

HERITAGE IMPACT ASSESSMENT

(REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999))

FOR THE PROPOSED HENDRINA GREEN HYDROGEN AND AMMONIA FACILITY, MPUMALANGA PROVINCE

Type of development:

Renewable Energy

Client:

Cabanga Environmental

Developer:

Hendrina South Wind Energy Facility (RF) Pty Ltd



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Responsibility	Name	Qualifications and Certifications	Date
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REPORT OUTLINE

Appendix 6 of the GNR 326 EIA Regulations published on 7 April 2017 provides the requirements for specialist reports undertaken as part of the environmental authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

Table 1. Specialist Report Requirements.

Requirement from Appendix 6 of GN 326 EIA Regulation 2017	Chapter
(a) Details of - (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Section a Section 12
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	<i>Declaration of Independence</i>
(c) Indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA) an indication of the quality and age of base data used for the specialist report	Section 3.4 and 7.1.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	9
(d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.4
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3
(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 site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 8 and 9
(h) 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 8
(I) Description of any assumptions made and any uncertainties or gaps in knowledge	Section 3.7
(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 or activities;	Section 1.3
(k) Mitigation measures for inclusion in the EMPr	Section 10.1
(l) Conditions for inclusion in the environmental authorisation	Section 10. 1.
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10. 5.
(n) Reasoned opinion - (i) as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (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 10.3
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 6
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to EIA report
(q) Any other information requested by the competent authority	N.A

Executive Summary

Cabanga Environmental was appointed by Enertrag South Africa (hereafter “Enertrag”) to undertake an Environmental Impact Assessment (EIA) process for the proposed **Green Hydrogen and Ammonia Facility**. Three alternative sites are included in the investigations for the development of the proposed Facility:

- Option 1 is located on Portion 3 of the Farm Dunbar189 IS
- Option 2 is located east of Option 1, also on Portion 3 of the Farm Dunbar189 IS and Portion 18 of the Farm Weltevreden 193 IS
- Option 3 is located on Portions 14 and 15 of the Farm Weltevreden 193 IS

The sites fall within the Steve Tshwete Local Municipality of the Nkangala District Municipality.

Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the project and the study area was assessed through a desktop assessment and by a non-intrusive pedestrian field survey. Key findings of the assessment include:

- The Project area is characterised by extensive cultivated fields and is considered to be of low archaeological potential;
- This was confirmed during the field survey and no archaeological sites of significance were noted and finds were limited to ruins and graves;
- This assessment recorded the range of heritage resources expected in the Project area however more sites could be recorded during the pre-construction walkthrough;
- According to the SAHRA Paleontological sensitivity map the study area is of very high paleontological significance (Figure 8.9) and an independent study was conducted for this aspect. Bamford (2022) concluded that it is extremely unlikely that any fossils would be preserved in the loose soils and sands of the Quaternary. There is a very small chance that fossils may occur in the shales and siltstones of the early Permian Vryheid Formation, but only more than 5m below the surface, therefore, a Fossil Chance Find Protocol should be added to the EMPr.


The impact to heritage resources can be mitigated to an acceptable level provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.

Recommendations:

- Implementation of a chance find procedure for the project (as outlined in Section 10.2);
- Avoidance of burial sites (Waypoint 088) with a 50 m buffer and access for family members;
- Identified ruins (Waypoint 067 – 071 and 082) should be indicated on development plans and avoided during construction.
- Based on the potential risks associated with Option 1 and Option 3 it is recommended that these options are avoided due to the presence of a burial site (Waypoint 088) and ruins (Waypoint 067 to 071);
- Pre-construction heritage walkdown of final layout.

○

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	<p>I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations, that I:</p> <ul style="list-style-type: none"> • I act as the independent specialist 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 the specialist report relevant to this application, 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 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; • All the particulars furnished by me in this form are true and correct; and • I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	08/04/2022

a) Expertise of the specialist

Jaco van der Walt has been practising as a CRM archaeologist for 15 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focussing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia, Guinea, Afghanistan and Tanzania. Through this, he has a sound understanding of the IFC

Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

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ABBREVIATIONS

ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
BIA: Basic Impact Assessment
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DEA: Department of Environmental Affairs
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMPr: Environmental Management Programme
ESA: Early Stone Age
ESIA: Environmental and Social Impact Assessment
GIS Geographical Information System
GPS: Global Positioning System
GRP Grave Relocation Plan
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MSA: Middle Stone Age
NEMA National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID Notification of Intent to Develop
NoK Next-of-Kin
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

1 Introduction and Terms of Reference:

Beyond Heritage was appointed to conduct a HIA for the proposed construction of the proposed **Green Hydrogen and Ammonia Facility** on various Portions of the Farms Dunbar 189 IS, Halfgewonnen 190 IS and Weltevrede 193 IS. Three alternative sites are included in the investigations for the development of the proposed

Facility:

- Option 1 is located on Portion 3 of the Farm Dunbar189 IS
- Option 2 is located east of Option 1, also on Portion 3 of the Farm Dunbar189 IS and Portion 18 of the Farm Weltevrede 193 IS
- Option 3 is located on Portions 14 and 15 of the Farm Weltevrede 193 IS.

The sites fall within the Steve Tshwete Local Municipality of the Nkangala District Municipality (Figure 1.1 to 1.3). The report forms part of the EIA report and Environmental Management Programme Report (EMPr) for the development.

The aim of the study is to survey the proposed development footprint to identify cultural heritage sites, document, and assess their importance within local, provincial, and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999). The report outlines the approach and methodology utilized before and during the survey, which includes Phase 1, review of relevant literature; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey, burial sites and ruins were recorded. General site conditions and features on sites were recorded by means of photographs, GPS locations and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all environmental documents, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA for commenting. Upon submission to SAHRA the project will be automatically given a case number as reference. As such the EIA report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

1.1 Terms of Reference

Field study

Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

1.2 Project Description

Project components and the location of the proposed WEF are outlined under Table 2 and 3.

Table 2: Project Description

Farm and Magisterial District	<p>Three alternative sites are included in the investigations for the development of the proposed Facility:</p> <ul style="list-style-type: none"> • Option 1 is located on Portion 3 of the Farm Dunbar189 IS • Option 2 is located east of Option 1, also on Portion 3 of the Farm Dunbar189 IS and Portion 18 of the Farm Weltevreden 193 IS • Option 3 is located on Portions 14 and 15 of the Farm Weltevreden 193 IS <p>The sites fall within the Steve Tshwete Local Municipality of the Nkangala District Municipality.</p>
Central co-ordinate of the development	<p>Option 1 26°11'53.49"S 29°33'4.61"E Option 2 26°12'16.13"S 29°33'40.25"E Option 3 26°11'20.18"S 29°35'2.60"E</p>
Topographic Map Number	2629BA

Table 3: Infrastructure and project activities

Type of development	Renewable Energy Facility
Project Components and extent of project components	<p>Three alternative Project locations are being investigated for the development of the proposed Project:</p> <ul style="list-style-type: none"> • Site Alternative 1 is located on Portion 3 of the Farm Dunbar 189IS, at the site of an old, abandoned farmyard. <p>Site Alternative 1 has three powerline options from the associated wind farms as follows:</p> <ul style="list-style-type: none"> • Powerline option 1 is up to 2km in length, to the North WEF substation Option 1 on Portion 1 of the Farm Dunbar 189IS; • Powerline option 2 is up to 7km in length, to the North WEF substation Option 2 on Portion 3 of the Farm Hartebeestkuil 185IS; • Powerline option 3 is up to 1.5km in length, to the South WEF substation on Portion 3 of the Farm Dunbar 189IS. <p>Site Alternative 1 has two options for water supply to the Site:</p> <ul style="list-style-type: none"> • Water Option 1: constructing a new pipeline (up to 16km) from the Komati Power Station • Water Option 2: constructing a new pipeline (up to 4km) from the Usuthu water pipeline network. <p>Site Alternative 2 is located on Portion 3 of the Farm Dunbar 189IS and Portion 18 of the Farm Weltevreden 193IS, adjacent to the proposed South WEF substation.</p> <p>Site Alternative 2 has three powerline options from the associated wind farms as follows:</p>

	<ul style="list-style-type: none"> • Powerline option 1 is up to 3km in length to the North WEF Option 1 substation on Portion 1 of the Farm Dunbar 189IS; • Powerline option 2 is up to 8km in length to the North WEF substation Option 2 on Portion 3 of the Farm Hartebeestkuil 185IS; • Powerline option 3 is up to 0.5km in length to the South WEF substation on Portion 3 of the Farm Dunbar 189IS. <p>Site Alternative 2 has two options for water supply to the Site:</p> <ul style="list-style-type: none"> • Water Option 1: constructing a new pipeline (up to 17km) from the Komati Power Station • Water Option 2: constructing a new pipeline (up to 5km) from the Usuthu water pipeline network. <p>Site Alternative 3 is located on Portions 14 and 15 of the Farm Weltevreden 193IS.</p> <p>Site Alternative 3 has three powerline options from the associated wind farms as follows:</p> <ul style="list-style-type: none"> • Powerline option 1 is up to 5km in length to the North WEF Option 1 substation on Portion 1 of the Farm Dunbar 189IS; • Powerline option 2 is up to 5km in length to the North WEF substation Option 2 on Portion 3 of the Farm Hartebeestkuil 185IS; • Powerline option 3 is up to 7km in length to the South WEF substation on Portion 3 of the Farm Dunbar 189IS. <p>Site Alternative 3 has two options for water supply to the Site:</p> <ul style="list-style-type: none"> • Water Option 1: constructing a new pipeline (up to 19km) from the Komati Power Station. • Water Option 2: constructing a new pipeline (up to 7km) from the Usuthu water pipeline network.
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1.3 Alternatives

Three alternative sites are included in the investigations for the development of the proposed Facility:

- Option 1 is located on Portion 3 of the Farm Dunbar189 IS
- Option 2 is located east of Option 1, also on Portion 3 of the Farm Dunbar189 IS and Portion 18 of the Farm Weltevreden 193 IS
- Option 3 is located on Portions 14 and 15 of the Farm Weltevreden 193 IS

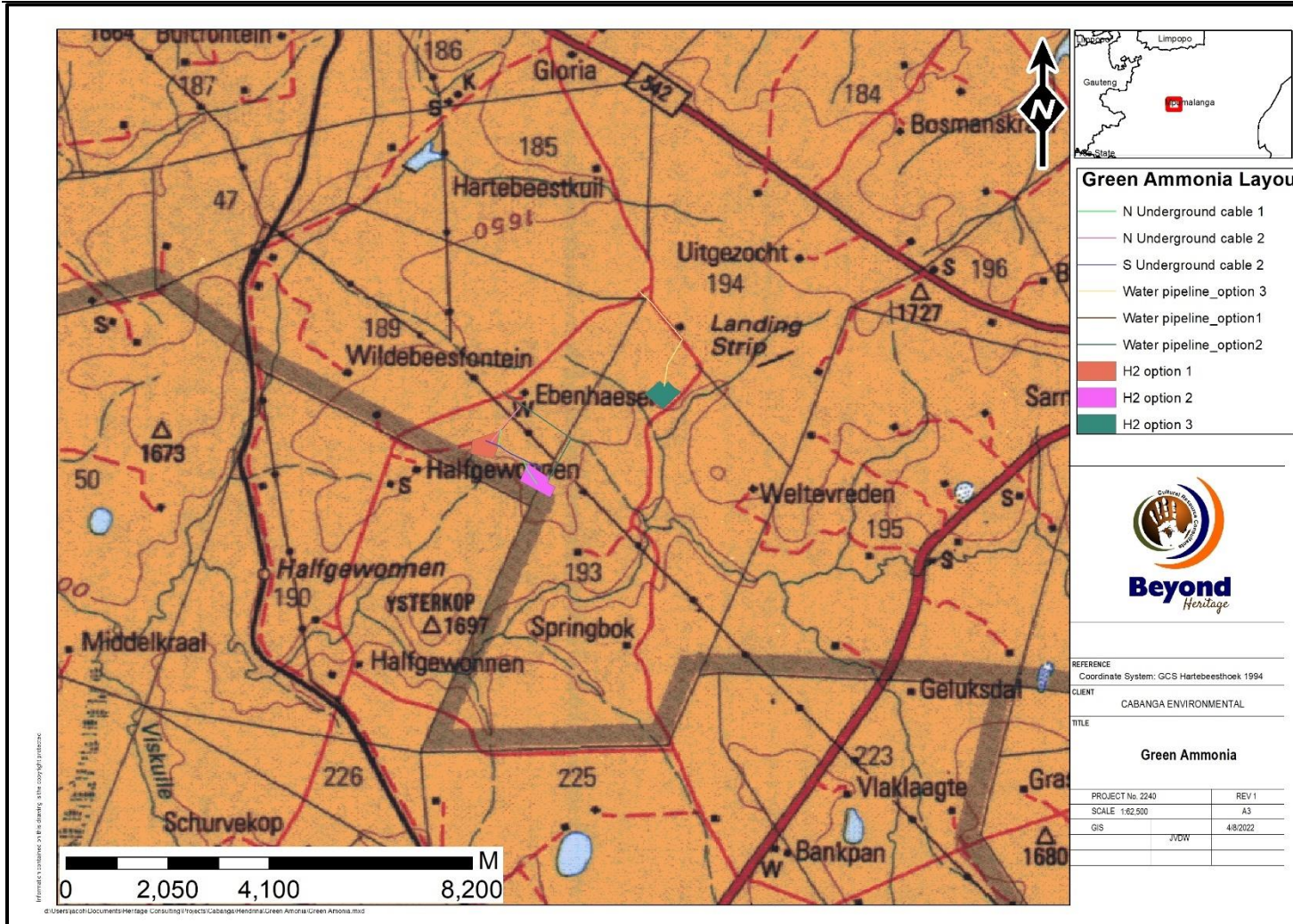


Figure 1.1. Regional setting of the Project (1: 250 000 topographical map).

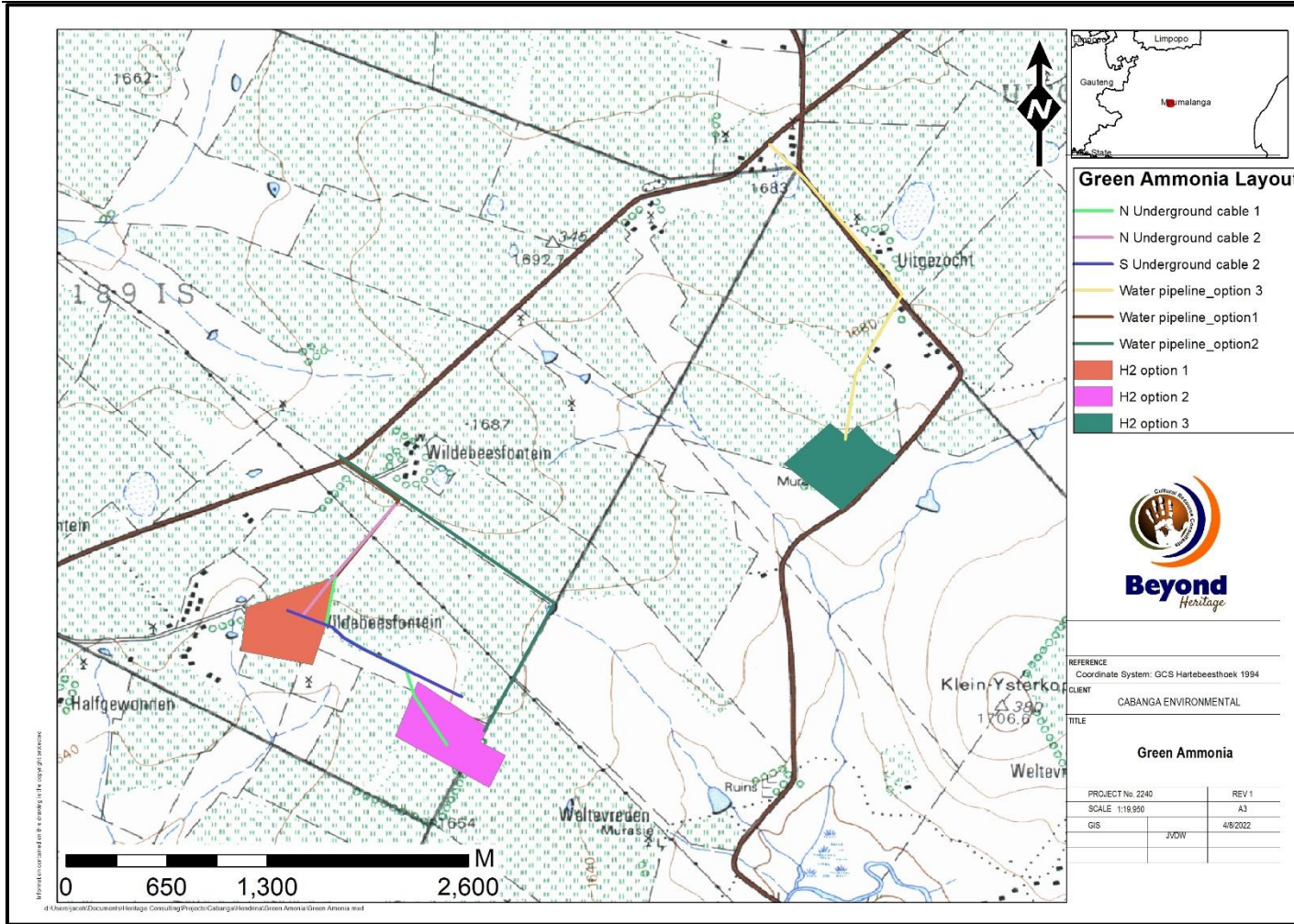


Figure 1.2. Local setting of the Project (1: 50 000 topographical map). Note the extensive cultivation in the Project Area.

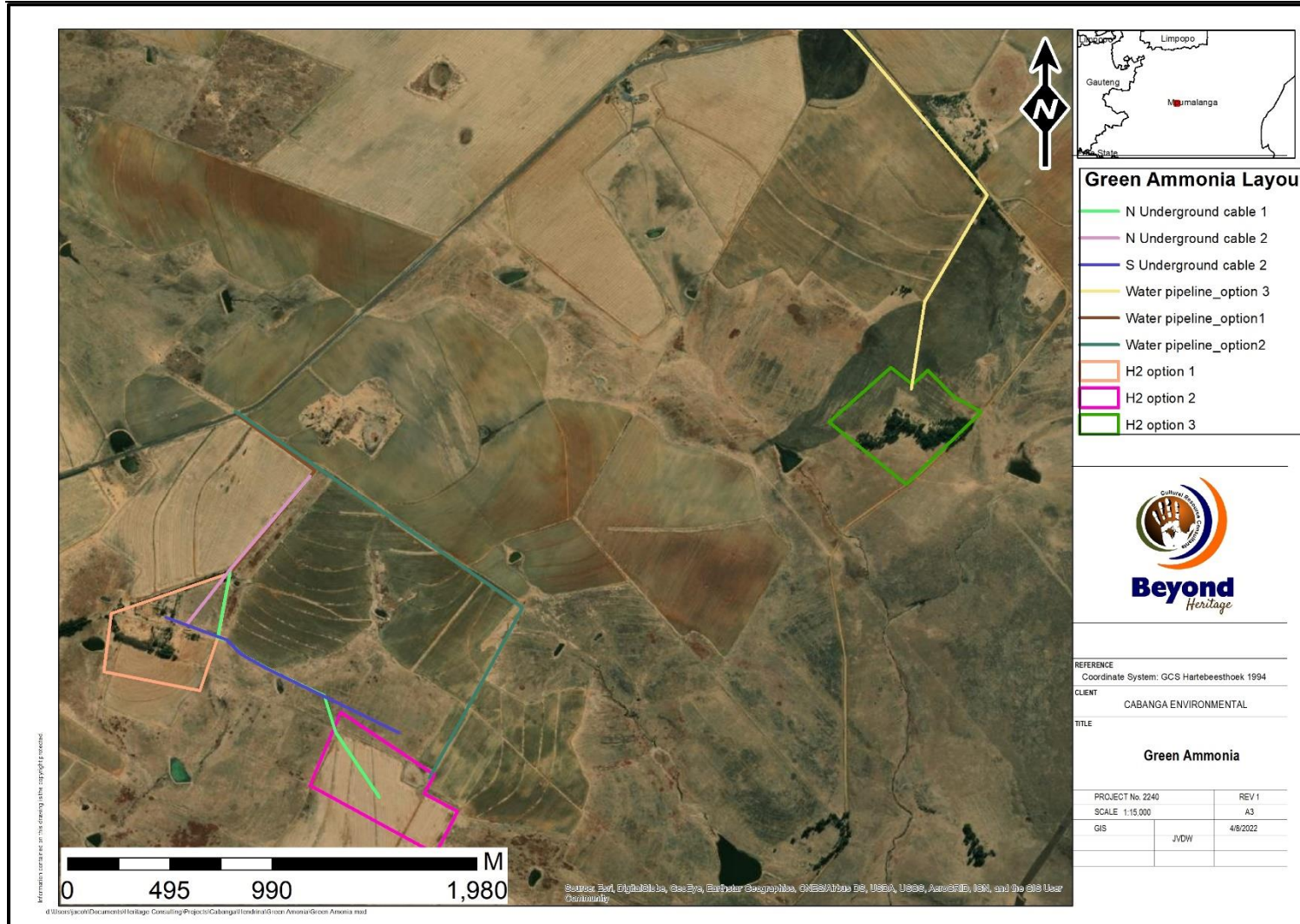


Figure 1.3. Aerial image of the proposed layout.

2 Legislative Requirements

The HIA, as a specialist sub-section of the EIA, is required under the following legislation:

- National Heritage Resources Act (NHRA), Act No. 25 of 1999)
- National Environmental Management Act (NEMA), Act No. 107 of 1998 - Section 23(2)(b)
- Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 - Section 39(3)(b)(iii)

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation.

The overall purpose of heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess the negative and positive impact of the development on these resources; and
- Make recommendations for the appropriate heritage management of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the PHRA if established in the province or to SAHRA. SAHRA will ultimately be responsible for the evaluation of Phase 1 HIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 HIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 HIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level). Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 HIA's are primarily concerned with the location and identification of heritage sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision-making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for with SAHRA by the applicant before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999 is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

3 METHODOLOGY

3.1 Literature Review

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS).

3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the fieldwork phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any EA process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings.

3.4 Site Investigation

The aim of the site visit was to:

- a) survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest;
- b) record GPS points of sites/areas identified as significant areas;
- c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Table 4: Site Investigation Details

	Site Investigation
Date	The week of 23 August 2021
Season	Summer – Heritage visibility was low due to extensive cultivated fields. The layout was also slightly changed after the survey due to environmental constraints resulting in some areas not being physically surveyed. The Project area was sufficiently covered to understand the heritage character of the area (Figure 3.1).

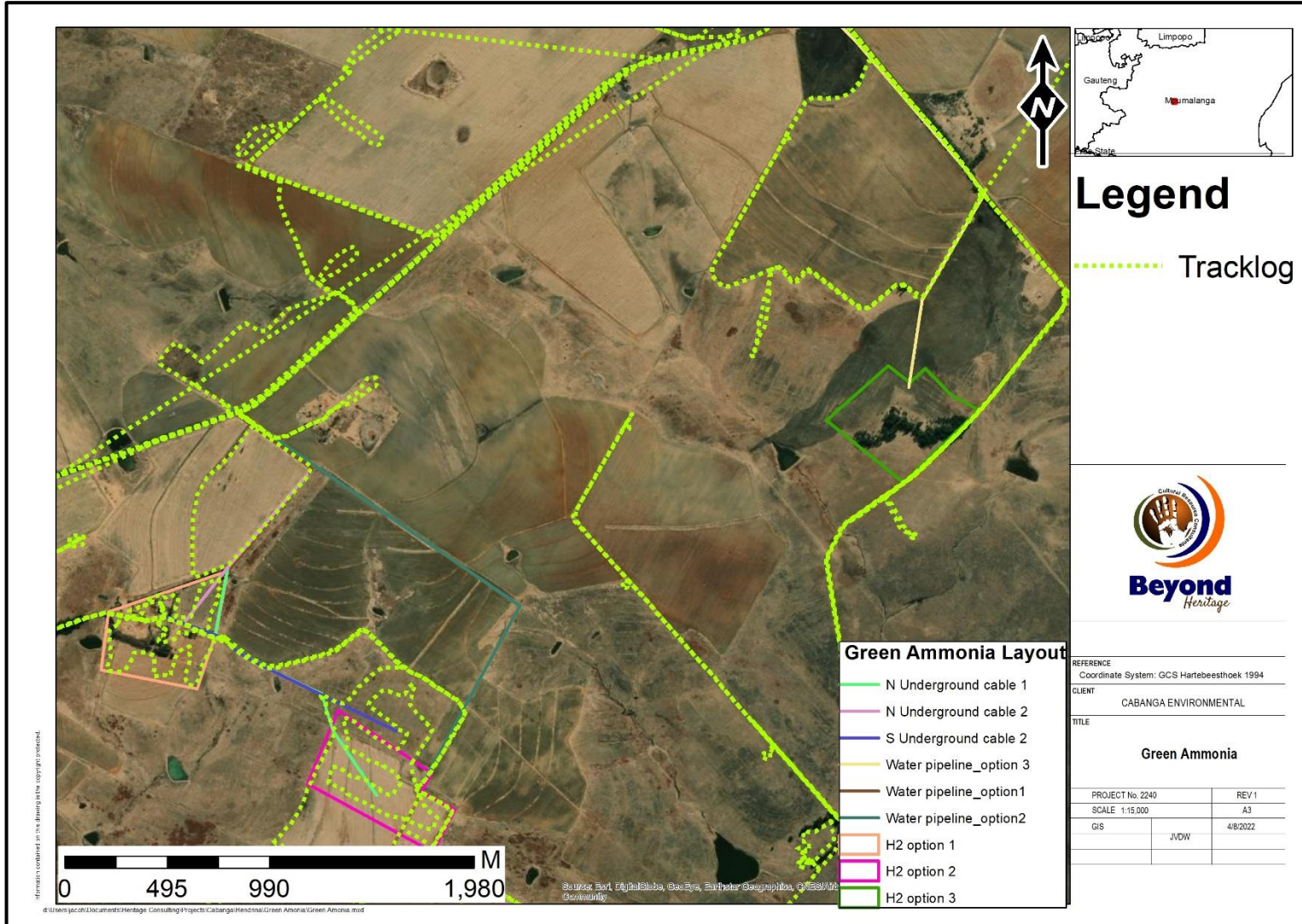


Figure 3.1. Tracklog of the survey path in green.

3.5 Site Significance and Field Rating

Section 3 of the NHRA distinguishes nine criteria for places and objects to qualify as ‘part of the national estate’ if they have cultural significance or other special value. These criteria are:

- Its importance in/to the community, or pattern of South Africa’s history;
- Its possession of uncommon, rare or endangered aspects of South Africa’s natural or cultural heritage;
- Its potential to yield information that will contribute to an understanding of South Africa’s natural or cultural heritage;
- Its importance in demonstrating the principal characteristics of a particular class of South Africa’s natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- Sites of significance relating to the history of slavery in South Africa.

The presence and distribution of heritage resources define a ‘heritage landscape’. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface. This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance with cognisance of Section 3 of the NHRA:

- The unique nature of a site;
- The integrity of the archaeological/cultural heritage deposits;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined/is known);
- The preservation condition of the sites; and
- Potential to answer present research questions.

In addition to this criteria field ratings prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 10 of this report.

Table 5: Heritage significance and field ratings

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP. A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP. B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

3.6 Impact Assessment Methodology

The following impact assessment rating was provided by the client and was used in this assessment.

	Weight	Description																			
Probability	1	Unlikely: Impact Could occur in extreme events. Less than 15% chance of the impact ever occurring.																			
	2	Possible: possibility of impact occurring is very low due to design or historic experience. Between 16% and 30% chance of the impact occurring.																			
	3	Probable There is a distinct possibility of the impact occurring at least once during the project lifespan. 31% to 60% chance of the impact occurring.																			
	4	Highly Probable: The impact is expected to occur. Between 61% and 85 % chance of the impact occurring.																			
	5	Definite: There are sound scientific reasons to expect that the impact will occur and cannot be prevented.																			
Duration	1	Short term: Less than 1 year																			
	2	Short to medium term: 2 - 3 years																			
	3	Medium term - 3 to 10 years																			
	4	Long term: 11-20 years																			
	5	Permanent: in excess of 20 years																			
Scale / Extent	1	Isolated: Limited footprint within the site will be affected (less than 50% of the site)																			
	2	Site Specific: The Entire Site will be affected																			
	3	Local: Will affect the site and surrounding areas																			
	4	Regional: Will affect the entire region / catchment / province																			
	5	National: Will affect the country, and possibly beyond the borders of the country																			
Magnitude/ Severity (Negative)	1	Slight: Little effect, negligible disturbance / benefit																			
	2	Slight to Moderate: Effects are observable but natural process continue without significant alteration																			
	3	Moderate: The effects of the impact change ecosystem processes / social dynamics and results in these processes being permanently altered, but functioning.																			
	4	Moderate - High: The effects of the impact permanently alter natural / social processes to the point where function is limited																			
	5	High: The aspect is affected to such an extent that its functioning is compromised and this effect is irreversible																			
Sensitivity of the Aspect	1	Not sensitive: The affected aspect is not sensitive to change or of particular significance to people (No irreplaceable loss of resource)																			
	2	Somewhat sensitive: The affected aspect is of not of significant value but is sensitive to change																			
	3	Sensitive: The affected aspect is of moderate value and is slightly resilient to change																			
	4	Very Sensitive: The affected aspect is of significant value and only slightly resilient to change																			
	5	Irreplaceable: The affected aspect is of significant value and extremely sensitive to change. Direct irreplaceable loss of significant resource																			
Consequence	4 to 19	Insignificant	Likelihood	5	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
		Low		4	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
	3			12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	
	40 to 59	Moderate		2	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
				1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	60 to 79	High		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
80 to 100	Significant	Consequence																			

3.7 Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the nature of heritage resources and pedestrian surveys, the possibility exists that some features or artefacts may not have been discovered/recorded and the possible occurrence of graves and other cultural material cannot be excluded. This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

4 Description of Socio-Economic Environment

Mpumalanga has a youthful population with approximately 64% of the population consisting of economically active people (15 to 34 years of age). This provides significant human resources for future economic growth and sustainability. The project will promote infrastructure and create employment opportunities.

5 Results of Public Consultation and Stakeholder Engagement:

5.1.1 Stakeholder Identification

Adjacent landowners and the public at large were informed of the proposed activity as part of the EIA process by the EAP. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process. No heritage concerns were raised.

6 Literature / Background Study:

6.1 Literature Review (SAHRIS)

The area under investigation was not previously covered by heritage surveys and few HIA's was conducted in the immediate area. Studies conducted in the general area that were consulted is listed in Table 6.

Table 6. Studies conducted in the greater area.

Author	Year	Project	Findings
Huffman, T.N.	1995	Archaeological Survey of Forzano Coal Holdings	Homesteads and Cemeteries
Van Schalkwyk, J	1997	A Survey of Cultural Resources in The Proposed Kleinfontein Mining Area, Mpumalanga Province	Cemeteries and a farm house as well as Stone Age scatters
Van Schalkwyk, J.	2002	A Survey of Cultural Resources for the Koorfontein Mining Development, Middelburg District, Mpumalanga Province	Farmsteads and cemeteries
Van Schalkwyk, J.	2003	Goedehoop Mine, Mpumalanga: Archaeological and Cultural Historical Survey and Impact Assessment	No Sites
Van Vollenhoven, A.C.	2013	A Report on A Cultural Heritage Impact Assessment for A Proposed Mining Right Amendment Application at The Halfgewonnen Colliery, Between Bethal And Hendrina, Mpumalanga Province	No Sites
Van der Walt, J.	2019	Heritage Impact Assessment for The Proposed Dunbar Opencast Coal Mine Mpumalanga Province	Stone cairn, a farmstead and a structure

6.1.1 Google Earth and The Genealogical Society of South Africa (Graves and burial sites)

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located. The database of the Genealogical Society of South Africa indicated no known grave sites within the study area

6.2 Archaeological Background

6.2.1 Stone Age

The Stone Age is divided in Early; Middle and Late Stone Age and refers to the earliest people of South Africa who mainly relied on stone for their tools.

Very few Early Stone Age sites are on record for Mpumalanga and no sites dating to this period are expected for the study area. An example in Mpumalanga is Maleoskop on the farm Rietkloof where ESA tools have been found. This is one of only a handful of such sites in Mpumalanga.

The MSA has not been extensively studied in Mpumalanga but evidence of this period has been excavated at Bushman Rock Shelter, a well-known site on the farm Klipfonteinhoek in the Ohrigstad district. This cave was excavated twice in the 1960's by Louw and later by Eloff. The MSA layers show that the cave was repeatedly visited over a long period. Lower layers have been dated to over 40 000 BP (Before Present)

while the top layers date to approximately 27 000 BP (Esterhuizen & Smith in Delius, 2007; Bergh, 1998). Some isolated finds were recorded close to Witbank as well by Huffman (1999) on the farm Rietfontein.

The Later phases of the Stone Age began at around 20 000 years BP. This period was marked by numerous technological innovations and social transformations within these early hunter-gatherer societies. These people may be regarded as the first modern inhabitants of Mpumalanga, known as the San or Bushmen. They were a nomadic people who lived together in small family groups and relied on hunting and gathering of food for survival. Evidence of their existence is to be found in numerous rock shelters throughout the Eastern Mpumalanga where some of their rock paintings are still visible. A number of these shelters have been documented throughout the Province (Bornman, 1995; Schoonraad in Barnard, 1975; Delius, 2007). These include areas such as Witbank, Ermelo, Barberton, Nelspruit, White River, Lydenburg and Ohrigstad.

Three late Stone Age sites are on record in the greater area. The sites are Welgelegen Skuiling close to Ermelo, Chrissiesmeer (also known for rock art) and lastly Groenvlei close to Carolina, this area is also known for rock art (Bergh 1999).

6.2.2 Iron Age

The Iron Age as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

- The Early Iron Age: Most of the first millennium AD.
- The Middle Iron Age: 10th to 13th centuries AD
- The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living. No Early Iron Age sites are on record in the greater region. Around 220 Late Iron Age stone walled sites are on record to the east of the study area (Bergh 1999) and is also associated with numerous pre-*difaqane* and *difaqane* wars that took place during the last quarter of the 18th century and during the first three decades of the 19th century. The sites are located close to Bethal. The study area was most probably inhabited by the Phuting group (Berg 1999). Around the study area the Phuting moved south due to the Ndebele migration (Difaqane). These wars led to the displacement of large numbers of Tswana clans on the Highveld where Mzilikazi's Ndebele caused chaos and havoc.

Late Iron Age settlements are characterised by extensive dry stonewalls and dates back to the 17th century. Late Iron Age communities who contributed to this stone walled architecture were the Sotho, Pedi, Ndebele and Swazi. The stone building tradition that these indigenous groups established many decades before the first colonial settlers arrived, may have influenced the colonial farmers to utilize these same resources as building material for the first farmsteads which arose on the Eastern Highveld (Pistorius 2006). Late Iron Age sites that have been identified in the larger geographical area is to the west of Bronkhorstspuit and in the vicinity of Bethal (Bergh 1999).

6.2.3 Historical Background

Sites dating to the historic period occur sporadically in the study area. These are mostly farming related, although some mining sites also occur. The farming related sites are usually farmsteads and farm cemeteries, either belonging to the landowners or their labourers. Mining related sites are for example the old Albion Colliery, dating to the 1940's.

6.2.4 The Anglo-Boer War (1899-1902)

The Anglo-Boer War, which took place between 1899 and 1902 in South Africa, was one of the most turbulent times in South Africa's history. Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr. Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicized, and therefore republican leader based their assessment of British intentions on the more moderate public utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace based on the status quo ante bellum. Salisbury's reply was, however, a clear statement of British war aims (Du Preez 1977).

During the Anglo-Boer War, several battles took place in the region. The one closest to the study area took place on the farm Wilmansrust, some distance to the east, in June 1901. During this clash, more than 50 British troops were killed.

7 Description of the Physical Environment

The landscape consists of slightly to moderately undulating plains with some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual highveld grass composition, including species from the genera *Aristida*, *Digitaria*, *Eragrostis*, *Themeda* and *Tristachya*, with small, scattered rocky outcrops of wiry, sour grasses and some woody species such as *Senegalia caffra*, *Celtis africana*, *Diospyros lycioides* subsp *lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschia* and *Englerophytum magalimontanum* (Mucina & Rutherford, 2010). Large sections of the area consist of ploughed fields that have been extensively cultivated for several years and other areas are used for grazing with a rocky sub strata in the south (Figure 7.1 to 7.2).



Figure 7.1. Maize rests in the project area.



Figure 7.2. Grass in the project area.

8 Findings of the Survey

8.1 Heritage Resources

Heritage finds were limited to burial sites and the demolished remains of residential dwellings (Figure 8.1). The recorded observations were given waypoint numbers recorded in the field. General site conditions, site distribution and selected features are illustrated in Figure 8.2 – 8.14. Recorded observations are briefly described in Table 7.

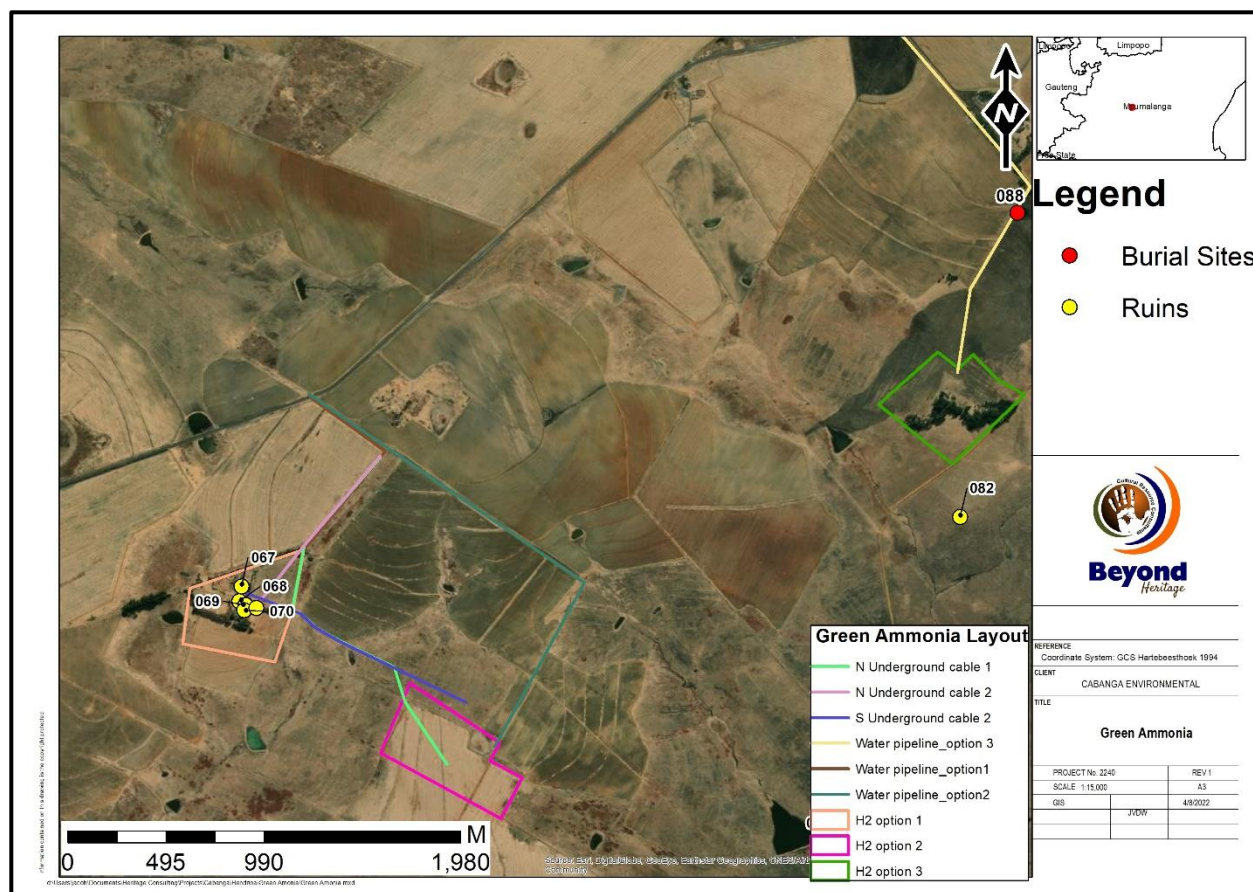


Figure 8.1. Site distribution in relation to the proposed layout.

Table 7. Sites recorded in the study area.

Label	Location	Type Site	Description	Significance and Field Rating
067, 068, 069, 070, 071.	-26.1966837, 29.5516095	Ruins	The site consists of multiple degraded and broken-down structures in an area of 100 x 100 m. These structures could possibly have been part of a farmstead with various buildings such as a house and accompanying infrastructure. The site is surrounded by large trees (pine and eucalyptus). The area is overgrown with grass and weeds.	The ruins potential to contribute to aesthetic, historic, scientific and social aspects are non-existent, and it is therefore of low heritage significance (GP C) unless associated with burial sites (e.g., still born graves) in which case the burial sites are of high social significance (GP A)
082	-26.1934217, 29.5842555	Ruin	A 5 x 5m packed stone wall or square foundation. The remnants of a small, stone packed structure.	The ruins potential to contribute to aesthetic, historic, scientific and social aspects are non-existent, and it is therefore of low heritage significance (GP C) unless associated with burial sites (e.g., still born graves) in which case the burial sites are of high social significance (GP A)
88	-26.1797006, 29.586785	Cemetery	Small cemetery (~40 x 30 m) located next to a main access road into the study area. The cemetery contains multiple graves with grave dressings consisting of granite, cement, and stone packed graves. These include adult as well as children graves. The cemetery contains historical as well as modern graves that are still being maintained.	GP A High Social significance

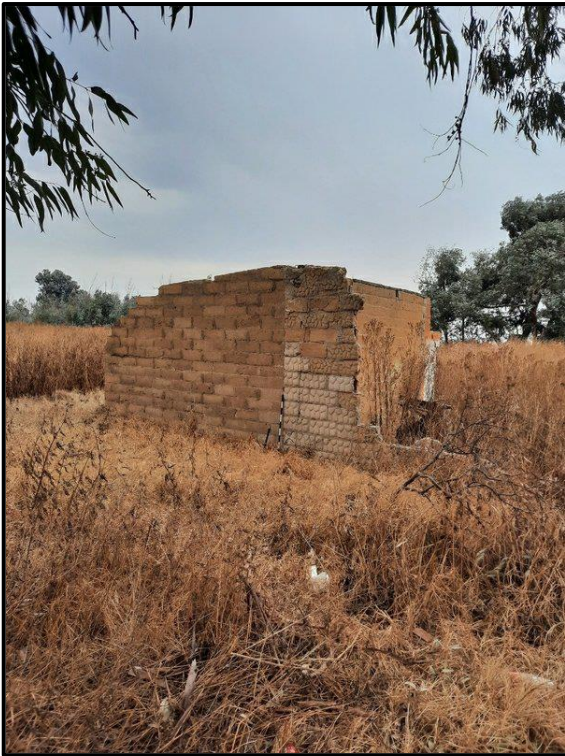


Figure 8.2. Ruin at waypoint 067.

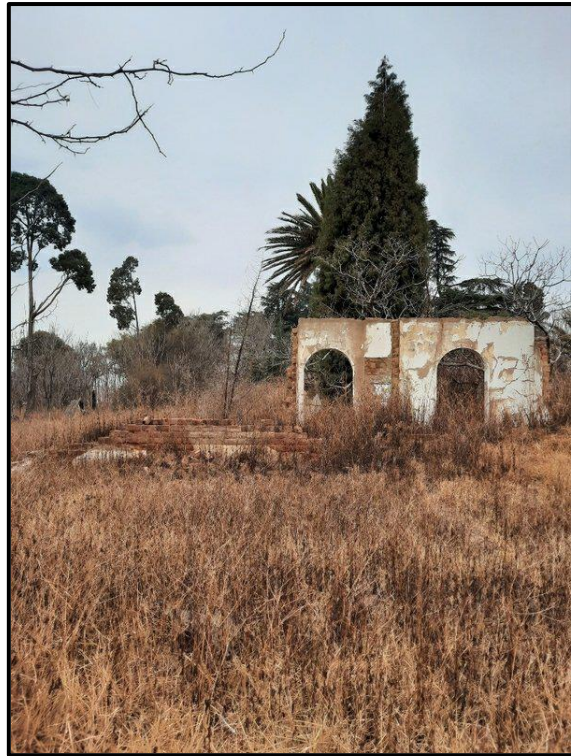


Figure 8.3. Partly demolished ruin at 070.



Figure 8.4. Ephemeral stone packed foundations at Waypoint 082.



Figure 8.5. Range of grave dressings at Waypoint 088.



Figure 8.6. Site conditions at cemetery Waypoint 088.

Due to lay out changes after the completion of the field work some project components were not covered in the field work. The components and the potential heritage sensitivity is listed below in Table 8.

Table 8. Areas not covered during field work and potential heritage sensitivity.

Project Component	Heritage sensitivity	Motivation
Option 3	High	Ruins of the Weltevreden Farmstead indicated on aerial images and historical topographical maps.

8.2 Cultural Landscape

The study area is in a rural setting and characterised by cultivation and agricultural activities with a historical layering consisting of burial sites and dwellings dating from prior to 1965 (Figure 8.14 to 8.15).

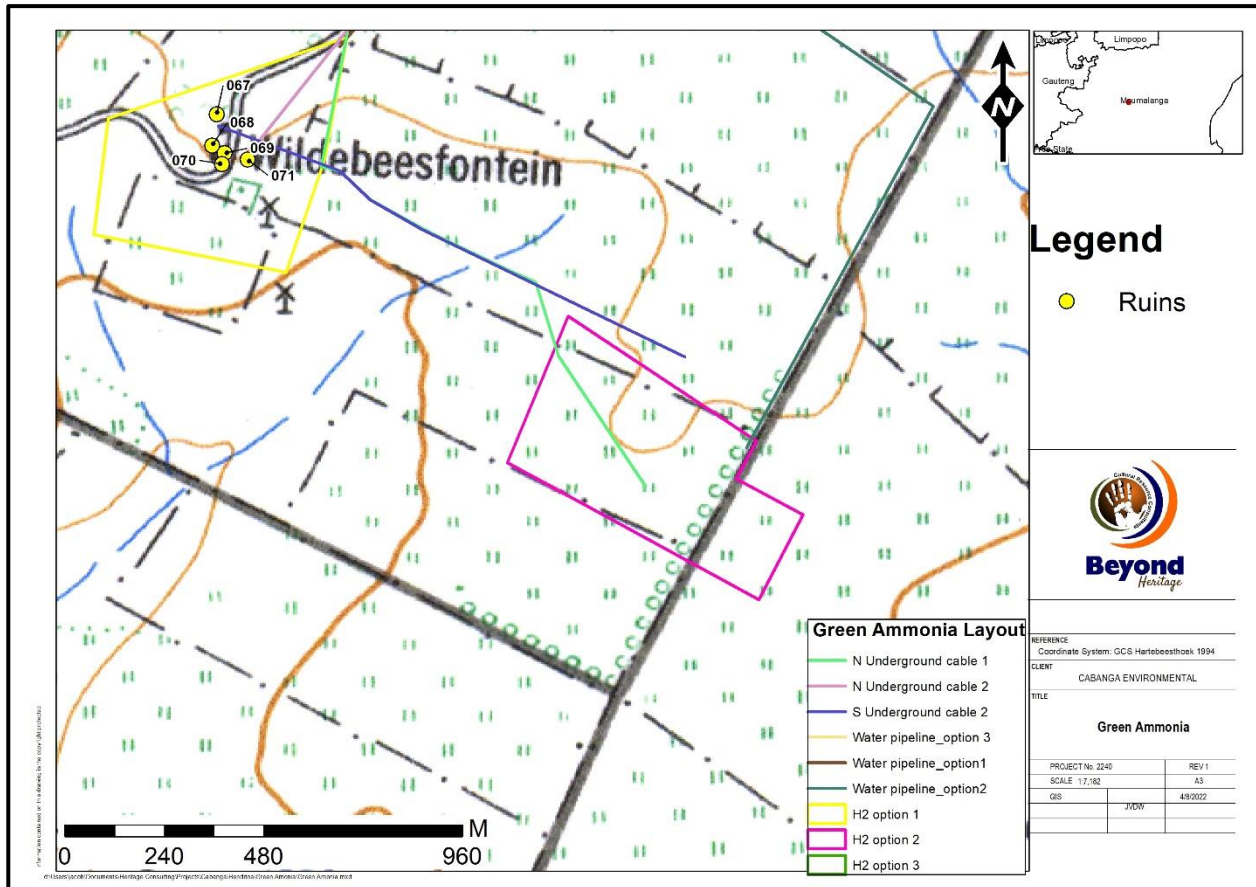


Figure 8.7. 1965 Topographic map of the area showing the structures and graves at Waypoint 067 to 071 were present prior to 1965.

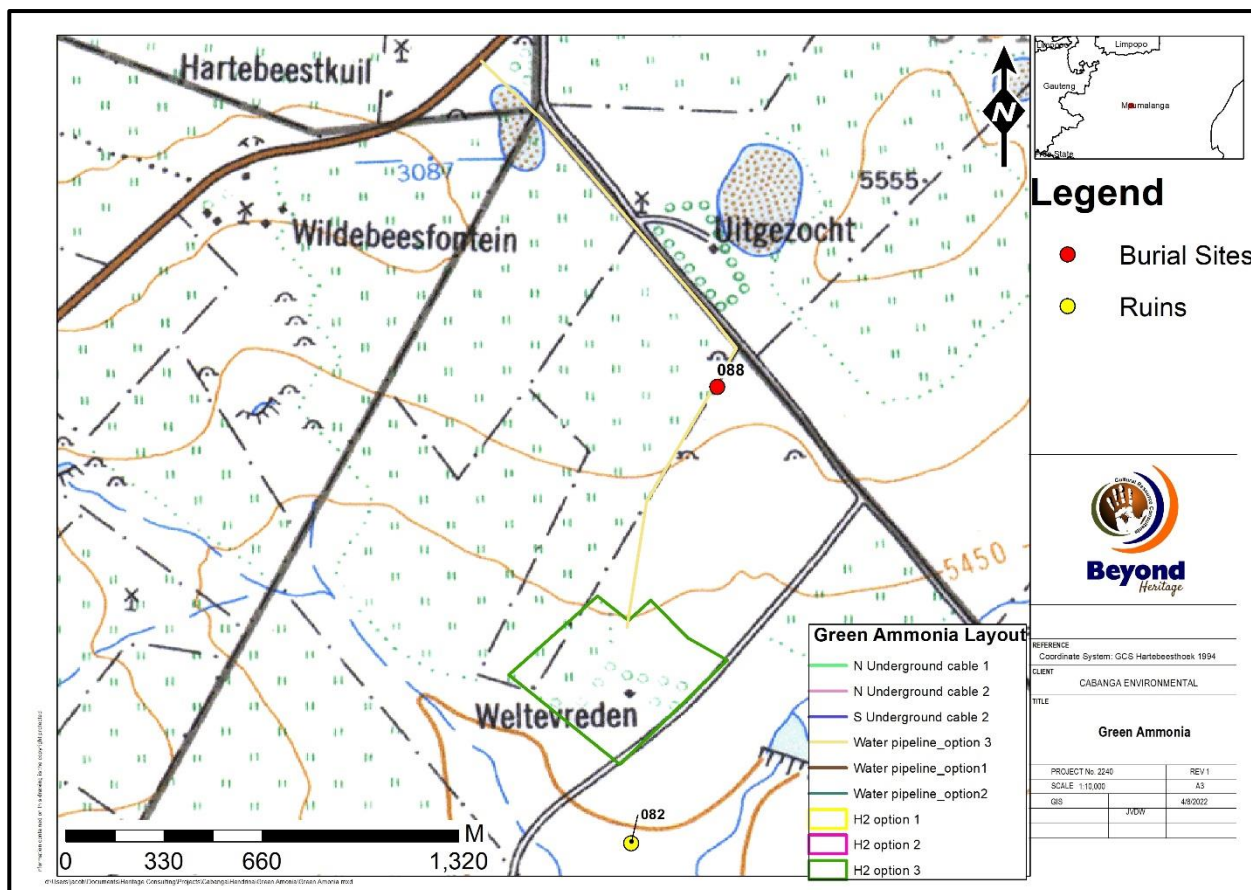
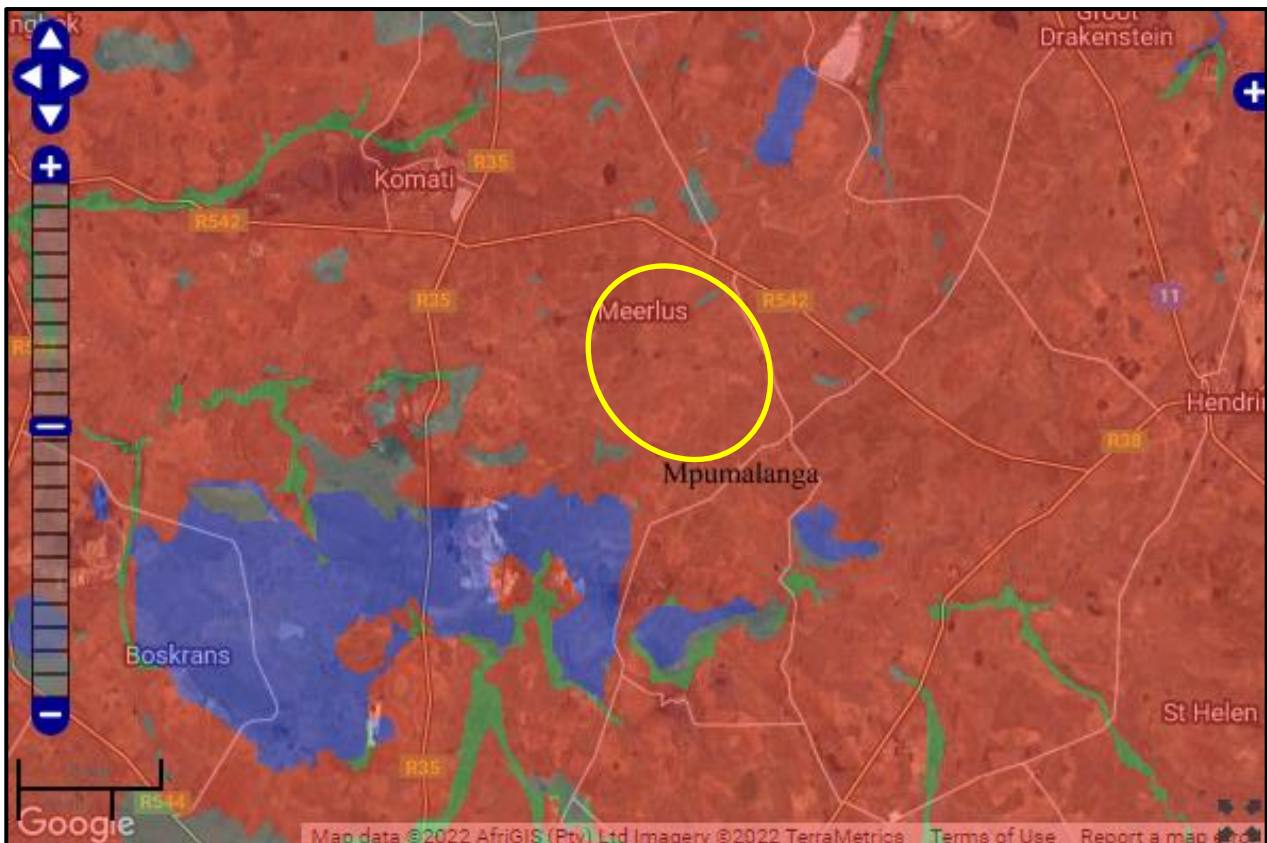


Figure 8.8.1965 Topographic map showing the location of Waypoint 082 and 088.

8.3 Paleontological Heritage

According to the SAHRA Paleontological map the study area is of very high paleontological significance (Figure 8.16) and an independent study was conducted for this aspect. Bamford (2022) concluded that it is extremely unlikely that any fossils would be preserved in the loose soils and sands of the Quaternary. There is a very small chance that fossils may occur in the shales and siltstones of the early Permian Vryheid Formation, but only more than 5m below the surface, therefore, a Fossil Chance Find Protocol should be added to the EMPr.:



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map

Figure 8.9. Paleontological sensitivity of the approximate study area (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map.

9 Potential Impact

Impacts to heritage resources without mitigation within the project footprint will be permanent and negative and occur during the pre-construction and construction activities. The recorded ruins (Waypoints 067 – 071 and 082) potential to contribute to aesthetic, historic, scientific and social aspects are non-existent, and it is therefore of low heritage significance unless associated with burial sites (e.g., still born graves) in which case the burial sites are of high social significance. The recorded burial sites (Waypoints 088) are of high social significance.

Based on the current lay out (Figure 9.1, 9.2 and 9.3) the ruins at Waypoint 067 – 071 will be directly impact on by Option 1 and although of low significance the possible presence of graves is a risk, and the impact is high. Option 3 is from a heritage point of view not a preferred option due to the occurrence of ruins (based on aerial photographs and Topographical maps) of the Weltevreden Farmstead. This option is not preferred from a heritage point of view as the associated water pipeline will also have a high impact on the burial site at Waypoint 088

Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure. Mitigation measures for specific sites as outlined under Table 8 and additional recommendations in this report should be implemented during all phases of the project. With the implementation of the recommended mitigation measures impacts of the project on heritage resources is acceptable (Table 9).

Cumulative impacts considered as an effect caused by the proposed action that results from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions. (Cornell Law School Information Institute, 2020). Cumulative impacts occur from the combination of effects of various impacts on heritage resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. In the case of this project, impacts can be mitigated to an acceptable level. However, this and other projects in the area can have a negative impact on heritage sites in the area where these sites have been destroyed unknowingly.

9.1.1 Pre-Construction phase

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can have a negative and irreversible impact on heritage features if any occur. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.2 Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. Potential impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.3 Operation Phase

No impacts are expected during the operation phase.

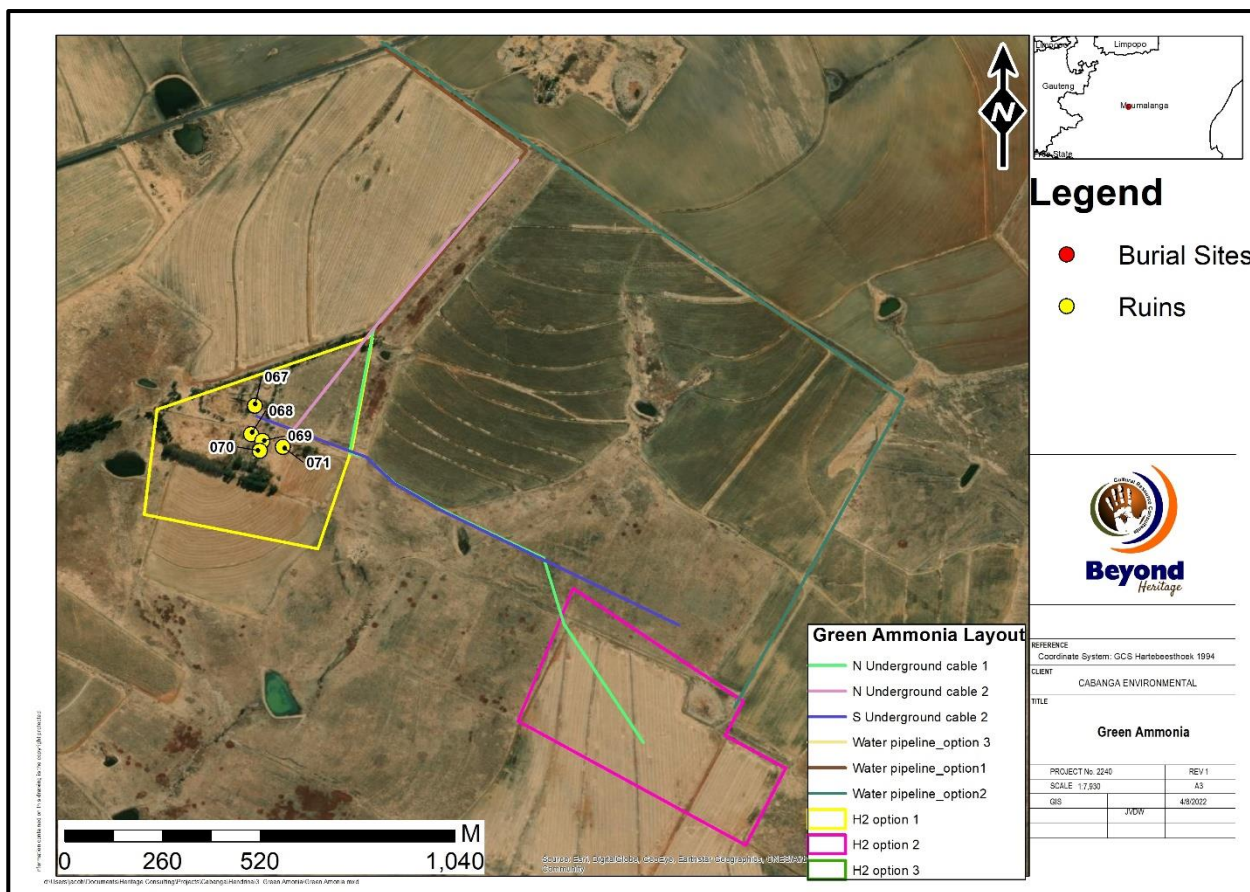


Figure 9.1. Direct impact to demolished ruins (067 - 071) Option 1.

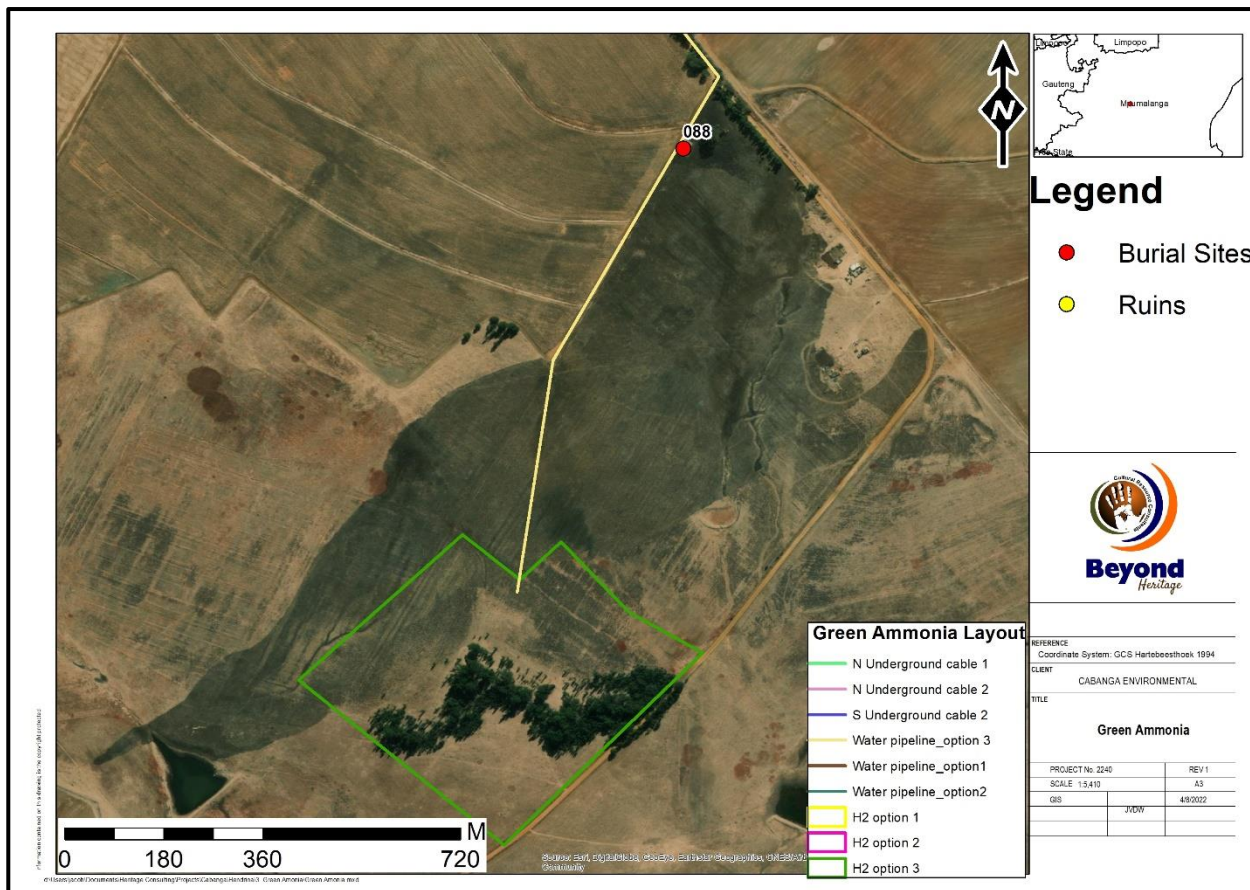


Figure 9.2. The impact of Option 3 on Waypoint 088 is high, and the ruins of the Weltevrede Farmstead are located in this option as well.

9.1.4 Impact Assessment for the Project

Table 9. Impact assessment for the project.

No	Activity	Aspect	Impact / Risk Description	Nature of Impact	Probability	Sensitivity of the Aspect	Severity of the Impact (Magnitude)	Duration	Scale / Extent	Significance (without Mitigation)	Management Actions	Probability	Sensitivity of the Aspect	Severity of the Impact	Duration	Scale / Extent	Significance (with Mitigation)
1	Option 3	Burial site at Waypoint 081	Clearing, levelling and construction activities	Negative	4 Highly Probable	4 Very sensitive	5 High	5 Permanent	3 Local	68 High	Avoidance of the graves and retaining the graves in situ with a 50 m buffer.	1 Unlikely	3 Sensitive	5 High	5 Permanent	2 Site	15 Insignificant
2	Option 1	Ruins at Waypoint 067 - 071	Destruction of ruins	Negative	5 Definite	2 Somewhat sensitive	3 Moderate	5 Permanent	2 Site	60 High	The features can be associated with the graves of still borns and should be avoided during construction.	1 Unlikely	2 Somewhat sensitive	2 Slight to Moderate	5 Permanent	2 Site	11 Insignificant
3	Option 1	Burial site at Waypoint 088	Clearing, levelling and construction activities	Negative	4 Highly Probable	4 Very sensitive	5 High	5 Permanent	3 Local	68 High	Avoidance of the graves and retaining the graves in situ with a 50 m buffer.	1 Unlikely	3 Sensitive	5 High	5 Permanent	2 Site	15 Insignificant
4	Construction of infrastructure	Ruins at Waypoint 082	Clearing, levelling and construction activities will permanently destroy heritage features.	Negative	2 Possible	2 Somewhat sensitive	3 Moderate	5 Permanent	2 Site	24 Low	The features can be associated with the graves of still borns and should be avoided during construction.	1 Unlikely	2 Somewhat sensitive	2 Slight to Moderate	5 Permanent	2 Site	11 Insignificant

10 Conclusion and recommendations

The Project area is characterised by extensive cultivated fields and is considered to be of low archaeological potential. This was confirmed during the field survey and no archaeological sites of significance were noted and finds were limited to the ephemeral remains of demolished dwellings and burial sites.

The recorded ruins' potential to contribute to aesthetic, historic, scientific, and social aspects are non-existent, and it is therefore of low heritage significance unless associated with burial sites (e.g., still born graves) in which case the burial sites are of high social significance. The graves are of high significance and should be avoided.

Based on the current lay out (Figure 9.1, 9.2 and 9.3) the ruins at Waypoint 067 – 071 will be directly impact on by Option 1 and although of low significance the possible presence of graves is a risk, and the impact is high. Option 3 is from a heritage point of view not a preferred option due to the occurrence of ruins (based on aerial photographs and Topographical maps) of the Weltevreden Farmstead. This option is not preferred from a heritage point of view as the associated water pipeline will also have a high impact on the burial site at Waypoint 088

According to the SAHRA Paleontological sensitivity map the study area is of very high paleontological significance (Figure 8.9) and an independent study was conducted for this aspect. Bamford (2022) concluded that it is extremely unlikely that any fossils would be preserved in the loose soils and sands of the Quaternary. There is a very small chance that fossils may occur in the shales and siltstones of the early Permian Vryheid Formation, but only more than 5m below the surface, therefore, a Fossil Chance Find Protocol should be added to the EMPr:

The impact to heritage resources can be mitigated to an acceptable level provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval

10.1 Recommendations for condition of authorisation

The following recommendations for Environmental Authorisation apply and the project may only proceed based on approval from SAHRA:

Recommendations:

- Implementation of a chance find procedure for the project (as outlined in Section 10.2);
- Avoidance of burial sites (Waypoint 088) with a 50 m buffer and access for family members;
- Identified ruins (Waypoint 067 – 071 and 082) should be indicated on development plans and avoided during construction.
- Based on the potential risks associated with Option 1 and Option 3 it is recommended that these options are avoided due to the presence of a burial site (Waypoint 088) and ruins (Waypoint 067 to 071);
- Pre-construction heritage walkdown of final layout.

10.2 Chance Find Procedures

10.2.1 Heritage Resources

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefore chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below and monitoring guidelines for this procedure are provided in Section 10.5.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

10.2.2 Chance find protocol for Paleontology – to commence once the excavations / mining activities begin.

1. The following procedure is only required if fossils are seen on the surface and when mining commences.
2. When excavations begin the sand must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.

7. If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished, then no further monitoring is required.

10.3 Reasoned Opinion

The overall impact of the project is considered to be low and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

10.4 Potential risk

Potential risks to the proposed project are the occurrence of intangible features and unrecorded cultural resources (of which graves and subsurface cultural material are the highest risk). This can cause delays during construction, as well as additional costs involved in mitigation, as well as additional layout changes.

10.5 Monitoring Requirements

Day to day monitoring can be conducted by the Environmental Control Officers (ECO). The ECO or other responsible persons should be trained along the following lines:

- *Induction training:* Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
- *Site monitoring and watching brief:* As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are from pre-construction and construction activities. The ECO should monitor all such activities daily. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 10. Monitoring requirements for the project

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
Cultural Heritage Resources	Entire project area	ECO	Weekly (Pre construction and construction phase)	Proactively	<ul style="list-style-type: none"> • If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented: <ol style="list-style-type: none"> 1. Cease all works immediately; 2. Report incident to the Sustainability Manager; 3. Contact an archaeologist/ palaeontologist to inspect the site; 4. Report incident to the competent authority; and 5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities.

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
					<ul style="list-style-type: none"> • Only recommence operations once impacts have been mitigated.

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10.6 Management Measures for inclusion in the EMPr

Table 11. Heritage Management Plan for EMPr implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
General project area	Implement chance find procedures in case possible heritage finds are uncovered	Construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
Graves at 088	Avoid and retain in situ with a 50 m buffer.	Pre Construction	Throughout the project	Applicant/ EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 of NHRA	ECO Checklist/Report
Option 1 and 3	Avoid this area for development alternatively mitigation measures will have to be employed including social consultation, monitoring and a development of a management plan.	Pre construction and during construction	Pre-Construction and construction	Applicant/ EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34 and 36 of NHRA	ECO Checklist/Report
Final Layout	Heritage walkthrough of final layout.	Pre-Construction	Pre-construction	Applicant/ EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	Heritage Statement

10.7 Knowledge Gaps

Due to the extensive cultivation of the study area and the often-ephemeral nature of heritage resources, the possibility of discovery of heritage resources during the construction phase cannot be excluded. This limitation is successfully mitigated with the implementation of a chance find procedure and monitoring of the study area by the ECO. Due to lay out changes after the field work was conducted some areas were not covered by the field survey this will be addressed by a pre-construction heritage walk through.

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