

**ARCHAEOLOGICAL IMPACT ASSESSMENT: PROPOSED HOTAZEL
SOLAR FACILITY 2 (100 MW) ON REMAINDER FARM YORK A 279 AND
132 KV GRID CONNECTION ON REMAINDER OF FARM HOTAZEL 280,
REMAINDER OF PORTION 3 OF FARM YORK A 279 AND PORTION 11
OF FARM YORK A 279, JOHN TAOLO GAETSEWE DISTRICT
MUNICIPALITY, NORTHERN CAPE**

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

SAHRA CaseID:

Prepared for:
Hotazel Solar Facility 2 (Pty) Ltd
Unit B1 Mayfair Square,
Century Way, Century City,
Western Cape, 7441

February 2021

Prepared by:

Lita Webley & Madelon Tusenius
5 Oaktree, Cornwall Place, Kenilworth, 7800
Email: lita@webleyonline.com
Tel: 0721796219

EXECUTIVE SUMMARY

Hotazel 2 Solar

Hotazel Solar Facility 2 (Pty) Ltd propose to construct the Hotazel 2 Solar facility (100MW PV) and associated powerline on the Remaining Extent of the farm York A 279, Portion 11 of the Farm York A 279, Remainder of Portion 3 of the Farm York A 279 and the Remainder of the Farm Hotazel 280, situated 3km south of the town of Hotazel, in the John Taolo Gaetsewe District Municipality, Northern Cape.

Previous Survey of the Study Area

An initial assessment in 2018 considered two alternative layout options for the Hotazel Solar Facility, namely Alternative 1 (on the eastern portion of the property) and Alternative 2 (on the western portion of the property). Both alternatives were thoroughly assessed during the field survey by Lita Webley and Madelon Tusenius from 22-25 October 2018.

The 2018 Archaeological Impact Assessment report, which comprises one of two specialist reports (the other is the Palaeontological Impact Assessment) was submitted to SAHRA, and they issued a Final Comment on 21 February 2019, in which they endorsed the AIA and PIA (see attached as Appendix 1).

- The amended Hotazel Solar 1 Facility is located approximately on the footprint of Alternative 2 (western part of study area)
- **Hotazel 2 Solar Facility** is located approximately on the footprint of Alternative 1 (the eastern part of the study area).

Assessment of Solar Facility and Powerlines

The assessment included a desktop study and a literature review of the study area and immediate surroundings. The field assessment was undertaken by Lita Webley and Madelon Tusenius from 22-25 October 2018. Access was gained from the R31 and transects were walked across the study area. Sections of the proposed powerline, through Portion 11 of York A 279 which belong to Kudumane Mineral Resources, were surveyed from a vehicle. There were no significant limitations to the study. It is assumed that the 1km section of powerline through Farm Hotazel 280, which has already been surveyed by Orton (2017) has been adequately assessed. Further, the desktop Scoping assessment by Nilssen (2017) asserted that archaeological resources were very scarce in the surrounding landscape and of very low cultural significance.

Impacts on Heritage Resources

The study examined the proposed location for the PV array. No archaeological and/or other heritage resources were identified during the foot survey and the probability of impacts is considered to be **very low**.

Powerlines and Substation

The position of the on-site substation/ collector switching station as well as the alternative routes to connect Hotazel Solar 2 to the Eskom Hotazel Substation was surveyed and no archaeological resources were identified. Potential impacts to heritage resources are considered to be **very low**.

Conclusions and Recommendations

The study indicates that there are no above-ground archaeological resources in the study area. There are no buildings or graveyards on the property and probability of impacts is considered to be **very low**. It is recommended that the project be authorised with the following conditions included in the EMPr:

- If during ground clearance or construction, any archaeological material or human graves are uncovered, work in that area should be stopped immediately and the ECO should report this to SAHRA (Tel: 021 462 4502). The heritage resource may require inspection by

the heritage authorities, and it may require further mitigation in the form of excavation and curation in an approved institution.

SPECIALIST DECLARATION

I, Lita Webley (PhD in Archaeology, University of Cape Town), herewith confirm that I am a member of the Association of Southern African Professional Archaeologists (ASAPA: Membership No 175). I am an accredited Principal Investigator Stone Age archaeology, Shell Midden Archaeology and Colonial Archaeology and Field Director for Grave Relocation. I am a member of the Association of Professional Heritage Practitioners. I have worked as a heritage practitioner since 1997 and have completed more than 250 archaeological and heritage impact assessments.

As the appointed independent specialist for this application declare that I –

- act as an independent specialist (archaeologist) 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 offense in terms of regulation 48 of GN No. R. 982.



Signature of the specialist

Name of company: Dr Lita Webley
Professional Archaeologist and Specialist Heritage Practitioner

Date: 9 February 2021

NEMA REQUIREMENTS FOR SPECIALIST REPORTS

NEMA Requirements for Specialist Reports		
Appendix 6	Specialist Report content as required by NEMA 2014 EIA Regulations including a curriculum vitae;	Section
1(1)(a)	(i) the specialist who prepared the report; and	Title page; as well as the accompanying CV
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 3
(c)	an indication of the scope of, and the purpose for which the report was prepared	Section 5
(c) A	an indication of the quality and age of the base date used for the specialist report	Section 5
(c) B	a description of the existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 4
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 5
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process, inclusive of equipment and modelling used;	Section 5
(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Part of EIA
(g)	an identification of any areas to be avoided, including buffers;	Part of EIA
(h)	a map superimposing the activity including the associated structures and infrastructures on the environmental sensitivities of the site including areas to be avoided, including buffers;	Part of EIA
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 5.4
(j)	A description of the findings and potential implications if such findings on the impact of the proposed activity, or activities;	Part of EIA
(k)	any mitigation measures for inclusion in the EMPr;	Part of the EIA
(l)	any conditions for inclusion in the environmental authorisation;	Part of EIA
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Part of EIA
(n)	a reasoned opinion-	Part of the EIA
	(i) whether the proposed activity or portions thereof should be authorised; and	
	(i)A regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plans	
(o)	A description of any consultation process that was undertaken during the course of preparing the specialist report;	Part of the EIA process and integrated HIA
(p)	A summary and copies of any comments received during consultation process and where applicable all responses thereto, and	Not yet done
(q)	Any other information requested by the competent authority	Not at this time
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirements to be applied to a specialist report, the requirements as indicated in such notice will apply	N/A

NHRA REQUIREMENTS FOR HERITAGE REPORTS

NHRA requirements for Heritage Reports – National Heritage Resources Act (No 25 of 1999)		
Section 38(3)	The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): provided that the following must be included:	
38(3)(a)	The identification and mapping of all heritage resources in the area affected;	Part of EIA
(b)	An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;	Part of EIA
(c)	An assessment of the impact of the development on such heritage resources	Part of EIA
(d)	An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development	Part of EIA
(e)	The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;	Part of EIA
(f)	If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and	Part of EIA
(g)	Plans for mitigation of any adverse effects during and after the completion of the proposed development	Part of EIA

GLOSSARY

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

Early Stone Age: The archaeology of the Stone Age between 2 500 000 and 200 000 years ago.

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

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

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

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

Middle Stone Age: The archaeology of the Stone Age between 200 000 and 20 000 years ago associated with early modern humans.

National Estate: The collective heritage assets of the Nation

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

Pleistocene: A geological time period (of 2.5 million – 10 000 years ago).

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

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

ABBREVIATIONS

AIA	Archaeological Impact Assessment
BIF	Banded Ironstone Formation
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
ESA	Early Stone Age
EMP	Environmental Management Program
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act, No 25 of 1999
OHL	Overhead line
PV	Photovoltaic
SAHRA	South African Heritage Resources Agency
SAHRIS	South Africa Heritage Resources Information System

CONTENTS

1. INTRODUCTION	9
2. PROJECT DESCRIPTION AND LAYOUT	9
2.1 Infrastructure	10
2.2 Grid Connection: OHL and cabling	10
3. HERITAGE LEGISLATION.....	11
3.1 Archaeology (Section 35(4))	12
3.2 Burial grounds and graves (Section 36(3))	12
3.3 Grading.....	12
3.4 SAHRA 2019 Final Comment	13
3.5 Consultation	13
4. RECEIVING ENVIRONMENT	13
5. ARCHAEOLOGICAL CONTEXT	15
5.1 Early and Middle Stone Age.....	15
5.2 Later Stone Age	16
5.3 Early and Later Iron Age	16
5.4 Historical Background	16
5.5 Cemeteries	16
6. METHODOLOGY	17
6.1 Purpose and Scope of Study	17
6.2 Background Desktop Studies.....	17
6.3 Archaeological Field Survey.....	18
6.4 Assumptions, Limitations and Gaps in Knowledge	18
6.5 Consultation	19
7. RESULTS OF THE ARCHAEOLOGICAL SURVEY	19
7.1 Solar Facility Survey.....	19
7.2 Powerline Survey	19
8. SOURCES OF RISK, IMPACT IDENTIFICATION AND ASSESSMENT.....	20
8.1 Impacts on Colonial Period Heritage.....	20
8.2 Impacts on Cemeteries and Graves.....	20
8.3 Impacts of Powerlines and Access Roads	20
9. CUMULATIVE IMPACTS.....	21
10. CONCLUSIONS	21
10.1 Solar Facility	21
10.2 Powerlines.....	21
11. RECOMMENDATIONS	22
12. ACKNOWLEDGEMENTS.....	22
13. REFERENCES	22

APPENDIX 1: SAHRA Final Comment (dated: 21 February 2019)

LIST OF FIGURES

- Figure 1: Figure 1: **The 1:50 000 map** sheets 2722BB and 2723AA showing the location of the study area and route of the powerline in relation to the town of Hotazel (Chief Directorate: National Geo-Spatial Information). Note the position of the major drainage system in the area, the Go-Magara River to the west.
- Figure 2: The location and layout of the proposed Hotazel Solar 2 facility on the eastern half of the property.
- Figure 3: Grid Connection Alternatives.
- Figure 4: There are large sections of grass cover across the site, particularly on the eastern side.
- Figure 5: There are numerous impenetrable clusters of thorn trees (*Acacia mellifera*) and it is impossible to survey under them.
- Figure 6: The western half of the farm York has been bisected by the railway line to Hotazel. The R31 crosses the railway line over the bridge shown to the left, and then travels northward, following the railway line.
- Figure 7: To the west of the railway line, large sections of the landscape on the Remainder of York A 279 have been disturbed by the construction of an underground water pipeline which runs parallel to the railway line, and between the railway line and the R31. Note also the 66kV powerline which crosses the site from east to west.

- Figure 8: View northwards of the Hotazel waste rock dumps on the horizon. These dumps separate the proposed PV facility from the town of Hotazel.
- Figure 9: View in a southerly direction of the OHL crossing the eastern edge of Portion 11 of York A 279.
- Figure 10: The substation of Hotazel on the western edge of the town.
- Figure 11: Archaeological survey tracks (in white) across the property.

LIST OF TABLES

- Table 1: Grading of Heritage Resources
- Table 2: Potential Impacts to Archaeology

1. INTRODUCTION

Lita Webley was appointed by Hotazel Solar Facility 2 (Pty) Ltd, in April 2020, to undertake an Archaeological Impact Assessment (AIA) for the construction of a proposed commercial photovoltaic (PV) solar energy facility (SEF), called Hotazel 2 (100MW), as well as associated grid connection. The proposed location is 3km south-east of the mine dumps of Hotazel, situated in the John Taolo Gaetsewe District Municipality, and some 50km north-west of Kuruman (Figure 1). The proposed facility is on the Remaining Extent (Portion 0) of the farm York A 279. The R31 runs along the western and southern boundaries of the study area, while a district line runs east of the eastern boundary. The railway line to Hotazel runs through the western edge of the property.

A central point for the study area is: S27.214496; E22.994971

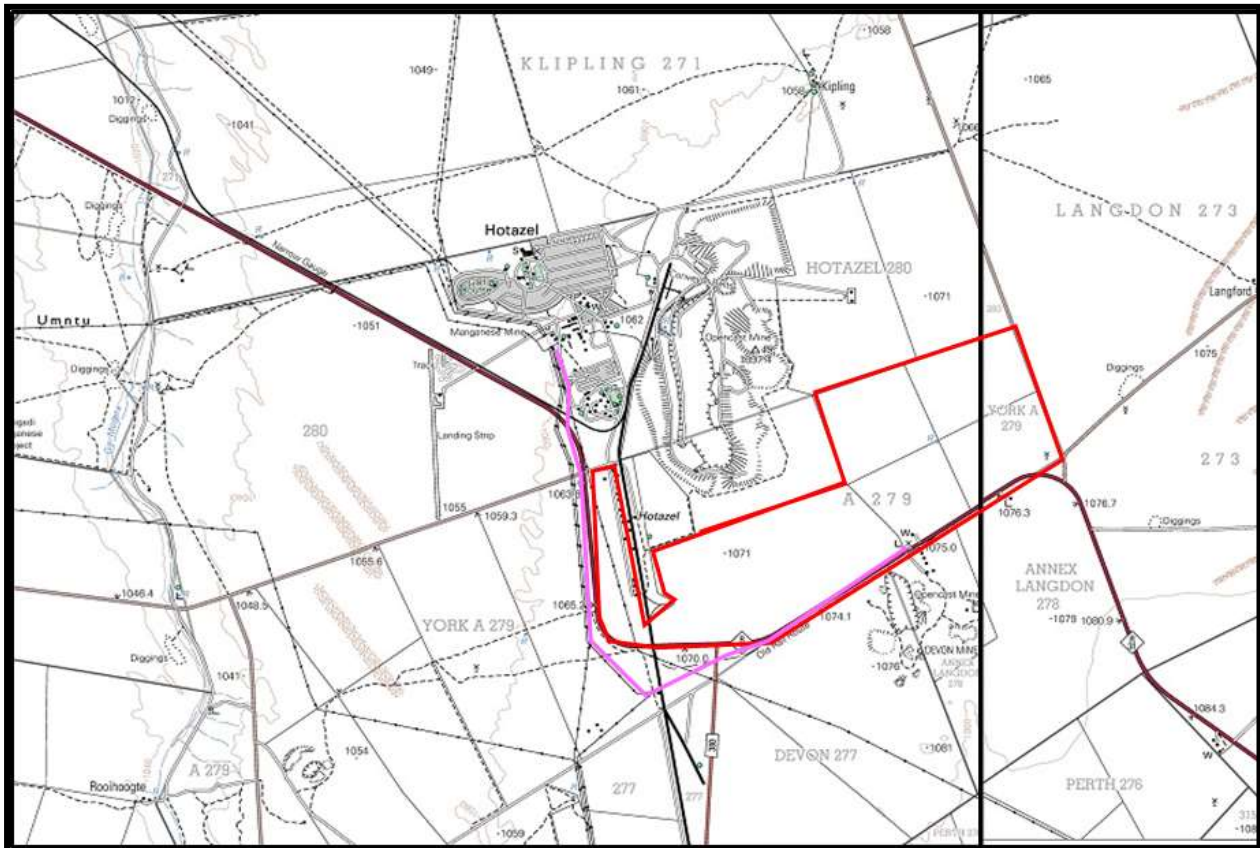


Figure 1: **The 1:50 000** map sheets 2722BB and 2723AA showing the location of the study area and route of the powerline in relation to the town of Hotazel (Chief Directorate: National Geo-Spatial Information). Note the position of the major drainage system in the area, the Go-Magara River to the west.

2. PROJECT DESCRIPTION AND LAYOUT

Hotazel 2 will consist of solar photovoltaic (PV) technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of 100MW. The PV panel area will be 210ha in extent with a total footprint of approximately 230ha. Access to the site will be at a new access point from the R31. The height of the installed PV structures will not be more than 4m.

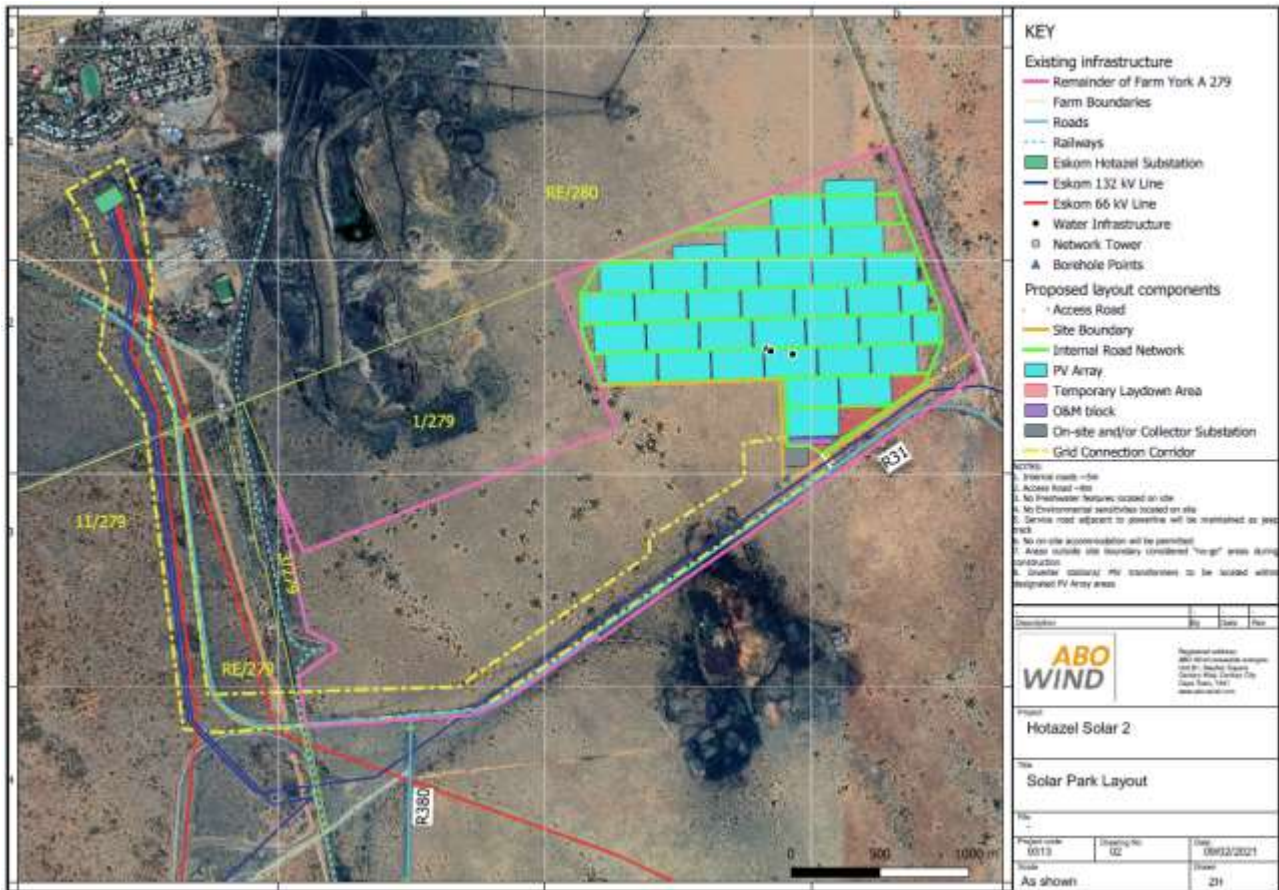


Figure 2: The location and layout of the proposed Hotazel Solar 2 facility on the eastern half of the property.

2.1 Infrastructure

This will include:

- On-site substation/collector switching station with a maximum size of 2ha. The on-site substation/collector switching station will collect the power from the SEF and transform it from low voltage level (up to 33kV) to 132kV level. The collector switching station component will be used if Eskom requires another SEF (i.e. Hotazel Solar) to connect to the national grid via the same grid connection point (27°13'10.62"S; 22°59'48.59"E).
- Auxiliary buildings (gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc).
- Inverter-stations, transformers, and internal electrical reticulation (underground cabling).
- Access and internal road network.
- Laydown area;
- Rainwater tanks; and
- Perimeter fencing and security infrastructure.

2.2 Grid Connection: OHL and cabling

There are three proposed alternatives to connect Hotazel Solar 2 to the Eskom Hotazel Substation (Figure 3):

- Alternative 1 (Preferred): ± 6.7 km overhead 132kV electrical transmission line. It will connect from the Hotazel 2 on-site substation/collector switching station to the Eskom Hotazel substation. To access the route, the line is buffered by 150m (i.e., a 300m corridor) in order to allow for micro-siting. The powerline will have a maximum height of 32m and a servitude width of between 31m and 36m.

- Alternative 2: 100m overhead 132kV electrical transmission line which will connect via a Loop in Loop out connection into the existing Hotazel/Eldoret 132kV line. The powerline will have a maximum height of 32m and a maximum servitude of 52m.
- Alternative 3: ±1km overhead 132kV powerline from the Hotazel 2 on-site substation/collector switching station to the Hotazel Solar collector switching station (which is currently going through a Part 2 Amendment process). The powerline will have a maximum height of 32m and a servitude width of between 31m and 36m.

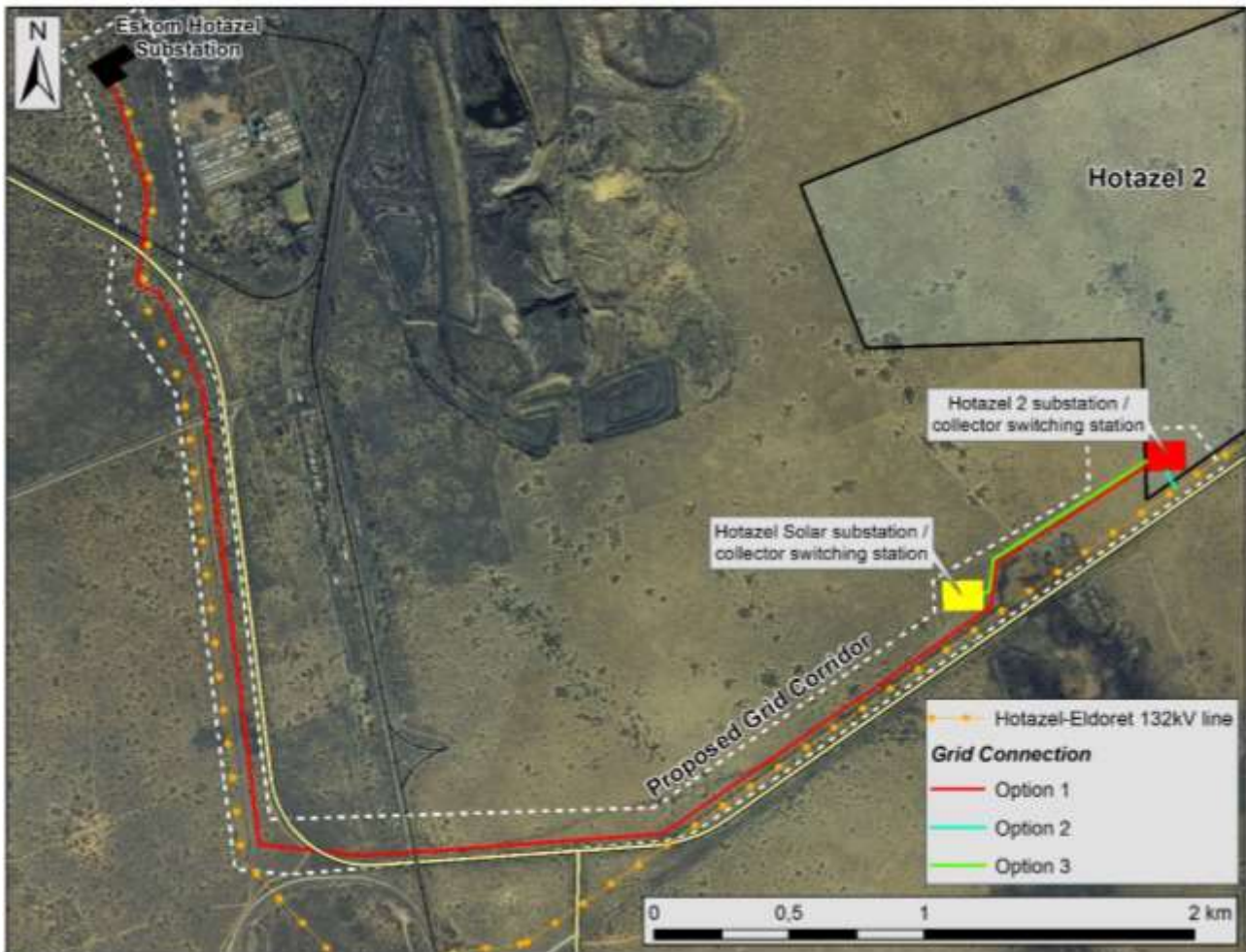


Figure 3: Grid Connection Alternatives¹

3. HERITAGE LEGISLATION

While the National Department of Environmental Affairs is the decision making authority acting in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) and Regulations (2014), they must ensure that the evaluation of the statutorily defined broad range of heritage resources fulfils the requirements of the relevant heritage resources authority in terms of Section 38 (8) of the National Heritage Resources Act (Act 25 of 1999) (NHRA) and that any comments and recommendations of the relevant heritage resources authority with regard to proposed development have been taken into account prior to the granting of the consent.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))

¹ The Hotazel Solar substation indicated in the yellow polygon does not form part of this application. This shows the authorised position of the substation for Hotazel Solar.

- Buildings or structures older than 60 years (Section 34);
- Archaeological Sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

3.1 Archaeology (Section 35(4))

No person may, without a permit issued by South African Heritage Resources Agency (SAHRA), destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite.

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

In terms of the definition, an archaeological survey therefore includes any ruined structures older than 100 years.

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

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

3.3 Grading

The South African Heritage Resources Agency (SAHRA) have prescribed a system of grading, which provides for assigning the appropriate level of management responsibility to a heritage resource. Grade I and Grade II heritage resources are managed by national and provincial heritage resources authorities, while Grade III resources are intended to be managed by the relevant local planning authority. These bodies are responsible for grading, but any individual may make recommendations for grading.

Table 1: Grading of Heritage Resources

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance	Grade I	High Significance	Conservation, National Site Nomination
Provincial Significance	Grade II	High	Conservation, Provincial Site Nomination
Local Significance	Grade III	High	Conservation, or extensive mitigation
Generally Protected A	Grade IV-A	High/Medium	Mitigation (Part of the site to be retained)
Generally Protected B	Grade IV-B	Medium	Mitigation (test excavation, systematic sampling/monitoring) before destruction
Generally Protected C	Grade IV-C	Low	Recording before destruction

3.4 SAHRA 2019 Final Comment

The original AIA and PIA specialist reports for the Hotazel Solar Facility (**which assessed the two alternative layouts**) were submitted to SAHRA and a final comment was received on 21 February 2019 reading as follows:

“The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit has no objections to the proposed development and supports the recommendations of the specialists” (**Appendix 1**).

3.5 Consultation

Since this study falls within the context of an EIA, which includes a public participation process, no dedicated public consultation will be undertaken. However, informal discussions were held with Mr P Jansen, the landowner of the Remaining Extent of farm York A 279, and mining officials from Kudumane Mineral Resources.

4. RECEIVING ENVIRONMENT

The proposed Hotazel 2 Solar facility (referred to as “the study area”) is about 3.5km south-east of the town of Hotazel and about 50km north-west of Kuruman (Figure 2). The R31 runs along the western and southern boundaries of the study area, while a district road runs east of the eastern boundary. The railway line to Hotazel runs through the western edge of the property. There is a 132kV powerline which runs along the southern perimeter of the property, parallel to the road.

According to the geological study, the proposed facility and OHL lines are underlain by Pleistocene to Recent aeolian sands of the Gordonia Formation (Kalahari Group). These soft sands are underlain by hardpan calcretes. The topography of the site is almost level with no features. The vegetation on the property is described as Kathu Bushveld, typically associated with aeolian red sands and calcrete deposits. There are some dense and impenetrable stands of *Acacia mellifera* across the site. They are not visible on satellite imagery but according to the ecologist are encroaching on the site. These dense, thorny clusters prevented evenly spaced survey transects, but this is not a significant limitation in terms of the study. The area is currently utilised for limited agricultural purposes. However, there are a number of manganese mining operations in close proximity to the study area, with the Langdon Devon Manganese Mine to the south, Kudumane Mineral Resources to the west, and the old waste rock dumps of Hotazel clearly visible to the north. There are numerous powerlines which cross the property, both along its southern and western boundaries.



Figure 4: There are large sections of grass cover across the eastern side of the property which allows for good surface visibility.



Figure 5: There are numerous impenetrable clusters of thorn trees (*Acacia mellifera*) and it is impossible to survey under them.



Figure 6: The western half of the Remaining Extent of farm York A 279 has been bisected by the railway line to Hotazel. The R31 crosses the railway line over the bridge shown to the left, and then travels northward, following the railway line.



Figure 7: To the west of the railway line, large sections of the landscape on the Remaining Extent of farm York A 279 have been disturbed by the construction of an underground water pipeline which runs parallel to the railway line, and between the railway line and the R31. Note also the 66kV powerline which crosses the site from east to west.



Figure 8: View northwards of the Hotazel waste rock dumps on the horizon. These dumps separate the proposed PV facility from the town of Hotazel.



Figure 9: View in a southerly direction of the OHL crossing the eastern edge of Portion 11 of York A 279.



Figure 10: The Hotazel substation on the western edge of the town.

5. ARCHAEOLOGICAL CONTEXT

A desktop Scoping Archaeological Impact Assessment has been completed by Nilssen (2018) and the details, specifically those relating to sites further afield, are not repeated here. The archaeological comments below draw on the conclusions of CRM studies conducted within a 20km radius of the proposed facility.

5.1 Early and Middle Stone Age

Important ESA archaeological distributions have been identified and studied around the town of Kathu, about 60km south of the study area (Chazan *et al* 2012). At Kathu Townlands, dense deposits of ESA cores, flakes and handaxes have been found over an area of 25ha. The artefacts are found directly on the surface of fine-grained ironstone bedrock and are mainly made on this material.

Closer to the study area, Küsel (2009) surveyed an area around Black Rock to the north of Hotazel and noted that stone artefact scatters are very ephemeral in the area and reported only one concentration of stone artefact knapping. These occurred in the pebble and gravel levels overlying the calcrete formations within the ancient riverbed of the Ga-Mogara River to the west of the proposed facility (see Figure 1). The lithics were exposed through excavations for a borrow pit in the riverbed. The availability of good quality raw materials appears to have led to significant episodes of stone artefact knapping (i.e., factory sites). Orton (2016/2017), Kruger (2015) and Hutten & Hutten (2013) have all identified a similar mix of ESA and MSA archaeological material along the Go-Magara River, about 5km west of the study area. The artefacts are made on the local cryptocrystalline silica rock types. The formal ESA tools include Acheulian handaxes or large cutting tools (LCT's). The MSA flakes and blades are characterised by the faceted striking platforms that indicate the use of prepared cores. Kruger (2015) observes that the Go-Magara River would have been an important source of water in this arid environment and may explain the absence of archaeological remains elsewhere in the area.

Küsel writes that stone tools are frequently found within calcrete zones underlying the modern surface soils of red Aeolian sands, and it is for this reason that they are *generally not observed during surface surveys*.

5.2 Later Stone Age

There have been no reported finds of LSA material in the immediate vicinity of the study area. Wilkins et. al (2017) report on LSA material from test excavations at two shelters on Gomahana Hill, which is located on the eastern edge of the Kuruman Hills, some 40km to the south-east from the site. Similarly, rock art sites have been reported from north of Kuruman in areas with rocky outcrops, but none have been reported in the immediate vicinity.

5.3 Early and Later Iron Age

Van Schalkwyk (2015) notes that there does not appear to be any evidence for Early Iron Age occupation of the area, and the earliest people to settle here were of Tswana-speaking origin (Tlhaping and Tlharo), mostly to the north and west of Kuruman around the 1600s (Humphreys 1976). Only Tswana speaking peoples were occupying the area when the first colonist arrived and the primary Tswana settlement of Dithakong was situated north-east of Kuruman. With gradual westward expansion, they had reached the Langeberg by the late 18th century. Humphreys (1976) suggested that they were established in the Postmasburg area by 1800. The Tswana lands were annexed by the British in 1855 and the area became known as British Bechuanaland. The Tswana rose in resistance to British occupation in 1895 but were subjected and their land annexed and divided up for white farmers. No reported Later Iron Age remains have been recorded in CRM studies for this area.

Nilssen (2018) concludes that several of the heritage studies around Hotazel have commented on the almost total absence of heritage resources. Surveys have revealed that there are large tracts of land where virtually no archaeological material occurs (Orton 2016, 2017; Van Schalkwyk 2010, 2016).

5.4 Historical Background

The first travellers through this area were missionaries, hunters and traders. The area was only sparsely settled until the 20th century, when the farms were surveyed. York 279, as well that of the neighbouring farm of Devon 277, was surveyed in 1914 (Orton 2016). He notes that the farm Hotazel was acquired by SA Manganese, and they were responsible for setting up a small town comprising 30 houses and some offices and stores. The official opening dates to 1959. The heritage of colonial settlement includes farmsteads, shed, kraals, dams, wells etc.

According to Küsel (2009), the first geologist to survey this portion of the Northern Cape was Dr AW Rogers of the Geological Commission of the Cape Colony in 1906. He described the small hill called Black Rock and reported the presence of manganese. The Associated Manganese Mines of South Africa acquired the manganese outcrop in 1940 and commenced mining. Much of the current heritage of the area relates to the history of manganese mining. Küsel (2009) has proposed that due to its significance in the history of manganese mining in South Africa, Black Rock should be proclaimed a National Heritage Site.

5.5 Cemeteries

Küsel (2009) has reported on cemeteries near the mine of Black Rock representing the graves of black mine workers. During their walkdown of the upgrade to the 66kV powerline from Hotazel to Mothibistat substation, PGS Heritage (2016) reported a number of graves but these were all situated to the south of the study area, along the "Moffat-Valley alignment". Cemeteries are likely to be found in proximity to villages and homestead.

6. METHODOLOGY

6.1 Purpose and Scope of Study

This report is conducted in terms of Section 38 (8) of the National Heritage Resources Act, No. 25 of 1999 (see section 3 above). Lita Webley was appointed to undertake the archaeological impact assessment (AIA).

The AIA complies with the minimum standards set by SAHRA, in terms of the National Heritage Resources Act, No 25 of 1999.

Specifically, the terms of reference are:

- The identification of all archaeological remains (including ruined structures older than 100 years as well as cemeteries/graves) within the footprint of the study area and along the proposed powerline alternatives.
- The assessment of significance of the archaeological resources as set out in Table 2.
- Assess the potential impacts of the proposed development on the archaeological resources using the prescribed format.
- Propose suitable mitigation measures to minimise possible negative impacts to the archaeological resources, if applicable. This may include additional studies/fieldwork if necessary.
- Provide a report that will meet the requirements of the heritage authorities.
- Provide input into the Environmental Management Program.

The AIA will be made available to all Interested and Affected Parties as part of the Public Participation Process being undertaken for the EIA process.

6.2 Background Desktop Studies

A comprehensive survey of available literature was carried out of the general heritage context of the area and this is described in **Section 5: Archaeological Context**. This complements the Scoping report which Nilssen (2018) conducted for the Hotazel Solar Facility. Both published and unpublished articles and reports were consulted. His desktop study also reviewed other Cultural Resource Management (CRM) projects within a 20km radius of the area via the South African Heritage Resources Information Systems (SAHRIS) database. Numerous impact assessments, in addition to a number of proposed solar facilities, have been conducted in proximity to the proposed facility as reflected on the SAHRIS database. Many of these reports have been completed during the last 5 years, and the quality of the reporting is therefore of sufficiently high standard for comparison. The following CRM reports in particular provide valuable information on the heritage resources of the area and were consulted:

- Orton, J. 2016. Heritage Impact Assessment for proposed power lines near Hotazel, Kuruman Magisterial District, Northern Cape. Unpublished report for Aurecon South Africa (Pty) Ltd.
- Orton, J. 2017. Heritage Impact Assessment for the Proposed Hotazel Solar Farm on the Annex Langdon 278, Kuruman Magisterial District, Northern Cape. Unpublished report for Aurecon South Africa (Pty) Ltd.

The proposed Hotazel Solar Facility referred to by Orton (2017) is on the opposite side of the road (R31) from the current study.

6.3 Archaeological Field Survey

Lita Webley and Madelon Tusenius undertook an archaeological survey of the Hotazel Solar facility and associated powerlines over a four-day period in October 2018. This is in spring, but due to the arid environment, the season has little impact on plant cover and therefore visibility. As far as possible, Webley and Tusenius walked transects across the entire property according to standard archaeological practice. They recorded their tracks and sites by means of two hand-held Garmin GPSmap62s receivers set to the WGS84 datum. All archaeological sites were recorded, described and photographed using a Sony DSC-H9 camera. These tracks are shown on Figure 11. Webley and Tusenius also drove along sections of the proposed access roads and powerline options where walking was not possible.

6.4 Assumptions, Limitations and Gaps in Knowledge

The study area can be accessed via a gate next to the York farmhouse and opposite the York Wash Bay. There were no other easily accessible entry points to the site.

The following advantages were identified with regard the study area:

- There is a large number of archaeological reports for the study area on the SAHRIS database enabling a good understanding of the local heritage.
- There were no significant obstacles to the archaeological field survey as the ground cover was sparse allowing identification of archaeological material.
- There were no significant obstacles to the survey, except for the dense and impenetrable stands of thorn trees (*Acacia mellifera*), which influenced the direction of our track paths.
- Visibility was generally good in areas of low grass cover.
- With respect to our coverage of the proposed powerline, we were able to access a section (1.9 km) of the proposed line which runs along the eastern section of Portion 11 of York A 279 (Figure 3), belonging to Kudumane Mineral Resources, after receiving permission from the CEO and the Mine Manager. Since the proposed powerline travels through an active mine, we were not able to walk the route on foot due to mine safety considerations. However, Ms Nemakhavhani (the ECO) accompanied us in a mine vehicle along the route of the existing 66 kV line, and also along the fence of the property. The fact that we drove along the proposed powerline route and did not walk, is not seen as a significant limitation.
- The northern section (about 1.2 km in length) of the proposed 132 kV line, as it connects with the Hotazel substation, runs through municipal land (Portion 0/Re Hotazel 280), and this section of the line has already been covered on foot by Orton (2016) during his assessment of the proposed powerlines for the proposed Hotazel Solar Park solar facility on the Annex Langdon 278, the farm immediately south of the study area. He did not find any archaeological material, and this report assumes that his assessment was adequate and does not have to be repeated here.

The following limitations have been identified in this AIA report:

- This report acknowledges that sub-surface archaeological sites, as well as unmarked graves, may occur anywhere on the landscape and may not be visible during site surveys. It is therefore possible, although not likely, that archaeological material and graves may be uncovered during construction of the facility.

We are of the opinion that our coverage of the area during the 2018-foot survey was sufficiently broad to identify the distribution of archaeological resources.

6.5 Consultation

Since this study falls within the context of a Scoping EIA, which includes a public participation process, no dedicated public consultation has yet been undertaken. However, informal discussions have been held with Mr P Jansen, the landowner of the Remaining Extent of farm York A 279, and mining officials from Kudumane Mineral Resources.

7. RESULTS OF THE ARCHAEOLOGICLA SURVEY

Our survey tracks are recorded in Figure 11 below:



Figure 11: Archaeological survey tracks (in yellow) with respect the proposed Hotazel Solar 2 facility. Point 10 is not an archaeological site, but rather an unflaked fragment of Banded Ironstone.

7.1 Solar Facility Survey

No archaeological resources were identified during the survey for the solar facility. Similarly, the area did not include the farmhouse and there are no buildings or structures within the development footprint. No cemeteries or graves were recorded.

7.2 Powerline Survey

The proposed 132 kV powerline which will connect the onsite substation/ collector switching station with the substation at Hotazel, will run in parallel with an existing 132 kV Eskom line (Figure 3). A foot survey (shown in white) was conducted along the route of the proposed line as far as the railway line. The survey along that portion of the line which runs through land belonging to

Kudumane Mineral Resources (KMR) was conducted in a mine vehicle, as explained above, due to mine safety considerations.

8. SOURCES OF RISK, IMPACT IDENTIFICATION AND ASSESSMENT

The main cause of impacts to archaeological sites is direct, physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose buried archaeological sites and artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. It is important to note, that due to the localised nature of archaeological resources, that individual archaeological sites can be missed during the field survey, although the probability of this is low. The impacts are likely to be most severe during the construction period although indirect impacts may occur during the operational phase of the project.

The clearing, levelling, and compaction of the ground to install the PV units for Hotazel 2 will result in the relocation or destruction of all existing surface heritage material. Similarly, the clearing of vegetation for the on-site substation and control room, as well as access roads will impact material that lies buried in the surface sand. The proposed grid connection option has the potential to have a permanent negative impact on heritage resources if they are present. Since heritage sites, including archaeological sites, are non-renewable, it is important that they are identified, and their significance assessed prior to construction. Further, archaeological sites and unmarked graves may be buried beneath the surface and may only be exposed during earth-moving and construction.

Since the planning and design phase of the development is informed by the broader EIA, any direct negative impacts on significant heritage resources can be avoided or minimized by altering the design and layout plans accordingly. A construction phase Environmental Management Plan (EMPr) will further avoid or minimize direct negative impacts on sub-surface remains which were not identified during the archaeological field survey.

8.1 Impacts on Colonial Period Heritage

The 1:50 000 maps and Google imagery confirm that there are no farm buildings or structures on the land identified for Hotazel Solar 2. The farmhouse of the Remaining Extent of farm York A 279, located on the R31, is outside of the study area. Further, it is of recent history and no historical archaeological material were identified during the survey. It is not anticipated that there will be any impacts to the Built Environment.

8.2 Impacts on Cemeteries and Graves

No isolated graves or cemeteries were identified during the survey. However, the possibility of unmarked archaeological and/or historical graves cannot be excluded. The landowner was interviewed with respect to graveyards on the property and confirmed that none were present.

8.3 Impacts of Powerlines and Access Roads

Potential impacts caused by a 132kV powerline and the power line access roads are likely to be limited and local. The access road required for a 132kV powerline is likely to be a 'two-track' which generally only requires limited physical disturbance of the ground surface. Due to the very loose sands in the area, Eskom has resorted to distributing a layer of BIF on the surface which will protect any archaeological material which may occur beneath the soil surface.

While it was not possible to walk down the entire length of the proposed powerline, inferences may be drawn from the survey of the proposed solar facility and from other CRM projects undertaken in proximity to the site. It is concluded that the impacts will be negligible.

Table 2: Potential impact to Archaeology

Impact Phase: Construction of PV facility and infrastructure - Archaeology		
Nature of Impact: Clearing and levelling the ground for solar panels, access roads, cabling, substation and powerlines may impact archaeological resources.		
	Without Mitigation	With Mitigation
Nature/Type	Negative & Direct	Positive
Extent	Local (2)	On-site (1)
Duration	Permanent (5)	Long-term (4)
Magnitude	Low (3)	Low (2)
Probability/likelihood	Improbable (2)	Improbable (2)
Significance	Minor (20)	Minor (14)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: If during ground clearance or construction, any graves or dense accumulations of stone tools are uncovered then the ECO should report this to SAHRA (Tel: 021 462 4502)		
Operational Phase: n/a		
Decommissioning Phase: n/a		
Cumulative impacts: n/a		

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

9. CUMULATIVE IMPACTS

A number of solar facilities have been proposed for this general area, these include the Hotazel Solar Park facility about 4 km south of Hotazel (Orton 2016/2017), the Kagiso Solar Power Plant some 8km south and the Adams Solar PV project some 21 km south of Hotazel. However, the extensive manganese mining in the area is considered to have the same cumulative impacts to archaeology as the various solar facilities which have been proposed. Since archaeological resources occur so infrequently in the region, cumulative impacts are not considered to be significant.

10. CONCLUSIONS

Studies further to the west, along the Go-Magara River have confirmed the presence of large scatters of ESA and MSA material (Figure 1). However, all archaeological studies to the south of Hotazel in the general vicinity of the study area have confirmed the almost total absence of any archaeological material.

10.1 Solar Facility

There are no river systems or drainage lines in the study area which might have encouraged settlement in the area. The 2018 survey did not identify any archaeological material, except for approximately six (6) stone artefacts on banded ironstone on the adjoining Hotazel Solar Facility. However, none were found within the Hotazel Solar Facility 2 footprint. Potential impacts to archaeology are considered to be very low.

10.2 Powerlines

The foot survey confirmed that no archaeological resources were identified along the routes of the proposed 132kV powerline.

11. RECOMMENDATIONS

Indications are that in terms of archaeological heritage, impacts are expected to be negligible. The study area is considered to be of very low heritage significance. It is recommended that the project be authorised with the following conditions included in the EMPr:

- If during ground clearance or construction, any archaeological material or human graves are uncovered, work in that area should be stopped immediately and the ECO should report this to SAHRA (Tel: 021 462 4502). The heritage resource may require inspection by the heritage authorities, and it may require further mitigation in the form of excavation and curation in an approved institution.

12. ACKNOWLEDGEMENTS

Mr Pieter Jansen of the Remaining Extent of farm York A 279 was consulted about the history of the property. Caesar Nokwe and Tshifhiwa Nemakhavhani of Kudumane Manganese Resources (KMR) kindly assisted with access to the proposed powerline which crosses through their property (Portion 11 of York A 279).

13. REFERENCES

Hotazel Solar Facility 2 (Pty) Ltd. 2018. Technical Layout Development Report for the Hotazel Solar Facility.

Chazan, M., Wilkins, J., Morris, D. & Berna, F. 2012. Bestwood 1: a newly discovered Earlier Stone Age living surface near Kathu, Northern Cape Province, South Africa. *Antiquity* 331:

De Jong, R. (Cultmatrix). 2010. Heritage Impact Assessment Report: Proposed land use change to provide for the extension of the town of Hotazel known as Hotazel Phase III, Gamagara Local Municipality, Northern Cape Province. Unpublished report for MEG Omgewingsimpakstudies.

Fourie, W. (PGS Heritage). 2015. The proposed upgrade of the 66kV network in the Kuruman Area – Hotazel to Mothibistat substations, Northern Cape Province. Heritage Walkdown and Management Plan. Unpublished report for Zitholele Consulting (Pty) Ltd.

Humphreys, A.J.B. 1976. Note on the southern limits of Iron Age settlement in the Northern Cape. *South African Archaeological Bulletin* 31: 54-57.

Küsel, U. & van der Ryst, M. 2009. Cultural Heritage Resources Impact Assessment of Manganese mining areas on the farms Belgravia 264, Santoy 230, Gloria 226 and Nchwaning 267, at Black Rock, north of Kuruman, Kgalagadi District Municipality, Northern Cape Province.

Kruger, N. 2015. Archaeological Impact Assessment (AIA) for the proposed East 132 kV double circuit power line connection for the East Solar Park to the Eskom Hotazel or Umtu substations development, Joe Morolong Local Municipality, John Taolo Gaetsewe District Municipality, Northern Cape Province. Unpublished report for Osalus Energy (Pty) Ltd.

Holder, D. 2018. Draft Scoping Report for Hotazel Solar on the Remainder of Farm York A 279 and grid connections on Remainder of Farm 280 and Portion 11 of Farm York A 279.

Hutten, L. & Hutten, M. 2013. Heritage Impact Assessment report for the farms Devon 277 Portion of Remaining Extent and Botha 313 Portion 1. Unpublished report for Carbon Development Corporation (Pty) Ltd.

Nilssen, P. 2018. Proposed Hotazel Solar and Grid Connection on Remaining Extent (Portion 0) of the Farm York A 279, Portion 0 of Hotazel 280, Portion 11 of the Farm York A 279 and Portion 3 of the Farm York A 279, District of Hotazel, Northern Cape Province. Scoping Report.

Orton, J. 2016. Heritage Impact Assessment for proposed power lines near Hotazel, Kuruman Magisterial District, Northern Cape. Unpublished report for Aurecon South Africa (Pty) Ltd.

Orton, J. 2017. Heritage Impact Assessment for the Proposed Hotazel Solar Farm on the Annex Langdon 278, Kuruman Magisterial District, Northern Cape. Unpublished report for Aurecon South Africa (Pty) Ltd

Pelser, AJ. & Van Vollenhoven, AC. 2011. A report on a Heritage Impact Assessment (AIA) for a proposed new rail crossing over the Gamagara River for the Gloria Mine Operations, Assmang Black Rock, on Gloria 266, North of Hotazel, Northern Cape. Unpublished report for Escience Associates (Pty) Ltd.

Van Schalkwyk, J. 2016. Cultural Heritage Impact Assessment for the development of the proposed Kagiso Solar Power Plant on the remaining extent of the farm Kameelaar No 315 Registration Division Kuruman, Northern Cape Province. Unpublished report for Protea Solar Power Plant (RF)(Pty) Ltd

Wilkins, J., Schoville, B., Brown, K., Pickering, R., Herries, A. & Collins, B. (2017). The North of Kuruman Project: newly discovered Middle and Later Stone Age rockshelter deposits in the Kalahari Basin at Gomahana Hill, Northern Cape, South Africa. Unpublished Poster.