

Heritage Impact Assessment

Heritage Impact Assessment for the Proposed Pulida Solar
Park south-east of Kimberley, Free State Province.

Compiled for:

Africa Geo-Environmental Services (AGES)

Survey conducted & Report compiled by:

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Executive Summary

Site name and location: Proposed development of the Pulida Solar Park on the Remainder Portion of the Farm Klipdrift 20, approximately 40km south-east of Kimberley in the Free State Province.

Local Authority: Xhariep District Municipality.

Developer: Pulida (Pty) Ltd.

Date of field work: 14 November 2012.

Date of report: January 2013.

Findings: Three sites with significant heritage value were identified during the study. Two of the heritage sites were situated on the proposed site alternative 1 and the other heritage site was situated on the proposed site alternative 2.

The two identified heritage sites at site alternative 1 covered rather large areas and consisted of pockets or concentrations of low density scattered stone artefacts. These artefacts belonged mostly to the Late Stone Age. The other heritage site located at site alternative 2 was a small site which consisted of a sparse scatter of lithic artefacts also from the Late Stone Age and covered an area of approximately 30m in diameter.

The developers have taken notice of the occurrence of these heritage sites and their locations and extents. They therefore have successfully re-designed the proposed layouts of the Solar Park in an effort to avoid the identified heritage sites. An additional 10m buffer zone was also incorporated in the new designs after consultation with the author.

These sites should be avoided during the development of the Solar Park. A watching brief performed by a suitable qualified person is also recommended during the bush clearing and construction phases of the project. This person should see to it that the heritage sites are safe and protected during these phases. If avoidance of the heritage sites deems not to be possible, further mitigation measures as outlined in this report should be performed before any development can commence. Mitigation measures will include mapping of the identified sites, controlled sampling of identified artefacts and the identification, analysis and storage of the recovered sample by a qualified Stone Age specialist. These measures can only be fulfilled with permits as issued by SAHRA.

The proposed development of the Solar Park and its associated power lines can continue from a heritage point of view if the recommendations as outlined in this report are adhered to.

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Disclaimer: *Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites and/or graves could be overlooked during the study. Hutten Heritage Consultants and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

1. Introduction

Hutten Heritage Consultants was contracted by Africa Geo-Environmental Services (AGES) to conduct a Heritage Impact Assessment (HIA) on the proposed development of the Pulida Solar Park on Remainder Portion of the Farm Klipdrift 20, approximately 40km south-east of Kimberley town in the Free State Province.

The aim of the study was to identify all heritage sites, to document and to assess their significance within Local, Provincial and National context. The report outlines the approach and methodology implemented before and during the survey, which includes in Phase 1: Information collection from various sources and social consultations; Phase 2: Physical surveying of the area on foot and by vehicle; and Phase 3: Reporting the outcome of the study.

This HIA forms part of the Environmental Impact Assessment (EIA) as required by various Acts and Laws as described under the next heading and is intended for submission to the provincial South African Heritage Resources Agency (SAHRA) for peer review.

Minimum standards for reports, site documentation and descriptions are set by the Association of Southern African Professional Archaeologists (ASAPA) in collaboration with SAHRA. ASAPA is a legal body representing professional archaeology in the Southern African Development Community (SADC) region. As a member of ASAPA, these standards are tried to be adhered to.

The extent of the proposed development sites were determined as well as the extent of the areas to be affected by secondary activities (access routes, construction camps, etc.) during the development.

2. Legislative Requirements

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

National Environmental Management Act (NEMA) Act 107 of 1998
National Heritage Resources Act (NHRA) Act 25 of 1999
Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
Development Facilitation Act (DFA) Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

National Environmental Management Act (NEMA) Act 107 of 1998
Basic Environmental Assessment (BEA) – Section (23)(2)(d)
Environmental Scoping Report (ESR) – Section (29)(1)(d)
Environmental Impacts Assessment (EIA) – Section (32)(2)(d)

Environmental Management Plan (EMP) – Section (34)(b)
National Heritage Resources Act (NHRA) Act 25 of 1999
Protection of Heritage resources – Sections 34 to 36; and
Heritage Resources Management – Section 38
Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
Section 39(3)
Development Facilitation Act (DFA) Act 67 of 1995
The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development
Facilitation Act, 1995. Section 31.

3. Proposed Project

Pulida (Pty) Ltd has proposed the development of the Pulida Solar Park on the Remainder Portion of the Farm Klipdrift 20, approximately 40km east of Kimberley town in the Free State Province. The developer has identified two potential suitable areas for the development of the proposed Solar Park.

The first alternative will be situated close to the eastern boundary of the farm and adjacent and to the north of the S122 Notnagel/Perdeberg gravel road. The Eskom “Kimberley DS – Skietpan Switching Station” 132kV power line was situated on the eastern extent of the proposed study area. The proposed study area was approximately 275ha in size and the footprint of the proposed Solar Park will be up to 210ha within this study area.

The second alternative will be situated at the southern extent of the farm. It will be situated approximately 2km south of the S122 Notnagel/Perdeberg gravel road. The study area was approximately 300ha in size and the proposed footprint of the Solar Park at this location will be up to 210ha within this study area. In order to connect this proposed Solar Park to the Eskom “Kimberley DS – Skietpan Switching Station” 132kV power line a medium voltage power line from the proposed location to the existing power line is required. This medium-voltage power line will cross Portion 1 of the Farm Klipdrift 20 (owned by the same landowner) and will be approximately 4.7km in length. A HV loop-in loop-out substation will be situated adjacent and close to this existing line on the eastern extent of the farm Klipdrift 20. The footprint of this substation will be approximately 5000m² (0.5ha).

This proposed development on each of the proposed study areas will mainly be the establishment of a renewable energy generation facility (Photovoltaic Solar Facility). The generated energy (electricity) will be supplied to the existing Eskom or municipal grid.

After bush clearing, construction will concentrate on the erection of Photovoltaic panels which will be mounted on constructed foundations. Both the proposed facilities shall make use of this photovoltaic technology with a total generating capacity of up to 75 MWp. The generated energy will be connected to the Eskom grid through the Eskom “Kimberley DS – Skietpan Switching Station” 132kV power line which crosses on the eastern extent of the proposed project site. Associated engineering infrastructure such as

service roads, water and sewerage lines for administrative and accommodation areas and electrical lines will also be installed.

The final footprint will be selected after the conclusion of all specialist studies.

The purpose of the study was to determine if the proposed areas were suitable for the development of the Solar Park from a heritage point of view.

The project was tabled during October 2012 and the developer intends to commence as soon as possible after receipt of the ROD from the Department of Environmental Affairs.

4. Project Area Description

The proposed development of the Pulida Solar Park will be situated on the Remainder Portion of the Farm Klipdrift 20, approximately 40km south-east of Kimberley town in the Free State Province. The developer has identified two potential suitable areas for the development of the proposed Solar Park on this property.

The first alternative (photo 1) will be situated close to the eastern boundary of the farm and adjacent and to the north of the S122 Notnagel/Perdeberg gravel road. The Eskom “Kimberley DS – Skietpan Switching Station” 132kV power line (photo 2) was situated on the eastern extent of the proposed study area. The proposed study area was approximately 275ha in size and the footprint of the proposed Solar Park will be up to 210ha within this study area. The proposed site was previously and presently used as a cattle/small stock grazing facility and was bordered with properties with the same intend (photo 1). The proposed site, however, was not intensely used as grazing area, as game were noted on the property as well as on neighbouring properties. The property was relatively flat with sandy soils and with typical monotonous Kalahari/Karoo vegetation (photo 1). A low ridge was present on the eastern central part of the proposed site. This low ridge extended from the east to the west across the eastern half of the proposed study area. The ridge overlooked a low-lying area to the north which resembled a pan, but was not a true pan in the real sense of the word. A second rise was situated in the south-western corner of the proposed study area. This rise overlooked a small pan to its east and north-east.

The second alternative (photo 3) will be situated at the southern extent of the farm. It will be situated approximately 2km south of the S122 Notnagel/Perdeberg gravel road. The study area was approximately 300ha in size and the proposed footprint of the Solar Park at this location will be up to 210ha within this study area. In order to connect this proposed Solar Park to the Eskom “Kimberley DS – Skietpan Switching Station” 132kV power line a medium voltage power line from the proposed location to the existing power line is required. This medium-voltage power line will cross Portion 1 of the Farm Klipdrift 20 (owned by the same landowner) and will be approximately 4.7km in length. A HV loop-in loop-out substation will be situated adjacent and close to this existing line on the eastern extent of the farm Klipdrift 20. The footprint of this substation will be approximately 5000m² (0.5ha). The proposed site was also previously and presently used

as a cattle/small stock grazing facility and was bordered with properties with the same intend (photo 3). The proposed site, however, was not intensely used as grazing area, as game were noted on the property as well as on neighbouring properties. A cattle watering facility (photo 4) was situated at the south-eastern corner of the proposed study area. The property was relatively flat with sandy soils and with typical monotonous Kalahari/Karoo vegetation (photo 3). A low ridge was present on the eastern central part of the proposed site. This low ridge extended from the east to the west across the eastern half of the proposed study area.

Both of the proposed study areas were largely undisturbed except for the power lines on the eastern extent of the first proposed alternative location for the Solar Park. Several tracks also crossed both of these study areas.

The proposed development will be situated on the Beaconsfield 2824 DD 1:50 000 topographical map (See Appendix B: Location Maps).

5. Archaeological History of the Area

The examination of heritage databases, historical data and cartographic resources represents a critical additional tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Therefore an internet literature search was conducted and relevant archaeological and historical texts were also consulted. Relevant topographic maps and satellite imagery were studied. Researching the SAHRA APM Report Mapping Project records and the SAHRIS online database (<http://www.sahra.org.za/sahris>), it was determined that no previous archaeological studies had been carried out in the study area. However, a number of previous archaeological or historical studies had been performed within the wider vicinity of the study area.

Previous Studies

Previous surveys in the vicinity of the study area listed in the APM Report Mapping Project and the SAHRIS database included the following reports listed in chronological order:

Henderson, Z.L. 2003. **Report on the excavation of an informal graveyard in the Whitworth dump, De Beers Mine, Koffiefontein (under permit No. 80/02/04/076/81 from South African Heritage Resources Agency)**. National Museum, Bloemfontein.

Henderson, Z.L. 2003. **Archaeological Survey of Van Aswegenshoek 134**. National Museum Bloemfontein, Archaeology Contracts Office. 2003-SAHRA-0036.

Van Schalkwyk, J.A. 2003. **Mercury-Perseus 400 kV Transmission Line, Cultural Heritage Resources**. National Cultural History Museum. 2003-SAHRA-0047.

Morris, D. 2003. **Archaeological Survey of the Farm Koodoosberg No.141.** McGregor Museum. 2003-SAHRA-0166.

Morris, D. 2005. **Phase 1 Archaeological Impact Assessment for De Beers Consolidated Mines Ltd (Contract 0616-AC-244-05) to Evaluate Heritage Resources on Properties as Indicated.** McGregor Museum. 2005-SAHRA-0185.

Van Jaarsveld, A. 2006. **Hydra-Perseus and Beta-Perseus 765 kV Transmission Power Lines Environmental Impact Assessment. Impact on Cultural Heritage Resources.** Heritage Resource Manager. 2006-SAHRA-0084.

Dreyer, C. 2006. **First Phase Archaeological and Cultural Heritage Assessment of the Proposed Developments at the Big Hole, Kimberly, Northern Cape.** Pr. Archaeologist/Heritage Specialist. 2006-SAHRA-0307.

Morris, D. 2007. **Mokala National Park: a first report on heritage resources.** McGregor Museum.

Dreyer, C. 2008. **Archaeological and Cultural Heritage Assessment of the Proposed MTN Mast at the Farm Elandsdraai 88, near Orange River Station, Hopetown District, Northern Cape.** Pr. Archaeologist/Heritage Specialist. 2008-SAHRA-0241.

Van Schalkwyk, J.A. 2008. **Heritage Impact Survey Report for the Development of Visitor Facilities in the Mokala National Park, Northern Cape Province.** Heritage Consultants. 2008-SAHRA-0513.

Nel, J. 2008. **Final Report Heritage Resources Scoping Survey & Preliminary Assessment Transnet Freight Line EIA, Eastern Cape and Northern Cape.** Archaic Heritage Project Management. 2008-SAHRA-0632.

Heather-Clark, S. 2012. **Solaire Direct Graspan EIR.** Environmental Resources Management.

The studies listed above located a significant number of heritage sites belonging to the Stone Ages for which the region is renowned (Sampson 1985) and historical period of which the discovery of diamonds and the Anglo Boer War of 1899-1902 had a significant impact. Morris (2003) surveyed the farm Koodoosberg located approximately 35 km to the west of the study area and mentioned a number of ESA, MSA & LSA sites located on hills and river banks including rock engravings. Furthermore artefacts from the historical period were found and suggested to be battlefield debris from the Anglo Boer War Battle of Kudusberg Drift which occurred over the farm, the graves of British soldiers having been exhumed there in the 1960s and a well known engraving of a British soldier being located nearby (Morris 2003). In a survey of Mokala National Park which lies approximately 50 km to the south west of the study area Morris (2007) catalogued 11 rock engravings which follow the 'San tradition' (despite very few surface assemblages of LSA artefacts) as well as a significant number of historical structures and cemeteries.

Other studies in the area detail the very extensive nature of Stone Age sites in the form of rock engravings and surface scatterings of lithics (e.g. Van Jaarsfeld 2006; Dreyer 2008) as well as the extensive nature of historical sites and material, many originating from the Anglo Boer War (e.g. Van Jaarsfeld 2006; Dreyer 2008). Heather-Clark (2012) surveyed the farm Graspan 50 km to the south west and identified a number of features including the potential presence of quaternary fossils, the presence of MSA and LSA artefacts and noted the presence of the Graspan and Enslin battlefield. This site is considered to be culturally important and it was deemed possible that there may still be human remains in the vicinity although identified graves were exhumed in the 1960s (Heather-Clark 2012). A large number of historical heritage sites occur in Kimberley and its environs some 25 km north west of the study area and surveys have stressed the extensive nature of these, including the mines, mine dumps and middens they contain (Morris 2005) as well as the large number of historical buildings in the city (SAHRIS Heritage Register accessed 9th December 2012).

Archaeological & Historical Sequence

The historical background and timeframe of the study area and other areas in Southern Africa can be divided into the Stone Age, Iron Age and Historical period. These can be divided as follows:

Stone Age sites

The Stone Age is divided into the Early; Middle and Late Stone Age. The *Early Stone Age* (ESA) includes the period from 2.5 million years B.P. to 250 000 years B.P. and is associated with Australopithecines and early *Homo* species who practiced stone tool industries such as the Oldowan and Acheullian. The *Middle Stone Age* (MSA) covers various tool industries, for example the Howiesons Poort industry, in the period from 250 000 years B.P. to 25 000 years B.P. and is associated with archaic and modern *Homo sapiens*. The *Late Stone Age* (LSA) incorporates the period from 25 000 years B.P. up to the Iron Age and Historical Periods and contact between hunter-gatherers and Iron Age farmers or European colonists. This period is associated with modern humans and characterised by lithic tool industries such as Smithfield and Robberg.

Excavations at several well known sites in the region attest to ESA occupation. Taung National Heritage Site some 150 km to the north of the study area yielded the first *Australopithecus africanus* skull, the Taung Child (Dart 1925). More recent surveys have documented Acheullian industries and continuity between ESA and MSA lithic technologies in the same area (Kuman 2001). Excavations at other well known sites in South Africa attest to further ESA occupation, for example at Makapansgat which provided evidence of long occupation, initially by *Australopithecus africanus* from approximately 3.3 million years B.P. (Bergh 1999). The LSA is extremely well represented in the wider vicinity of the study area and it is particularly well known for its abundance of rock engravings as well as rock paintings (e.g. Morris 2003; Morris 2007; Van Jaarsfeld 2006) belonging to San forager and Khoekhoen herder communities (Smith & Ouzman 2004) with the Duggan-Cronin Gallery in Kimberley chronicling a photographic record of the San culture.

Iron Age

The Iron Age incorporates the arrival and settlement of Bantu speaking people and overlaps the Pre-Historic and Historical Periods. It can be divided into three phases. The *Early Iron Age* includes the majority of the first millennium A.D. and is characterised by traditions such as Happy Rest and Silver Leaves. The *Middle Iron Age* spans the 10th to the 13th Centuries A.D. and includes such well known cultures as those at K2 and Mapungubwe. The *Late Iron Age* is taken to stretch from the 14th Century up to the colonial period and includes traditions such as Icon and Letaba.

According to Van Jaarsveld (2006) the Iron Age is absent from the study area as a result of its aridity and poor carrying capacity for cattle herds. Humphreys (1976) analysed historical and archaeological records to determine the southernmost distribution of Tswana Iron Age settlement in the Northern Cape and determined that the limit of settlement was along a line between Postmasburg and just to the south of Taung, some distance to the north of the study area. Again, the western limits of Iron Age settlement were a considerable distance to the east of the study area where studies have documented the south- and westwards migration and the replacement of hunter-gatherer ceramics by agro-pastoralist ceramics (Maggs 1976; Thorp 1996).

Historical Period

The beginning of the Historical Period overlaps the demise of the late Stone and Iron Ages and is characterised by the first written accounts of the region from 1600 A.D. A number of early European travellers visited the area from the early 18th Century onwards including such figures as the missionaries Robert Moffat and David Livingstone, with the first towns being established in the early 19th Century (Van Jaarsfeld 2006). There are a large number of national and provincial heritage sites in the region and particularly in the towns with Kimberley and its hinterland alone having 92 heritage sites, mostly historical buildings but also including battlefields, cemeteries and geological formations (SAHRIS Heritage Register accessed 9th December 2012). The discovery of diamonds in the region from the 1860s onwards led to a large influx of white settlers and migrant workers to Kimberley and later Koffiefontein, the workers originating from the Eastern Cape, Northern Cape, Botswana, Lesotho, the Free State as well as Mpumalanga and Mozambique (Henderson 2003). The establishment of the mines whose infrastructure and mine dumps themselves are in fact heritage features led to Morris (2005), for example, referring to the 'Kimberley aesthetic' as including the mine dumps which are a feature of this most famous of diamond cities.

There are a number of other historical towns in the area including those also associated with the diamond rush such as Koffiefontein, 55 km to the south east of the study area, whose name originates from the regular making of coffee there by transport riders. In 1870 the first diamond was found nearby (Henderson 2003) and by 1882 there were four mining houses operating there and there are still a number of historical buildings dating from this period. During World War Two the town served as a camp for prisoners of war, including Italian soldiers, and there remain two wall paintings of Benito Mussolini (Van Jaarsfeld 2006). The town of Jacobsdal some 25 km to the south of the study area

commemorates Christoffel Johannes Jacobs who was the owner of the original farm (Van Jaarsfeld 2006). Jacobsdal has a number of historic features including an Anglo Boer War blockhouse on the outskirts and the Nederduitse Gereformeerde Church (SAHRIS Heritage Register accessed 9th December 2012).



The Blockhouse in Jacobsdal.

The railway line to Kimberley, located 17 km to the west of the study area is another historical feature of the region which predates the 20th Century and ‘offers very significant insight into the historical and political climate of the late 19th century’ with remnants of the original line still indicated on topographical maps (Nel 2008). The Anglo-Boer War saw substantial activity in the wider area including the siege and shelling of Kimberley and the use of the mines as shelter from the bombardment. Battlefields in the vicinity of the study area include Graspan, Koedoesburg, Magersfontein, Paardeberg, Driefontein and Poplar Grove. The latter battle, possibly the most decisive in the region, took place in March 1900 and resulted in the prolonging of the war as the poorly equipped British were unable to capture the fleeing Boer forces including Paul Kruger (Pakenham 1979). A significant number of studies and surveys report the presence of troop camps, battlefield debris and soldiers graves scattered across the region (e.g. Morris 2003; Dreyer 2008; Heather-Clark 2012).

6. Methodology

Physical Survey

The extent of the proposed development sites were determined as well as the extent of the areas to be affected by secondary activities (access route, construction camp, etc.) during the development.

The physical survey was conducted on foot over the entire area proposed for development. Priority was placed on the undisturbed areas. A systematic inspection of the area on foot along linear transects resulted in the maximum coverage of the proposed area. The author and an experienced field worker, who did not have a GPS device with him, transected the study area in transects of approximately 50m -75m between them. The field work was conducted on November 14, 2012 and most of the day was spent on the survey, which was performed by M. Hutten and field worker T. Mulaudzi. The survey focused on the indicated study area as provided by the developer where the proposed development will be situated. Areas outside of the indicated study area were not surveyed.

No sampling was done even though sites or finds of heritage significance were found.

Interviews

The owner of the farm Mr. Wouter de Villiers was contacted telephonically and was questioned during the survey and he indicated that he was not aware of any sites of heritage value or significance (such as graves) in the proposed area. The farm manager (Mr. Nel) was met on the farm and was also questioned during the survey and he also indicated that he was not aware of any sites of heritage value or significance.

Restrictions

Vegetation proved the major restriction and contributed to poor surface visibility after the spate of recent good rains.

Documentation

All sites/findspots if any located during the foot surveys were briefly documented. The documentation included digital photographs and descriptions as to the nature and condition of the site and recovered materials. The sites/findspots were plotted using a Global Positioning System (GPS) (Garmin GPSmap 60CSx) and numbered accordingly.

7. Assessment Criteria

This chapter describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The significance of archaeological and heritage sites were based on the following criteria:

- The unique nature of a site
- The amount/depth of the archaeological deposit and the range of features (stone walls, activity areas etc.)
- The wider historic, archaeological and geographic context of the site
- The preservation condition and integrity of the site
- The potential to answer present research questions.

Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report.

<i>FIELD RATING</i>	<i>GRADE</i>	<i>SIGNIFICANCE</i>	<i>RECOMMENDED MITIGATION</i>
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected (GP.A)	Grade 4A	High / Medium Significance	Mitigation before destruction
Generally Protected (GP.B)	Grade 4B	Medium Significance	Recording before destruction
Generally Protected (GP.C)	Grade 4C	Low Significance	Destruction

Impact Rating:

Low or No Significance:

The constraint is absent, but in instances where present, poses a negligible significance on the proposed development in terms of heritage concerns.

Moderate Significance:

The constraint is present and poses a notable but not major significance on the proposed development in terms of heritage concerns. If the constraint can not be avoided, appropriate mitigation measures must be implemented to minimize the significance.

High Significance:

The constraint is present and poses a high significance on the proposed development in terms of heritage concerns. It is recommended that the constraint be avoided or appropriate mitigation measures must be implemented to minimize the significance.

Certainty

DEFINITE: More than 90% sure of a particular fact. Substantial supportive data exist to verify the assessment.

PROBABLE: Over 70% sure of a particular fact, or of the likelihood of an impact occurring.

POSSIBLE: Only over 40% sure of a particular fact, or of the likelihood of an impact occurring.

UNSURE: Less than 40% sure of a particular fact, or of the likelihood of an impact occurring.

Duration

SHORT TERM: 0 – 5 years

MEDIUM: 6 – 20 years

LONG TERM: more than 20 years

DEMOLISHED: site will be demolished or is already demolished

Mitigation

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be classified as follows:

- **A** – No further action necessary
- **B** – Mapping of the site and controlled sampling required
- **C** – Preserve site, or extensive data collection and mapping required; and
- **D** – Preserve site

8. Assessment of Sites and Finds

This section will contain the results of the heritage site/find assessment.

Pulida Solar Park

The developer has identified two potential suitable areas for the development of the proposed Solar Park. The first alternative will be situated close to the eastern boundary of the farm and adjacent and to the north of the S122 Notnagel/Perdeberg gravel road. The proposed study area was approximately 275ha in size and the footprint of the proposed Solar Park will be up to 210ha within this study area.

The second alternative will be situated at the southern extent of the farm. It will be situated approximately 2km south of the S122 Notnagel/Perdeberg gravel road. The study area was approximately 300ha in size and the proposed footprint of the Solar Park at this location will be up to 210ha within this study area.

Site KD 001:

GPS: 29,09238° S
24,89500° E

This identified heritage site was situated on the second proposed alternative site as this was where the survey started.

The identified site consisted of a low density surface scatter of lithic artefacts (\pm 2-5 artefacts in 10m x10m) and was situated in the south-western corner of the proposed property (photo 5). The artefacts were exposed by the opening of a road along the southern boundary fence of the property. Subsequent sheet erosion also exposed some of the artefacts in this area. The site was not very big and artefacts were found scattered in an area of approximately 30m in diameter.

The artefacts included a variety of Late Stone Age flakes, blades and cores (photo 6). Most of the artefacts seemed to be heavily weathered quartzite products. No sample was taken. The site probably extended across the boundary fence into the neighbouring property. The neighbouring property was not investigated.

Field Rating:	Generally Protected; Grade 4B
Heritage Significance:	Medium significance
Impact:	Moderate
Certainty:	Probable
Duration:	Demolished
Mitigation:	B – Recording before destruction

After further intensive investigations, no other sites or finds of any heritage value or potential were identified in this the second proposed study area.

Site KD 002:

GPS: 29,04521° S
24,93123° E

This identified heritage site was situated on the first proposed alternative site and this was the second area to be investigated.

Another low density scatter of stone tools was identified here (\pm 2-5 artefacts in 10m x10m). A low ridge was present on the eastern central part of the proposed site. This low ridge extended from the east to the west across the eastern half of the proposed study area. The identified site (photo 7) was situated on this low ridge which overlooked a low-lying area to the north which resembled a pan, but was not a true pan in the real sense of the word.

The artefacts were identified in several clearings which were exposed to some measure of sheet erosion along the summit of the rise (photo 8). The stone tools consisted mostly of Late Stone Age blades, scrapers and a few cores (photo 9) and were scattered in small concentrations over an area of approximately 400m x 200m (see maps). The artefacts were not found continuously across the indicated area, but rather in small pockets or concentrations which differed in density and size. Most of the artefacts seemed to be heavily weathered quartzite products. No sample was taken.

Field Rating:	Generally Protected; Grade 4B
Heritage Significance:	Medium significance
Impact:	Moderate
Certainty:	Probable
Duration:	Demolished
Mitigation:	B – Recording before destruction

Site KD 003:

GPS: 29,05009° S
24,91871° E

This identified heritage site was also situated on the first proposed alternative site and this was the second area to be investigated.

Another low density scatter of stone tools was identified here (\pm 2-5 artefacts in 10m x10m). The site was in many ways similar to Site KD 002. A small rise was situated in the south-western corner of the proposed study area. This rise overlooked a small pan to

its north and north-west. The identified site was situated on the small rise (photo 10) which flanked and overlooked a small pan to the north-west.

The artefacts were identified in several clearings which were exposed to some measure of sheet erosion (photo 11) along the summit of the rise as well as along the southern and western edges of the pan. The stone tools consisted mostly of Late Stone Age blades, scrapers and a few cores (photo 12) and were scattered in small concentrations over an area of approximately 150m x 200m (see maps). The artefacts were not found continuously across the indicated area, but rather in small pockets or concentrations which differed in density and size. The artefact density also decreased as distance away from the pan increased. Most of the artefacts seemed to be heavily weathered quartzite products. No sample was taken.

Field Rating:	Generally Protected; Grade 4B
Heritage Significance:	Medium significance
Impact:	Moderate
Certainty:	Probable
Duration:	Demolished
Mitigation:	B – Recording before destruction

After further intensive investigations, no other sites or finds of any heritage value or potential were identified in this the first proposed study area.

9. Recommendations

The following steps and measures are recommended regarding the investigated areas:

Pulida Solar Park

The proposed areas to be developed were mostly undisturbed except for the power lines which passed on the eastern extent of the first alternative proposed site.

Site KD 001:

This identified heritage site was situated in the second proposed alternative site. The identified site had a low density occurrence of heavily weathered stone artefacts.

The developers have taken notice of the occurrence of this heritage site and its location and extent. They therefore have successfully re-designed the proposed layout of the Solar Park in an effort to avoid the identified heritage site. An additional 10m buffer zone was also incorporated in the new design after consultation with the author (see layout plans in Addendum B).

The following measures and recommendations are applicable to the identified heritage site:

- It is recommended that the identified heritage site should be avoided. The site should be avoided during all phases of development which include bush-clearing and the construction phase itself.
- The heritage site should be demarcated as a no-go-area before any activities start on the proposed development site.
- The proposed earth-moving/bush clearing activities should be altered and should be planned around this heritage site in order to protect it from any damage or other negative impacts.
- A watching brief performed by a suitable qualified person is recommended during the bush clearing and construction phases of the project. This person should see to it that the heritage site is safe and protected during these phases.

If the above recommendations can not be adhered to, further steps and measures should be taken to mitigate and document the heritage site to accepted archaeological standards. This should only be done as last resort if no other options deem to be possible. The following is then required:

- Mitigation measures which will include mapping of the identified sites, controlled sampling of identified artefacts and the identification, analysis and storage of the recovered sample by a qualified Stone Age specialist.
- A permit/s for the destruction of the sites from the South African Heritage Resources Agency will be necessary for the mitigation measures as well as further development on these identified heritage sites.

Sites KD 002 & KD 003:

The identified heritage sites were situated in the first proposed alternative site. The two heritage sites were similar in nature and only varied in size. The identified sites had a low density occurrence of heavily weathered stone artefacts which were not found continuously, but rather in various pockets or concentrations across extended areas.

The developers have taken notice of the occurrence of the heritage sites and their locations and extents. They have successfully re-designed the proposed layout of the Solar Park in an effort to avoid the identified heritage sites. An additional 10m buffer zone was also incorporated in the new design after consultation with the author (see layout plans in Addendum B).

The following measures and recommendations are applicable to the identified heritage sites:

- It is recommended that the identified heritage sites should be avoided. The sites should be avoided during all phases of development which include bush-clearing and the construction phase itself.
- The heritage sites should be demarcated as no-go-areas before any activities start on the proposed development site.
- The proposed earth-moving/bush clearing activities should be altered and should be planned around these heritage sites in order to protect them from any damage or other negative impacts.
- A watching brief performed by a suitable qualified person is recommended during the bush clearing and construction phases of the project. This person should see to it that the sites are safe and protected during these phases.

If the above recommendations can not be adhered to, further steps and measures should be taken to mitigate and document the sites to accepted archaeological standards. This should only be done as last resort if no other options deem to be possible. The following is then required:

- Mitigation measures which will include mapping of the identified sites, controlled sampling of identified artefacts and the identification, analysis and storage of the recovered sample by a qualified Stone Age specialist.
- A permit/s for the destruction of the sites from the South African Heritage Resources Agency will be necessary for the mitigation measures as well as further development on these identified heritage sites.
- The proposed development of the Pulida Solar Park in the indicated areas can continue from a heritage point of view if the above mentioned recommendations are adhered to.

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APPENDIX A

Photographs



Photo 1: General view of the proposed alternative site 1 from the north-east.



Photo 2: View of the power lines on the eastern extent of the study area.



Photo 3: General view of the proposed alternative site 2 from the south-west.



Photo 4: View of the cattle drinking facilities on the site.



Photo 5: General view of identified Site KD 001.



Photo 6: View of some of the artefacts identified at Site KD 001.



Photo 7: General view of identified Site KD 002.



Photo 8: View of an exposed area due to sheet erosion at Site KD 002.



Photo 9: View of some of the artefacts identified at Site KD 002.



Photo 10: General view of identified Site KD 003.



Photo 11: View of an exposed area due to sheet erosion at Site KD 003.

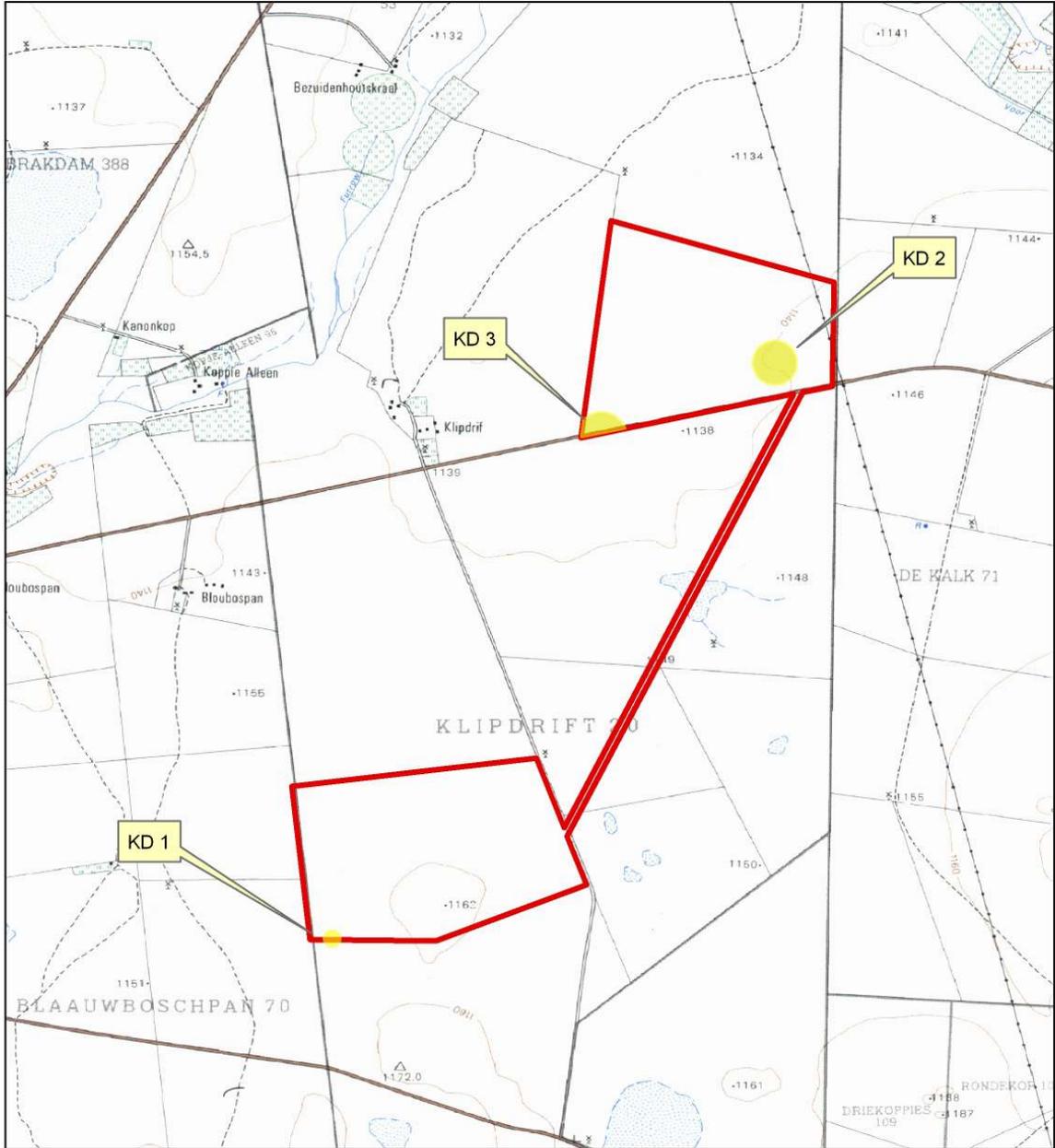


Photo 12: View of some of the artefacts identified at Site KD 002.

APPENDIX B

Location Maps

Pulida Solar Park



0 1.5 3 Kilometres

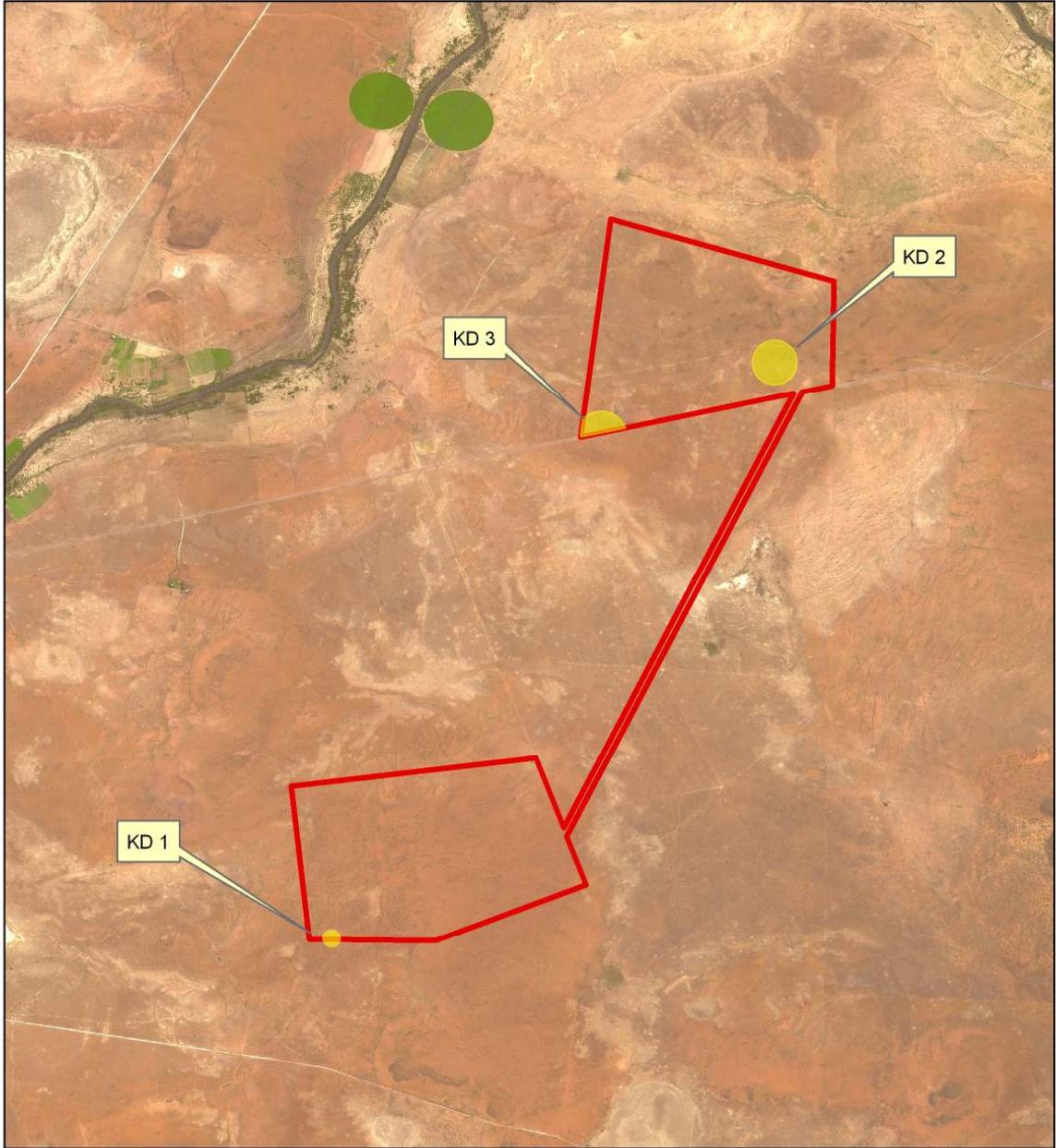
1:50,000



- Study area
- Heritage site

Image: WGS2924BB
 Source: Chief Directorate: National Geo-spatial Information
 Datum: WGS84
 Study Area: Remainder portion of the Farm Klipdrift 20

Pulida Solar Park



0 1.5 3 Kilometres

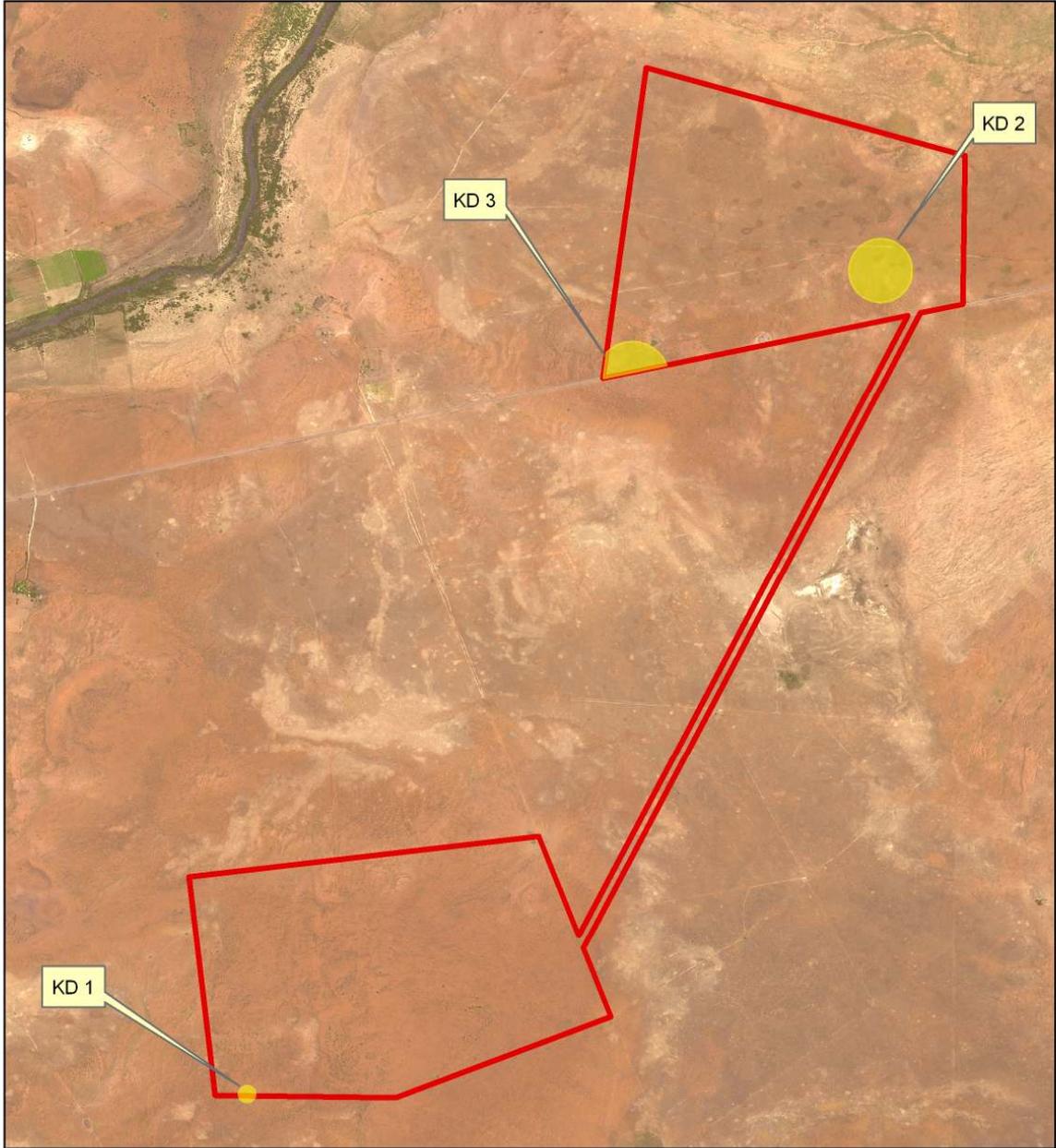
1:50,000



-  Study area
-  Heritage site

Image: Spot 5 National Mosaic 2924B
Source: Chief Directorate: National Geo-spatial Information
Datum: WGS84
Study Area: Remainder portion of the Farm Klipdrift 20

Pulida Solar Park



0 1 2 Kilometres

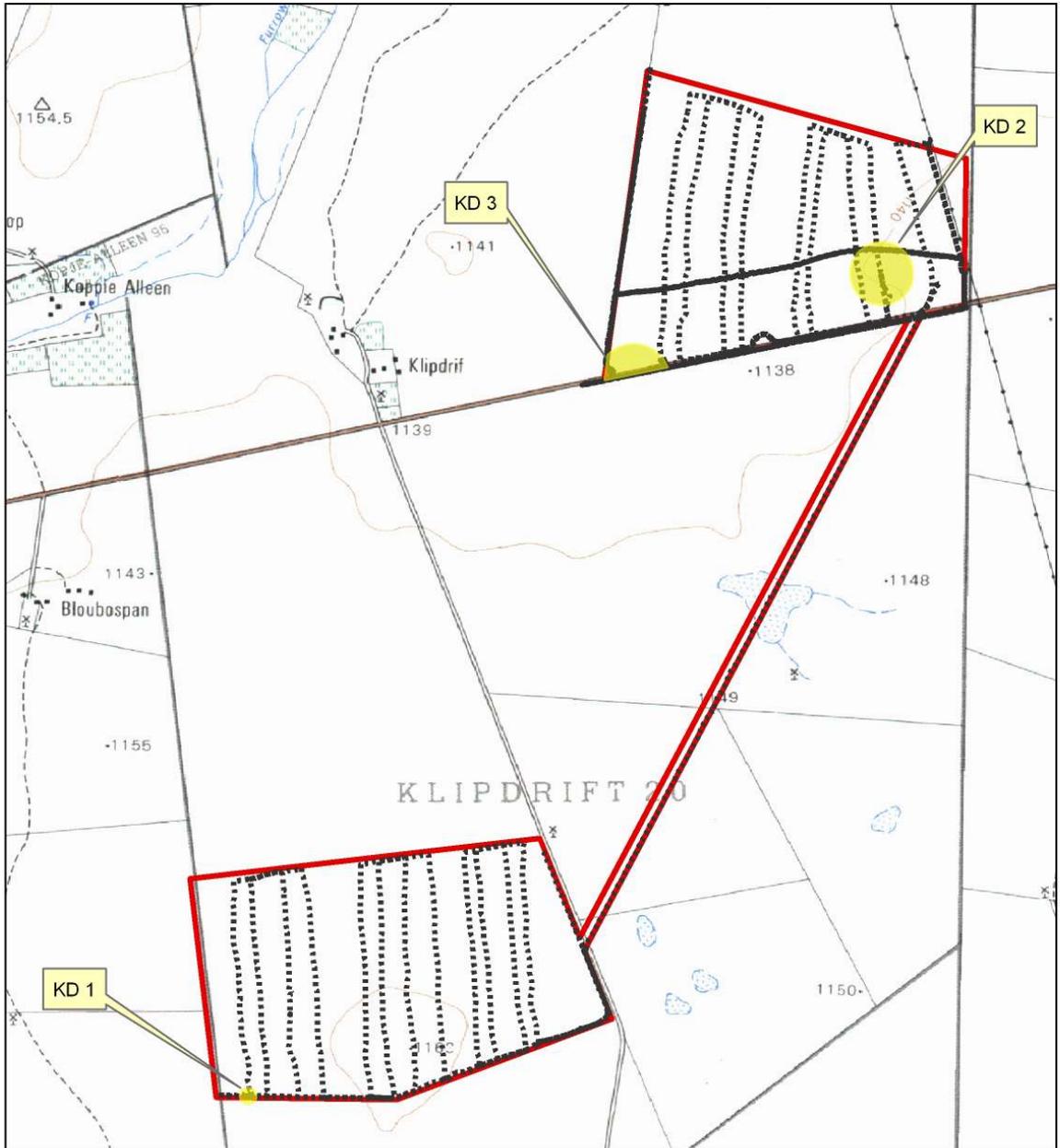
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-  Study area
-  Heritage site

Image: Spot 5 National Mosaic 2924B
Source: Chief Directorate: National Geo-spatial Information
Datum: WGS84
Study Area: Remainder portion of the Farm Klipdrift 20

Pulida Solar Park



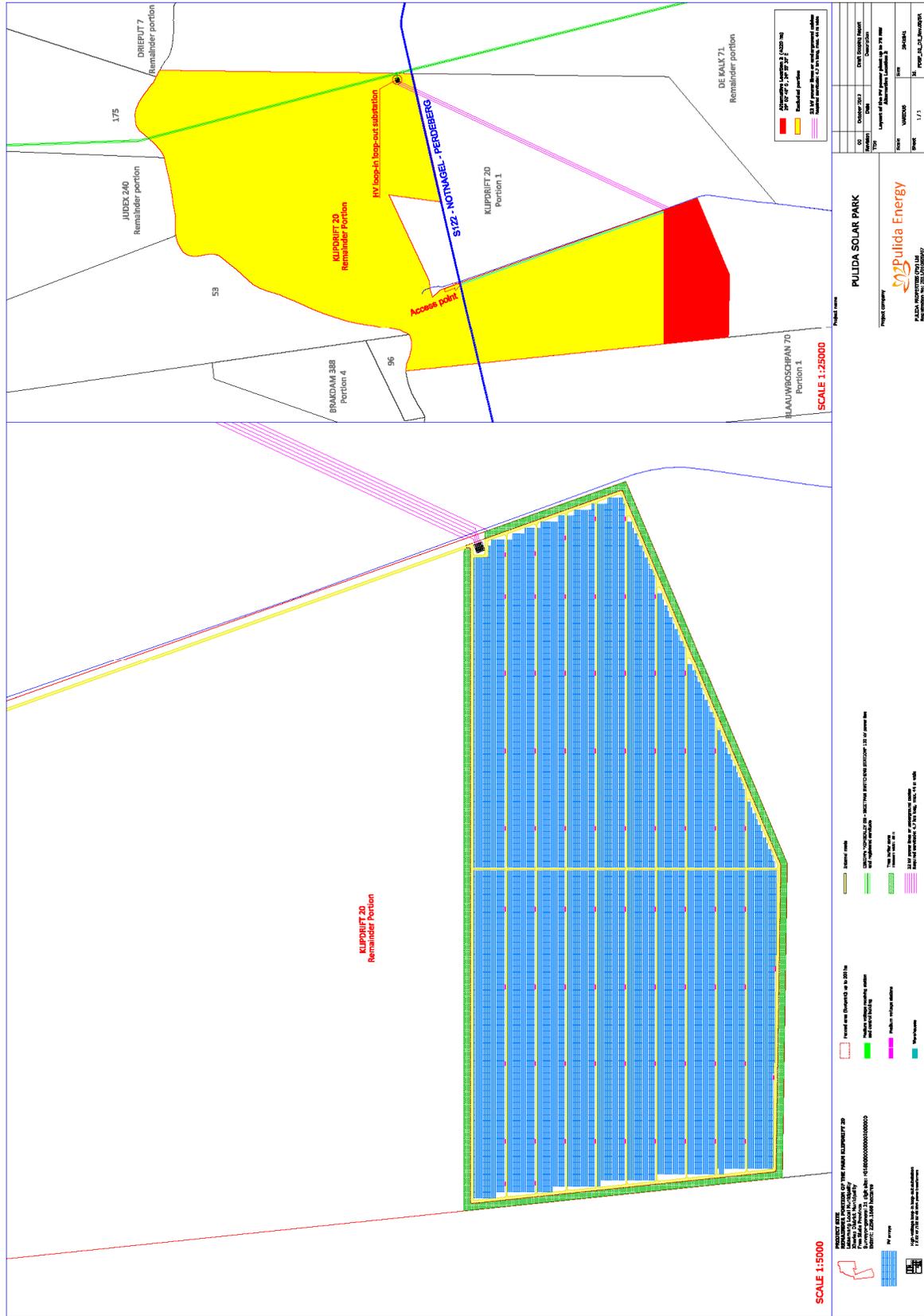
0 1 2 Kilometres

1:35,000



- Study area
- Heritage site
- Track log

Image: WGS2924BB
 Source: Chief Directorate: National Geo-spatial Information
 Datum: WGS84
 Study Area: Remainder portion of the Farm Klipdrift 20



Site Alternative 2: Original proposed layout option.

