



D6: Heritage Impact Assessment



PGS HERITAGE

Proposed Carpe Diem Solar Photovoltaic Plant and Associated Infrastructure

On the Farms Varkenslaagte 119 IQ and Doornfontein 118 IQ, near Carletonville, Gauteng Province.

Heritage Impact Assessment

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REVISION HISTORY

Version	Issue Date	Description of Changes
01	26 April 2023	First draft
02	14 April 2025	Impact Assessment Amendment and Buffer Relaxation
03	28 April 2025	Updated with Palaeontological Impact Assessment
04	11 June 2025	Client revisions

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Declaration of Independence

- I, Nikki Mann, declare that –
- General declaration:
- I act as the independent heritage practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting heritage impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

HERITAGE CONSULTANT:

PGS Heritage (Pty) Ltd

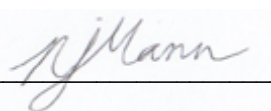
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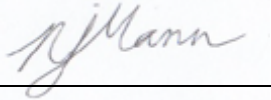
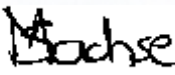
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SIGNATURE:



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ACKNOWLEDGEMENT OF RECEIPT

Report Title	Heritage Impact Assessment - Proposed Carpe Diem Solar Photovoltaic Plant and Associated Infrastructure on the Farms Varkenslaagte 119 IQ and Doornfontein 118 IQ, near Carletonville, Gauteng Province.		
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The Heritage Impact Assessment Report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA): Appendix 6 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended, 2017) requirements for specialist reports as indicated in the table below.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report
1.(1) (a) (i) Details of the specialist who prepared the report	Page iii of Report – Contact details and company
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to Appendix C
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page iii of the report
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1
(cA) An indication of the quality and age of base data used for the specialist report	Section 3, 4 and 5
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 5
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3 and 4
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3 and Appendix A
(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;	Section 5 and 6
(g) An identification of any areas to be avoided, including buffers	Section 9
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 6
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 6
(k) Any mitigation measures for inclusion in the EMPr	Section 9
(l) Any conditions for inclusion in the environmental authorization	Section 9
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorization	Section 9
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 10
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and	
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 10
(o) A description of any consultation process that was undertaken during the course of carrying out the study	
(p) A summary and copies if any comments that were received during any consultation process	Not applicable. To date no comments regarding heritage resources that require input from a specialist have been raised.
(q) Any other information requested by the competent authority.	Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	No protocols or minimum standards for HIAs or PIAs

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EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd was appointed by Legacy Environmental Management Consulting (Pty) Ltd (Legacy EMC), on behalf of JUWI Renewable Energies (Pty) Ltd (JUWI), to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Assessment (EIA) process for the proposed Carpe Diem Solar Photovoltaic Plant (SPP) on the Farms Varkenslaagte 119 IQ and Doornfontein 118 IQ, Merafong City Local Municipality, Gauteng.

A further standalone Palaeontological Impact Assessment (PIA) was completed for PGS by Dr Elize Butler of Banzai Environmental which forms part of this report.

Heritage Resources Identified

A selective survey of the study area was undertaken by a combination of vehicle and pedestrian means by one archaeologist (Michelle Sachse) and one field assistant (Xander Fourie) on the 6th, 7th and 9th of March 2023. Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant. Throughout the fieldwork, hand-held GPS devices were used to record tracklogs showing the routes followed by the fieldwork team. It is important to note that although as intensive a fieldwork coverage as possible was undertaken, sections of the study area are in areas which are more densely overgrown and/or disturbed, which limited visibility in those areas of the study area. The individual site descriptions as contained in **Appendix B**.

Two sites were identified within the region that was demarcated as “restricted” and thus not planned for development. These include one burial ground with approximately 10 informal graves (**CTV01**) and one locality with stone walling (**CTV02**).

Burial grounds and graves

One (1) burial ground (**CTV01**) was rated as having **high heritage significance**. It is located within a region which is not demarcated for development but will still require a 50m buffer to retain its integrity. Alternatively, JUWI proposes implementing a 10 m buffer from the outermost graves of the burial site, with a minimum 2,5m high fence (similar to a palisade or ‘Clear View’ fence). This will ensure the protection and demarcation of the graves while preventing unauthorised access or disturbance during and after the project’s completion. An application for relaxation of the proposed 50m buffer has been submitted to SAHRA with accompanying documentation, including a Graveyard Buffer Relaxation Motivation letter, a Signature Authorisation Register and a Burial Ground Management Plan.

Historical Structure

One locality with stone walling (**CTV02**) was rated as having **low heritage significance**.

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Palaeontology

The Proposed Carpe Diem Solar Photovoltaic Plant (SPP) and associated infrastructure is largely underlain by the Vaalian aged Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup) with a small portion in the south underlain by the Timeball Hill Formation and Rooihoogte Formations of the Pretoria Group (Transvaal Supergroup). A very small portion in the south is underlain by unfossiliferous diabase). The Malmani Subgroup is undifferentiated in this area. The SAHRIS PalaeoMap indicates that the Palaeontological Sensitivity of the Malmani Subgroup is Very High, while areas with a High, Low and Zero is also crossed (Almond and Pether, 2009; Almond et al., 2013, Groenewald et al 2014). However, the Palaeotechnical report of the Gauteng province indicates that the Palaeontological Sensitivity of the Malmani Subgroup is High (Groenewald et al, 2014). The suggested location is classified as having a Very High Palaeontology Theme Sensitivity in the DFFE Screening Report. Updated geology (Council for Geosciences, Pretoria) indicates that the study area is underlain by the Malmani Subgroup (anml) as well as the Timeball Hill and Rooihoogte Formations of the Pretoria Group

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 12 May 2024. No fossiliferous outcrop was detected in the proposed development. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare. This is in contrast with the Very High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. **A medium to high Palaeontological Significance has been allocated for the construction phase of the PV development pre-mitigation and a moderate significance post mitigation.** The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases. The No-Go Alternative considers the option of 'do nothing' and maintaining the status quo, will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impacts of the development is considered to be medium pre- mitigation and Low post mitigation and falls within the acceptable limits for the project. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

Impact Assessment

Archaeology

The pre-construction and construction phase of the proposed development will entail extensive surface clearance and excavations into the superficial sediment cover and underlying bedrock. The possible pre-construction impacts calculated on the tangible cultural heritage resources is an overall **MEDIUM NEGATIVE** rating. Still, with the implementation of the recommended buffers and management guidelines will be reduced to a **LOW NEGATIVE** impact.

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Mitigation measures

The calculated impact as summarised in **Section 8** of this report confirms that the impact of the proposed development will be reduced with the mitigation measures. This finding, in addition to implementing a chance finds procedure, as part of the EMP, will mitigate possible impacts on unidentified heritage resources. The following mitigation measures are listed in **Table 1**.

Table 1 - Heritage management recommendations.

Area and site no.	Mitigation measures
General project area	Implement a chance to find procedures in cases where possible heritage finds are uncovered.
Burial Ground (CTV01)	Initial measures - The burial ground should be demarcated with a 50-meter buffer zone and should be avoided and left <i>in situ</i>. - A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by SAHRA). - If the site is going to be impacted directly and the graves need to be removed, a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with SAHRA under the NHRA and National Health Act regulations. Proposed measures - An application for relaxation of the proposed 50m buffer has been submitted to SAHRA with accompanying documentation, including a Graveyard Buffer Relaxation Motivation Letter, a Signature Authorisation Register and a Burial Ground Management Plan. The buffer relaxation application proposes implementing a 10 m buffer from the outermost graves of the burial site, with a minimum 2,5m high fence (similar to a palisade or 'Clear View' fence). This will ensure the protection and demarcation of the graves while preventing unauthorised access or disturbance during and after the project's completion.
Stone Walling (CTV02)	No mitigation required.

Conclusion

If heritage resources are discovered during site clearance, construction activities that may impact the find must stop, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.

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There are no preferences on heritage grounds for any particular layout among the various site options under consideration.

It is the opinion of this report's authors that the overall impact of the proposed development on heritage resources will be Low. Provided that the general recommendations and mitigation measures outlined in this report are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage perspective. The management and mitigation measures, as described in **Section 9** of this report, have been developed to minimise the project's impact on heritage resources.

We have no objection to the proposed construction under the condition that a walk down of the final approved footprints be conducted before construction commences.

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TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes:

- material remains resulting from human activity which are 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;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency, and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Early Stone Age

The archaeology of the Stone Age between 700 000 and 2 500 000 years ago.

Fossil

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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).

Heritage resources

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

Holocene

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

Late Stone Age

The archaeology of the last 30 000 years associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

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.

Abbreviations	Description
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AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
JUWI	JUWI Renewable Energies (Pty) Ltd
Legacy EMC	Legacy Environmental Management Consulting (Pty) Ltd
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA-G	Gauteng Provincial Heritage Resources Authority
PHS	Provincial Heritage Site
PSSA	Palaeontological Society of South Africa
PV	Photovoltaic
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SPP	Solar Photovoltaic Plant

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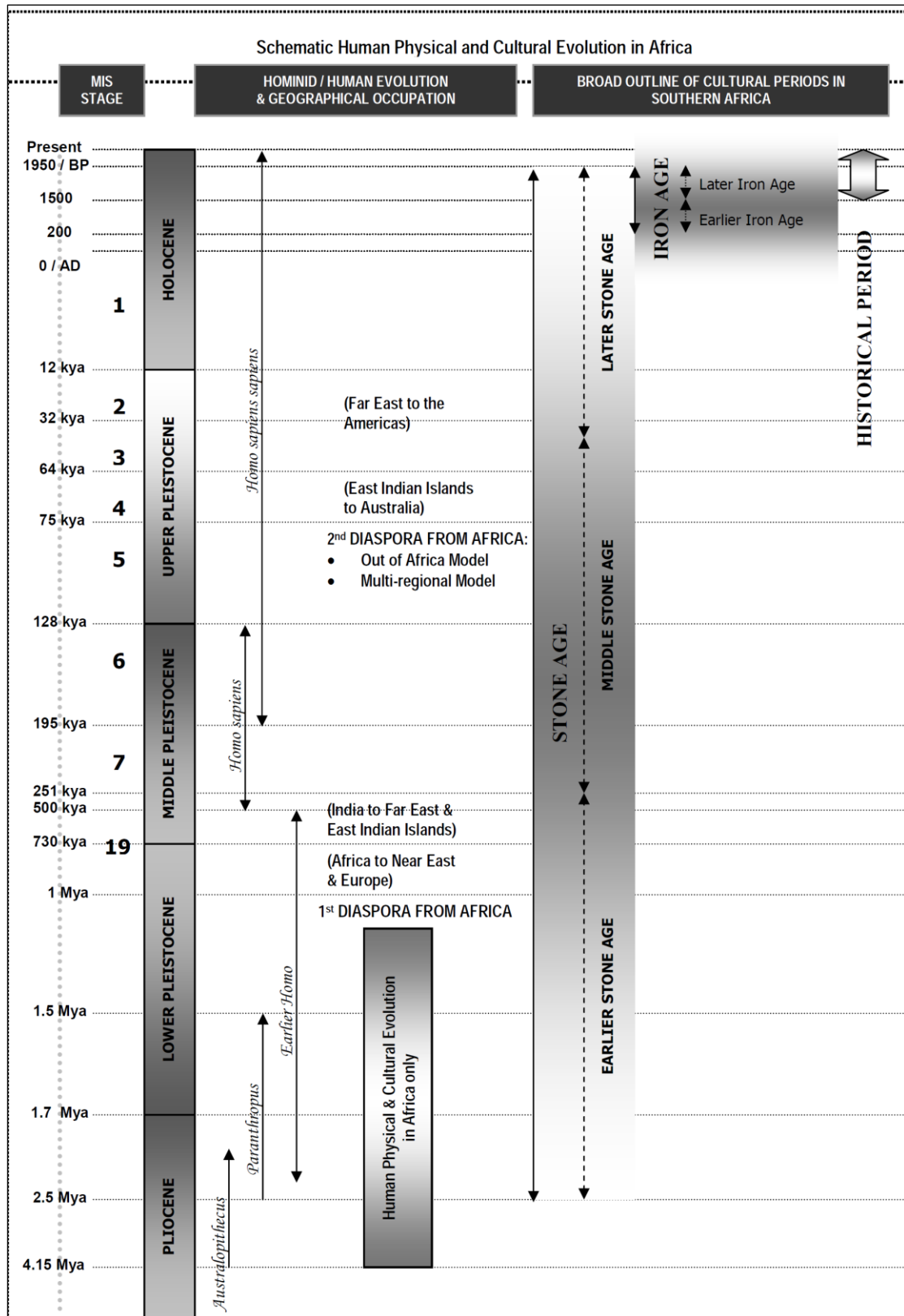


Figure 1 – Human and Cultural Timeline in Africa

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1 INTRODUCTION

PGS Heritage (Pty) Ltd was appointed by Legacy Environmental Management Consulting (Pty) Ltd (Legacy EMC), on behalf of JUWI Renewable Energies (Pty) Ltd (JUWI), to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Assessment (EIA) process for the proposed Carpe Diem Solar Photovoltaic Plant (SPP) on the Farms Varkenslaagte 119 IQ and Doornfontein 118 IQ, Merafong City Local Municipality, Gauteng.

A further standalone Palaeontological Impact Assessment (PIA) was completed for PGS by Dr Elize Butler of Banzai Environmental which forms part of this report.

1.1 Scope of the Study

The study aims to identify heritage sites and finds that may occur in the proposed project area. The HIA aims to inform the BA to assist the developer in responsibly managing the discovered heritage resources, to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

This HIA Report was compiled by PGS Heritage (PGS).

The staff at PGS has a combined experience of nearly 90 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Nikki Mann, the author of this report, is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA). She has 5 years of experience in the heritage assessment field and holds a Master's degree (MSc) in Archaeology from the University of Cape Town.

Michelle Sachse, the co-author of this report, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist, membership number - 526. She has 3 years of experience in the heritage and grave relocation field, and holds a master's degree (MA) in Archaeology from the University of Pretoria

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Wouter Fourie, the Project Coordinator and Archaeologist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP). He is also one of the Directors of PGS Heritage.

Xander Fourie is an archaeological field assistant who is currently busy with his undergraduate studies in archaeology.

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and existing vegetation cover.

It should be noted that most of the study area was accessible for the fieldwork survey. Fieldwork was also focussed on the area not previously ploughed or disturbed by farming activity, thus focussing on areas with the highest potential to yield heritage resources.

Therefore, should any heritage features and/or objects be located or observed outside the identified heritage-sensitive areas during the construction activities, a heritage specialist must be contacted immediately. Such observed or located heritage features and/or objects may only be disturbed or removed in such time that the heritage specialist has been able to assess as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

1.4 Legislative Context

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

- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified
- National Environmental Management Act (NEMA), Act 107 of 1998 – Appendix 6
- National Heritage Resources Act (NHRA), Act 25 of 1999

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1.4.1 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA, GN.648 requires sensitivity verification for a site selected on the national web-based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this Government Notice (GN) are listed in **Table 2**, and the applicable section in this report noted.

Table 2 - Reporting requirements for GN648

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery;	Section 5	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	Section 4	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	Section 4	-
2.3(b) contains motivation and evidence (e.g., photographs) of either the verified or different use of the land and environmental sensitivity;	Section 4	-

An assessment of the Environmental Screening tool provides low sensitivity ratings for archaeological and heritage resources (**Figure 2**).

The field work in the study area demonstrates that one burial ground of heritage significance, located near the proposed development area, warrants conservation. The level of dense vegetation in the study area also needs to be taken into consideration. Therefore, in the case of this study area, the DFFE screening tool sensitivity map is only partly supported based on the findings of this fieldwork.

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2 SITE LOCATION AND DESCRIPTION

2.1 Locality

Table 3 - Table with Locality and Property Information

Study Area Coordinates	Northern Point S -26.39748° E 27.30383°	Eastern Point S -26.4456° E 27.33486°
	Southern Point S -26.44873° E 27.32653°	Western Point S -26.39991° E 27.29314°
Location	The proposed project area is located approximately 9km south-west of Carletonville, in the Merafong City Local Municipality and the West Rand District Municipality, within the Gauteng Province (Figure 3). The affected properties are located within proximity of the Carmel Distribution Centre (Eskom Power). The study area is excluded from any promulgated Renewable Energy Development Zones (REDZs).	
Property	▪ Farm Varkenslaagte No. 119 IQ; ▪ Farm Doornfontein No. 118 IQ.	
Topographic Map	2627AD CARLETONVILLE	

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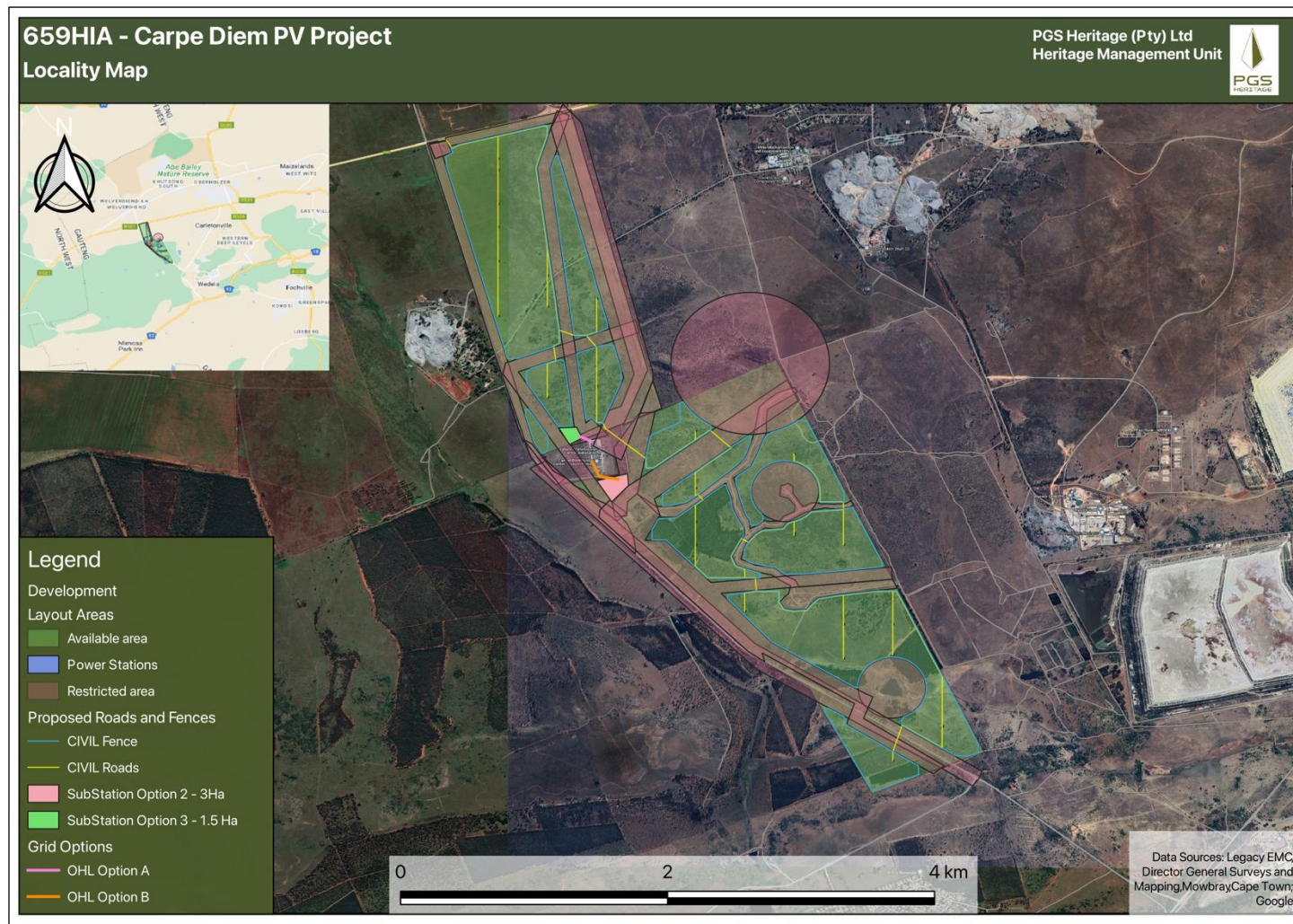


Figure 3 - Regional Locality of study area.

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2.2 Project Description

The following information was supplied by JUWI.

Capacity of the facility	300MW (150 MW for Carpe Diem North SPP and 150 MW for Carpe Diem South SPP).
Type of technology	Solar photovoltaic (PV) technology (monofacial or bifacial) with fixed, single or double axis tracking mounting structures, as well as associated infrastructure, which will be made up of: ▪ Facility Substation; ▪ Inverter-stations, transformers and internal electrical reticulation (underground cabling); ▪ Battery Energy Storage System (BESS) ▪ Access road and Internal Road network ▪ Laydown areas ▪ Auxiliary buildings ▪ Staff lockers, 33kV switch room, gatehouse security, control centre, office, warehouse, canteen & visitors centre ▪ Rainwater Tanks/Attenuation Pond ▪ Conservancy Tanks ▪ Construction Camp with ablution facilities ▪ Hazardous Store ▪ Cement Batching Areas ▪ Boreholes (to be determined depending on the water availability – to be determined) ▪ Perimeter fencing and security infrastructure ▪ Overhead Powerline of up to 132kV to the Carmel substation which is located on adjacent land.
Structure height	Solar panels with a maximum height of 5m above the ground
Structure Orientation Fixed or tilt	▪ North-facing at a defined angle of tilt. ▪ The panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west; or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.

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	▪ Double axis tracking: mounted in a north-south orientation, tracking from east to west. ▪ Crystalline silicon or thin film technology (to be determined at a later stage)
PV Panels Dimensions	Approximate width: 1000mm; Approximate height: 2000mm
Laydown area Dimensions	▪ Approximately 4 ha laydown area will be required for the PV facility (the laydown areas will not exceed 4 ha and will be situated within the assessed footprint). ▪ Permanent and temporary laydown areas are required. The laydown area at the substation will remain permanent laydown area.
Fencing	For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. Fencing with a height of 2.5 meters will be used.
Boreholes and Storage Tanks	No new boreholes to be drilled or developed.’Conservancy tanks will be required. Water for the proposed development will be obtained from external sources. The estimated maximum amount of water required during construction is 1200m³ per month during the 12 - 18 months of construction. The estimated maximum amount of water required during the facility’s 20 years of production is 4200m³ per annum. The majority of this usage is for the cleaning of the solar panels. Since each panel requires approximately 2 litres of water for cleaning, the total amount of ~500 000 panels will require 1 000 000 litres per wash. It is estimated that the panels may only need to be washed twice per annum, but provision is made for quarterly cleaning (March, May, July, and September). This totals approximately 4,000,000 litres per annum for washing, and allows 200,000 litres per annum (or 548 litres per day) for toilet use, drinking water, etc. This total to approximately 4 200m³ of water required per annum.
Storage Solution: Battery Energy Storage System (BESS)	Area: up to 1 ha Capacity: Unspecified (500MWh) Technology: solid-state/ non-liquid type batteries.
Grid Connection	Size and capacity of on-site substation – 1Ha area

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	Eskom side and Facility Side substation with a footprint, not exceeding 1ha (separate from IPP S/S) – effectively 2 substations side by side. Substation via a single or double circuit overhead powerline up to 132 kV, within a 100m wide corridor and up to 700 meters long for Carpe Diem. The facility will contain inverter-stations, transformers, switchgear and internal electrical reticulation (underground cabling may be required) and lightning conductors.
Additional Infrastructure	▪ Auxiliary buildings of no more than 1 ha, including (but not limited to) a 33 kV switch room, a gate house, ablutions, workshops, storage and warehousing areas, site offices and a control centre. Rainwater tanks; and Electrified perimeter fencing not exceeding 6 m in height. ▪ O&M Office Buildings with toilets, including septic tanks and all infrastructure and activities associated, will be permanent infrastructure. ▪ There will also be a site office and site construction camp with sanitation and canteen facilities, waste separation and storage areas on site.
Details of access roads	▪ The access road will comprise of a new road, as well as the expansion of sections of the existing farm road. The access roads will range from 5 -8m in width.
Details of internal roads	▪ Internal access roads, each with a width of range from 5 -8m, will be constructed to provide access to the various components of the facility. ▪ At this point it is not certain if the existing roads must be upgraded (the roads activity will be triggered, but has to be ascertained through EAP site visits) ▪ Footprint not available at this time, to be determined for new roads. EAP to calculate.
Extent of areas required for laydown of materials and equipment	Approximately 4 ha of temporary laydown areas will be required (laydown areas will not exceed 4 ha). A permanent laydown area of a maximum of a 1 ha will remain for operations.

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Alternatives	A single preferred location alternative to be assessed, which has been identified through the optimization of the area considering the sensitivities identified in the O&C mapping.
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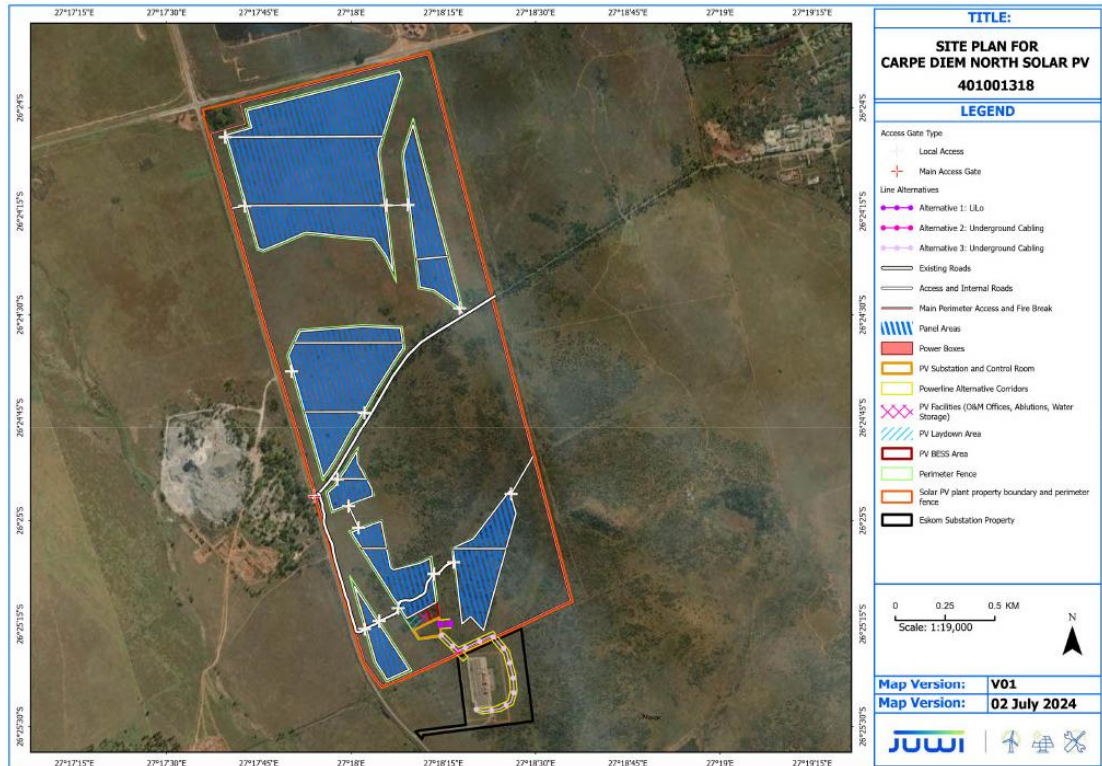


Figure 4 - Updated layout of Carpe Diem North

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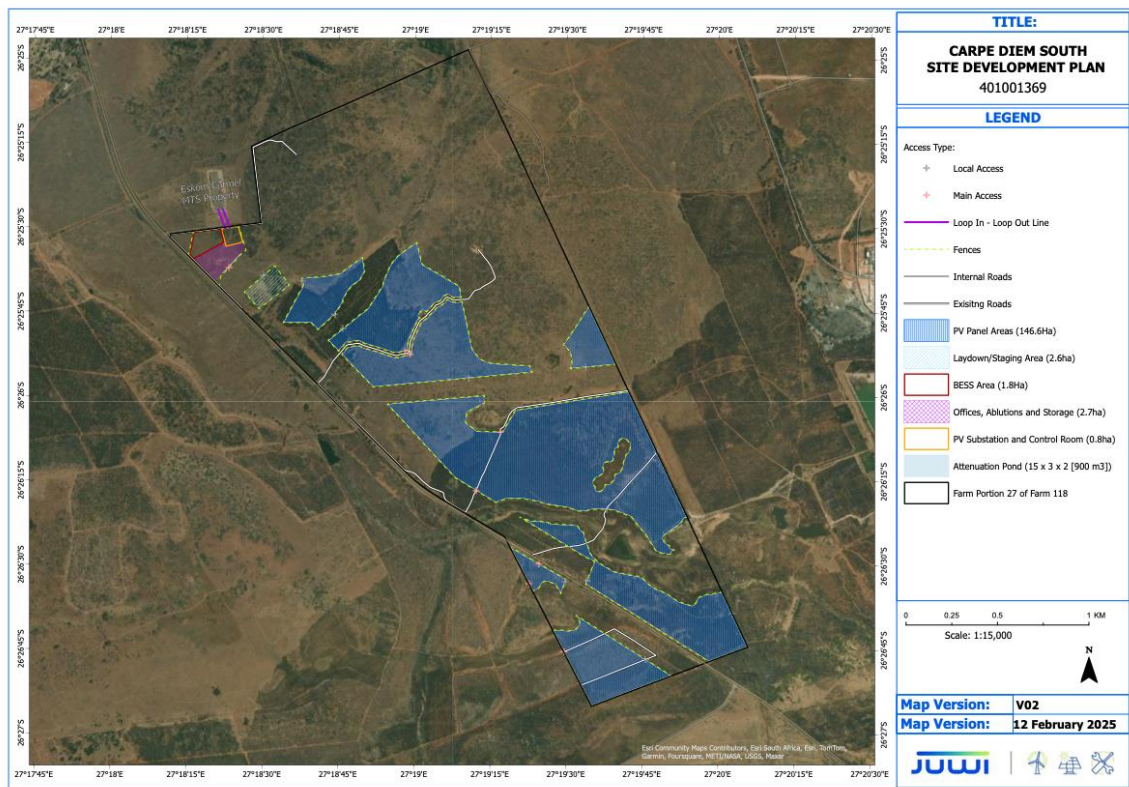


Figure 5 - Updated layout of Carpe Diem South.

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3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

3.1 Methodology for Assessing Heritage Site significance

This HIA report was compiled by PGS for the proposed development. The applicable maps, tables and figures are included, as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (No. 107 of 1998). The HIA process consists of three steps:

Step I – Literature Review and initial site analysis: A detailed archaeological and historical overview of the study area and surroundings were undertaken. This work was augmented by an assessment of reports and data contained on the SAHRIS. Additionally, an assessment was made of the available historic topographic maps. All these desktop study components were undertaken to support the fieldwork.

Step II – Physical Survey: A physical survey was conducted by a combination of vehicle and pedestrian access through the proposed project area by one qualified heritage specialist and a field assistant (6th, 7th and 9th March 2023), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant heritage resources identified in the physical survey, the assessment of these resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

The significance of heritage sites is based on four main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
 - Low - <10/50m²
 - Medium - 10-50/50m²
 - High - >50/50m²
- Uniqueness; and
- Potential to answer present research questions.

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

A - No further action necessary;

B - Mapping of the site and controlled sampling required;

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C - No-go or relocate development activity position;

D - Preserve site, or extensive data collection and mapping of the site; and

E - Preserve site.

Impacts on these sites by the development will be evaluated as follows:

3.1.1 Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2021) is implemented in this report

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 4** and **Table 5**).

Table 4 - Rating system for archaeological resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the	Low Significance

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Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
		recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table 5 - Rating system for built environment resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority.	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade	Medium Significance

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Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
		IIIA buildings and sites at local level.	
IIIC	Such a resource is of contributing significance to the environs These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or other cultural significance

3.2 Methodology Used in Determining the Significance of Environmental Impacts

The methodology used to determine the environmental impact significance was provided by Legacy EMC and is explained in **Appendix A**.

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4 CURRENT STATUS QUO

The proposed project is located approximately 9km south-west of Carletonville, in the Merafong City Local Municipality and the West Rand District Municipality, within the Gauteng Province. The affected properties are located near the Carmel Distribution Centre (Eskom Power).

The proposed development areas are within generally flat and open landscapes. The R501 national road connects the two areas. Overall, the accessibility of the project footprint area was good, although difficult to navigate in some areas due to dense vegetation cover.

Regarding topography, the study area can be described as primarily flat.

The study area is located within two distinct areas classified as the **Carletonville Dolomite Grassland** vegetation type and the **Gauteng Shale Mountain Bushveld**:

The Carletonville Dolomite Grassland vegetation type is described as, *“slightly undulating plains dissected by prominent rocky chert ridges. Species-rich grasslands forming a complex mosaic pattern dominated by many species”* (www.sanbi.org).

The Gauteng Shale Mountain Bushveld vegetation type is described as, *“low, broken ridges varying in steepness and with high surface rock cover. Vegetation is a short (3–6 m tall), semi-open thicket dominated by a variety of woody species including Acacia caffra, Rhus leptodictya, R. magalismsontana, Cussonia spicata, Ehretia rigida, Maytenus heterophylla, Euclea crispa, Zanthoxylum capense, Dombeya rotundifolia, Protea caffra, Celtis africana, Ziziphus mucronata, Vangueria infausta, Canthium gilfillanii, Englerophytum magalismsontanum, Combretum molle, Ancylobotrys capensis, Olea europaea subsp. africana and Grewia occidentalis. The understorey is dominated by a variety of grasses. Some of the ridges form plateaus above the northern slopes that carry scrubby grassland with high surface rock cover”* (www.sanbi.org).

In terms of geology and soils, the study area is located within two distinct areas classified as the Carletonville Dolomite Grassland vegetation type and the Gauteng Shale Mountain Bushveld:

The Carletonville Dolomite Grassland soil type is described as, *“dolomite and chert of the Malmani Subgroup (Transvaal Supergroup) supporting mostly shallow Mispah and Glenrosa soil forms typical of the Fa land type, dominating the landscapes of this unit. Deeper red to yellow apedal soils (Hutton and Clovelly forms) occur sporadically, representing the Ab land type”* (www.sanbi.org).

The Gauteng Shale Mountain Bushveld vegetation type is described as, *“dominated by shale and some coarser clastic sediments as well as significant andesite from the Pretoria Group (Transvaal*

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Supergroup), all sedimentary rocks. A part of the area is underlain by Malmani dolomites of the Chuniespoort Group (Transvaal Supergroup). Soils are mostly shallow Mispah but are deeper at the foot of the slopes. Land type is mostly Fb, with some Ib” (www.sanbi.org).

Existing land uses associated with the project area and its immediate surroundings, include:

- Large areas for grazing;
- Stables for horses and ponies;
- Dirt roads;
- R501 National Road;
- Old mining road;
- Sub-station;
- Powerlines;
- Reservoirs;

The general site descriptions and photographs of the proposed development areas are provided as follows:

4.1 Varkenslaagte 119 IQ

The area is relatively flat. Some sections have recently been burnt, whilst other sections are very densely vegetated (thorny plants). The area contains informal roads and powerlines. There is also some dumping in the area. **Poor surface visibility and limited access in some areas due to dense vegetation.**

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Figure 6 - General views of the landscape and vegetation within Varkenslaagte 119 IQ.

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Figure 7 - Existing land uses and infrastructure within Varkenslaagte 119 IQ.

4.2 Doornfontein 118 IQ

The area consists of undulating grasslands. Some sections are very densely vegetated. The area consists of dirt roads, powerlines, a sub-station that abuts the property, and some fenced livestock camps. Old mining infrastructure, including a road run across the study area, which presumably connected the Doornfontein mine to a power source (Eskom sub-station). **Poor surface visibility and limited access in some areas due to dense vegetation.**

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5 BACKGROUND RESEARCH

5.1 Overview of the study area and surrounding landscape

DATE	DESCRIPTION
2.5 million – 250 000 years ago	The Earlier Stone Age is the first and oldest phase identified in Southern Africa's archaeological history and comprises two technological phases. The earliest of these technological phases is known as Oldowan, which is associated with crude flakes and hammer stones and dates to approximately 2 million years ago. The second technological phase in the Earlier Stone Age of Southern Africa is known as the Acheulian and comprises more refined and better-made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian phase dates to approximately 1.5 million years ago. One such site is the Sterkfontein Caves, located approximately 50km north-east of the study area. The Sterkfontein caves have also provided a wealth of knowledge on our previous Australopithecus and hominid ancestors through discoveries such as Mrs Ples and Little Foot (www.Maropeng.co.za).
250 000 to 40 000 years ago	The Middle Stone Age (MSA) dates to between 250 000 to 40 000 years BP. MSA dates of around 250 000 BP originate from sites such as Leopards Kopje in Zambia, while the late Pleistocene (125 000 BP) yields several important dated sites associated with modern humans (Deacon & Deacon, 1999). The MSA is characterised by flake and blade industries, the first use of grindstones, wood and bone artefacts, personal ornaments, the use of red ochre, circular hearths and a hunting and gathering lifestyle.
40 000 years ago, to the historic past	The Later Stone Age is the third phase identified in South Africa's archaeological history. It is associated with an abundance of very small stone artefacts known as microliths. In Southern Africa, the Later Stone Age is characterised by the appearance of rock art in the form of paintings and engravings. The Magaliesberg Mountains, located approximately 50km north-east of the study area, is well known for its Stone Age history, and especially so the Later Stone Age (Carruthers, 2000). Several researchers have undertaken excavations of these sites, including Professor Revil Mason, Mr Robbie Steel and Dr Lyn Wadley. The Later Stone Age sites from this area include open sites such as Xanadu as well as rock shelter and cave sites such as Kruger Cave and Jubilee Shelter (Bergh, 1999). Additionally, Later Stone Age lithics were identified in the general surroundings of the study area during an archaeological survey undertaken by Van der Walt (2009).
The Study Area and Surroundings during the Iron Age – Early Farming Communities	

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DATE	DESCRIPTION
The arrival of early farming communities (EFC) during the first millennium, heralded the start of the Iron Age in South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-colonial farming communities who practised cultivation and pastoralist farming activities, metal working, cultural customs such as lobola and whose settlement layouts show the tangible representation of the significance of cattle (known as the Central Cattle Pattern) (Huffman, 2007).	
AD 150 – AD 750	Early Iron Age ceramic facies can be identified within the vicinity of the study area. Firstly, the Bambata ceramic facies were identified at the site known as Jubilee Shelter in the Magaliesberg, which dates to between AD150 - AD750 and is associated with the Kalundu tradition though no settlements were ever found relating to this facies within the region (Wadley 1996). Secondly, the Mzonjani ceramic facies associated with the Urewe tradition can be found at the site known as Broederstroom, which is a settlement located in the Magalies Valley, which dates to between AD450 – AD750 and is situated approximately 40km north northeast of the study area (Huffman 2007, Manson 1981, Wadley 1996).
AD 1000 – AD 1300	The Middle Iron Age in the surrounding area is represented by the Eiland ceramic facies, dating to between AD 1000 – AD 1300, and is associated with the Kalundu tradition (Evers 1988, Huffman 2007). Eiland ceramics can also be found in the settlements of communities in the Limpopo valley that produce Mapungubwe facies ceramics. This hints at regional trade occurring across the Soutpansberg mountain range at sites like Mapungubwe and Mutamba (Antonites 2012, Calabrese 2007: 24). Hall (1981) has also identified the Eiland facies at Rooikrans in the Boschoffsberg valley and Rhenosterkloof 3 in the Sand River Valley. While a variation of the Eiland facies can also be found in southeastern Botswana and is known as the Broadhurst facies (Denbow 1981, Biemond 2017).
AD 1550 – AD 1580	The Ndebele, an offshoot of the main Nguni-speaking peoples, began migrating to the Transvaal region. The main group of Transvaal Ndebele traces its ancestry to King Mhlanga, who settled at Emhlangeni or Mohlakeng in Sotho, which is now a suburb of Randfontein (van de Walt 2015). After the passing of Mhlanga, Musi Mhlanga's son assumed the position of King amongst the amaNdebele and soon after moved the amaNdebele northeast to what is today known as Pretoria (www.Britanica.com).
1600 – 1750	The origins of the Bakwena ba Mogôpa can be traced back to a place named Rathatheng, near the junction of the Marico and Crocodile (Odi or Oori) Rivers, where the Bakwena ba Mogôpa were known to have settled as early as AD 1600. During the mid-seventeenth century, the Bakwena ba Mogôpa moved from Rathateng to Lokwadi (Zandriviervoort) near the foot of the Phalane Mountains.

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	During the first half of the eighteenth century, the Bakwena ba Mogôpa moved to the Mabjanamatswane Hills, north-east of modern-day Brits. The sphere of influence of the Bakwena ba Mogôpa during this time stretched from the Crocodile River in the west to the Apies River in the east and from the Pienaars River in the north to the Hennops River in the south (Breutz, 1953) (Mogapi, 1996).
1700	The Bapo ba Mogale, an early Nguni migrant group, resided along the banks of the Crocodile (Odi or Oori) river during this time (Breutz, 1953). Their settlements along the banks of this river would likely have been in the general surroundings of the present study area, albeit more likely along the western bank of the river than the eastern bank. Within a few years, the Bapo ba Mogale moved in a western direction to the area known as Makolokwe (either the present-day farm Wolwekraal or the present-day farm Kareepoort) (Breutz, 1953).
1750 – Early 1800s	During the middle of the eighteenth century, the Bakwena ba Mogôpa moved from the Mabjanamatswane Hills in an eastern direction to settle at Mangwatladi (or Lengwatladi) east of the Apies River. They stayed here for several years, moving back to the Mabjanamatswane Hills. Bakwena ba Mogôpa later settled in this same area at Mamogaleskraal (Gwate) at the foot of a hill named Thaba ya Morena (Breutz, 1953) (Mogapi, 1996).
AD 1817 – 1823	A Pedi force under Maleleku invaded the areas surrounding the Magaliesberg Mountains. After an unsuccessful attack against the Bakwena ba Mogôpa near the Apies River, the Pedi attacked the Bapo Mogale in the vicinity of Wolhuterskop. Although they were defeated as well, the Pedi managed to retire from the battle with many captured cattle as well as women and children who were enslaved during the battle. The heir to the Bapo throne, Mohale Mohale, was a child at the time, and although he was also almost captured in the battle, he was hidden in a kloof and managed to escape discovery. The name of the Magaliesberg Mountains is derived from Mohale Mohale's name (Breutz, 1953) (Carruthers, 2000).
AD 1827 – 1832	The Khumalo Ndebele (Matabele) of Mzilikazi moved north from their settlements along the Vaal River into the surroundings of the study area and started attacking the communities residing here (Bergh, 1999). They crossed over the Magaliesberg Mountains at present-day Commandonek, and according to Carruthers (2000), first attacked the Bakwena ba Mogôpa settlement located near present-day Zilkaatsnek. Although the Kwena defended themselves against the Matabele

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	onslaught over the course of three separate battles, they were defeated in the end. Their surrender to Mzilikazi came at a very high cost, with their chief More and his son Segwati both executed and all the Kwena cattle confiscated. Additionally, the Kwena men were forced to join the ranks of the Matabele army, and those who refused were "...impaled on stakes or had their ears and eyes removed." (Carruthers, 2000:240). Mzilikazi then attacked the Bopo at Wolhuterskop and dispersed them (Breutz, 1953). After the defeat of these and other groups living along the Magaliesberg Mountains, Mzilikazi and his Khumalo Ndebele settled themselves along the northern foothills of the mountains between 1827 and 1832. He had three royal residences built along the mountain range, their localities providing an estimate of the area controlled and settled by the Matabele during these five years. The three Matabele royal residences were built at Kungwini (at the foot of the Wonderboom Mountain), Hlahlandlela (near present-day Rustenburg) and Dinaneni (near present-day Zilkaatsnek).
The Study Area and Surroundings during the Historical Period	
The Historical Period within the study area and surroundings commenced with the arrival of newcomers to this area. The first arrivals would almost certainly have been travellers, traders, missionaries, hunters, and fortune seekers. However, with time, this initial trickle was replaced by a mass flood of white immigrants during the 1830s, when a mass migration of roughly 2 540 Afrikaner families (comprising approximately 12 000 individuals) from the frontier zone of the Cape Colony to the interior of Southern Africa took place. The people who took part in this Great Trek were later to be known as Voortrekkers (Visagie, 2011). As the Historical Period carried on, the general surroundings of the study area underwent significant changes and development during the twentieth century, including extensive development in the form of gold and uranium mining, railway and transportation development as well as the establishment of nearby towns such as Krugersdorp.	
1836	The first Voortrekker parties started crossing over the Vaal River (Bergh, 1999).
AD1840s – 1850s	Increasing numbers of Voortrekkers started establishing themselves permanently in the general vicinity of the study area during this time (De Beer, 1975). During this period, the first contact between these new arrivals and the black people residing in this wider area took place. According to Bergh (2005), regarding the Rustenburg District located 80km northwest of the study area, these early contacts resulted in the setting aside of land by the Voortrekker leadership for some of the black groups, such as the Bafokeng. Mbenga (1997) also indicates that the relationship between the Voortrekkers and the Bakgatla was initially similarly amicable.

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	However, within a short period, the relationship between the Voortrekkers and the black groups living in these areas became increasingly strained. For example, Bergh (2005) states that the Bafokeng were eventually dispossessed of their farms. The system of unpaid labour enforced by the Voortrekkers on the local black groups would certainly have deteriorated the relationship further. See, for example, Morton (1992). The permanent settlement of white farmers in the area resulted in the proclamation of individual farms and the establishment of permanent farmsteads.
AD 1886	The city of Johannesburg was formally established in 1886 with the discovery of gold and the Witwatersrand reef on the farm Langlaagte. The Randfontein Estates Gold Mining Company (Witwatersrand) Limited was established by J. B. Robinson shortly after the Witwatersrand gold rush, which started in 1886. Robinson had acquired his wealth from the Kimberly diamond fields and was later appointed mayor of Kimberly. Robinson laid claim to two areas which later became known as Langlaagte and Crown mines. Laanglaagte had proven to be a success producing 10 ounces per ton and, later, 5 ounces per ton. The success at Langlaagte lead to Robison procuring more farms in the area around Randfontein. Other prospectors such as Rhodes and Hans Sauer had turned down the Randfontein area (located approximately 40km from the study area) as there was an absence of 'red bar' found in the Witwatersrand sandstone formations and was thought to be indicative of the main reef. Though there are other reefs at greater depths, such as the black reef and conglomerate reef, which they were unaware of (Randfontein Gold Mining Company Limited 1989). In November 1886, Robinson started buying property for future mining ventures, and within a week, he had purchased a quarter of the farm Uitvalfontein, a sixth of the farm Randfontein and sections of Middelvlei, Gembokfontein, Anvlakte, Droogeheuvel and Rietfontein. Later Robison acquired the remainder of farms Randfontein and Uitvalfontein before buying Waterval. The land acquired by Robinson amounted to 12000 ha and contained approximately 11km of reef outcrop (Randfontein Gold Mining Company Limited 1989).
AD 1889 – 1898	The Randfontein Estates Gold Mining Company, Witwatersrand Limited was only officially registered on March 7th, 1889, with Hermann Eckstein as the chairman and Maurice Marcus as Managing director. Later in 1889, James Brooks was appointed as managing director in place of

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	Maurice Marcus. In 1891 James Brooks opened Leader Reef. This reef was extremely rich and was later known as the Randfontein Leader. In 1898 a second reef was identified to the west of Randfontein. The reef was traced by all the existing subsidiaries to the ground, which had not yet been claimed (Randfontein Gold Mining Company Ltd, 1889).
AD1899 – AD1902	On 11 October 1899, war broke out between Britain and the two Boer republics of the Orange Free State and Transvaal (Zuid-Afrikaansche Republiek). The Magaliesberg Mountains had strategic significance to both sides because of its closeness to Pretoria (and Krugersdorp) as well as the fact that the main access routes between Pretoria and the western part of the old Zuid-Afrikaansche Republiek (including the town of Rustenburg) passed through its valleys. As a result, several skirmishes and battles took place in the wider surroundings As part of the so-called 'scorched earth' policy initiated by Lord Kitchener, many Boer farmhouses were destroyed. This would certainly also have been true for the surroundings of the study area as well. Another aspect characteristic of the 'scorched earth' policy was the system of concentration camps (also referred to as refugee camps) in which Boer and Black women and children were held. The closest of any of these camps to the present study area was the one at Krugersdorp, which existed from 1901 to March 1902. (www.angloboerwar.com). Many of the mines on the rand closed, and their staff returned home. Then in November 1901, Pope Yeatman, the general manager of the Randfontein Estates Gold Mining Company, returned to South Africa to oversee the reopening of the mines and the installation of the new machinery which had come from Europe and the United States. (Randfontein Gold Mining Company Limited 1989). The Anglo-Boer War ended with the signing of the Peace Treaty of Vereeniging in May 1902. (www.angloboerwar.com).
AD 1902	The South African War took place during this time. No evidence for specific battles or skirmishes from within the study area was found during the desktop study, although there is evidence that troops of both the British and the Boer forces were present throughout the general region, including the Carletonville/Westonaria area (van der Bergh, 2009) and the Krugersdorp/Randfontein area. However, evidence was found for a skirmish that took place on a koppie to the south of Carletonville/Westonaria. This incident was an ambush planned for the morning of 5 September 1900 by Commandant Danie Theron and his scouts and General Liebenberg, and members of the Potchefstroom Commando. A large British convoy comprising 1,000 men was expected to move from Johannesburg to Potchefstroom. However, the planned attack was derailed due to the unexplained

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	absence of Genl. Liebenberg. Theron was apparently surprised by a British scouting force on a nearby hill. Nevertheless, he killed three British soldiers on the hill before firing on the British column, apparently as a bluff. The British forces started shelling the hill's summit with howitzers, and Theron was struck by shrapnel and killed. (Malan, 1939; Breytenbach, 1950). The British forces subsequently buried Theron on the border between the farms Buffelsdoorn and Elandsfontein with the three British soldiers who he had killed. Subsequently (In September 1900), Theron's body was exhumed by his men and buried in the Pienaar family cemetery on the farm Elandsfontein. After the war (on 10 March 1903 his men exhumed his body again and buried him next to the grave of his fiancé Hannie Neethling at Eikenhof, south of Johannesburg (Malan, 1939; Breytenbach, 1950). In 1950 the Danie Theron Monument was unveiled on the ridge summit where he died. The monument was built with funds collected by the Voortrekker organisation (http://www.afrikanergeskiedenis.co.za/presidente/monumente-en-erfenisterreine/danie-theron-monument-gatsrand/).
AD 1903 – 1905	The Krugersdorp Municipality was established in 1903, of which Randfontein was included and remained so until 1929, when it became an independent Authority. In 1905 the first school was erected in Randfontein by the Transvaal administration, and the first two churches, one by the Anglican community and the other by the Methodists. (Randfontein Gold Mining Company Limited 1989)
AD 1906 – 1910	The railway line between Pretoria North and Rustenburg was constructed during this time (Bergh, 1999).
AD 1914 – 1939	In 1914, the first world war broke out, leading to the mobilization of south African forces to invade German West Africa. Hostilities ceased in 1918, with approximately 700 soldiers from Randfontein seeing active service. Twenty-five years later, in 1939, the second world war broke out. This led to cutting ties with Germany and mobilising a voluntary brigade by Jan Smuts from regiments such as the Transvaal Scottish, of which many men resided in Randfontein. (Randfontein Gold Mining Company Limited 1989).
AD1950 – 1967	In 1950 Dr Nico Diederichs was elected as Randfontein's town representative in parliament. Later becoming state president. During this period, tests were carried out in Randfontein, showing that the bird reef contained uranium. This led to Randfontein Estates applying for a permit to become a uranium producer, which was granted in 1952. Randfontein Estates' workforce had diminished significantly from 27 000 men in 1935 to 1600 men in 1967, with only one headgear in operation. Randfontein 247 IQ was subdivided and later included in the expansion of the West Porges Township in 1967 (Randfontein Gold Mining Company Limited 1989).

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AD 1948 - 1959	Carletonville was named after Mr Guy Carleton Jones, an engineer from the Gold Fields Ltd mining company, who played a prominent role in discovering the West Wits gold field, which Carletonville forms a part of. Carletonville was laid out by West Witwatersrand Areas gold mining company on the farm Twyfelvlakte. Most of the mines were developed after the Second World War. The town was proclaimed in 1948 and became a municipality on July 1, 1959 (Bulpin 1986: 721).

5.2 Archival and Historical Maps

Examining historical data and cartographic resources is critical for locating and identifying heritage resources and determining the study area's historical and cultural context. Relevant topographic maps and satellite imagery were studied to identify structures, possible burial grounds or archaeological sites present in the footprint area.

Historical topographic maps (1:50 000) for various years (1958 and 1976) were available for utilisation in the background study. These maps were assessed to observe the area's development and the location of possible historical structures and burial grounds. The study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under Sections 34 and 36 of the NHRA.

5.2.1 *Krugersdorp Imperial Map, 1900 – 1919 and Kroonstad Imperial Map, 1900 – 1919*

(University of Cape Town Libraries, South Africa)

The map depicted in **Figure 8** below is titled “Krugersdorp”. John Wood compiled it for the Field Intelligence Department. The map dates from 1900 and depicts two farms on which the study area is located (Varkenslaagte and Doornfontein).

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Figure 8 - Section of the 1900 Krugersdorp map highlighting the names of the farms (Varkenslaagte and Doornfontein) where the Project Site is located (green polygons) (University of Cape Town Libraries, South Africa).

5.2.2 The First Edition of the 2627AD Carletonville Topographical Map dated 1958

The 2627DB Vereeniging Topographical Map was utilised to create an image overlay of the proposed Project Site (**Figure 9**). This map sheet shows a few heritage features within the proposed Project Site.

Overlays of the Project Site over this map sheet are provided in the image below. The following observations can be made from this overlay:

- Historical Homesteads;
- The R501 national road, secondary roads and footpaths;
- Powerlines.

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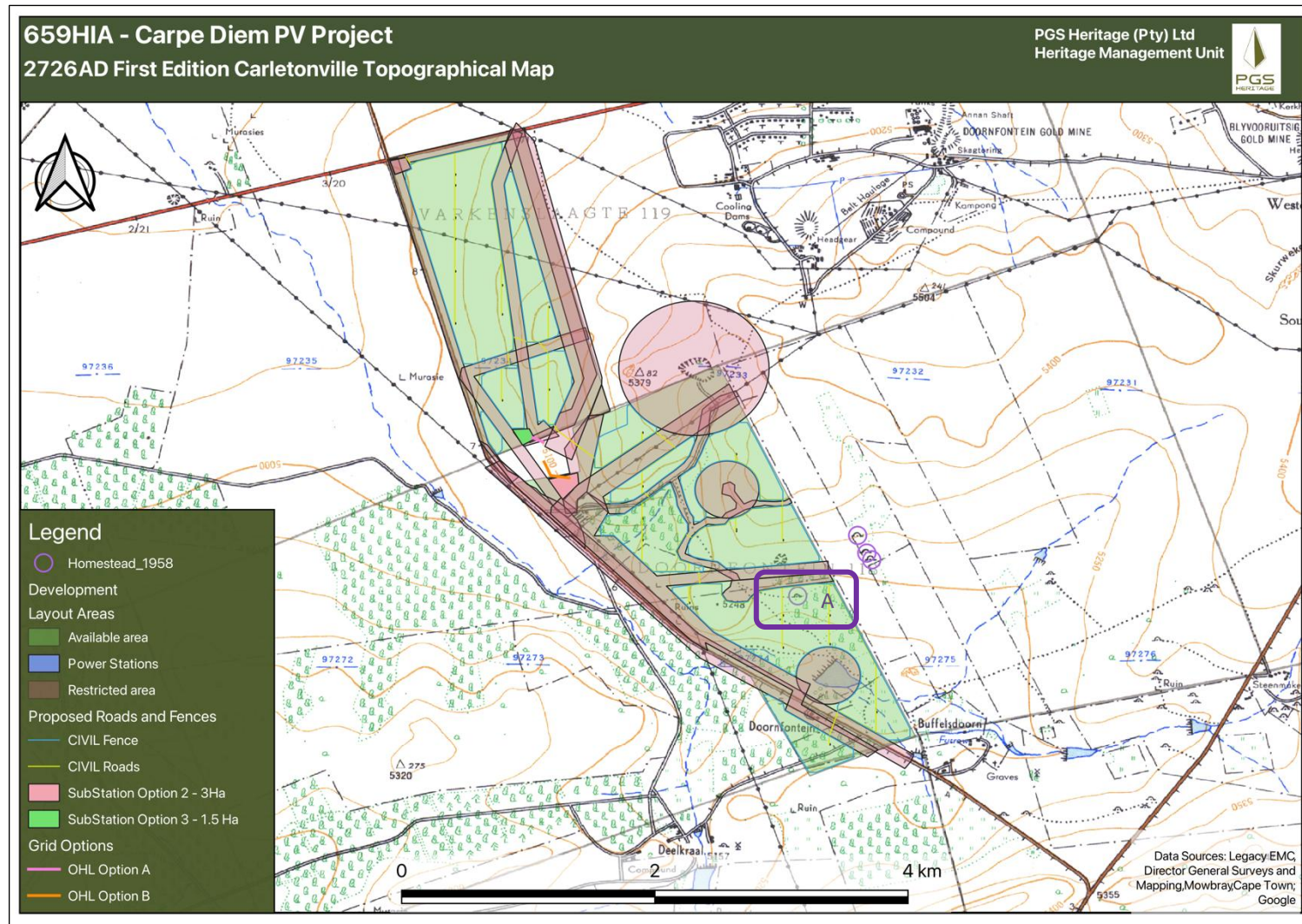


Figure 9 - Section of the first edition 2627AD Carletonville Topographical Map highlighting the Project. See inset A below.

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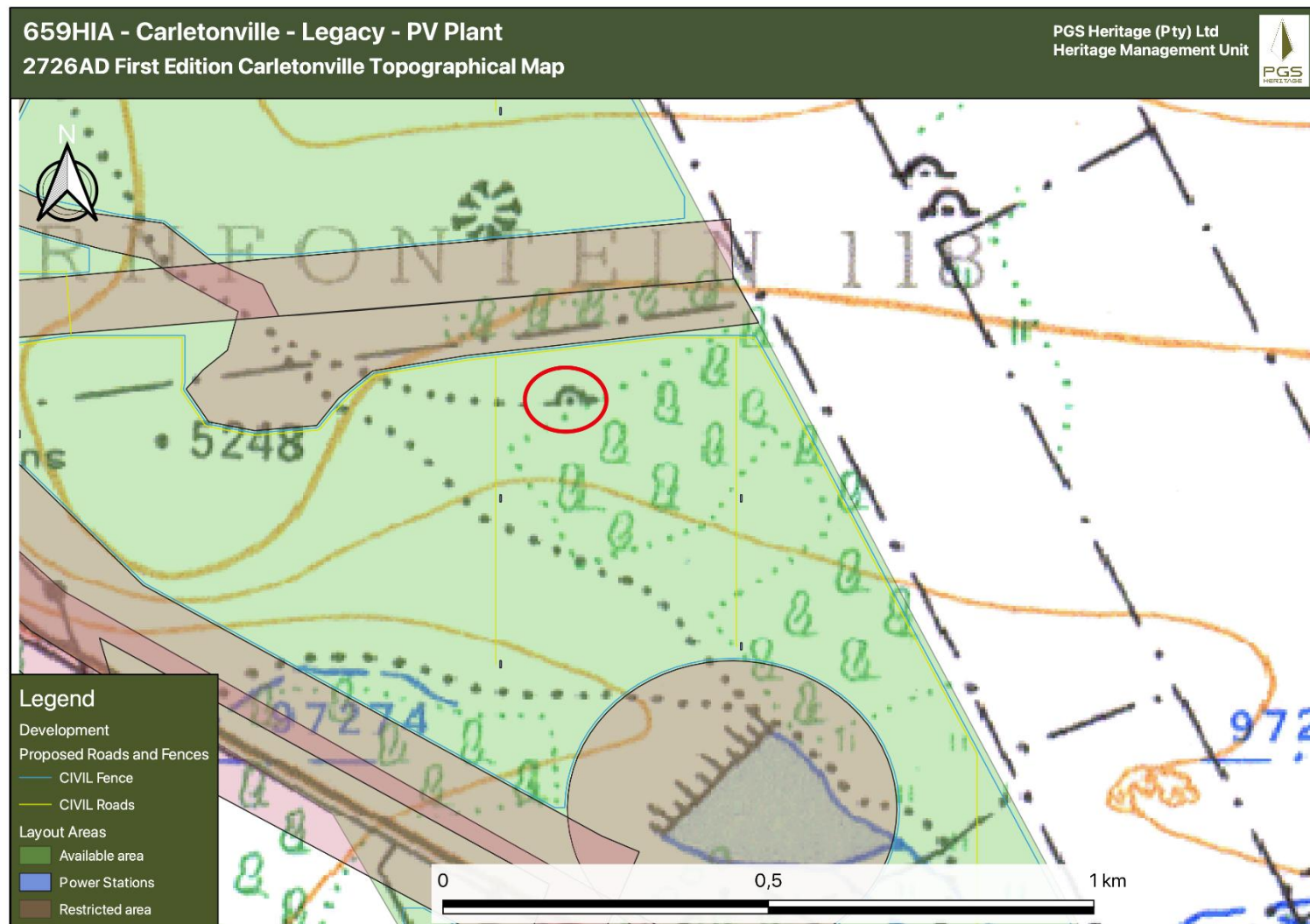


Figure 10 – Inset A: Section of the first edition Topographical Map highlighting the one homestead (red polygon) within the study area.

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5.3 Previous heritage impact assessment reports from the study area and surroundings

A search of the South African Heritage Resources Information System (SAHRIS) database revealed that several previous archaeological and heritage impact assessments had been undertaken within the surroundings of the study area. In each case, the results of each study are shown in bold. These previous studies are listed below in ascending chronological order:

- Hardwick, S. 2018. Environmental Impact Assessment for the Blyvoor Gold Mining Project near Carletonville, Gauteng Province. Notification of Intent to Develop. **No heritage resources were identified during the heritage survey.**

- Pelser, A. J. 2018. Report on a Phase 1 Archaeological Impact Assessment for the Proposed Development of 2 New Kilns as Part of Corobrik Driefontein's Expansion on Portions 23 & 27 (Portions of Portion 22) of the Farm Driefontein 355 IQ, near Carletonville, Gauteng. **No heritage resources were identified during the heritage survey.**

- Pistorius, J. C. C. 2019. A Phase I Heritage Impact Assessment Study for AngloGold Ashanti (Pty) Limited's Proposed Surface Pipeline and Associated Infrastructure near Carletonville in the Gauteng Province. **No heritage resources were identified during the heritage survey.**

- Smeyatsky, I and Kitto, J. 2019. Westrand Strengthening Project, Spanning Randfontein, Krugersdorp & Westonaria, Westrand District Municipality, Gauteng Province. **The fieldwork resulted in the identification of twenty-three (23) archaeological and heritage sites. These identified sites comprise the following: the sites identified were 12 burial grounds and graves (of which four (4) are municipal cemeteries) and eleven (11) historical structures or dwellings.**

- Fourie, W. 2021. The Proposed Eskom Azaadville 4km 400KV Deviation Power Line, Eskom Westrand Strengthening Phase I, Mogale City and Randwest City Local Municipality, Gauteng Province. **No heritage resources were identified during the heritage survey.**

5.4 Findings of the Historical Desktop Study

The archival and historical desktop study has revealed important aspects about the history of the area.

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5.4.1 Heritage sensitivity

The sensitivity maps were produced by overlying:

- Satellite Imagery;

Current Topographical Maps;

- First edition Topographical Maps dating from the 1960's.

This enabled the identification of possible heritage sensitive areas around the proposed development area that included:

- Cluster of dwellings (farmsteads),
- Homesteads ("huts") and
- Structures/Buildings.

By superimposition and analysis, it was possible to rate these structure/areas according to age and thus their level of protection under the NHRA. Note that these structures refer to possible tangible heritage sites as listed in **Table 6**.

Table 6 - Tangible heritage site in the study area.

Name	Description	Legislative protection
Archaeology	Older than 100 years	NHRA Sections 3 and 35
Structures	Possibly older than 60 years	NHRA Sections 3 and 34
Burial grounds	Graves	NHRA Sections 3 and 36 and MP Graves Act

5.4.1 Possible Heritage Finds

The evaluation of satellite imagery and the analysis of the studies previously undertaken in the area has indicated that certain areas may be sensitive from a heritage perspective. This combined analysis of satellite imagery and previous heritage studies has assisted in the development of the following landform type to heritage find matrix (**Table 7**)

Table 7 - Landform type to heritage find matrix

LANDFORM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters, LIA settlements
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery, and beads
Water holes/pans/rivers	MSA and LSA sites, LIA settlements
Farmsteads	Historical archaeological material
Ridges and drainage lines	LSA sites, LIA settlements

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6 FIELDWORK FINDINGS¹

The fieldwork was conducted on the 6th, 7th and 9th of March 2023 by a field team of PGS heritage. The fieldwork comprised a controlled exclusive survey of the proposed development footprint areas. The fieldwork team recorded track logs with their hand-held GPS devices. These track logs are in yellow in **Figure 13** and show the areas assessed by the archaeologists during the fieldwork.

Two sites were identified within the region demarcated as “restricted” and thus not planned for development (**Figure 15**). These include one burial ground with approximately 10 informal graves (**CTV01; Figure 11**) and one locality with stone walling (**CTV02; Figure 12**). The individual site descriptions as contained in **Appendix B**.



Figure 11 - Views of some of the informal graves identified at CTV01.



Figure 12 - View of the stone walling identified at CTV02.

¹ Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.

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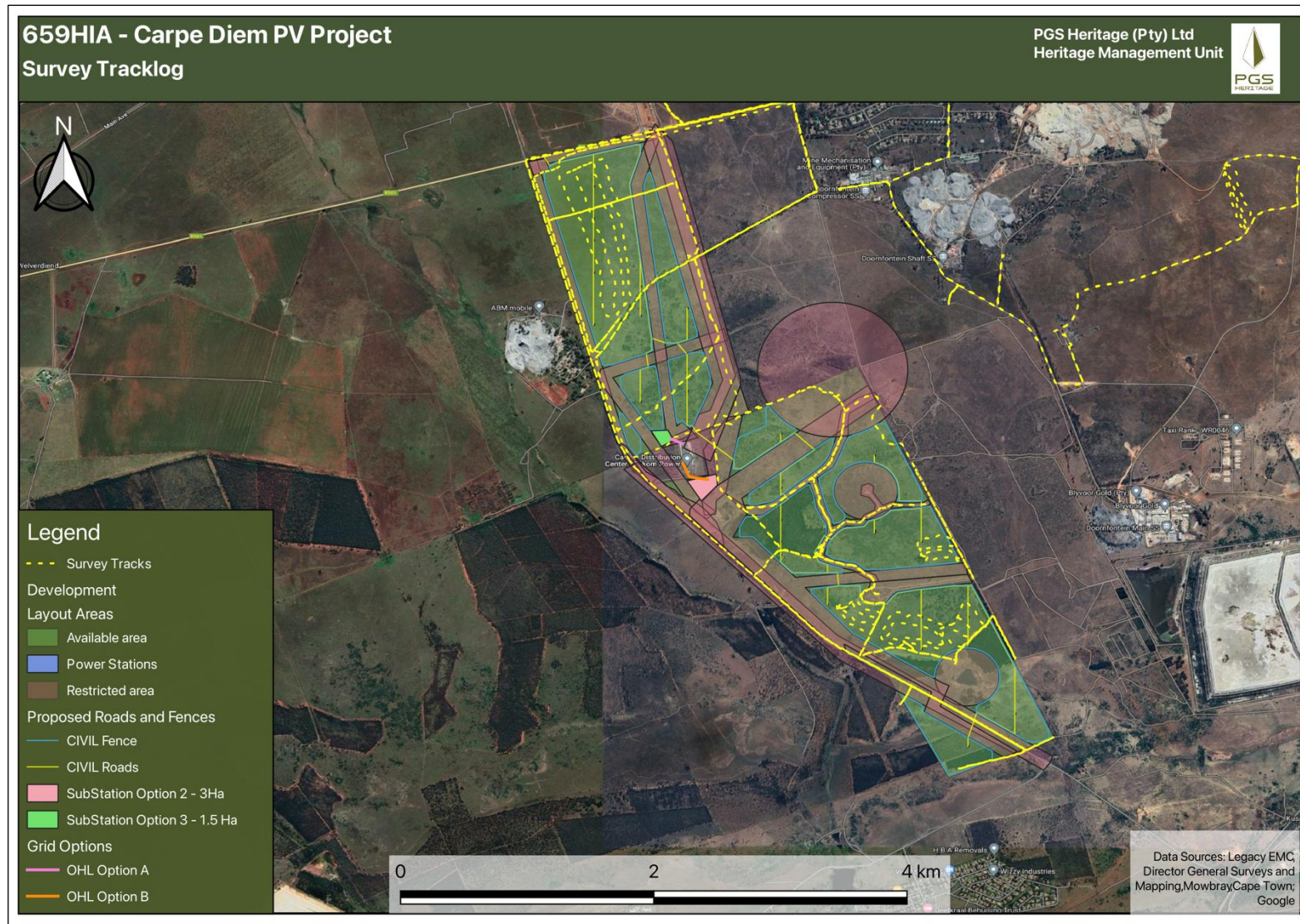


Figure 13 - Fieldwork tracklogs (track in yellow).

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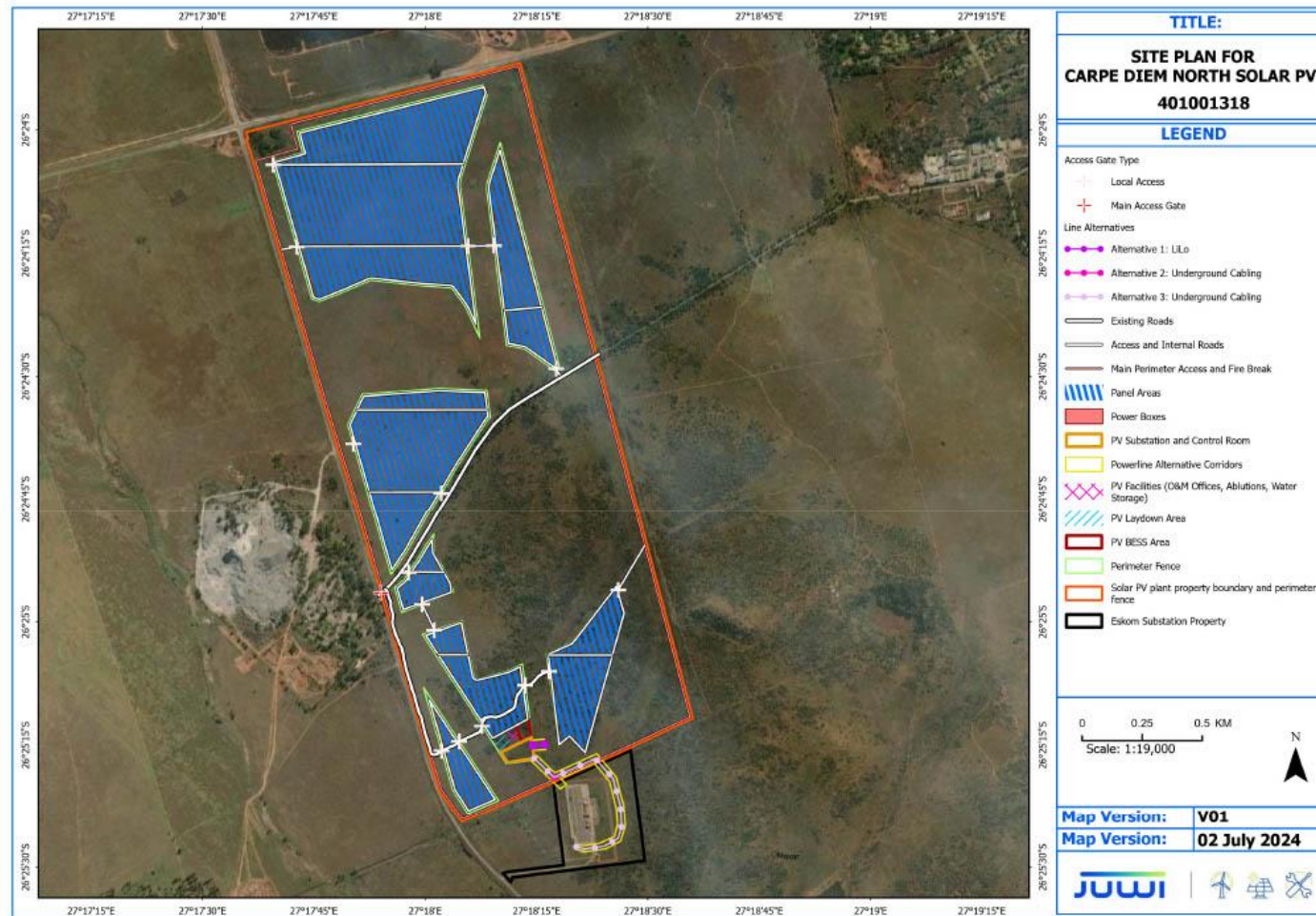


Figure 14 - Identified heritage resources within the Carpe Diem North study area (updated layout). No heritage resources were identified within the Carpe diem North study area.

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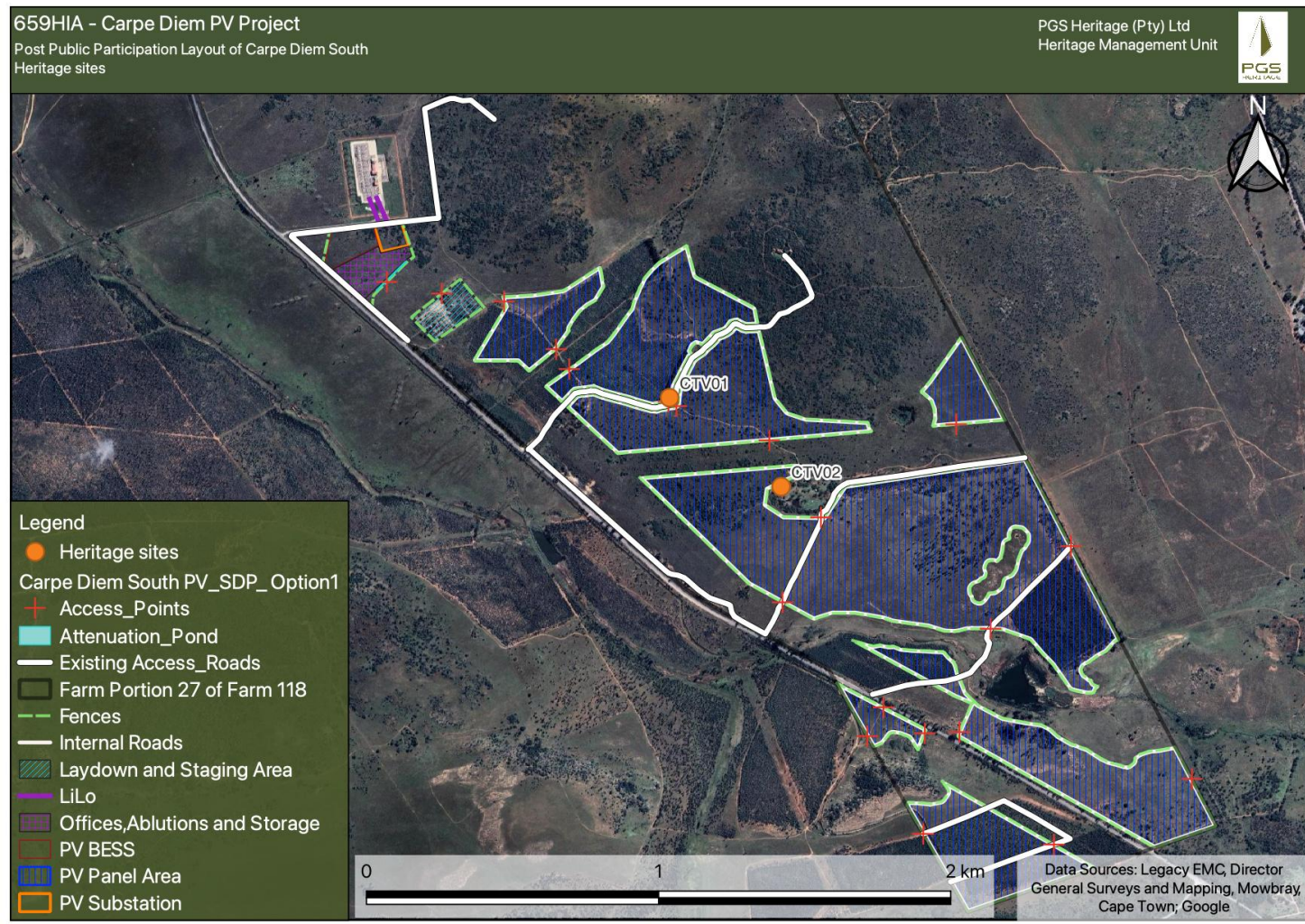


Figure 15 - Identified heritage resources within the Carpe Diem South study area (updated layout).

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7 PALAEONTOLOGY

The proposed Carpe Diem North and South Solar Photovoltaic plant (SPP) and associated infrastructure in Gauteng, is depicted on the 2626 West-Rand (1986) Geological map (Council of Geoscience, Pretoria) (Figure 16). This map indicates that the study area is largely underlain by the Vaalian aged Malmani Subgroup (Vmd, Chuniespoort Group, Transvaal Supergroup) with a small portion in the south underlain by the Timeball Hill Formation (Vt) and Rooihoogte Formations (Vr) of the Pretoria Group (Transvaal Supergroup). A very small portion in the south is underlain by unfossiliferous diabase (di). The Malmani Subgroup is undifferentiated in this area. The SAHRIS PalaeoMap indicates that the Palaeontological Sensitivity of the Malmani Subgroup is Very High (red), while areas with a High (orange), Low (blue) and Zero (grey) is also crossed (Almond and Pether, 2009; Almond et al., 2013, Groenewald et al 2014) (Figure 17). However, the Palaeotechnical report of the Gauteng province indicates that the Palaeontological Sensitivity of the Malmani Subgroup is High (orange) (Groenewald et al, 2014). The suggested location is classified as having a Very High Palaeontology Theme Sensitivity in the DFFE Screening Report, as seen in Figure 18. Updated geology (Council for Geosciences, Pretoria) indicates that the study area is underlain by the Malmani Subgroup (anml) as well as the Timeball Hill and Rooihoogte Formations of the Pretoria Group (Figure 19).

The SAHRIS PalaeoMap (Figure 17) indicates a Very High Palaeontological Sensitivity which is in agreement with the DFFE Screening Tool (Figure 18). However, during a site investigation conducted on 12 May 2024 NO fossiliferous outcrops were detected. The Very High Palaeontological Sensitivity is thus contested by the actual findings in the field, as the relevant specialist has rated the sensitivity as low.

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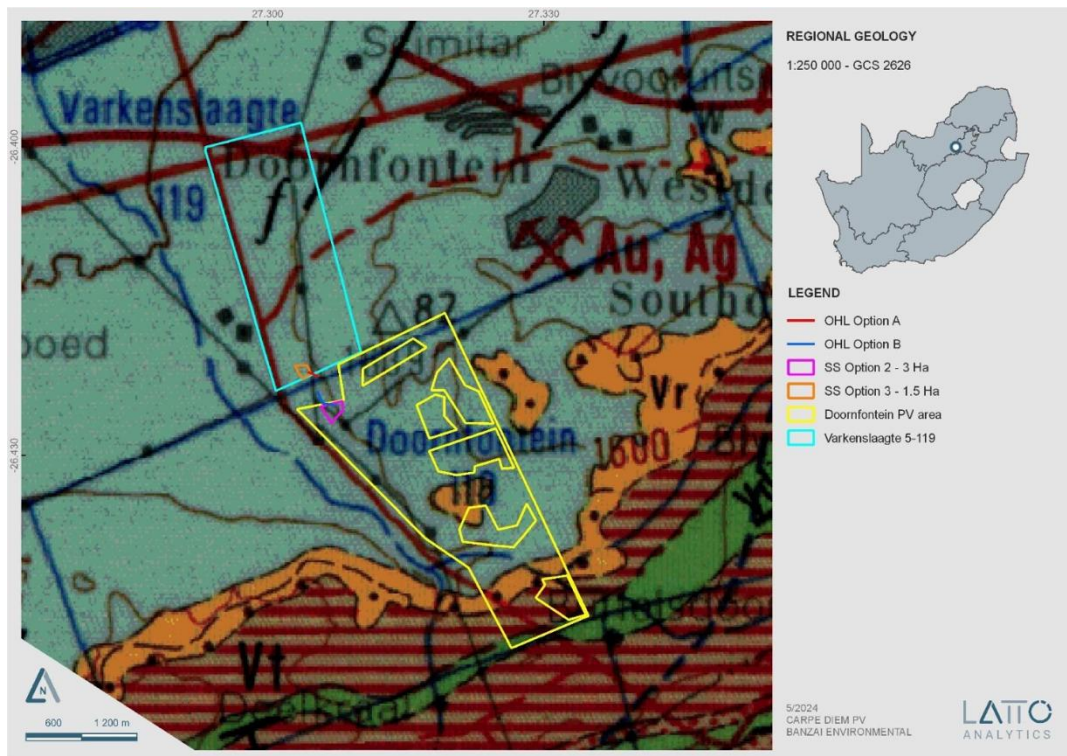


Figure 16 – Extract of the 1:250 000 West Rand 2626 (1986) (Council for Geosciences, Pretoria) indicates that Carpe Diem SPP study area is largely underlain by the Malmani Subgroup (Vmd, blue; Chuniespoort Group, Transvaal Supergroup) while the southern portion is also underlain by the Hekpoort and Rooihooft Formations of the Pretoria Group as well as unfossiliferous diabase.

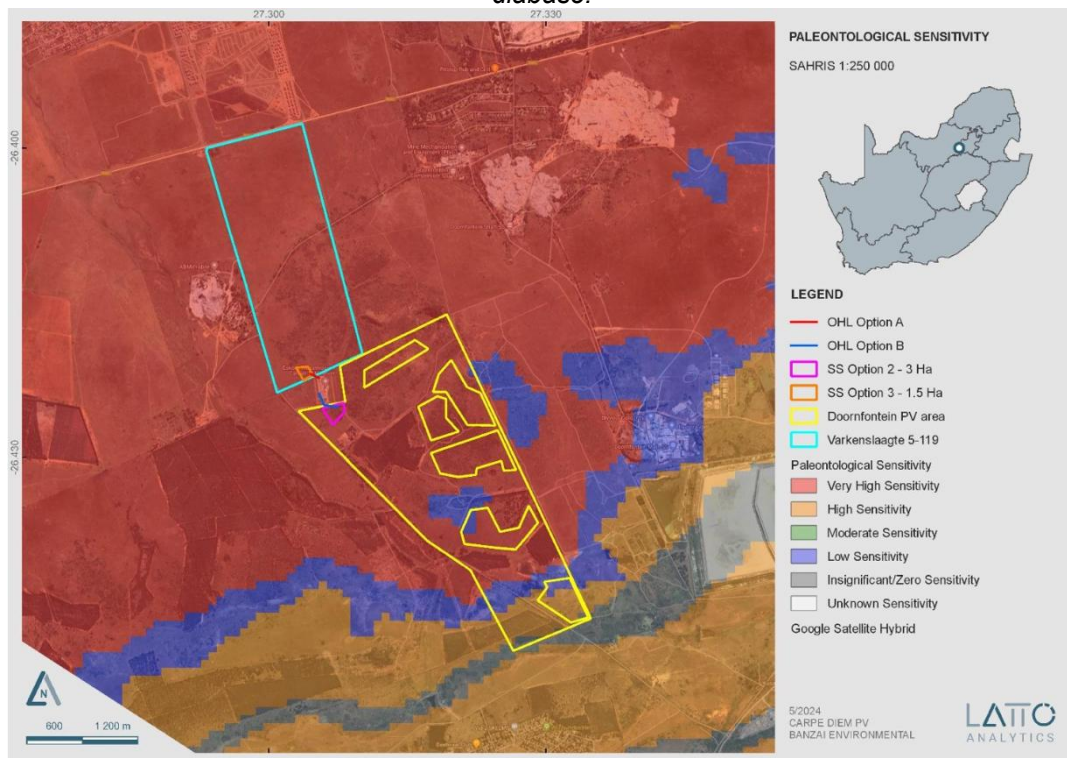


Figure 17 – Extract of the 1:250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the Very High (red) Palaeontological Sensitivity of the proposed Carpe Diem SPP in Gauteng. Areas with a High (orange), Low (blue) and Zero (grey) is also crossed.

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Screening Report Map

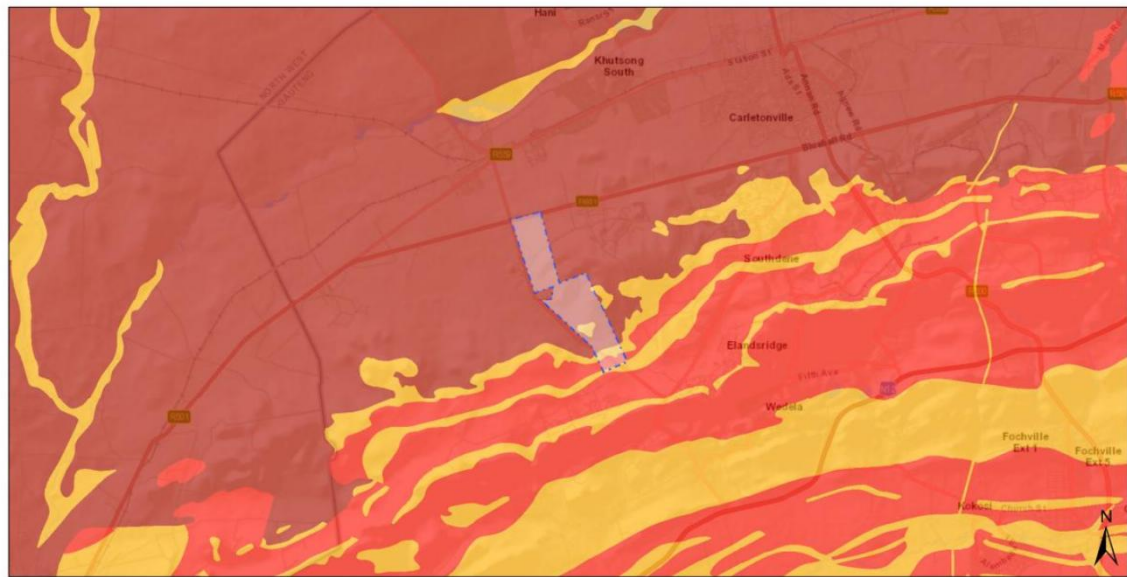


Figure 18 – Palaeontological Sensitivity of the study area by the National Environmental Web-based Screening Tool indicates a Very High Palaeontological Sensitivity.

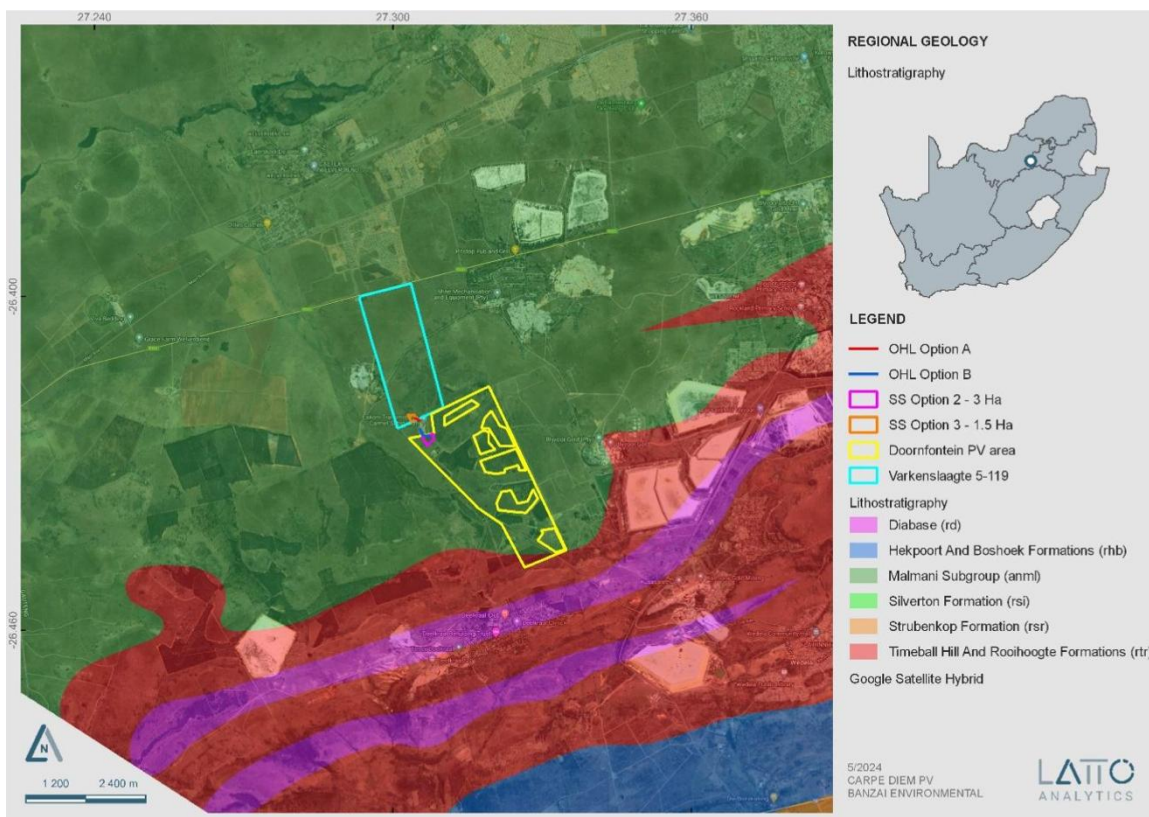


Figure 19 – Updated Geology (Council of Geosciences, Pretoria) of the proposed Study area indicates that the development is underlain by the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup) as well as the Timeball Hill Formation of the Pretoria Group.

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8 IMPACT ASSESSMENT

In this section, an assessment will be made of the impact of the proposed development on the identified heritage sites. An overlay of all the heritage sites identified during the fieldwork over the proposed development footprint areas was made to assess the impact of the proposed project on these identified heritage sites. This overlay resulted in the following observations:

The following general observations will apply for the impact assessment undertaken in this report:

- The impact assessment rating is based on the rating scale as contained in **Appendix A**.
- Heritage sites assessed to have a low heritage significance are not included in these impact risk assessment calculations. The reason for this is that sites of low significance will not require mitigation. This includes one locality with stone walling (**CTV02**).
- One burial ground (**CTV01**) was located near the proposed development areas. As a result, the proposed development may impact upon this site.
- It is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some heritage sites. The impact assessment conducted for heritage sites assumes the possibility of finding heritage resources during the project life and has been conducted as such.

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Figure 20 – Updated Layout of Carpe Diem South with the proposed 10m buffer relaxation

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8.1 Impact Assessment Table

Implementing the impact assessment methodology as supplied by the client, the table below provides a quantitative assessment of the impacts of the proposed project.

Table 8 - Rating of impacts on archaeological resources

IMPACT	CUMULATIVE IMPACT	DURATION	SPATIAL EXTENT	INTENSITY - NEGATIVE IMPACTS	INTENSITY - POSITIVE IMPACTS	REVERSIBILI TY	IRREPLACEA BILITY	PROBABILITY	RATING
Unidentified Heritage Resources		Permanent	Site Specific	VERY HIGH	NO IMPACT	Irreversible	Definite loss of irreplaceable resources	Improbable (0 - 5%)	
Pre mitigation	Low	5	1	10	0	5	5	1	26.00
Post mitigation	Low	5	1	4	0	5	5	1	20.00

Table 9 – Rating of Impacts on Burial grounds and graves

IMPACT	CUMULATIVE IMPACT	DURATION	SPATIAL EXTENT	INTENSITY - NEGATIVE IMPACTS	INTENSITY - POSITIVE IMPACTS	REVERSIBILI TY	IRREPLACEA BILITY	PROBABILITY	RATING
Direct Impact to site CTV01	Medium	Permanent	Site Specific	HIGH	NO IMPACT	Irreversible	Definite loss of irreplaceable resources	Moderate potential for loss of irreplaceable resources	
Pre mitigation	Medium	5	1	8	0	5	5	3	72.00
Post mitigation	Medium	5	1	6	0	5	2	2	38.00

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Table 10 - Rating of Impacts on Palaeontological resources

IMPACT	CUMULATIVE IMPACT	DURATION	SPATIAL EXTENT	INTENSITY - NEGATIVE IMPACTS	INTENSITY - POSITIVE IMPACTS	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	RATING
Impact on palaeontology	Medium	Permanent	Site Specific	HIGH	NO IMPACT	Irreversible	Definite loss of irreplaceable resources	Moderate potential for loss of irreplaceable resources	
Pre mitigation	Medium	5	1	8	0	5	5	3	72.00
Post mitigation	Medium	5	1	4	0	5	5	2	40.00

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9 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

The following section must be read in conjunction with **Table 12** of this report.

9.1 Construction and operational phases

The project will encompass a range of activities during the construction phase, including ground clearance and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind that delays can be costly during construction and must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance. However, holes do offer a window into the past, and it is possible to rescue some of the data and materials.

During the construction phase, it is essential to recognise any significant material being unearthed, correctly judging which actions should be taken. It is recommended that the following chance find procedure should be implemented.

9.2 Chance finds procedure

- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

9.3 Possible finds during construction

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed reclamation activities, could uncover the following:

- Historical structures and foundations
- Unmarked burial grounds and graves

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9.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 11** gives guidelines for lead times on permitting.

Table 11 - Lead times for permitting and mobilisation

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	3 months
Documentation, excavation, and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of the development	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

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9.5 Heritage Management Plan for EMPr implementation

Table 12 - Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (Monitoring tool)
General project area	- Implement a chance to find procedures in case where possible heritage finds are uncovered. - A detailed “walk down” of the final approved footprints will be required before construction commences. - Any significant features of significance identified during this walkdown will require formal mitigation (i.e., permitting where required) or where possible a slight change in design could accommodate such resources. A Heritage Management plan (HMP) for heritage resources needs to be compiled and approved for implementation during construction and operations where heritage features of significance are identified.	Construction	During construction	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report
Burial Ground (CTV01)	- The burial ground should be demarcated with a 50-meter buffer zone and should be avoided and left in situ. - A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by SAHRA). - If the site is going to be impacted directly and the graves need to be removed, a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with SAHRA under the NHRA and National Health Act regulations. - JUWI proposes implementing a 10 m buffer from the outermost graves of the burial site, with a minimum 2,5m high fence (similar to a palisade or ‘Clear View’ fence). This will ensure the protection and demarcation of the graves while preventing unauthorised access or disturbance during and after the project’s completion. - An application for relaxation of the proposed 50m buffer has been submitted to SAHRA with accompanying documentation, including a Graveyard Buffer Relaxation Motivation Letter, a	Construction	During Construction	Applicant Environmental Control Officer (ECO) Heritage specialist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report

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Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (Monitoring tool)
	Signature Authorisation Register and a Burial Ground Management Plan.						
Stone Walling (CTV02)	No mitigation required.	Construction	During Construction	Applicant Environmental Control Officer (ECO) Heritage specialist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
Palaeontology	- If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the ECO/site manager in charge of these developments. These discoveries ought to be protected (if possible, <i>in situ</i>) and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carry out by a paleontologist. - Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.	Construction	During Construction	Applicant Environmental Control Officer (ECO) Palaeontological specialist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	ECO Monthly Checklist/Report

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10 CONCLUSIONS AND RECOMMENDATIONS

PGS was appointed by Legacy EMC, on behalf of JUWI, to undertake a HIA that forms part of the EIA process for the proposed Carpe Diem SPP on the Farms Varkenslaagte 119 IQ and Doornfontein 118 IQ, Merafong City Local Municipality, Gauteng.

This HIA aims to evaluate the possible impacts on heritage resources present within the proposed development footprint.

10.1 Heritage Resources Identified

A selective survey of the study area was undertaken by a combination of vehicle and pedestrian means by one archaeologist (Michelle Sachse) and one field assistant (Xander Fourie) on the 6th, 7th and 9th of March 2023. It is important to note that although as intensive a fieldwork coverage as possible was undertaken, sections of the study area are in areas which are more densely overgrown and/or disturbed, which limited visibility in those areas of the study area. Irrespective of the limitations, the survey coverage can still be considered as sufficient to meet the HIA requirements.

Two sites were identified within the region that was demarcated as “restricted” and thus not planned for development. These include one burial ground with approximately 10 informal graves (**CTV01**) and one locality with stone walling (**CTV02**).

10.1.1 Burial grounds and graves

One (1) burial ground (**CTV01**) was rated as having **high heritage significance**. It is located within a region which is not demarcated for development but will still require a 50m buffer to retain its integrity. Alternatively, JUWI proposes implementing a 10 m buffer from the outermost graves of the burial site, with a minimum 2,5m high fence (similar to a palisade or ‘Clear View’ fence). This will ensure the protection and demarcation of the graves while preventing unauthorised access or disturbance during and after the project’s completion. An application for relaxation of the proposed 50m buffer has been submitted to SAHRA with accompanying documentation, including a Graveyard Buffer Relaxation Motivation letter, a Signature Authorisation Register and a Burial Ground Management Plan.

10.1.2 Historical Structure

One locality with stone walling (**CTV02**) was rated as having **low heritage significance**.

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10.2 Palaeontology

The site investigation as well as desktop research (National Database and published data) concluded that fossil heritage of scientific and conservational interest in the development area is relatively rare and of low conservational and scientific value. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the PV development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. The significance of the impact occurring will be negative medium before mitigation. The post-mitigation Significance of the Impact will be low.

10.3 Impact Assessment

Archaeology

The pre-construction and construction phase of the proposed development will entail extensive surface clearance as well as excavations into the superficial sediment cover and underlying bedrock. The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall **MEDIUM NEGATIVE** rating but with the implementation of the recommended buffers and management guidelines will be reduced to a **LOW NEGATIVE** impact.

10.4 Mitigation measures

The calculated impact as summarised in **Section 8** of this report confirms that the impact of the proposed development will be reduced with the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources. The following mitigation measures are listed in **Table 1**.

Table 13 - Heritage management recommendations.

Area and site no.	Mitigation measures
General project area	Implement a chance to find procedures in cases where possible heritage finds are uncovered.
Burial Ground (CTV01)	Initial measures - The burial ground should be demarcated with a 50-meter buffer zone and should be avoided and left <i>in situ</i>. - A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by SAHRA). - If the site is going to be impacted directly and the graves need to be removed, a grave relocation process for these sites is recommended as a mitigation and management measure. This

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Area and site no.	Mitigation measures
	will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with SAHRA under the NHRA and National Health Act regulations. Proposed measures An application for relaxation of the proposed 50m buffer has been submitted to SAHRA with accompanying documentation, including a Graveyard Buffer Relaxation Motivation Letter, a Signature Authorisation Register and a Burial Ground Management Plan. The buffer relaxation application proposes implementing a 10 m buffer from the outermost graves of the burial site, with a minimum 2,5m high fence (similar to a palisade or 'Clear View' fence). This will ensure the protection and demarcation of the graves while preventing unauthorised access or disturbance during and after the project's completion.
Stone Walling (CTV02)	No mitigation required.
Palaeontology	If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the ECO/site manager in charge of these developments. These discoveries ought to be protected (if possible, in situ) and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carry out by a paleontologist. Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.

10.5 Conclusion

If heritage resources are discovered during site clearance, construction activities that may impact the find must stop, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.

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There are no preferences on heritage grounds for any particular layout among the various site options under consideration.

It is the opinion of this report's authors that the overall impact of the proposed development on heritage resources will be Low. Provided that the general recommendations and mitigation measures outlined in this report are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage perspective. The management and mitigation measures, as described in **Section 9** of this report, have been developed to minimise the project's impact on heritage resources.

We have no objection to the proposed construction under the condition that a walk down of the final approved footprints be conducted before construction commences.

The current layout is supported from a heritage and archaeological perspective if the applicable recommendations (mitigation measures) are followed.

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11.4 Google Earth

All the aerial depictions and overlays used in this report are from Google Earth or QGIS.

11.5 Historical Topographical Maps

All the historic topographical maps used in this report were obtained from the Directorate: National Geospatial Information of the Department of Rural Development and Land Reform in Cape Town.

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APPENDIX A

ENVIRONMENTAL IMPACT METHODOLOGY

Legacy EMC: Impact Rating Methodology

The assessment of the potential environmental and social impacts was based on the project team's professional judgement, field observations and desk-top analysis..

The standard Legacy EMC impact/risk rating method has been adopted to enable the author to determine the overall impact of the proposed activities by collating the information at hand into a uniform rating matrix.

The following methodology has been applied to the prediction and assessment of impacts. Potential impacts have been rated in terms of the direct, indirect and cumulative nature of the impact:

- **Direct** impacts – are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable;
- **Indirect** impacts – of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity;
- **Cumulative** impacts – are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

The significance of each potential impact, with and without the implementation of the proposed mitigation measures, will be assessed based on the following variables (evaluation components):

- Spatial extent – The size of the area that will be affected by the impact;
- Intensity – The anticipated severity of the impact;
- Duration – The timeframe during which the impact will be experienced;
- Probability – The probability of the impact occurring;
- Reversibility – The “reversibility” of the environmental impacts of the proposed development after project cessation or decommissioning; and
- Irreplaceability – The “irreplaceability” of natural characteristics in the area that may be impacted upon by the proposed development.

Using the criteria above, the impacts will further be assessed with the use of quantifiable values as described below:

Table 14 - Evaluation of criteria by means of quantitative ratings and descriptions.

Criteria	Description	Quantitative Rating
Duration	Temporary (less than a year)	1
	Short term (1 to 6 years)	2
	Medium term (6 to 15 years)	3

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Criteria	Description	Quantitative Rating
	Long term (the impact will cease after the operational life of the activity)	4
	Permanent (mitigation will not occur in such a way or in such a time span than the impact can be considered transient)	5
Spatial extent	Site specific	1
	Local (less than 2 km from the site);	2
	Regional (within 30 km of the site)	3
	National (beyond Provincial boundaries and within National boundaries)	4
	International / Transboundary (Beyond National boundaries)	5
Intensity / Magnitude Applicable to Negative Impacts (at indicated spatial extent)	None (Biophysical and/or social functions and/or processes will remain unaltered)	0
	Very Low (Biophysical and/or social functions and/or processes might be negligibly altered)	2
	Low (Biophysical and/or social functions and/or processes might be slightly altered)	4
	Medium (Biophysical and/or social functions and/or processes might be notably altered)	6
	High (Biophysical and/or social functions and/or processes might be considerably altered)	8
	Very High (Biophysical and/or social functions and/or processes might be severely altered)	10
Intensity / Magnitude Applicable to Positive Impacts (at indicated spatial extent)	None (Biophysical and/or social functions and/or processes will remain unaltered)	0
	Very Low (Biophysical and/or social functions and/or processes might be negligibly enhanced)	2
	Low (Biophysical and/or social functions and/or processes might be slightly enhanced)	4
	Medium (Biophysical and/or social functions and/or processes might be notably enhanced)	6
	High (Biophysical and/or social functions and/or processes might be considerably enhanced)	8
	Very High (Biophysical and/or social functions and/or processes might be substantially enhanced)	10
Probability	Improbable (5% to no chance of occurring)	1
	Probable (5% - 25% chance of occurring)	2
	Medium Probability (25% - 75% chance of occurring)	3
	Highly probable (75% - 95% chance of occurring)	4
	Definite (greater than 95% chance of occurring)	5
Reversibility	No impact	0
	Impact will be reversible	1
	High potential that impact might be reversed	2
	Moderate potential that impact might be reversed	3

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Criteria	Description	Quantitative Rating
Irreplaceability	Low potential that impact might be reversed	4
	Impact cannot be reversed	5
	None	0
	Very low potential for loss of irreplaceable resources	1
	Low potential for loss of irreplaceable resources	2
	Moderate potential for loss of irreplaceable resources	3
	High potential for loss of irreplaceable resources.	4
	Definite loss of irreplaceable resources	5
CUMULATIVE impact	High: The activity is one of several similar pasts, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.	
	Medium: The activity is one of a few similar pasts, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.	
	Low: The activity is localised and might have a negligible cumulative impact.	
	None: No cumulative impact on the environment.	

Once the evaluation components have been ranked for each impact, the significance of the potential impact is assessed (or calculated) using the following formula:

$$SP \text{ (significance points)} = (\text{intensity} + \text{duration} + \text{spatial extent} + \text{irreplaceable} + \text{reversibility}) \times \text{probability}.$$

The maximum value is 150 SP (significance points). The unmitigated and mitigated scenarios for each environmental impact should be rated as per the table below (Table 8).

Table 15 - Definition of significance ratings (positive and negative)

Significance Points	Environmental Significance	Description
125 – 150	Very high (VH)	An impact of high or very high significance could influence a decision about whether or not to proceed with the proposed Project, regardless of available mitigation options.
100 – 124	High (H)	Cumulative Impacts: The activity is one of several similar pasts, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.
75 – 99	Moderate-High (MH)	If left unmanaged, an impact of moderate-high significance could influence a decision about whether or not to proceed with the proposed Project. Mitigation options should be re-evaluated.
40 – 74	Moderate (M)	Cumulative Impacts: If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with the proposed Project. The activity is one of a few similar pasts, present or future activities in the same geographical area, and might have a combined impact of

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Significance Points	Environmental Significance	Description
		moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.
<40	Low (L)	An impact of low significance is likely to contribute to positive decisions about whether or not to proceed with the proposed Project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation. Cumulative Impacts: The activity is localised and might have a negligible cumulative impact.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect and is likely to contribute to positive decisions about whether or not to proceed with the proposed Project.

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APPENDIX B
SITE DESCRIPTION FORMS

Site coordinates		
Site	X	Y
CTV01	27.316174	-26.430966
CTV02	27.320006	-26.434018

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Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
CTV01	-26.430966	27.316174	General Landscape Characteristics Flat lying area, Grassy vegetation Site Conditions Overgrown/ limited visibility Time Period Historical Period Site Type Graves Notes The burial ground is located adjacent to an informal road. There are approximately 10 informal graves in an overgrown environment. The graves are oval-shaped and/or tightly stone packed.	High Significance	IIIA

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Figure 21 - View towards the burial ground.



Figure 22 – Views of the general setting of the burial ground.

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Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<i>Figure 23 - Views of the informal graves identified at CTV01.</i>					

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Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
CTV02	-26.434018	27.320006	General Landscape Characteristics Flat lying area, Grassy vegetation Site Conditions Demolished/Destroyed Time Period Recent Site Type Stone Walling (kraal) Notes Constructed from locally sourced rock.	Low Significance	IIIC

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Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<i>Figure 24 - Views of the stone walling identified at CVT02.</i>					

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APPENDIX C
PGS TEAM CVS

WOUTER FOURIE

Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

Summary of Experience

Specialised expertise in Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems, including *inter alia* -

Involvement in various grave relocation projects (some of which relocated up to 1000 graves) and grave “rescue” excavations in the various provinces of South Africa

Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
 - Iron Age Mitigation Work for various projects, including archaeological excavations and monitoring
 - Involvement with various Heritage Impact Assessments, outside South Africa, including -
- Archaeological Studies in Democratic Republic of Congo
- Heritage Impact Assessments in Mozambique, Botswana and DRC
- Grave Relocation project in DRC

Key Qualifications

BA [Hons] (Cum laude) - Archaeology and Geography - 1997

BA - Archaeology, Geography and Anthropology - 1996

Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member

Accredited Professional Heritage Specialist – Association of Professional Heritage Practitioners (APHP)
CRM Accreditation (ASAPA) -

- Principal Investigator - Grave Relocations
- Field Director – Iron Age
- Field Supervisor – Colonial Period and Stone Age
- Accredited with Amafa KZN

Key Work Experience

2003- current - Director – Professional Grave Solutions (Pty) Ltd

2007 – 2008 - Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand

2005-2007 - Director – Matakoma Heritage Consultants (Pty) Ltd

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2000-2004 - CEO– Matakoma Consultants

1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng

1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

Worked on various heritage projects in the SADC region including, Botswana, Mauritius, Malawi, Zambia, Mozambique, and the Democratic Republic of the Congo

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PROFESSIONAL CURRICULUM VITAE FOR NIKKI MANN

Professional Archaeologist for PGS Heritage

Name: Nikki Mann
Profession: Archaeologist
Date of birth: 1992-10-13
Parent Firm: PGS Heritage (Pty) Ltd
Position at Firm: Archaeologist
Years with firm: 2
Years of experience: 7
Nationality: South African
HDI Status: White

EDUCATION:

Name of University or Institution : University of Cape Town
Degree obtained : BSc
Major subjects : Archaeology, Environmental and
 Geographical Sciences
Year : 2013

Name of University or Institution : University of Cape Town
Degree obtained : BSc [Hons]
Major subjects : Archaeology
Year : 2014

Name of University or Institution : University of Cape Town
Certificate obtained : MSc – Archaeology (phytolith analysis)
Year : 2017

Professional Qualifications:

Professional Archaeologist - Association of Southern African Professional Archaeologists -
 Professional Member – No 472

Languages:

English
 French

KEY QUALIFICATIONS

- 3 years of work in the heritage consulting field;

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- 7 years working experience in archaeological excavations;
- Proven experience in report writing and report deliverables;

HERITAGE IMPACT ASSESSMENTS

South African

2021- Current – Archaeologist – PGS Heritage (Pty) Ltd

HMPs for the Khangela and Umsinde WEFs and associated grid infrastructure, near Murraysburg, Western Cape. Nala Environmental. **Position:** Heritage Specialist.

Proposed new 132kV grid connection for the authorised Emoyeni WEF, near Murraysburg, Western Cape. Nala Environmental. **Position:** Heritage Specialist.

Proposed Apollo PV Plant, near Atlantis, Western Cape – Desktop study. TerraManzi. **Position:** Heritage Specialist.

Proposed Eskom Witkop-Pietersburg 132kV Powerline, Limpopo. Polokwane. Acer. **Position:** Heritage Specialist.

Proposed deviations to Eskom Nhlavuko-Tshebela 132kV Powerlines, Limpopo. Polokwane. Acer. **Position:** Heritage Specialist.

Proposed Tetra4 Cluster 2 gas production project, near Welkom. EIMS. **Position:** Heritage Specialist.

Kathu Tyre Management Plant HIA. Kathu. EXM. **Position:** Heritage Specialist.

Kathu Borrow Pit Screening. Kathu. EXM. **Position:** Heritage Specialist.

Kolomela Mine Expansion. Postmasburg. EXM. **Position:** Heritage Specialist.

Kudumane HIA update. Hotazel. SRK. **Position:** Heritage Specialist.

Victoria West Pipeline project. Victoria West. iXEng. **Position:** Heritage Specialist.

10MW Chelsea Solar PV. Gqeberha, Eastern Cape. SLR. **Position:** Heritage Specialist.

Koup 1 and Koup 2 WEF. Beaufort West, Western Cape. SiVEST. **Position:** Heritage Specialist.

Victoria West Pipelines. Victoria West, Northern Cape. iXEng. – **Position:** Heritage Specialist.

East Orchards Poultry Farm Project. Delmas, Mpumalanga. EcoSphere. – **Position:** Heritage Specialist.

Gunstfontein WEF and OHL. Sutherland, Northern Cape. Savannah– **Position:** Heritage Specialist.

Overhead power line for Oya PV Facility. Sutherland, Northern Cape. SiVEST– **Position:** Heritage Specialist.

Infrastructure for Kudusberg WEF. Sutherland, Northern Cape. SiVEST– **Position:** Heritage Specialist.

Proposed SKA fibre optic cable, between Beufort West and Carnarvon, Northern and Western Cape. **Position:** Heritage Specialist.

Proposed SANSA Space Operations. Matjiesfontein, Western Cape. **Position:** Heritage Specialist

Pienaarspoort WEF 1 and 2. North-west of Matjiesfontein, Western Cape. Savannah- **Position:** Heritage Specialist.

Swellendam WEF. Swellendam, Western Cape. – **Position:** Heritage Specialist.

Matjiesfontein Road Extension Project. Matjiesfontein, Western Cape. **Position:** Heritage Specialist.

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MITIGATION WORK

2020 – Coega Zone 10, Coega IDZ, Eastern Cape Province. Colonial Period Phase 2 Mitigation Archaeological Excavation. **Archaeologist.**

2019 – 2020 - **Lesotho Highland Development Authority – Polihali Dam Project - Heritage Management Plan development and Implementation.** Mokhotlong, Kingdom of Lesotho. **Archaeologist.**

2018- Proposed development of boreholes and associated pipelines for the Langebaan Aquifer within the Hopefield Private Nature Reserve, Hopefield, Western Cape. **Archaeologist.**

POSITIONS HELD

2021 – current: Archaeologist - PGS (Pty) Ltd

2019 – 2020: Archaeologist - PGS (Pty) Ltd Lesotho

2018 – 2020: Contract Archaeologist – CTS Heritage

REFERENCES

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George Washington

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CTS Heritage

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Email:

nic.wiltshire@ctsheritage.com

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PROFESSIONAL CURRICULUM FOR MICHELLE SACHSE
Archaeologist for PGS Heritage

Summary of Experience

Involvement in various grave relocation projects in the various provinces of South Africa.
Expertise in Heritage Impact Assessment Surveys, Historical and Archival Research,
Archaeology, Fieldwork including *inter alia* -

Involvement with various Heritage Impact Assessments,

- Heritage Impact Assessments within Gauteng, Limpopo, Mpumalanga, Free State, North West and the Northern Cape and Western Cape Provinces.
- Archaeological Walkdowns for various projects.
- Desktop, archival and heritage screening for projects.
- Instrument Survey and recording for various projects.

Heritage Impact Assessments:

- Proposed New Pit for Msobo Coal (Spitzkop Colliery), in Ermelo, within the Mpumalanga Province. **Position:** Heritage Specialist.
- The Proposed Harmony FSS6 Reclamation Pipeline, Welkom, Free State Province. **Position:** Heritage Specialist.
- Heritage Impact Assessment Report, for the Proposed Kalgold Expansion Project between Mafikeng and Vryburg, the North West Province. **Position:** Heritage Specialist.
- Heritage Impact Assessment Report, for the Proposed Chartwell Data Centre Project in Chartwell, Johannesburg, Gauteng Province. **Position:** Heritage Specialist.
- Proposed Development on Portions of the Farm Rondebult 303 JS, Near Kwa-Guqa, Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province. **Position:** Heritage Specialist.
- The Buffelspoort Solar Photovoltaic (PV) Energy Facility, on Portions 75 and 134 of the Farm Buffelspoort 343 JQ, between Buffelspoort and Mooinooi, in the North West Province. **Position:** Heritage Specialist.
- Proposed Development on Portion 7 of the Farm Langkuil 363 IR, in Meyerton, within the Midvaal Local Municipality, and the Sedibeng District Municipality, in the Gauteng Province. **Position:** Heritage Specialist.
- Heritage Impact Assessment report for the Eskom Gamohaam – Seven Miles 22kV Powerline. On the remaining extent of the Farm Kuruman Reservaat 690, outside and within the informal settlement of Mamoratlwe, close to the town of Kuruman, in the Northern Cape Province. **Position:** Heritage Specialist.
- Heritage Impact Assessment (HIA) Report for the ArcelorMittal South Africa (AMSA) Vanderbijlpark Solar Energy Facility. **Position:** Heritage Specialist.

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Grave Relocation Projects:

- Report on the Relocation of Graves: Relocation of 22 Graves at Nkomati Anthracite Mine on the Farm Fig Tree 503 JU, near Madadeni Mpumalanga Province.
- Report on the Relocation of Graves: Relocation of 27 Graves Located on the Farm Welstand 55 IS, near Kriel, Mpumalanga Province.
- Report on the Relocation of Graves: Relocation of 6 Graves Located on the Farm Klipfontein 241 IS, near Breyten, Mpumalanga province.
- Report on the Relocation of Graves. Relocation of 68 Graves Located at Erf 4460, 4461 and 4463, Kudube Unit 4, in Hammanskraal, Gauteng Province.
- Report on the Relocation of Graves. Relocation of 10 Graves for the Vreugdenburg Family on Portion 246 of the Farm Roodekopjes 417 JQ, near Brits, North-West Province.
- Report on the Relocation of Graves: Two (2) Graves Located at Msobo Coal Mine (Albion Southwest Pit) on Portion 6 of the Farm Witbank 82 IT, near Breyten, Mpumalanga Province.
- Report on the Relocation of Graves: One (1) Grave at Msobo (Spitzkop) on Portion 3 of the Farm Voorslag 274 IS, between Breyten and Ermelo, in the Mpumalanga Province.

Key Qualifications

- | | |
|-------------|---|
| 2016 - 2019 | MA in Archaeology
University of Pretoria, Pretoria |
| 2015 | BA Honours in Archaeology
University of Pretoria, South Africa |
| 2012 - 2014 | BA (General)
University of Pretoria, South Africa
Major subjects: Archaeology and History |

Professional Qualifications

Professional Archaeologist - Association of Southern African Professional Archaeologists -
Professional Member – No 526

Key Work Experience

- 2020 – to date: Archaeologist - PGS Heritage
- 2018 – 2019: Assistant Manager at the Archaeology Laboratory on South Campus at the University of Pretoria