smaller handaxes were, prior to 1965, considered to signify a transitional stone tool industry between the ESA and the MSA called the Fauresmith. However, in a recent review, Underhill (2011) has highlighted the need to determine the validity of this industry. Van der Walt (2013) identified isolated scatters of ESA tools including bifaces made on quartzite to the north of the study area.

Orton & Webley (2013a & b) recorded large scatters of MSA material across Hoekplaas and Klipgats pan to the south-east of the study area. A highly significant MSA site, associated with a fossilised equid tooth, was recorded in a borrow pit at the side of the road. Substantial MSA sites are rare with only a few isolated examples known (Beaumont *et al.* 1995). Van der Walt (2013) concurs about the presence of localised MSA quarries utilising quartz and quartzite outcrops. He describes the MSA as including large flakes, radial and bipolar cores, end scrapers, large utilised and retouched blade tools, and utilised and retouched flakes.

In general, the artefact distributions on Humansrus Solar 3 resemble those on Humansrus Solar 4 but the densities are much lower. Artefact distributions appeared to consist predominantly of MSA material. Very few ESA artefacts were recorded and virtually no LSA material was identified.

Later Stone Age

Several LSA sites in the Bushmanland area to the northwest, west and southwest of Copperton have been investigated by Beaumont and colleagues (1995), Smith (1995a) and Parsons (2003, 2008). Work on these sites led to a distinction between hunter-gatherer and herder sites (Beaumont *et al.* 1995; Beaumont & Vogel 1984, 1989; Parsons 2003), which has recently been called into question (Parsons 2007). Briefly, it is asserted that hunter-gatherer assemblages, termed ‘Swartkop’ may be distinguished from herder sites, termed ‘Doornfontein’ based on stone

artefact assemblages. All these LSA sites have very few, if any, organic items on them. The only organic material generally present is fragments of ostrich eggshell.

Orton & Webley (2013a & b) observed that LSA artefacts were often found in clusters, suggesting that they represented occupation sites. These artefacts are recognised by their small size, their relatively un-weathered surface appearance and the inclusion of quartz in the assemblages. Most LSA scatters were found located around pans. There is also some evidence for the quarrying of quartzite outcrops. Van der Walt (2013) described fewer concentrations of LSA material, including scraper, retouched and utilised flakes, blades and small round cores predominantly made on crypto-crystalline silica (CCS) material.

Most recently, Orton (2014) has undertaken archaeological mitigation of seven Later Stone Age sites on the farm Klipgats Pan 117. He recorded that they were found in dry river courses. The sites included pottery, ostrich eggshell (including decorated fragments), stone artefacts (including many retouched pieces) made on quartz, quartzite, crypto-crystalline silica and hornfels. Some sites also included hammer stones, grindstones and anvils. He concluded that these sites provided a valuable sample of late Holocene settlement from northern Bushmanland.

5.2 Historical Background

Smith (1995b) notes that around that time white farmers were making extensive use of Bushmanland for summer grazing and that this led to the extermination of the massive springbok herds on which the indigenous population subsisted. This in turn led to the descendants of indigenous groups turning to the farmers for food (and employment), effectively ending the span of prehistory in the region.

The farm complex of Humansrus and Platsambok lie outside the study area. The farms of Humansrus and Hoekplaas were surveyed in 1977 and appear to comprise portions of the farms Plat Sjambok 102 and Vogelstruis Bult 104 both of which date to the 1880s and appear to be some of the older farms in this district. There are however, no farm buildings in the study area.

The town of Copperton was established in 1972 to provide housing for the nearby copper mine, but after the mine closed down in 1992 the town was sold and some of the housing has been demolished.

6. IMPACT ASSESSMENT

The levelling and clearing of the ground to install the PV units will result in the relocation or destruction of all surface heritage material. Similarly, the clearing of vegetation for the on-site substation and control room, as well as access roads will impact material that lies buried in the surface sand. Since heritage sites, including archaeological sites, are non-renewable, it is important that they are identified and their significance assessed prior to construction.

Potential impacts caused by a 132 kV power line and the power line access roads are likely to be limited and local. The access road required for a 132 kV powerline is likely to be a 'two-track' which generally only requires limited physical disturbance of the ground surface.

6.1 Impact to Pre-Colonial Archaeology

The main cause of impacts to archaeological sites is direct, physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose buried archaeological sites and artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. The impacts are likely to be

most severe during the construction period although indirect impacts may occur during the operational phase of the project.

Surveys on adjoining farms have recorded high concentrations of MSA and LSA material on the farm Hoeklaas (Orton & Webley 2013a), on the farm Klippgats Pan (Orton & Webley 2013b), Vogelstruis Bult (Kaplan & Wiltshire 2013) and Bosjesmansberg (Van der Walt 2013) and they have been graded as potentially of very high research value and the “No-Go” option has been recommended. However, these artefact concentrations are found on small hills with outcrops of quartzite/quartz as well as around pans. In general these areas need to be avoided.

Our survey for Humansrus 3 (Webley & Halkett 2014) recorded ephemeral scatters of ESA material and widespread, but dispersed scatters of MSA artefacts across the study area. We did not record any LSA artefacts in the study area. While impacts to the stone tool scatters will be permanent, assigning significance to these surface scatters of ESA and MSA material is difficult. The stone artefacts are no longer in their original location or *in situ*. They can provide only limited information with respect to activity areas.

Table 2: Potential impact to pre-colonial Archaeology

Impact Phase: Construction of PV Facility and infrastructure - Archaeology							
Nature of Impact: Clearing and levelling the ground for solar panels, access roads, cabling, substation and powerlines may impact archaeological resources.							
ANTICIPATED SCOPING IMPACTS TO BE SCOPED OUT OR INVESTIGATED FURTHER							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L-	Negative	Medium -	M	H
With Mitigation	L	M	L-	Positive	Low -	M	H
Can the impact be reversed?						NO – physical heritage resources are generally non-renewable	
Will impact cause irreplaceable loss or resources?		No – the field assessment indicates that archaeological resources are of low significance					
Can impact be avoided, managed or mitigated?		Yes					
Mitigation: If during ground clearance or construction, any dense accumulations of stone tools, particularly if they are associated with ostrich eggshell fragments, are uncovered then the ECO should report this to SAHRA (Tel: 021 462 4502)							

Further impacts are not expected during the operational or decommissioning phase of the project.

6.2 Impacts on Colonial Period Heritage

The 1:50 000 maps and Google imagery confirm that there are no farm buildings or structures on the land identified for the solar facility. No historical archaeological material was identified during the survey.

It is not anticipated that there will be any impacts to the Built Environment.

6.3 Impacts on Cemeteries and Graves

In the absence of any residential structures, it seems unlikely that any farm graveyards will be present. However, the possibility of unmarked archaeological and/or historical graves cannot be excluded. The landowner was interviewed with respect to graveyards on the property and confirmed that none were present.

6.4 Impacts of Powerlines and Access Roads

Potential impacts caused by a 132 kV power line and the power line access roads are likely to be limited and local.

Morris (2013) points out that the access road required for a 132 kV powerline is likely to be a 'two-track' which generally only requires limited physical disturbance of the ground surface.

It was not possible to drive down all the alternative routes as they cross other properties. However, inferences may be drawn from the other CRM projects undertaken in proximity to the site. It is concluded that the impacts will be limited.

7. CUMULATIVE IMPACTS

Of concern, however, is the increasing number of solar facilities increase in this area (Figure 5). The cumulative impacts of the developments will result in widespread destruction of pre-colonial sites. Although many of these sites have, individually, been rated as having low significance, the cumulative impact of the removal of all archaeological material will result in the destruction of large areas of archaeology and could be considered significant.

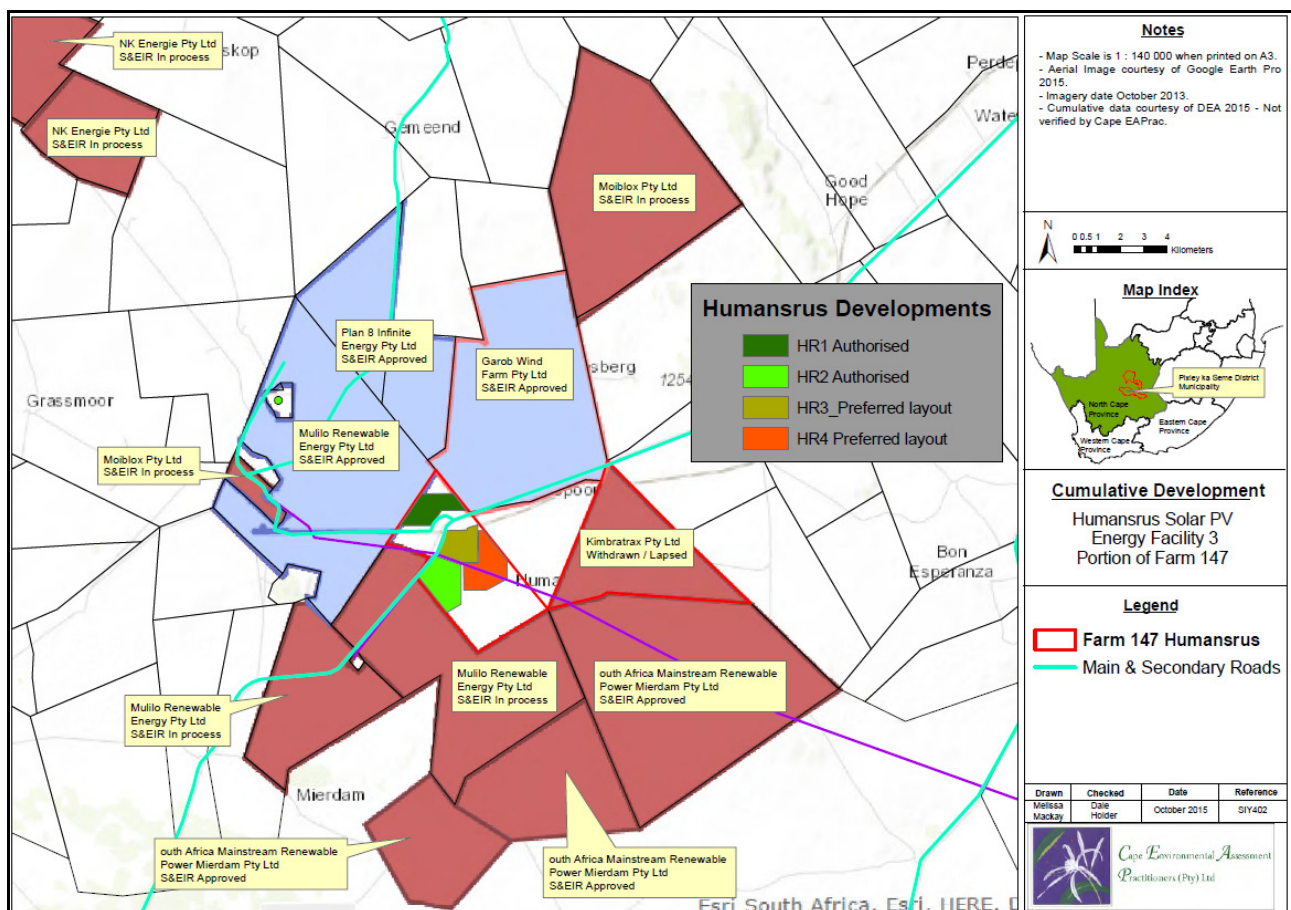


Figure 5: The location of renewable energy facilities (both approved and proposed) in proximity to Humansrus 3.

Limited mitigation, particularly of Later Stone Age sites, has been undertaken by Orton (2014) on the farm Klipgats Pan 117 and this addresses some of the concerns about the destruction of archaeological heritage. The mitigation of additional archaeological sites will need to be considered based on the merits of each site. Mitigation of archaeological sites on a portion of Humansrus 147 is not warranted based on the low significance of the archaeological resources on the property.

8. CONCLUSION

The archaeological survey identified an amorphous distribution of Early and Middle Stone Age artefacts randomly scattered across the landscape. No Later Stone Age sites, such as those mitigated by Orton (2014) on the adjoining farm of Klipgats Pan 117, were observed. It is concluded that the artefacts distributions are of low significance and that no further mitigation is required.

9. RECOMMENDATIONS

Indications are that in terms of archaeological heritage the proposed activity is viable; impacts are expected to be limited and controllable.

Construction of the proposed solar facility may proceed. Either layout (Alternative 1 and Alternative 2) is acceptable.

The following recommendations should be enforced:

- If during ground clearance or construction, any dense accumulations of stone tools, particularly if they are associated with ostrich eggshell fragments, are uncovered then the ECO should report this to SAHRA (Tel: 021 462 4502);
- If any human remains are uncovered during construction, the ECO should have the area fenced off and contact SAHRA (Tel: 021 462 4502) immediately.

10. REFERENCES

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Table 3: List of archaeological sites recorded during the field survey.

Local Name	Site	GPS co-ordinates Latitude	Longitude	Site description	Significance
L033		22.39252305	-29.98107489	Artefact scatters. They appear to lie on calcretes pavements where the red soils have been deflated.	Low
L034		22.39369048	-29.97454279	Ditto	Low
L035		22.39040343	-29.97575230	Ditto	Low
L036		22.38938830	-29.97607986	Ditto. A handaxe with a very thick butt.	Low
L037		22.38895445	-29.97620207	Ditto. Near the railway line and quite disturbed	Low
L038		22.38841315	-29.97398724	Artefact scatter	Low
L039		22.38808936	-29.97657540	Ditto	Low
L040		22.37919264	-29.97987184	Ditto	Low
L045		22.38328326	-29.98359265	Ditto	Low
L046		22.38296675	-29.98273032	Ditto	Low
L047		22.38292719	-29.98192448	Bedrock outcrop	Low
L048		22.38793437	-29.98472974	Artefact scatter	Low
L055		22.38993304	-29.98749727	4 implements; ine fine-grained quartzite flake with retouch; 3 quartzite artefacts. Large number of grey quartzite blocks around here	Low
L074		-29.97969707	22.36077525	One blade	Low
L075		-29.97984795	22.36239555	Quartzite blocks, some of which are flaked. Some are radial cores, others more irregular. 1 shale flake.	Low
L076		-29.98236235	22.36681156	Close to the Eskom servitude road, 1 worn hornfels flake, 1 retouched blade, 1 hornfels core apparently freshly flaked.	Low
L077		-29.98031314	22.37250916	Ditto	Low
L078		-29.97633660	22.37301584	Artefact scatter. 1 flake with cortex; some "freshly" flaked hornfels.	Low
L079		-29.97651044	22.37273195	Artefact scatter. 1 quartzite radial core	Low
L080		-29.97288393	22.37583593	Ditto	Low
D070		-29.97600996	22.36741497	Ditto	Low