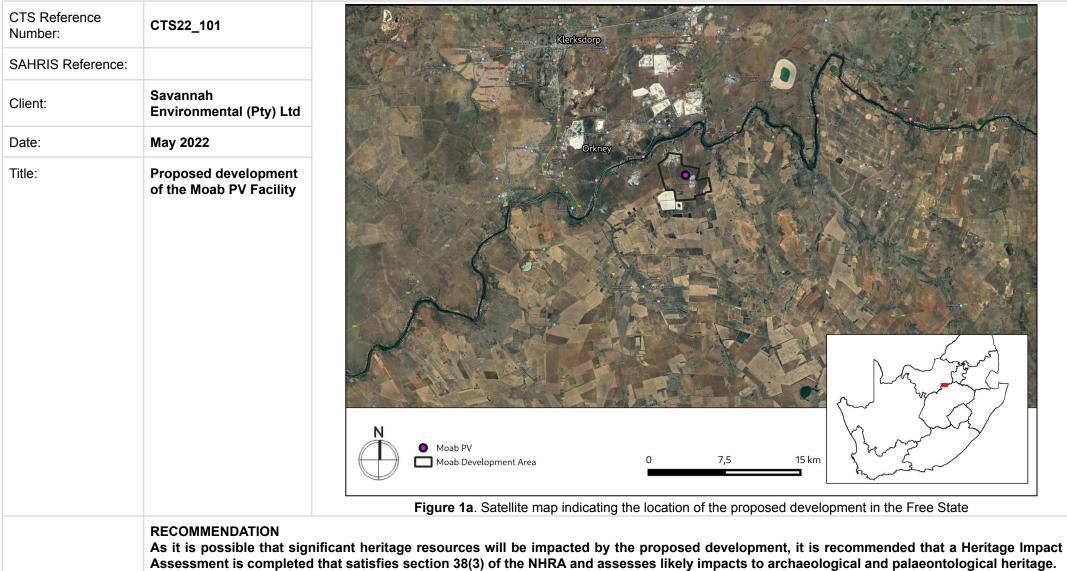


HERITAGE SCREENER





1. Proposed Development Summary

The development of a renewable energy facility, overhead powerline and associated infrastructure is proposed by HARMONY MOAB KHOTSONG OPERATIONS PTY (LTD). The project entails the development of three (3) separate solar PV facilities with a combined contracted capacity of up to 100MW over 280 ha of land and will be known as Harmony Moab Khotsong Solar PV Facility, each facility will include a grid connection and other associated infrastructure.

The Solar PV facilities are based near Harmony Moab mining operations and fall within the Klerksdorp Renewable Energy Development Zone (REDZ) located ~10km North of the town of Vierfontein within the Moqhaka Local Municipality respectively, and within the Fezile Dabi District Municipality, Free State Province.

2. Application References

Name of relevant heritage authority(s)	SAHRA
Name of decision making authority(s)	DFFE

3. Property Information

Latitude / Longitude	26°59'7.19"S 26°48'9.56"E		
	ANGLO 593	593	
	HOEKPLAATS 598	598	
Erf number / Farm number	MISPAH 274	274	
	MOAB 279	279	
	ZAAIPLAATS 2/190	2/190	
	ZAAIPLAATS 1/190	1/190	
	DOORNKOM WES 446	RE/446	



	CHRYSTALKOP 69	69	
	ZUIPING 394	4/394	
	ZUIPING 394	3/394	
	ZUIPING 394	5/394	
	ZUIPING 394	RE/394	
	ZUIPING 394	1/394	
Local Municipality	Moqhaka		
District Municipality	Fezile Dabi, Free State Province		
Province	Free State		
Current Use	Agricultural		
Current Zoning	Agricultural		

4. Nature of the Proposed Development

Total Area	280ha
Depth of excavation (m)	<2m
Height of development (m)	20m pylons for OHL

5. Category of Development

x	Triggers: Section 38(8) of the National Heritage Resources Act
	Triggers: Section 38(1) of the National Heritage Resources Act
х	1. Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.



	2. Construction of a bridge or similar structure exceeding 50m in length.
	3. Any development or activity that will change the character of a site-
x	a) exceeding 5 000m ² in extent
	b) involving three or more existing erven or subdivisions thereof
	c) involving three or more erven or divisions thereof which have been consolidated within the past five years
	4. Rezoning of a site exceeding 10 000m ²
	5. Other (state):

6. Additional Infrastructure Required for this Development

NA



7. Mapping (please see Appendix 3 and 4 for a full description of our methodology and map legends)

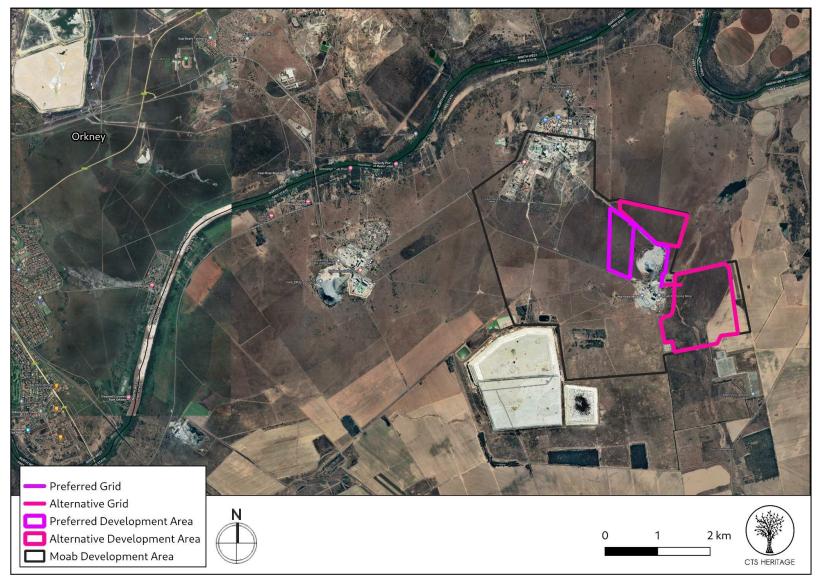


Figure 1b. Overview Map. Satellite image (2020) indicating the proposed development area



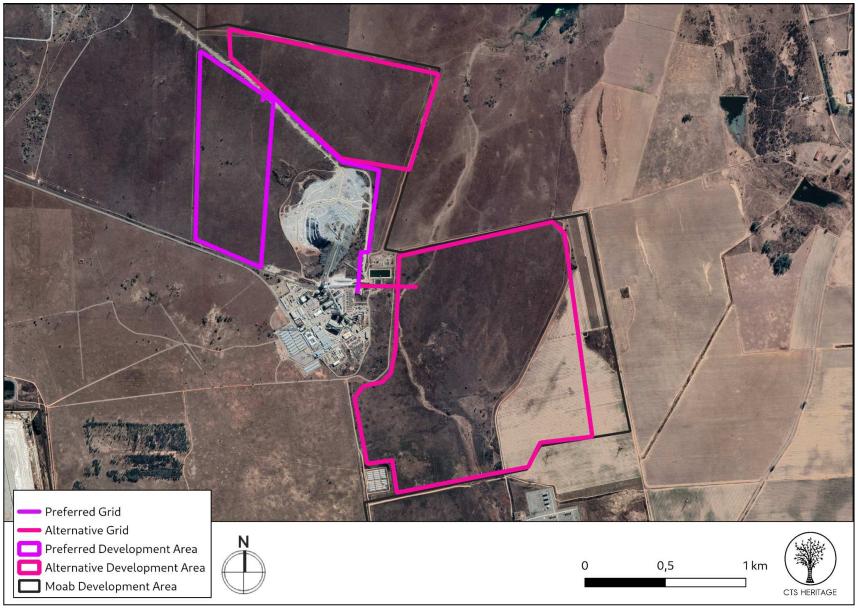


Figure 1c. Overview Map. Satellite image (2020) indicating the proposed development area



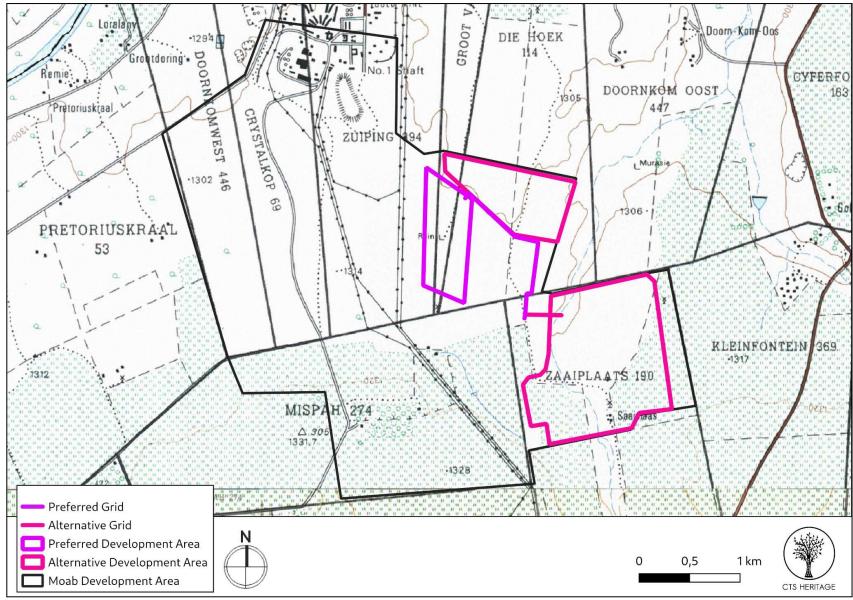


Figure 1d. Overview Map. Extract from 1:50 000 Topo



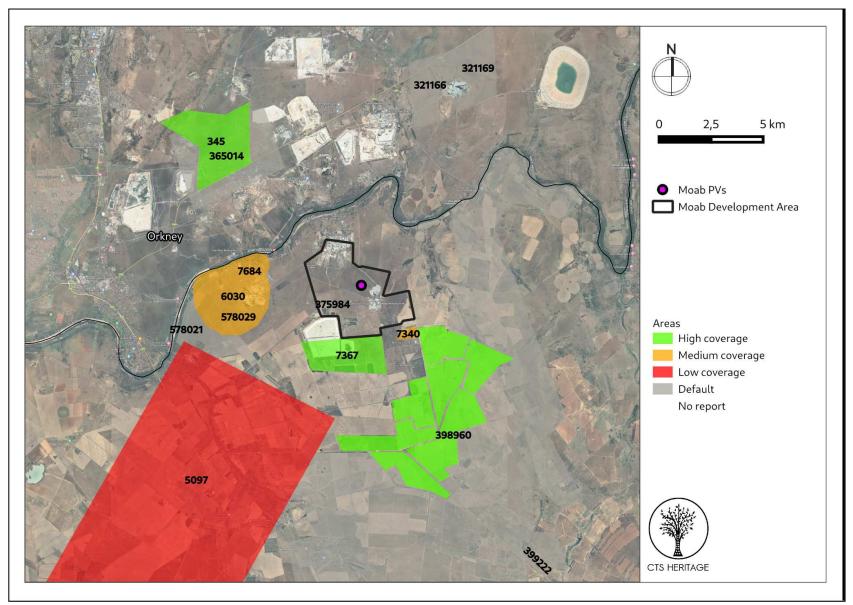


Figure 2. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.



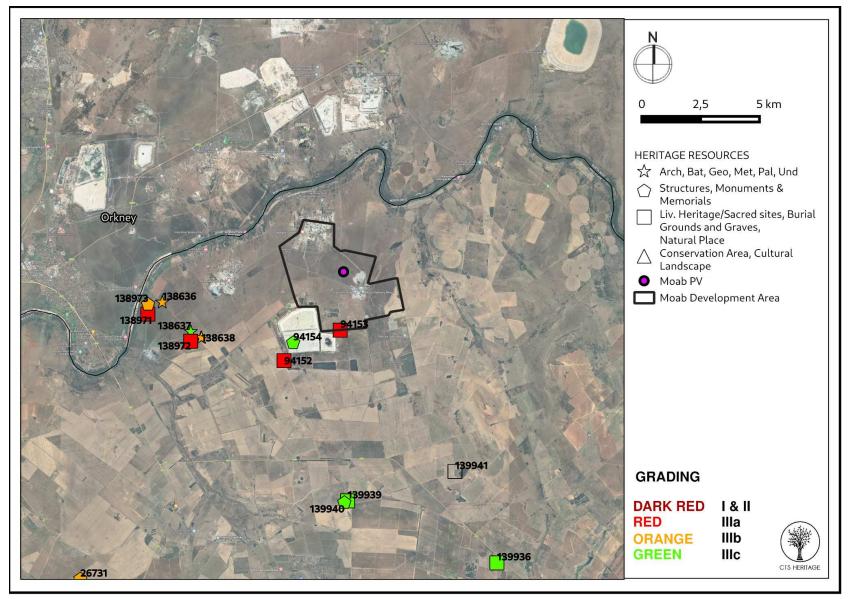


Figure 3. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for full description of heritage resource types.



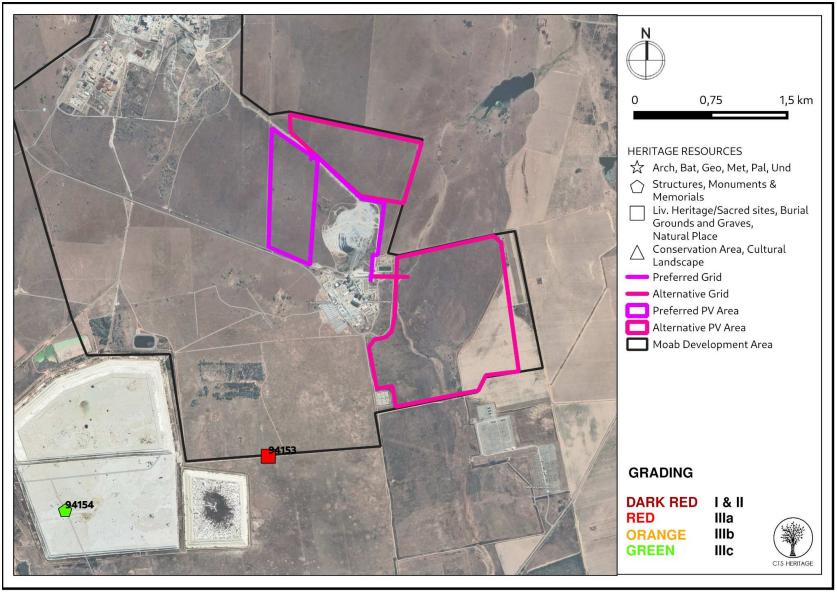


Figure 3a. Heritage Resources Map. Inset A



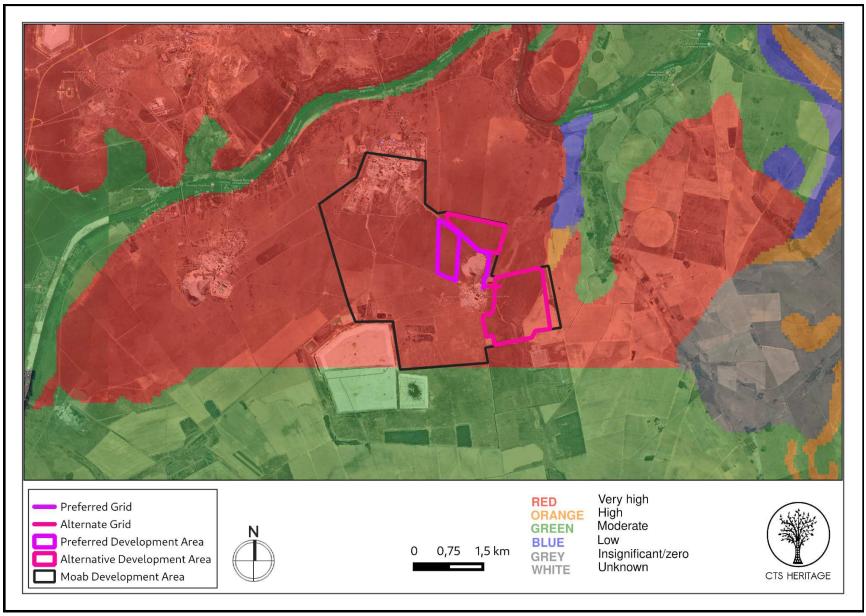


Figure 4a. Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.



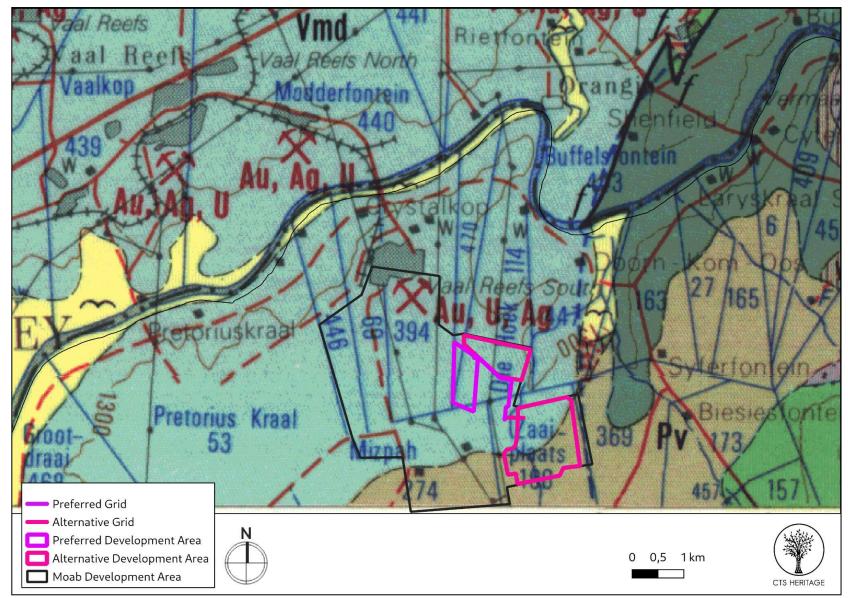


Figure 4b. Geology Map. Extract from the CGS 2626 West Rand Geology Map indicating that the development area is underlain by sediments of the (Pv) Vryheid Formation and (Vmd) Malmani Subgroup.



8. Heritage Assessment

Background

The assessment area for the proposed PV Solar farms and grid connections is situated north and south of the R76 close to the town of Viljoenskroon in the Free State Province. It falls within the jurisdiction of the Moqhaka Local Municipality in the Fezile Dabi District Municipality and is located within the existing Harmony Mine.

Built Environment & Cultural Landscapes

The development areas are located in peri-urban farms just outside the towns of Orkney (North West) and Viljoenskroon (Free State). The town of Orkney was established in 1940 at the junction of the various railway lines. It was name after the old gold mine opened by Thomas Leask, who came from the Orkney Islands, in 1880 (SESA 1973 in Van Schalkwyk 2021). Viljoenskroon is a maize and cattle farming town located in the Free State province of South Africa. It was named after the original farm owner J. J. Viljoen and his horse Kroon. The town was laid out in 1921 on the farm "Mahemskuil" and became a municipality in 1925. A number of large gold and diamond mines are also located inbetween the three solar PV sites, namely Taulekoa Mine next to Goedgenoeg 433, Kopanong Gold Mine next to Pretorius Kraal 53 and Great Noligwa Mine next to Groot Vaders Bosch 592. Ruins of or intact avenues of trees, historical farmsteads and farm labourer's cottages may potentially be found within the proposed development areas. The cultural landscape is characterised by a agriculture with abrupt transitions into extremely heavy industrial areas in and around the mining compounds. The installation of solar PV plants is therefore unlikely to have any impacts on the landscape character of the area.

Archaeology

Archaeological sites spanning the Earlier, Middle and Later Stone Age have been found in the region despite the extensive agricultural transformation of the area. In Dreyer (2005) and Van der Walt's (2007) heritage impact assessments of the nearby Pretorius Kraal 53, various modern buildings were recorded that are located near the banks of the Vaal River that were deemed as not conservation worthy. Van der Walt identified some Middle to Later Stone Age artefacts scattered across the farm but did not map them. In Van Schalkwyk's (2021) impact assessment of the Siyanda Solar farm on Grootdraai 468 (which lies on the western border of Pretorius Kraal 53), visibility issues were a major problem, "Due to the very dense vegetation cover that occur in the project area, natural as well as agricultural fields, it was impossible to obtain any ground visibility. The strategy was therefore

to examine natural and man-made features that are usually associated with human habitation and activities such as clumps of trees and rock outcrops. The proposed power line corridor connecting the Solar Power Plant to the the existing Vaal Reef Substation was not surveyed as access to the relevant properties (Pretoriuskraal 53) was not possible. It is proposed that once the power line route has been confirmed within the 100m corridor a heritage walk-though needs to be undertaken." Two burial sites were recorded during this survey despite the lack of Stone Age sites with the help of a local informant who had been working on the property for a number of years.

In his assessment of an area immediately adjacent to the project area, Huffman (2005, SAHRIS ID 7367) identified no sites of archaeological interest. In their assessment of an area located immediately adjacent to the areas proposed for development, Henderson and Koortzen (2007, SAHRIS ID 7340) noted that while no sites were found in the area surveyed, a number of previously excavated inspection pits yielded archaeological material in the form of stone artefacts. Henderson and Koortzen (2007, SAHRIS ID 7340) noted that while no sites were found in the area surveyed, a refacts had been brought up from an unknown depth (probably no more than a metre or two), and were mostly undiagnostic flakes with one blade-like flake which could be Middle Stone Age. Raw material included cryptocrystalline, chert and quartz."

In an assessment completed by CTS Heritage for a proposed PV facility located nearby, a single site and very few isolated individual artefacts were documented. Cumulatively these findings indicate cultural evidence for MSA and LSA occupations of the area. It was noted that the majority of finds were identified in disturbed surface contexts, and could not be tied chrono-culturally to a particular prehistoric period, however one site (VK4) was relatively less affected by post-depositional processes, and may have been exposed relatively recently. Apart from this one site, the potential for finding a dateable *in-situ* archaeological horizon based on current surface observations appears to be low. The documented archaeology is



therefore classified as scientifically LOW-SIGNIFICANCE. It is therefore highly likely that further burials may be located on the proposed solar PV areas as well as Stone Age material similar to the artefacts recorded but not mapped by Van der Walt. An archaeological field survey is therefore recommended.

Palaeontology

According to the SAHRIS Palaeosensitivity Map the development sites are underlain by sediments of Low to Very High fossil sensitivity (Figure 4a). The solar PV sites are underlain by sediments of the Malmani subgroup (Vmd) and the Vryheid Formation (Figure 4b). In his assessment of the Siyanda Solar Plant, Almond (2021) found "several large float blocks on either side of farm track comprising pale grey to yellowish-weathering chert within mm-scale fine internal lamination, locally convolute or with zones of regular, stromatolite-like, upward-convex stacked laminae. These might be pseudostromatolites - i.e. abiogenic sedimentary structures formed by isopachous cement growth - rather than true microbially-bound stromatolites."

In a PIA completed by Bamford (2022) for an adjacent PV development, it was noted that "The proposed site lies on the moderately sensitive Quaternary sands and alluvium which might have trapped transported and fragmentary fossils if there are such features as palaeo-pan and palaeo-springs. The land has been cultivated or grazed for decades and no such feature is visible in the satellite imagery. Due to inconsistency in the geological maps it appears that (the development is located) on very highly sensitive rocks of the Vryheid Formation that are most likely covered by Quaternary sands and alluvium." Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, mudstones, shales and sands are typical for the country and might contain fossil plant, insect, invertebrate and vertebrate material. The sands and soils of the Quaternary period would not preserve fossils.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the right age and type to contain fossils but the area is covered in deep cultivated soils. Since there is an extremely small chance that fossils from the Vryheid Formation may occur below ground and may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

RECOMMENDATION

As it is possible that significant heritage resources will be impacted by the proposed development, it is recommended that a Heritage Impact Assessment is completed that satisfies section 38(3) of the NHRA and assesses likely impacts to archaeological and palaeontological heritage.



9. Scoping Assessment Impact Table

Impact

- Impact to archaeological and built environment resources
- Impact to palaeontological resources
- Impact to Cultural Landscape
- Cumulative Impact

Desktop Sensitivity Analysis of the Site

- Impact to significant archaeological resources such as Stone Age artefact scatters, remnants of Iron Age settlements, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the development phase and disturbance during the operational phase is possible.
- Impacts to palaeontological resources are unlikely.
- There is the potential for the cumulative impact of proposed solar energy facilities to negatively impact the cultural landscape due to a change in the landscape character from rural and mining to semi-industrial, however, due to the density of mining activities in the area, the impact on the experience of the cultural landscape is not foreseen to be significant.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact to significant heritage resources through destruction during the development phase and disturbance during the operational phase.	Destruction of significant heritage resources	Local scale with broader impacts to scientific knowledge	None known at present

Gaps in knowledge & recommendations for further study

The heritage resources in the area proposed for development are not yet sufficiently recorded

Based on the available information, including the scale and nature of the proposed development, it is likely that significant heritage resources will be impacted by the proposed development and as such it is recommended that further heritage studies are required in terms of section 38 of the NHRA with specific focus on impacts to archaeological heritage.



APPENDIX 1

List of heritage resources within the development area

Site ID	Site no	Full Site Name	Site Type	Grading
94152	Moab 01	Moab 271 / 01	Burial Grounds & Graves	Grade IIIa
94154	Moab 03	Moab 271 / 03	Building	Grade IIIc
94153	Moab 02	Moab 271 / 02	Burial Grounds & Graves	Grade IIIa
138636	GTI/468-001	GROOTDRAAI 468	Palaeontological	Grade IIIb
138637	GTI/468-002	GROOTDRAAI 468	Palaeontological	Grade IIIc
138638	GTI/468-003	GROOTDRAAI 468	Palaeontological	Grade IIIb
138639	GTI/468-004	GROOTDRAAI 468	Palaeontological	Grade IIIb
138971	GDI-001	Grootdraai 468	Burial Grounds & Graves	Grade IIIa
138972	GDI-002	Grootdraai 468	Burial Grounds & Graves	Grade IIIa
138973	GDI-003	Grootdraai 468	Structures	
138974	GDI-003	Grootdraai 468	Structures	Grade IIIb
139939	VNN-009	Viljoenskroon	Burial Grounds & Graves	Grade IIIc
139940	VNN-010	Viljoenskroon	Structures	Grade IIIc
139941	VNN-011	Viljoenskroon	Burial Grounds & Graves	



APPENDIX 2

Reference List with relevant AIAs and PIAs

	Heritage Impact Assessments					
Nid	Report Type	Author/s	Date	Title		
321166	Archaeological Specialist Reports	Jaco van der Walt	17/06/2015	Archaeological Scoping Report for the Proposed Buffels Solar 1 SEF, Klerksdorp, North West Province		
321168	PIA Desktop	Barry Millsteed	21/06/2015	Palaeontological Heritage Impact Assessment Report on the Site of a Proposed Solar Power Production Facility known as the Buffels Solar 1 PV Energy Facility to be located approximately 20 km north East of Orkney, NW Province		
321169	PIA Desktop	Barry Millsteed	21/06/2015	Palaeontological Heritage Impact Assessment Report on the Site of a Proposed Solar Power Production Facility known as the Buffels Solar 2 PV Energy Facility to be located approximately 20 km north East of Orkney, NW Province		
321170	Archaeological Specialist Reports		17/06/2015	Archaeological Scoping Report for the Proposed Buffels Solar 2 SEF, Klerksdorp, North West Province		
345	PIA Phase 1	Marion Bamford	18/05/2012	Palaeontological Impact Assessment for Kabi Vaalkop Solar PV Facility		
365014	HIA Phase 1	Sidney Miller	02/03/2015	Cultural Heritage Impact Assessment for Shafts #1 to #7, Orkney, Northwest Province, South Africa, for CAPM Gold.		
369846		Jaco van der Walt	31/08/2016			
5097	AIA Phase 1	Johnny Van Schalkwyk	07/03/2003	Mercury-Perseus 400 kV Transmission Line, Cultural Heritage Resources		
6030	AIA Phase 1	Cobus Dreyer	20/06/2005	Archaeological and Historical Investigation of the Proposed Residential Developments on Subdivision 13 of the Farm Pretoriuskraal 53, Viljoenskroon, Free State		
7340	AIA Phase 1	Zoe Henderson, C Koortzen	19/06/2007	Heritage Assessment Report Mercury Substation Expansion, Zaaiplaats 190/3, Fezile Dabi (DC20) District, Free State, South Africa		



7367	AIA Phase 1	Thomas Huffman	01/03/2005	Archaeological Assessment of the Mispah Tailings Dam Extension
7684	AIA Phase 1	Jaco van der Walt	25/09/2007	Archaeological Impact Assessment. Township Development and Sub Division of AH18, Pretoriuskraal, Orkney, North West Province
7685	AIA Phase 1	Jaco van der Walt	25/09/2007	Archaeological Impact Assessment. Township Development on Sub Division of AH19, Pretoriuskraal, Orkney, North West Province
9124	Heritage Study	Francois P Coetzee	01/04/2012	Cultural Heritage Survey of the Proposed Kabi Vaalkop PV Facility near Orkney, Dr Kenneth Kaunda District, North West Province



APPENDIX 3 - Keys/Guides

Key/Guide to Acronyms

AIA	Archaeological Impact Assessment		
DARD	Department of Agriculture and Rural Development (KwaZulu-Natal)		
DEA	Department of Environmental Affairs (National)		
DEADP	Department of Environmental Affairs and Development Planning (Western Cape)		
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism (Eastern Cape)		
DEDECT	Department of Economic Development, Environment, Conservation and Tourism (North West)		
DEDT	Department of Economic Development and Tourism (Mpumalanga)		
DEDTEA	Department of economic Development, Tourism and Environmental Affairs (Free State)		
DENC	Department of Environment and Nature Conservation (Northern Cape)		
DMR	Department of Mineral Resources (National)		
GDARD	Gauteng Department of Agriculture and Rural Development (Gauteng)		
HIA	Heritage Impact Assessment		
LEDET	Department of Economic Development, Environment and Tourism (Limpopo)		
MPRDA	Mineral and Petroleum Resources Development Act, no 28 of 2002		
NEMA	National Environmental Management Act, no 107 of 1998		
NHRA	National Heritage Resources Act, no 25 of 1999		
PIA	Palaeontological Impact Assessment		
SAHRA	South African Heritage Resources Agency		
SAHRIS	South African Heritage Resources Information System		
VIA	Visual Impact Assessment		

Full guide to Palaeosensitivity Map legend

RED:	VERY HIGH - field assessment and protocol for finds is required	
ORANGE/YELLOW:	HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely	
GREEN:	MODERATE - desktop study is required	
BLUE/PURPLE:	LOW - no palaeontological studies are required however a protocol for chance finds is required	
GREY:	INSIGNIFICANT/ZERO - no palaeontological studies are required	
WHITE/CLEAR:	UNKNOWN - these areas will require a minimum of a desktop study.	



APPENDIX 4 - Methodology

The Heritage Screener summarises the heritage impact assessments and studies previously undertaken within the area of the proposed development and its surroundings. Heritage resources identified in these reports are assessed by our team during the screening process.

The heritage resources will be described both in terms of **type**:

- Group 1: Archaeological, Underwater, Palaeontological and Geological sites, Meteorites, and Battlefields
- Group 2: Structures, Monuments and Memorials
- Group 3: Burial Grounds and Graves, Living Heritage, Sacred and Natural sites
- Group 4: Cultural Landscapes, Conservation Areas and Scenic routes

and **significance** (Grade I, II, IIIa, b or c, ungraded), as determined by the author of the original heritage impact assessment report or by formal grading and/or protection by the heritage authorities.

Sites identified and mapped during research projects will also be considered.

DETERMINATION OF THE EXTENT OF THE INCLUSION ZONE TO BE TAKEN INTO CONSIDERATION

The extent of the inclusion zone to be considered for the Heritage Screener will be determined by CTS based on:

- the size of the development,
- the number and outcome of previous surveys existing in the area
- the potential cumulative impact of the application.

The inclusion zone will be considered as the region within a maximum distance of 50 km from the boundary of the proposed development.

DETERMINATION OF THE PALAEONTOLOGICAL SENSITIVITY

The possible impact of the proposed development on palaeontological resources is gauged by:

- reviewing the fossil sensitivity maps available on the South African Heritage Resources Information System (SAHRIS)
- considering the nature of the proposed development
- when available, taking information provided by the applicant related to the geological background of the area into account

DETERMINATION OF THE COVERAGE RATING ASCRIBED TO A REPORT POLYGON

Each report assessed for the compilation of the Heritage Screener is colour-coded according to the level of coverage accomplished. The extent of the surveyed coverage is labeled in three categories, namely low, medium and high. In most instances the extent of the map corresponds to the extent of the development for which the specific report was undertaken.



Low coverage will be used for:

- desktop studies where no field assessment of the area was undertaken;
- reports where the sites are listed and described but no GPS coordinates were provided.
- older reports with GPS coordinates with low accuracy ratings;
- reports where the entire property was mapped, but only a small/limited area was surveyed.
- uploads on the National Inventory which are not properly mapped.

Medium coverage will be used for

• reports for which a field survey was undertaken but the area was not extensively covered. This may apply to instances where some impediments did not allow for full coverage such as thick vegetation, etc.

• reports for which the entire property was mapped, but only a specific area was surveyed thoroughly. This is differentiated from low ratings listed above when these surveys cover up to around 50% of the property.

High coverage will be used for

• reports where the area highlighted in the map was extensively surveyed as shown by the GPS track coordinates. This category will also apply to permit reports.

RECOMMENDATION GUIDE

The Heritage Screener includes a set of recommendations to the applicant based on whether an impact on heritage resources is anticipated. One of three possible recommendations is formulated:

(1) The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.

This recommendation is made when:

- enough work has been undertaken in the area
- it is the professional opinion of CTS that the area has already been assessed adequately from a heritage perspective for the type of development proposed

(2) The heritage resources and the area proposed for development are only partially recorded - The surveys undertaken in the area have not adequately captured the heritage resources and/or there are sites which require mitigation or management plans. Further specific heritage work is recommended for the proposed development.

This recommendation is made in instances in which there are already some studies undertaken in the area and/or in the adjacent area for the proposed development. Further studies in a limited HIA may include:

• improvement on some components of the heritage assessments already undertaken, for instance with a renewed field survey and/or with a specific specialist for the type of heritage resources expected in the area

• compilation of a report for a component of a heritage impact assessment not already undertaken in the area



• undertaking mitigation measures requested in previous assessments/records of decision.

(3) The heritage resources within the area proposed for the development have not been adequately surveyed yet - Few or no surveys have been undertaken in the area proposed for development. A full Heritage Impact Assessment with a detailed field component is recommended for the proposed development.

Note:

The responsibility for generating a response detailing the requirements for the development lies with the heritage authority. However, since the methodology utilised for the compilation of the Heritage Screeners is thorough and consistent, contradictory outcomes to the recommendations made by CTS should rarely occur. Should a discrepancy arise, CTS will immediately take up the matter with the heritage authority to clarify the dispute.

APPENDIX 5 - Summary of Specialist Expertise

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management , heads up the heritage division of the organisation, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is a member of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 50 Heritage Impact Assessments throughout South Africa.