

Scoping Archaeological Impact Assessment

Proposed development of the AMDA ECHO PV (Solar Energy Facility) on Remaining Extent Klondike No 670, and Overhead Power Line Grid Connection to the Mookodi MTS Sub-Station across Remainder of Erf 506 and Remainder of the Farm Rosendal 673, Vryburg, Registration Division, North West Province

prepared for

PERCEPTION Planning, P.O. Box 9995, George, 6530, Western Cape,
Cell: 082 568 4719, E-mail: perceptionenvplg@gmail.com, **Applicant: AMDA Echo (Pty) Ltd**, Co Reg No 2015/300642/07, PO Box 2681, Cape Town, 8000,
charlie@amdadevelopments.co.za

by



Dr Peter Nilssen, PO Box 2635, Mossel Bay, 6500
044 691 0051 | 0827835896 | peter@carm.co.za

21 February 2016

Name, Expertise and Declaration

I, **Peter Nilssen** (PhD in archaeology, UCT 2000), herewith confirm that I am a Professional member - in good standing - of the Association of South African Professional Archaeologists (ASAPA), including the Cultural Resource Management section of the same association and am accredited to undertake the necessary archaeological studies required for the proposed development.

As the appointed independent specialist (archaeologist) for this project hereby declare that I:

- act as an independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be 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 NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and 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 NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 982) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- am aware that a false declaration is an offence in terms of regulation 48 of GN No. R. 982.



Signature of the specialist:

Date: **21 February 2016**

Introduction

This Scoping Archaeological Impact Assessment is based on a desktop level study, and therefore, more detailed descriptions of the receiving environment will be presented in the future Archaeological Impact Assessment following a comprehensive foot survey and assessment of the proposed development site.

AMDA Echo (Pty) Ltd is proposing the establishment of a commercial solar photovoltaic energy facility (SEF) on the remaining extent of farm Klondike No 670, situated in the District of Vryburg, North West Province. The entire property is 1142.4853 ha in extent, while the affected portion of the property is approximately 250 ha in extent and is located about 7 km SW of Vryburg in the North West Province (Figures 1 & 2).

The proposed photovoltaic (PV) SEF will have a net generating capacity of 75 MW (AC) with an installed capacity of 85 MW (DC). The proposed technology is Solar PV on fixed tilt structures or single axis tracking technology. The dimensions or extents of the development components are as follows: Solar PV field footprint = 185ha, project sub-station = 1ha, collector sub-station = 1ha, buildings = 1.5ha, roads = 22km long at 6m wide = 13.2ha, permanent lay down areas = 7ha and construction lay down areas = 12ha. The solar field tracker structure height is approximately 3.5m, while the perimeter fence will be a 2.4m high multi-strand electric security fence.

The proposed SEF project will connect to the Eskom Mookodi MTS sub-station south of Vryburg as indicated in Figure 2. The sub-station to connect the facility has a confirmed capacity of 485MW - Eskom letter for REIPPPP Bid window 4 accelerated programme & 907MW in GCCA 2022 June 2015. The project sub-station will connect to the collector sub-station via a single 132kV overhead line. The collector sub-station will connect to Mookodi MTS sub-station via a double 132kV overhead line. The power line route will be approximately 5.88km in length and will run from the collector sub-station east of the Klondike 670 property, across a district road and over Municipal land to the Mookodi MTS sub-station. The power line will be 25m in height with a servitude width of 50m.

Additional infrastructure includes; water from Municipality or borehole, auxiliary electricity supply from Eskom, and sewerage by conservancy tank. An existing access road from the N14 may be used or a new access road may be developed off the Vryburg - Reivilo district road.

While detailed specifications and development layouts of the proposed solar facility and associated infrastructure will be guided and determined by the Environmental Impact Assessment (EIA) process, the current preferred development layout plan is shown in Figure 2.

Activities associated with the proposed development trigger the National Heritage Resources Act (Act 25 of 1999), and therefore, this author was appointed to provide archaeological input for the broader integrated Heritage Impact Assessment that is being undertaken by Perception Planning in terms of Section 38(8) of the National Heritage Resources Act. Mr Dale Holder of Cape Environmental Assessment Practitioners (Cape EAPrac) is facilitating the EIA process.

The current phase of the archaeological component of the broader Heritage Impact Assessment and EIA process involves a Scoping Archaeological Impact Assessment (SAIA) of the affected environment. Because the proposed development activities - construction and installation - may have a permanent negative impact on archaeological resources in the development footprint, this SAIA provides a summary of the findings of previous heritage

related studies in the surrounding environment. The latter provide a guide as to what archaeological resources are expected to occur in the proposed development area. Following a comprehensive foot survey of the affected property, a detailed Archaeological Impact Assessment (AIA) report will be provided, and will form part of the integrated Heritage Impact Assessment.

Study Area

A detailed description of the receiving environment will be given in the future AIA report following the archaeological foot survey. This will include topography, vegetation cover, geological sediments, archaeological visibility, exposed and disturbed surfaces and existing recent disturbances to the landscape. Nevertheless, the literature review and Google Earth imagery suggest that vegetation cover is likely to be open and sparse and that archaeological visibility will be adequate for an assessment. Water sources in the form of pans occur within the study area and it is also possible that ancient drainage lines are present. Such features are commonly attractive to life, and it is likely that archaeological resources occur in their vicinity.

Overview of Previous Studies

To the best of my knowledge, no archaeological or heritage related study has been undertaken on the affected property. Most of the information concerning the history and archaeology of the surroundings was obtained through heritage and archaeological studies associated with environmental impact assessments for a variety of development activities. More recently, the bulk of these assessments are associated with the development of solar energy facilities.

The North West and Northern Cape Provinces have a rich and long archaeological record that spans the entire Stone Age, includes Iron Age sites, and more recent historic occupation of the region. Detailed accounts of the history, heritage resources and associated hominin and human behaviours have already been written and are not repeated here (see for e.g. Küsel and Küsel 2015, Birkholtz 2014, Hutten 2012, Kruger 2013 and van der Walt 2014). Of relevance here is the nature of the archaeological record in the surroundings of the present study area, which give an indication of the type of heritage resources that are expected to occur in the proposed development site.

The nearest and most significant heritage site is that of the Taung Skull World Heritage Site, which is situated approximately 60km to the south of the present study area. The site is famous for the late Professor Raymond Dart's identification of the skull of an infant gracile australopithecine, named *Australopithecus Africanus*, that was unearthed from a limestone quarry in the mid 1920s. This was the first major hominin discovery in South Africa, and indeed one of the earliest worldwide.

The National Heritage Site of Wonderwerk Cave is situated roughly 100km south of the present study area, and archaeological investigations in the cave are ongoing. This is an important Stone Age site and one of the few which contains the full Stone Age sequence from Early Stone Age (ESA) through Middle Stone Age (MSA) to Later Stone Age (LSA). Rock paintings adorn the walls of the cave near its mouth.

Numerous archaeological resources were identified and recorded along the Harts Rive some 60km south of the present study area in the late 1980s by the Harts River Valley

Survey Project of the University of the Witwatersrand. These finds included Early Stone Age, pastoralist (Iron Age) and rock art sites (Birkholtz 2014).

In addition to these, heritage related finds made during heritage and archaeological impact assessments include the following (arranged by individual reports): isolated finds and low density Stone Age stone artefact scatters ranging in origin from ESA through LSA times; possible Iron Age collapsed circular stone structure with no associated cultural remains, possible historic farmstead, possible grave (Kruger 2014); heritage resources associated with canal building and agricultural development, German and Italian cemeteries, history of the Vaalharts Irrigation Scheme, also referred to in this report is van Ryneveld's (2005) discovery of a laterally extensive LSA site with an estimated depth of deposit at 2.5m (Küsel 2015); extensive low density stone artefact scatters of MSA and LSA origin, discrete MSA and LSA quarry/knapping site (artefact types and raw materials are described in detail in the report) associated with a ridge sourced for its abundant cryptocrystalline silica (CCS), a possible grave, the latter two sites were protected by means of buffer zones, van der Walt notes that archaeological occurrences and sites are associated with drainage channels, pans and ridges and that they are rare to absent on the flatlands that are removed from water sources (van der Walt 2014 & 2015); high density and extensive scatter of MSA stone artefacts that is interpreted as a factory site where raw material was sourced from a local outcrop and then knapped into tools, leaving behind cores and flakes, this site has been protected and will be conserved in perpetuity (van Schalkwyk 2012); stone artefacts of ESA, MSA and LSA origin, Iron Age pottery and recent graves, all these finds were considered to be of low significance due to their lack of context (van Schalkwyk 1996); flakes and tools of MSA origin made in chert and hornfels scattered on the surface and are considered to be of low significance (van Schalkwyk 2008); finds include Stone Age sites, farmsteads, stock pens, windmills, historic structures and architecture, railway line and associated stations and other structures, local and private cemeteries, roadside memorials, and van Schalkwyk (2014) notes that the following are sensitive heritage areas and provides recommendations for their management and conservation; "All pans are sensitive as stone tools have been identified to occur on the rim of a number of them. A buffer of 20 metres from the outer edge of the rim of the pan should be created in order not to impact on the stone tools. The same hold true for all water courses. Some rock outcrops in the region show signs of having being quarried by Stone Age people in order to obtain material for producing stone tools. In addition, in some cases rock engraving occur on some of the outcrops. Therefore, all outcrops should be avoided as far as possible. All farmsteads, occupied or not, should be buffered with a no-go zone of at least 100 metres from the last visible feature associated with the farmstead/homestead. All cemeteries should have a buffer of at least 20 metres from the outer most graves. Fortunately, many cemeteries are fenced off, which can then be used as a buffer. All other features such as bridges, station buildings, etc. should be buffered with a no-go zone of at least 20 metres." (van Schalkwyk 2014, executive summary).

Several heritage related impact assessments in the surroundings of the present study area reported the complete absence of heritage and archaeological resources within their studied areas (Birkholtz 2014, Dreyer 2008, Hutten 2012 & 2015, Kruger 2015 and van Schalkwyk 2011).

Overall, a pattern emerges showing that archaeological resources are most commonly clustered around rivers and river valleys, existing and ancient drainage lines, pans, and ridges with rocky outcrops, and that heritage resources are generally absent from flatlands that are some distance from existing or ancient water sources.

Potential Impacts on Archaeological Resources

Because tangible heritage resources are non-renewable and each archaeological occurrence is unique, it is important that areas affected by development are assessed for the presence and sensitivity of such resources prior to development. The proposed development will involve both area and linear developments that could have a permanent negative impact on archaeological resources if they were to occur in the affected areas. This scoping study has shown that archaeological resources do occur in the surrounding environment. The purpose of the broader EIA process is to assess the sensitivity of environmental resources in the affected area, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures. The future AIA will serve the same purpose concerning archaeological resources.

Because the planning and design phase of the development is being informed by the broader EIA, any direct negative impacts on significant environmental resources can be avoided or minimized by altering the design and layout plans accordingly. A construction phase Environmental Management Plan (EMP) will further avoid or minimize direct negative impacts.

Potential direct negative impacts on archaeological and tangible heritage resources will occur during the construction and installation phase of the proposed development. Indirect and cumulative impacts may occur during the operational phase, but these can be avoided or minimized by means of an EMP that should be implemented during the operational phase of the development.

Previous studies, as detailed above, have shown that archaeological resources occur in the surrounding environment and that they are most commonly associated with existing and/or ancient water sources such as pans, drainage lines, rivers and river valleys, as well as ridges with rocky outcrops. Since existing and ancient water sources occur in the study area, it is anticipated that Stone Age materials will occur in the study area. It is unlikely that Iron Age remains will be found as these are more common further to the east. Google Earth imagery indicates that historic occupation is absent though this can only be confirmed through ground truthing.

Methodology for the Archaeological Impact Assessment

The purpose of an AIA is to conduct survey of the affected areas in order to identify, record and rate the significance of archaeological resources, to assess the impact of the proposed area and linear developments on such resources, and to recommend mitigation measures where necessary.

To assess the nature and significance of the archaeological record in the affected areas, it is necessary to conduct a comprehensive foot survey. The latter will cover the entire affected property, proposed access road location and alignment, as well as the power line route from the on-site sub-station to the Mookodi MTS sub-station (Figure 2).

The potential for different landforms, sediments or landscape features to contain archaeological traces is assessed according to type, such as rocky surfaces, sandy surfaces, cultivated areas, previously developed or disturbed areas, rock shelters, and so on. Overall, the significance of archaeological occurrences or sites are evaluated in terms of their content and context. Attributes to be considered in determining significance include artefact and/or ecofact types, rarity of finds, exceptional items, organic preservation, aesthetic appeal,

potential for future research, density of finds and the context in which archaeological traces occur.

Based on previous work conducted in the immediate surroundings, it is likely that open vegetation and large expanses of exposed ground surfaces will provide good archaeological visibility that will allow for a good understanding of the archaeological record in the area. Initially, the field work will focus on existing and potential ancient water sources and thereafter survey walk tracks will be spaced between about 200m apart. In the event that archaeological sources are common or unpredictable in the study area, the distance between survey walk tracks will be narrowed to about 50m apart.

Walk tracks will be fixed with a hand held GPS to record the search area. The position of archaeological occurrences, observations and photo localities will also be fixed by GPS. Digital audio notes of observations and a comprehensive, high quality digital photographic record will also be made.

Once archaeological traces have been identified, recorded and assessed in terms of their significance, the aim of the AIA is to assess the potential negative impacts of the proposed developments on such resources and to make recommendations in mitigation. The end product of the AIA is a report that forms part of the broader Integrated Heritage Impact Assessment undertaken by Perception Planning and that meets standards required by the South African Heritage Resources Agency (SAHRA) in terms of the National Heritage Resources Act, No. 25 of 1999. The AIA report will give detailed results from fieldwork, will assess potential negative impacts associated with the proposed development, and will make recommendations in mitigation where necessary.

References

Birkholtz, P. 2014. HERITAGE IMPACT ASSESSMENT: PROPOSED CONSTRUCTION OF A PHOTOVOLTAIC POWER STATION AND ASSOCIATED INFRASTRUCTURE ON THE FARM BRAKFORTEIN 879 HN BETWEEN TAUNG AND REIVILO IN THE NORTH WEST PROVINCE

Dreyer, C. 2008. ARCHAEOLOGICAL AND CULTURE HISTORICAL INVESTIGATION OF THE PROPOSED UPGRADING OF THE DITHAKWANENG (D3462) - N14 ROAD BETWEEN VRYBURG AND KURUMAN, NORTHERN CAPE

Hutten, M. 2012. HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED CAROCRAFT SOLAR PARK EAST OF VRYBURG, NORTH WEST PROVINCE

Hutten, M. 2015. HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED EXTENDED CAROCRAFT SOLAR PARK EAST OF VRYBURG, NORTH WEST PROVINCE

Kruger, N. 2013. ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF A DEMARCATED SURFACE PORTION ON THE FARM KANGKATJES 919 HN FOR THE PROPOSED VIDIGENIX PHOTOVOLTAIC POWER PLANT AND POWER LINE DEVELOPMENT, GREATER TAUNG LOCAL MUNICIPALITY, NORTHWEST PROVINCE

Kruger, N. 2014. ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED 88 KV OR 132KV POWER LINE FOR THE CONNECTION OF THE CAROCRAFT SOLAR PARK TO THE ESKOM BOPHIRIMA SUBSTATION, NALEDI LOCAL MUNICIPALITY, BOPHIRIMA DISTRICT MUNICIPALITY, NORTH WEST PROVINCE

Küsel, U.S. 2015. PHASE I CULTURAL HERITAGE RESOURCES IMPACT ASSESSMENT FOR THE VAALHARTS IRRIGATION PROJECT CANAL GANSPAN – PAMPIERSTAD –JAN KEMPDORP – HARTSWATER AND TAUNGH NORTH WEST PROVINCE AND NORTHERN CAPE PROVINCE

Küsel, U.S. and Küsel, U.S. 2015. PHASE II CULTURAL HERITAGE RESOURCES IMPACT ASSESSMENT FOR THE VAALHARTS IRRIGATION PROJECT CANAL NORTH WEST PROVINCE WITH PHASE 2 DOCUMENTATION FOR THE NORTH CANAL

van der Walt, J. 2014. ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED TIGER KLOOF PHOTOVOLTAIC SOLAR ENERGY FACILITY NEAR VRYBURG, NORTH WEST PROVINCE

van der Walt, J. 2015. ARCHAEOLOGICAL SCOPING REPORT FOR THE PROPOSED WOODHOUSE SOLAR 1 AND WOODHOUSE SOLAR 2 PV FACILITIES COSE TO VRYBURG, NORTH WEST PROVINCE

van Schalkwyk, J 1996. A SURVEY OF CULTURAL RESOURCES IN THE PROPOSED JANETSI DAM SITE, LETABA RIVER

van Schalkwyk, J 2008. HERITAGE IMPACT SURVEY REPORT FOR THE PROPOSED 400/132KV VRYBURG SUBSTATION AND LOOP-IN LINES, NORTH WEST PROVINCE

van Schalkwyk, J. 2011. HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF PHOTOVOLTAIC POWER PLANTS ON FIVE DIFFERENT LOCATIONS IN NORTH WEST AND NORTHERN CAPE PROVINCES

van Schalkwyk, J. 2012. HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF PHOTOVOLTAIC POWER PLANTS ON FOUR DIFFERENT LOCATIONS IN NORTH WEST AND NORTHERN CAPE PROVINCES

van Schalkwyk, J 2014. BASIC HERITAGE ASSESSMENT FOR THE PROPOSED MOOKODI 132KV PHASE 2 POWER LINES DEVELOPMENT, NORTH WEST PROVINCE

Figures and Plates (on following pages)

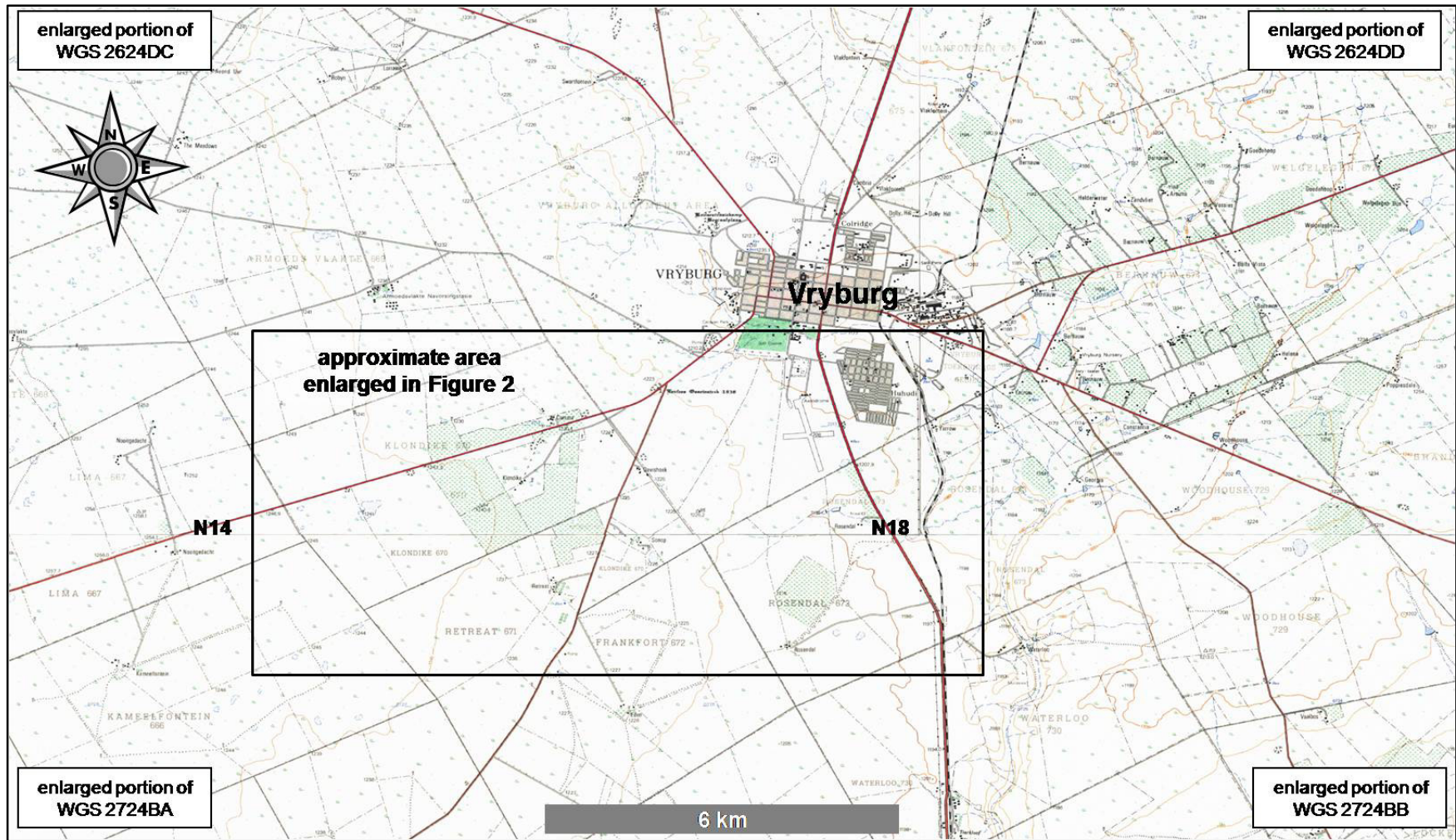


Figure 1. General location of study area relative to Vryburg, North West Province. Courtesy of the Chief Directorate Surveys and Mapping, Mowbray.

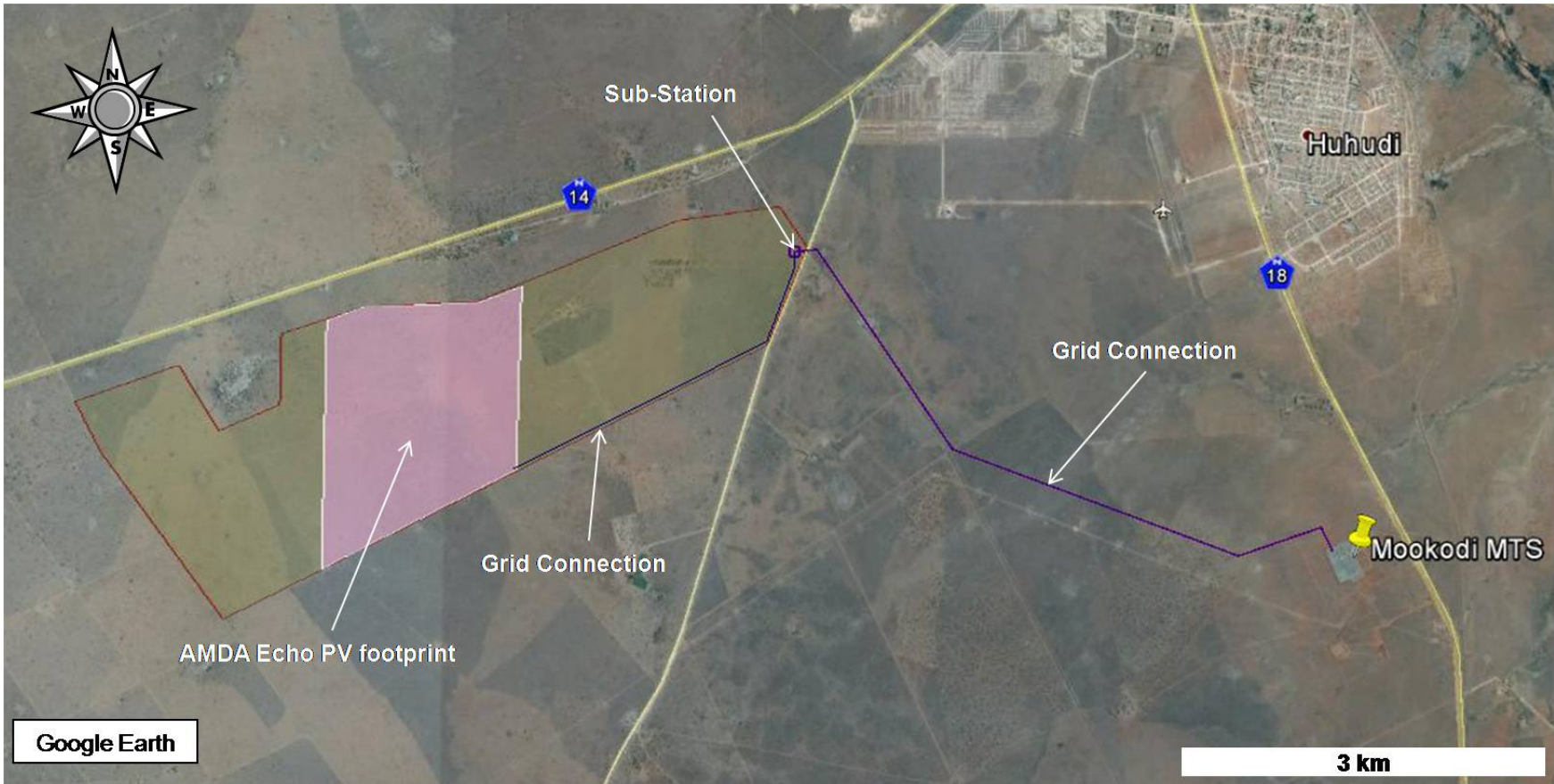


Figure 2. Provisional development layout on the affected property showing the AMDA Echo PV footprint (solar panels), on-site sub-station and grid connection to the Mookodi MTS sub-station. Information courtesy of the applicant via Cape EAPrac.