ARCHAEOLOGICAL IMPACT ASSESSMENT FOR PHASE 1 OF THE PROPOSED AEOLUS SOLAR ENERGY FACILITY ON FARMS LEKKERWATER 183, EVERTS HOPE 190 AND PORTIONS 4 & 5 OF WASCHKLIP 191, LANGEBAAN, SALDANHA BAY MUNICIPALITY, WEST COAST

Prepared for:

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EXECUTIVE SUMMARY

Cape Lowlands Environmental Services (CLES), on behalf of Aeolus Development Corporation (Pty) Ltd (Aeolus), appointed the Agency for Cultural Resource Management (ACRM) to conduct an Archaeological Impact Assessment (AIA) for a proposed solar energy power generation facility near Langebaan. The solar plant is proposed on farms Lekkerwater 183, Evertshope 190 and portions 4 & 5 of Waschklip 191 to the west of the R27 road between the Langebaan turnoff and Velddrif. The nearest urban development is about 2km away on the outskirts of Langebaan and Long Acres Country Estate. Tiekosklip and Kleinberg farmhouses abut the proposed development footprint which lies in the Saldanha Bay Municipality of the West Coast District Municipality.

Aeolus proposes to generate a total of 70MW over 5 years in 20MW blocks. The facility requires a grid of interconnected photovoltaic panels, two service buildings up to a maximum height of 1.5 storeys, service tracks and electrical infrastructure. The panels will stand up to 2m above the ground and are installed to a depth of 80cm. As solar panels generate far lower energy than wind turbines per square metre, the horizontal footprint of the proposal will be large.

This AIA forms part of a Heritage Impact Assessment (HIA) requested by Heritage Western Cape (HWC) in June 2011 (see Appendix 1). The aim of the study is to locate and map archaeological sites that may be impacted by the planning, construction and implementation of the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate against the impacts.

The archaeological study entailed the following:

- A background study of previous archaeological work done in the area
- A 1-day site visit that included a foot survey of the proposed development sites.

The following findings were made:

A single dark quartzite flake of indeterminate age (but probably Middle Stone Age) was found near a heap of ploughed calcrete cleared away for agriculture. A number of other piles of calcrete dotted the property but no shell middens or other artefact scatters were documented along the length of the 13.06km survey. This study therefore feeds into the debate around the pattern for the distribution of Later Stone Age (LSA) and Middle Stone Age (MSA) sites encountered by others working in the area (Kaplan 1993; Jakavula 1999; Smith & Mütti 2009; Deacon et al in press). The properties surveyed for this proposal lie at least 4.2km from the nearest coastline and are therefore outside of the 0-500m zone from the beach where most of the known shell middens occur.

A ruined farmhouse was found just **outside** the western boundary of the proposed solar plant and negative impacts resulting from the proposed facility are not expected on this structure.
The following recommendations are made:

1. The proposed development may proceed on archaeological grounds but subsurface finds may be found during construction. Should these be encountered they must be reported to HWC immediately.
2. HWC should make arrangements for an investigation into the conservation worthiness of the ruin as neglect of the structure will lead to rapid deterioration of the building.

Specialist study

DECLARATION OF INDEPENDENCE IN ACCORDANCE WITH REGULATION 33 (b) OF THE NEMA EIA REGULATIONS, AS AMENDED

I, Nicholas George Wiltshire, as the appointed Heritage specialist hereby declare that I:

- am independent in this application;
- regard the information contained in my report as true and correct;
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2006.
- have and will not have vested interest in the proposed activity proceeding;
- have no, and will not engage in, conflicting interests in the undertaking of the activity;
- undertake to disclose, to the competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations.
- am fully aware of my responsibilities in terms of the National Environmental Management Act of 1989 ("NEMA") (Act No. 107 of 1998), the Environmental Impact Assessment Regulations ("EIA Regulations") in terms of NEMA (Government Notice No. R. 385, R. 386, and R. 387 in the Government Gazette of 21 April 2006 refer).

Signature of the Specialist

Name of company: Agency for Cultural Resource Management

Date: 14 November 2011

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1. INTRODUCTION

Cape Lowlands Environmental Services (CLES), on behalf of Aeolus Development Corporation (Pty) Ltd (Aeolus), appointed the Agency for Cultural Resource Management (ACRM) to conduct an Archaeological Impact Assessment (AIA) for a proposed solar energy power generation facility near Langebaan. The solar plant is proposed on farms Lekkerwater 183, Evertshope 190 and portions 4 & 5 of Waschklip 191 to the west of the R27 road between the Langebaan turnoff and Velddrif. The nearest urban development is about 2km away on the outskirts of Langebaan and Long Acres Country Estate. Tiekosklip and Kleinberg farmhouses abut the proposed development footprint which lies in the Saldanha Bay Municipality of the West Coast District Municipality.

The total size of the farms and portions included in this development proposal is 3792 hectares. The actual development footprint surveyed for this phase of the solar farm is **270** hectares. The proposed solar facility is one of several energy related projects undertaken by Aeolus which intends to complete up to 700MW by 2019 (Cape Chamber of Commerce 2011). For this solar facility, Aeolus proposes to generate a total of 70MW over 5 years in 20MW blocks. The facility requires a grid of interconnected photovoltaic panels, two service buildings up to a maximum height of 1.5 storeys, service tracks and electrical infrastructure. The panels will stand up to 2m above the ground and are installed to a maximum depth of 80cm. As solar panels generate far lower energy than wind turbines per square metre, the horizontal footprint of the proposal will be large.

This AIA forms part of a Heritage Impact Assessment (HIA) requested by Heritage Western Cape (HWC) in June 2011 (see Appendix 1). Dr John Pether has been appointed to conduct a Palaeontological Impact Assessment (PIA) study of the proposed project.

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

The Archaeological Impact Assessment forms part of the Environmental Impact Assessment (EIA) process that is being conducted by CLES.

The archaeological study entailed the following:

- A background study of previous archaeological work done in the area
- A 1-day site visit that included a foot survey of the proposed development sites.

2. TERMS OF REFERENCE

The terms of reference for the archaeological study are to:

- Conducting a detailed desktop level investigation to identify all archaeological sites in the proposed development areas;
- Undertaking field work to verify results of desktop investigation;
- Document (GPS coordinates and map) all sites, objects and structures identified on the candidate sites;

Compile a report which would include:

- Identification of archaeological sites within the proposed development areas;
- Assess the sensitivity and significance of archaeological remains in the sites;
- Recommendation of mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance;

3. THE STUDY SITE

The location chosen for the proposed Aeolus solar facility is on land owned by Arcelor Mittal which owns and operates the Saldanha Steel Mill. The study site is currently zoned Agriculture 1 and the applicant requires rezoning to Industrial 2 to enable this development. The core zone of the steel export facility is 6.5km to the north-west of the study site and the furnace towers are a prominent feature on the horizon (see Figure 17, best viewed in high resolution on the accompanying DVD). A large slimes dam is 1.5km away between the north-west corner at Tiekosklip and the steel mill (Figure 2 & 18). Long Acres Country Estate is about 2km away and is the nearest urban development on the outskirts of Langebaan to the west and south-west of the study site.

An Engen service station is near the south-eastern corner while the two farmhouses mentioned previously, Tiekosklip and Kleinberg, border the north-west and north-east corners respectively. 765kV powerlines and the border fence of Everts Hope 190 run through the middle of the study site and are parallel to each other. No developments are allowed below the powerlines but the ground has been used for grazing of sheep and cattle by a farmer who rents the land for certain parts of the year. Evidence of past cultivation of wheat and other crops was clearly visible as the natural vegetation was disrupted and ploughed heaps of calcrete stood up to 1m high in places.

Besides the remnants of cultivated plants, the vegetation was mainly grassy and dry during the survey. Dense stands of Port Jackson fortunately do not occur on this property besides a small cluster in the mid-western area of the study site. Even this area appears to have been managed by

the farmer to maximize the yield of grazing area available. Despite the industrial developments at the port of Saldanha and the service station, the study site has retained a **rural character**.

For archaeologists, the greater Vredenburg peninsula region needs no introduction. Extensive surveys and excavation projects have been carried out by archaeologists from the University of Cape Town and the University of the Witwatersrand (Smith et al 1991; Sadr et al 2003; Parkington 2006). A number of dense shell middens occur along the coastline, and one of these, Paternoster North Site A (PNNA), was declared a Provincial Heritage Site by HWC in 2009 (Deacon et al in press). The Vredenburg peninsula also happened to be identified as the most sensitive stretch of archaeological sites along the West Coast by Jakavula (1999) in his cultural sensitivity model. Sadly, much of the best archaeological sites have been swept away by rampant housing developments over the last 12 years.

Efforts to identify archaeological conservation areas and complete more formal declarations are underway along with management plans built on the vast database of sites identified thus far (Smith & Mütti pers. comm. 2011). Kasteelberg, near Paternoster, is one of the most important of these and a proposed wind farm application has triggered much debate on defining appropriate buffer zones for highly significant sites.

Recent and ongoing research in the area includes the University of Tubingen team of Conard and Kandel at Geelbek who recorded a number of Later and Middle Stone Age sites south-west of the study area in the Geelbek Dunes in the West Coast National Park (Fuchs et al 2008). Smith et al (1991) embarked on an extensive recording programme aimed at resolving the hunter-gatherer versus herder debate at Kasteelberg and Witklip in Vredenburg. Sadr (2009) followed this up by completing a thorough open site survey and dating programme across a wide area of the Vredenburg peninsula with the objective of finding better evidence for herding camps. Many of these sites are ephemeral at best and are under constant pressure from farming activities, but the study still drew invaluable information from the spatial distribution of these archaeological sites.

A number of Early Stone Age sites have been documented to the north-east, east and south-east of the study area (Singer 1961; Singer & Wymer 1968; Klein & Cruz-Uribe 1991). Acheulean bifacial tools in quartz porphory, granite and silcrete have been excavated in poorly stratified limestone deposits bearing fossil remains (Archer & Braun 2010). Some of these are on display at the West Coast Fossil Park, another area being investigated for enhanced protection status on heritage grounds. Since 2009, the resurgence in the market price for phosphate has led to a

number of proposed mining applications in the region which directly impact on both palaeontological and archaeological sites unless extensively mitigated (Kaplan 2009a).

Contract surveys and excavations triggered by the housing and other developments have also made a significant contribution to our understanding of the archaeological record in the area. The Archaeology Contracts Office (ACO) at UCT, (ACRM), Cape Archaeological Survey (CAS) and the Centre for Archaeological Resource Management (CARM) have been the main participants in AIAs over the last 30 years.

Many of the sites located by these archaeologists have been entered onto the UCT sites database (Wiltshire 2011) and summarized in a recent paper assessing the way forward for heritage management along the West Coast (Deacon et al in press). The Leentjiesklip and Lynch Point shell middens are closer to the study site and excavations have produced dates between 4000 – 1800 years BP and included various terrestrial and marine food remains and human burials (Parkington et al 1988; Hart 1997, 1998, 2001).

Ephemeral sites comprising a few stone flakes and some fragments of shellfish have also been documented away from the coast and between this study site and Leentjiesklip on the farm Oliphantskop (Hart and Halkett 1992; Orton 2008). A similar pattern of sites was found by Kaplan (2009b) nearer to Paternoster on Besterskraal. These are the most vulnerable types of sites in the region as they are often destroyed by farming activities that have not necessarily even triggered impact assessments.

An in-depth summary of the palaeontological sensitivity of the area is provided in the PIA but it suffices to mention here that the Langebaan Limestone formations (Avery 1997) are particularly rich in fossils due to the calcareous environment.

Figure 1. 1:250 000 locality map showing the position of the proposed solar plant with Langebaan to the south-west, Langebaanweg to the north-east, Saldanha Bay to the west, Vredenburg to the north-west and Velddrif is to the north just off the map.

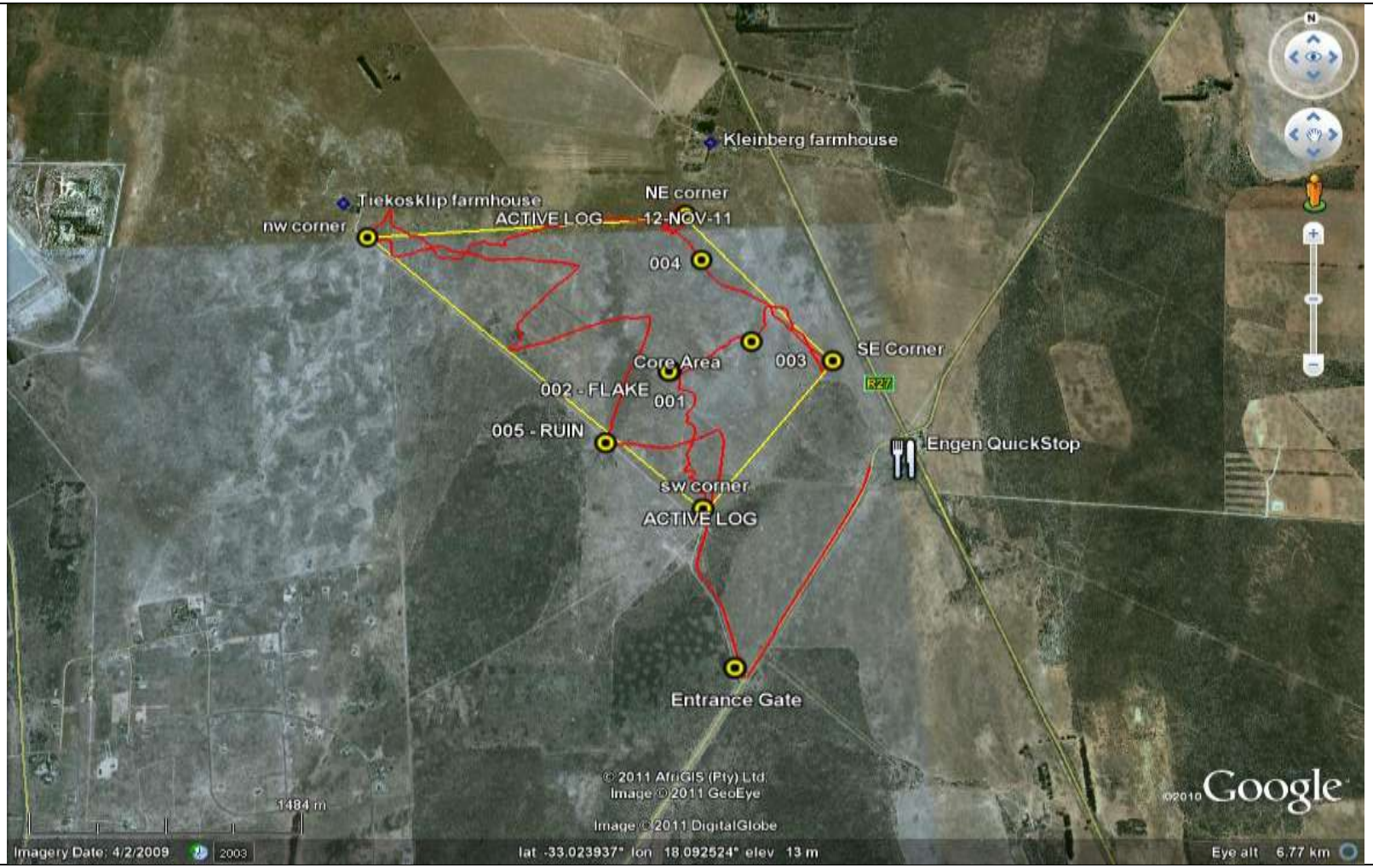

Figure 2. Google Earth aerial view of the area for the proposed solar facility in a yellow polygon showing the locations of the nearby farms in blue diamonds, the track path in red and the observations in yellow point markers.

4. METHODOLOGY FOR THE STUDY

4.1 Method of survey

A desktop study using the SAHRA GIS Report Mapping Project was conducted to establish an overview of previous contract work in the area surrounding this proposal. The UCT sites database was also consulted to check the results of AIAs against the researched sites found thus far (Wiltshire 2011).

The ground survey covered 13.06km and took a full day of recording on site. The terrain was completely flat with little change in elevation. Digital photographs of all finds were taken with a scale and mapped using a handheld Garmin Etrex Vista Hcx device. These finds were in turn mapped in Google Earth and GlobalMapper as the chosen GIS packages for the report. A spreadsheet listing the GPS coordinates of the finds has been included in the DVD submitted to HWC.

4.2 Constraints and limitations

The archaeological visibility varied widely across the property. In some areas the vegetation consisted of low scrub and visibility was high in these places. For the most part, dry grasses, weeds, wheat and other dry grassy vegetation reduced visibility considerably. The area east of the powerlines generally had the densest vegetation whilst west of the powerlines the grazing of sheep and cattle led to better visibility. An isolated area north-east of the ruin had a small area of Port Jackson growth. Piles of ploughed calcrete dotted the entire property and this has certainly shifted the archaeological record. However, the extremely low artefact count experienced on this property is not due simply to ploughing - farming activities on other properties usually fail to completely destroy the archaeological remains as long as they were there in the first place.

5. FINDINGS

Only a single isolated dark quartzite flake, marked as observation 002, was found near a pile of ploughed calcrete at observation 001. The flake is not diagnostic but certainly no older than the Middle Stone Age. This particular quartzite is of local origin and has been noted by the author on other properties in the area. The immediate area near the flake was intensively searched for more material but none was found. Various calcrete chunks were noted across the property but none were associated with granite, quartzite or other raw materials typical of artefact scatters in this area. It is therefore likely that most of these chunks are naturally broken or were broken by farming activities.

The piles of calcrete rock mentioned earlier are ubiquitous and were found all over the property. The land had clearly been used for cultivation of crops in the past despite the low nutrient quality of the soils. In many places the calcrete bedrock was visible on the surface forming hardened crusts and it was hoped that the greater visibility in these areas would provide more archaeological finds. This unfortunately did not occur and given the shallow soil depth the low artefact counts cannot be simply due to ploughing.

The nearest beach is at least 4.2km away from the study site to the west and south-west, just north of Leentjiesklip and Lynch Point. A number of shell middens occur there but none of this material appears to have traveled back onto this property. No granite outcrops occur on the study site and nor are there any rivers or streams. It therefore appears that this area is somewhat of a no-man's land archaeologically speaking: it is too far away from the beach to leave immediate and obvious traces of primary processing of seafood and it is not directly between the beach and a granite outcrop such as those found near Paternoster at Kasteelberg. Of course, there is always the possibility that artefact scatters were simply missed during the survey. If these are found during construction they are likely to be ephemeral but no less important than the larger shell middens on the coast.

Significant Early Stone Age and palaeontological material has been found to the east, north-east and south-east of the study area at Elandsfontein and Langebaanweg. Similar finds will possibly be encountered in the construction phase of the project and recommendations made in this report must be followed.

A large ruined farmhouse was identified just outside the western boundary of the study area. The roof has collapsed and modern beehives have been installed nearby. The site was mapped and photographed for the record but it is not within the development area. HWC should contact the relevant owner and arrange for an assessment of the grading of this structure as it is being neglected and possibly has heritage value.

Figure 3. View of 001 pile of ploughed calcrete cleared for cultivation.

Figure 4. View of 002 dark quartzite flake. Scale in cm.

Figure 5. View of 003 ploughed calcrete.

Figure 6. View of 004 ploughed calcrete.

Figure 7. View of ruined farmhouse from just inside the study site (east of the fence and the jeep track).

Figure 8. View of the north side of the ruin.

Figure 9. View of the north-west corner of the ruin.

Figure 10. View of the south-west corner of the ruin.

Figure 11. View of the eastern side of the ruin.

Figure 12. View inside the ruin looking in from the south-east.

Figure 13. Google Earth aerial view of the ruined farmhouse just outside the study site east of the jeep track.

Figure 14. View of study site from the south-west corner. 180 degree Panorama best viewed on DVD.

Figure 15. View of study site from the south-east corner. 360 degree Panorama best viewed on DVD.

Figure 16. View of study site from the north-east corner. 360 degree Panorama best viewed on DVD.

Figure 17. View of study site from the north-west corner. 360 degree Panorama best viewed on DVD.

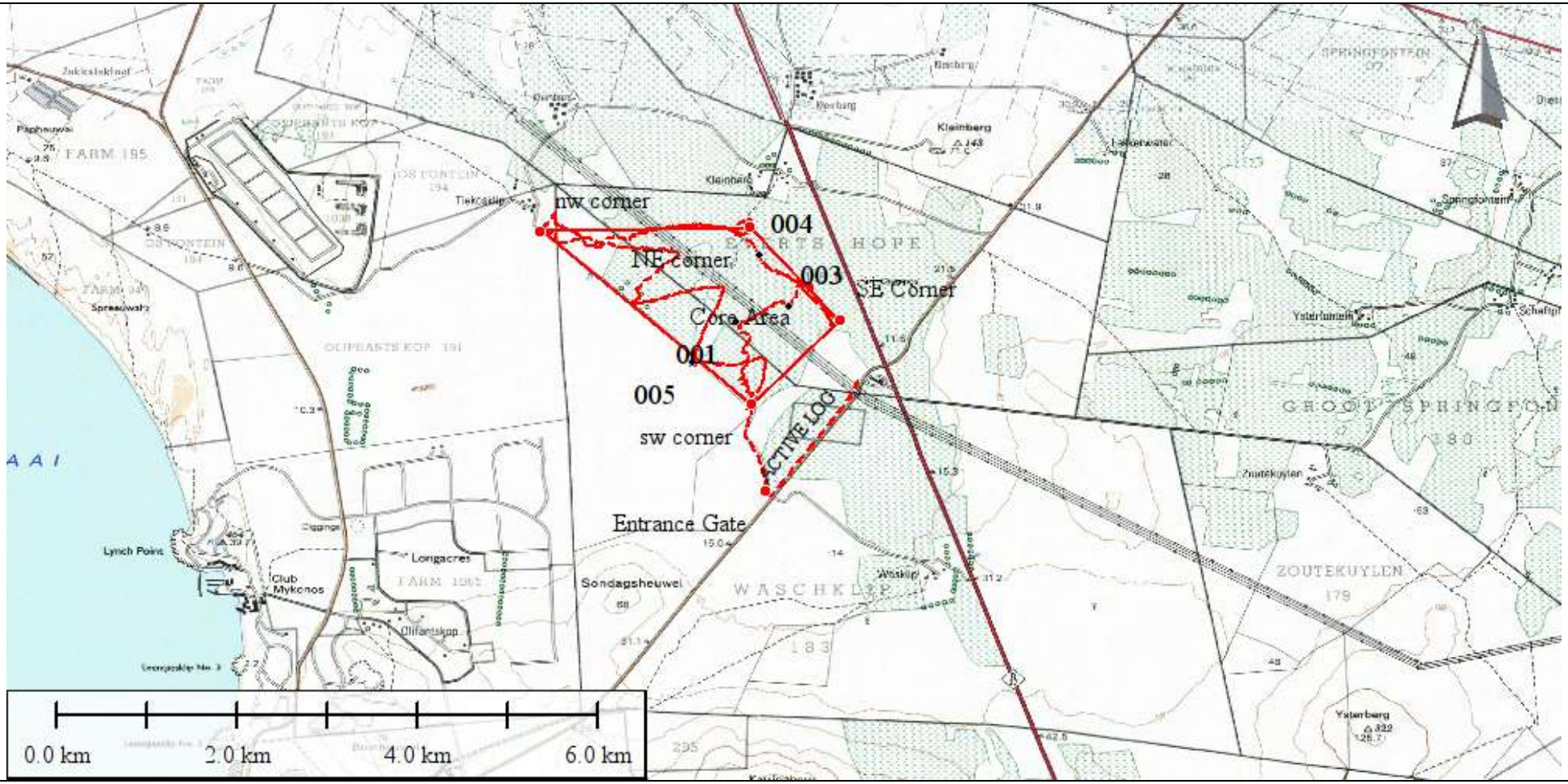

Figure 18. 1:10 000 topographic map showing the study site, the survey track path and GPS waypoints.

6. IMPACT STATEMENT

The following table outlines the SAHRA significance ratings for heritage sites:

Significance Rating	Description
1	National Heritage Site
2	Provincial Heritage Site
3A	Local, High significance
3B	Local, Medium significance
3C	Local, Low significance

Table 1. SAHRA significance ratings.

Site/Observation #	Description	Significance Rating
001	Heap of ploughed calcrete	3C
002 – Flake	Dark quartzite flake	3C
003-004	Heap of ploughed calcrete	3C
005 – Ruin	Ruined farmhouse outside development	Possibly 3A/3B

Table 2. Grading summary for this survey.

Nature of impact: The potential impact of the solar facility on archaeological heritage remains.		
	Without Mitigation	**With Mitigation**
Extent of impact	Local	Local
Duration of impact	Permanent	Permanent
Intensity	Low	Low
Probability	Definite	Improbable
Significance	Local – Low	Low
Degree of confidence	High	High
Mitigation: Mitigation is not required.		

7. RECOMMENDATIONS AND MITIGATION ACTION

The following recommendations are made:

1. No significant above surface archaeological remains were found. The proposed solar farm may proceed on archaeological grounds.
2. Highly significant fossil bearing deposits and buried archaeological remains are known to occur nearby at Langebaanweg and Elandsfontein. These areas are even further away from the coast than the study site. There is therefore the possibility of encountering further archaeological material during construction.
3. The installation depth of the solar panels is not deep < (80cm) and therefore full time archaeological monitoring is not recommended in this instance.
4. A ruin outside of the development area was recorded by the archaeologist. The site has been mapped and photographed extensively for the submission DVD so that HWC can assess the building for possible inclusion on the heritage register.
5. Should any burials, fossils or other archaeological material be encountered during construction, work must cease immediately and HWC must be contacted (021 483 9685).

8. CONCLUSION

The AIA found very little evidence of above surface archaeological remains for the first phase of the Aeolus solar facility near Langebaan. A ruin, certainly older than 60 years and possibly older than 100 years, was found outside of the development site. The development of the solar farm will not directly affect this structure but some recommendations for action on the part of the relevant authorities have been made in this report. The recommendations in this AIA must be read in conjunction with the PIA and VIA, summarized in the HIA requested by HWC.

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10. APPENDICES

iLifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

Our Ref: **HM\WEST COAST\SALDANHA BAY\LANGEBAAN\FARMS LEKKERWATER 180, EVERTSHOPE 190 AND PTNS 4 AND 5 OF WASCHKLIP 191**

Case ID: **1539**
Tracking Number: **110920JL16**
Unique Letter ID: **1469**

Enquiries: Jenna Lavin
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28 June 2011
M. H. Duckitt
Cape Lowlands Environmental Services
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7345

INTERIM COMMENT
NID: PROPOSED AEOLUS SOLAR ENERGY FACILITY ON FARMS LEKKERWATER 180, EVERTSHOPE 190 AND PTNS 4 AND 5 OF WASCHKLIP 191, LANGEBAAN

The above matter was discussed at the Heritage Western Cape staff meeting held on 23 September 2011. In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999):

It was noted that:

1. The total property covers 3792ha, and the PV panels will cover 500ha
2. The PV panels will not extend higher than 2m above ground level
3. The proposal includes service tracks and 2 structures (max. 1.5 storeys)
4. No impact to structures, historical settlements or landscapes is anticipated
5. Potential impact to archaeological and palaeontological material was identified.

Heritage Western Cape (HWC) agreed that:

1. An HIA is required consisting of an archaeological impact assessment, palaeontological impact assessment and a visual impact assessment with a combined set of recommendations and appropriate mitigation measures.

Yours faithfully

PP
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Chief Executive Officer
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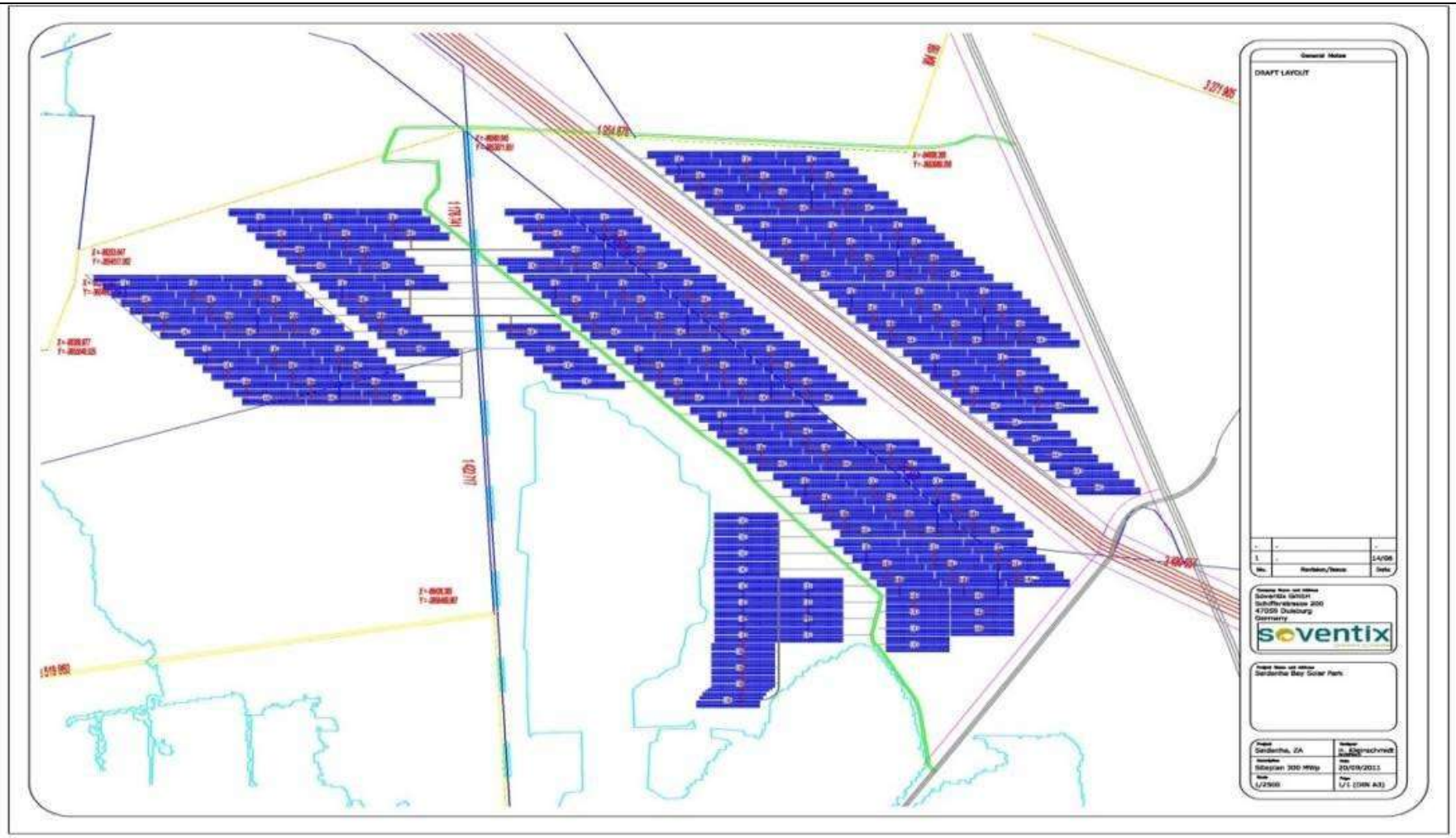
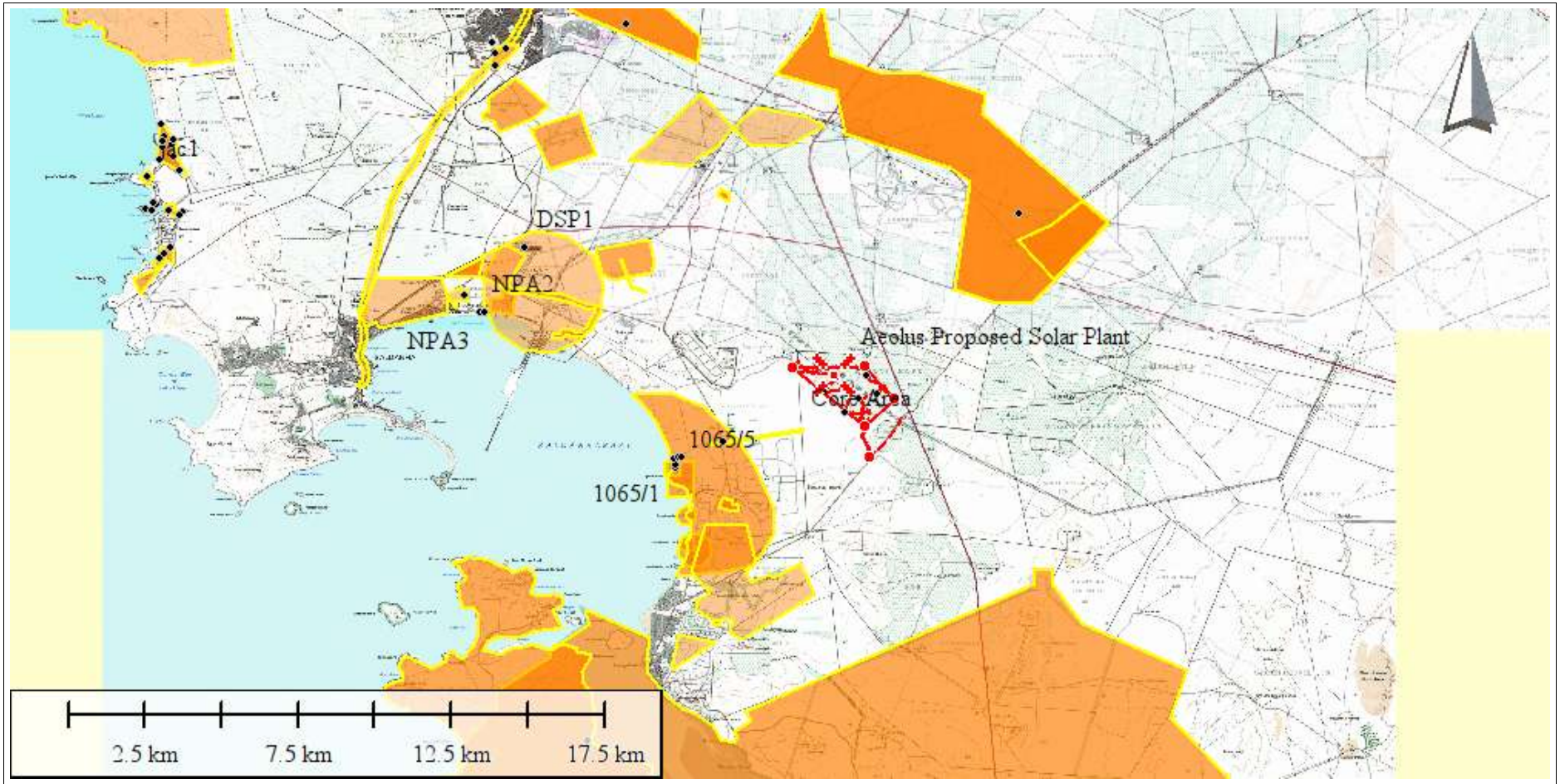
Appendix 1. HWC response to NID in June 2011 requesting AIA, PIA, VIA and HIA.



Appendix 2. Proposed layout of the photovoltaic solar panel array by CLES. The area for the first phase surveyed for this report is marked with a green outline.



Appendix 3. 1:10 000 topographic map showing the SAHRA GIS Report Mapping layer of previous contract work in the immediate area around the study site in orange shaded polygons along with recorded sites from research and contract studies in blue dots.