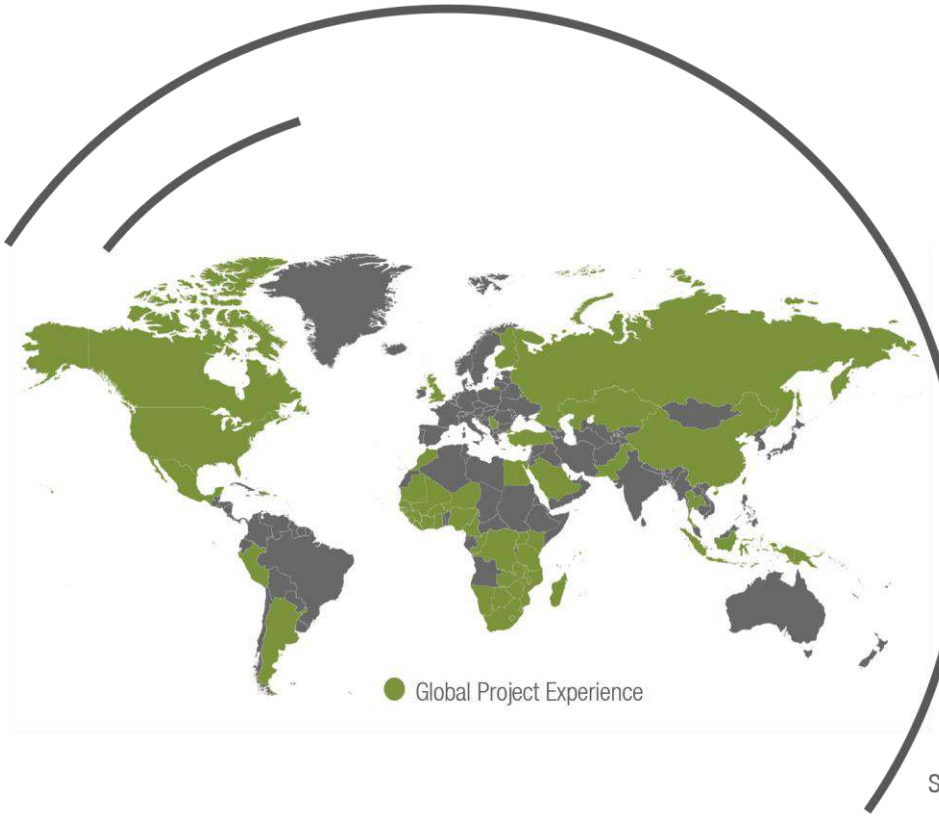

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Proposed Arnot South Coal Mining Project, located near Hendrina, Mpumalanga Province

Heritage Impact Assessment

Prepared for:
Exxaro Coal Mpumalanga (Pty) Ltd

Project Number:
UCD6802

August 2021

Department of Mineral Resources and Energy Reference (DMRE) Reference:
MP 30/5/1/2/3/2/1 (10292) MR

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This document has been prepared by Digby Wells Environmental.

Report Type:	Heritage Impact Assessment
Project Name:	Proposed Arnot South Coal Mining Project, located near Hendrina, Mpumalanga Province
Project Code:	UCD6802

Name	Responsibility	Signature	Date
Shannon Hardwick HRM Consultant ASAPA Member: 451	Report Compilation Pre-disturbance Survey		August 2021
Johan Nel Manager: Heritage Services ASAPA Member 095	Technical Review		

DETAILS AND DECLARATION OF THE SPECIALIST

Digby Wells and Associates (South Africa) (Pty) Ltd

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Title/ Position:	Heritage Resources Management Consultant
Qualification(s):	Master of Science (MSc) Archaeology
Experience (years):	4 years
Registration(s):	ASAPA, ICOMOS

I, Shannon Hardwick, declare that: –

- 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 of the Specialist  *Date:* August 2021

Findings, recommendations, and conclusions provided in this report are based on the best available scientific methods and the author's professional knowledge and information at the time of compilation. Digby Wells employees involved in the compilation of this report, however, accepts no liability for any actions, claims, demands, losses, liabilities, costs, damages, and expenses arising from or in connection with services rendered, and by the use of the information contained in this document.

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EXECUTIVE SUMMARY

Exxaro Coal Mpumalanga (Pty) Ltd (hereinafter Exxaro) intends to establish the Arnot South Underground Coal Mining Project (the Project) across several farms approximately 10 km east of Hendrina in the Mpumalanga Province. Exxaro is applying for Environmental Authorisation (EA) and a Mining Right (MR) Application and Mine Works Programme (MWP) was submitted to the Department of Mineral Resources and Energy (DMRE) in support of the Project

The Project will entail the establishment and operation of the proposed underground mining operation and supporting infrastructure, which includes (but is not limited to) the adit or boxcut, access road and road upgrades, offices, stockpiles and a processing plant. The proposed Project triggers activities listed in the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R 982 of 4 December 2014 as amended by GN R 326 of 7 April 2017) (EIA Regulations, 2014) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The Project further requires a Waste Management Licence (WML) in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA) and an Integrated Water Use Licence (IWUL) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA).

Universal Coal Energy Holdings SA (Pty) Ltd (hereinafter Universal Coal) appointed Digby Wells Environmental (hereinafter Digby Wells) on behalf of Exxaro as the independent Environmental Assessment Practitioner (EAP) to complete the required Scoping and EIA process in support of the proposed Project. The EIA process includes a specialist Heritage Resources Management (HRM) process in compliance with the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

This document comprises the specialist Heritage Impact Assessment (HIA) report in support of the EIA process for submission to the Heritage Resources Authorities (HRAs), including the South African Heritage Resources Agency (SAHRA) and the Mpumalanga Provincial Heritage Resources Authority (MPHRA).

Digby Wells identified two heritage resources within the proposed Project area – two historical farm *werwe*. These structures have Negligible Cultural Significance. Following the SAHRA Minimum Standards, the impacts to these heritage resources have not been assessed in detail in this report. This notwithstanding, these structures are afforded General Protection under Section 34 of the NHRA and may not be affected without the applicable permit.

Summary of the CS of Identified Heritage Resources

Resource ID	Description	INTEGRITY	CS
Wf-01	Historical werf	3	Negligible
Wf-02	Historical werf	3	Negligible

Additionally, the proposed Project presents a risk of direct negative impact to heritage resources that may exist within the Project area and which have not been identified to date. The table below summarises the risk to these resources.

Summary of the potential risk to heritage resources

Unplanned event	Potential impact
Accidental exposure of fossil bearing material implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 35 of the NHRA.
Accidental exposure of *in situ* archaeological material during the implementation of the Project.	
Accidental exposure of *in situ* historical built environment sites during the implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 34 of the NHRA
Accidental exposure of *in situ* burial grounds or graves during the implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 36 of the NHRA.
Accidental exposure of human remains during the construction phase of the Project.	

Considering the nature, location and scope of the Project, Digby Wells recommends the following:

- Exxaro must apply for a permit issued in terms of Section 34 of the NHRA to allow for the destruction or alteration of the structures associated with Wf-01 and Wf-02; and
- Exxaro must draft and implement a Chance Finds Protocol (CFP) as part of the Environmental Management Programme (EMPr).

Where these recommendations are implemented, Digby Wells does not object to the Project going forward from a heritage perspective.

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ACRONYMS, ABBREVIATIONS AND DEFINITION

Abbreviation	Meaning
ASAPA	Association of Southern African Professional Archaeologists
BA	Bachelor of Arts, or Basic Assessment (*the applicable term will be defined in the report*)
BCE	Before Common Era (also: Before Christ or BC)
BSc	Bachelor of Science
c.	Circa, meaning approximately
CALLM	Chief Albert Luthuli Local Municipality
CE	Common Era (also: *Anno Domini* or AD)
CFP	Chance Find Protocol
CRR	Comments and Response Report
CS	Cultural Significance
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EFC	Early Farming Community (*also known as Early Iron Age, see below*)
EIA	Environmental Impact Assessment. *Please note that EIA can also refer to the 'Early Iron Age'; however, in this document, this time period is referred to as 'Early Farming Community'.*
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
ESA	Early Stone Age
GIS	Geographical Information System
GN R	Government Notice Regulation
GPS	Global Positioning System
GSDM	Gert Sibanda District Municipality
HIA	Heritage Impact Assessment
Hons	Honours degree
HRAs	Heritage Resources Authorities
HRM	Heritage Resources Management
HSMP	Heritage Site Management Plan
ICOMOS	International Council on Monuments and Sites

Abbreviation	Meaning
Kya	Thousand years ago
LED	Local Economic Development
LFC	Late Farming Community also known as Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MPHRA	Mpumalanga Provincial Heritage Resources Authority
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MR	Mining Right (boundary)
MRA	Mining Right Application
MSA	Middle Stone Age
MSc	Master of Science
Mtpa	Million tonnes per annum
Mya	Million years ago
NDM	Nkangala District Municipality (NDM)
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
PCD	Pollution Control Dam
PHRA	Provincial Heritage Resources Authority
RoD	Record of Decision
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SCF	Statutory Comment Feedback
SEP	Stakeholder Engagement Process
SoW	Scope of Work
STLM	Steve Tshwete Local Municipality
ToR	Terms of Reference
Wits	University of the Witwatersrand
Werf	A farmstead or multiple outbuildings associated with a farmhouse or agricultural activities. Plural: *werwe* (Afrikaans).

Refer to Appendix A for a Glossary of Terms.

NHRA and GN R 326 Appendix 6 Legislated Requirements

Description	App. 6	NHRA	Section
Declaration that the report author(s) is (are) independent.	1(b)	-	Page iii-iv
An indication of the scope of, and the purpose for which, the report was prepared.	1(c)	-	1.1 1.2
Details of the person who prepared the report and their expertise to carry out the specialist study.	1(a)	-	1.3
Outlines the legislative framework relevant to the specialist heritage study.	-	-	0
Identifies the specific constraints and limitations of the HIA, including any assumptions made and any uncertainties or gaps in knowledge.	1(i)	-	4
Describes the methodology employed in the compilation of this HIA.	1(e)	-	5
An indication of the quality and age of base data used for the specialist report.	1(cA)	-	5.4 15
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment.	1(d)	-	5.5
Provides the baseline cultural landscape.	-	38(3)(a)	6.1
Motivates for the defined CS of the identified heritage resources and landscape.	-	38(3)(b)	7.1
A description of the potential impacts to heritage resources by project related activities, including: - Existing impacts on the site; - Possible risks to heritage resources; - Cumulative impacts of the proposed development; - Acceptable levels of change; and - Heritage-related risks to the project.	1(cB)	38(3)(c)-	7
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities.	1(j)	38(3)(c)	
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.	1(f)	-	7 Plan 4

Description	App. 6	NHRA	Section
Considers the development context to assess the socio-economic benefits of the project in relation to the presented impacts and risks.	-	38(3)(d)	6.4 13
A description of any consultation process that was undertaken during the course of preparing the specialist report and the results of such consultation.	1(o)	38(3)(e)	10
A summary and copies of any comments received during any consultation process and where applicable all responses thereto.	1(p)	38(3)(e)	
Details the specific recommendations based on the contents of the HIA.	-	38(3)(g)	11
An identification of any areas to be avoided, including buffers.	1(g)		
Any mitigation measures for inclusion in the Environmental Management Programme (EMPr)	1(k)		8
Any conditions for inclusion in the environmental authorisation.	1(l)		11
Any monitoring requirements for inclusion in the EMPr or environmental authorisation.	1(m)		9
A reasoned opinion— (i) 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	1(n)	38(3)(g)	12
Collates the most salient points of the HIA and concludes with the specific outcomes and recommendations of the study.	-	38(3)(f) 38(3)(g)	14
Lists the source material used in the development of the report.	1(cA)	-	15
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	1(h)	-	Plan 4
Any other information requested by the competent authority.	1(q)	-	N/A

1. Introduction

Exxaro Coal Mpumalanga (Pty) Ltd (hereinafter Exxaro) held a Prospecting Right[1] (PR) to mine coal on various farms covering approximately 16 000 ha, located approximately 10 km east of Hendrina in the Mpumalanga Province. The PR was renewed in September 2017 and lapsed on 10 September 2020. Exxaro is applying for Environmental Authorisation (EA) for the proposed Arnot South Underground Coal Mining Project (the Project). A Mining Right (MR) Application and Mine Works Programme (MWP) for underground mining was submitted[2] to the Department of Mineral Resources and Energy (DMRE) in support of the Project prior to the lapse of the PR. The Applicant was issued with a reference number MP 30/5/1/2/2/10292 MR.

The mining target area and mining-related infrastructure is located on four of the properties comprising the PR area: Mooiplaats 165 IS, Schoonoord 164 IS, Vlakfontein 166 IS and Weltevreden 174 IS. The Project will entail the establishment and operation of the proposed underground mining operation and supporting infrastructure, which includes (but is not limited to) the adit or boxcut, access road and road upgrades, offices, stockpiles and a processing plant. Refer to Section 2.1 for a more detailed description of the proposed infrastructure.

The proposed Project triggers activities listed in the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R 982 of 4 December 2014 as amended by GN R 326 of 7 April 2017) (EIA Regulations, 2014) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The Project will also require a Waste Management Licence (WML) in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA) and an Integrated Water Use Licence (IWUL) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA).

Universal Coal Energy Holdings SA (Pty) Ltd (hereinafter Universal Coal), on behalf of Exxaro, appointed Digby Wells Environmental (hereinafter Digby Wells) as the independent Environmental Assessment Practitioner (EAP) to complete the required Scoping and EIA process in support of the proposed Project. The EIA process includes a specialist Heritage Resources Management (HRM) process in compliance with the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

This document comprises the specialist Heritage Impact Assessment (HIA) report in support of the EIA process for submission to the Heritage Resources Authorities (HRAs), including the South African Heritage Resources Agency (SAHRA) and the Mpumalanga Provincial Heritage Resources Authority (MPHRA).

[1] Reference Number: MP 30/5/1/1/2/360 PR

[2] 08 September 2020.

1.1. Terms of Reference

Exxaro appointed Digby Wells as the independent EAP to undertake the EIA process required through the triggering of activities listed in the EIA Regulations, 2014, as amended. This EIA process includes an HIA in support of the EA applications and in compliance with the NHRA.

1.2. Scope of Work

The Scope of Work (SoW) for the specialist HRM process included the compilation of an HIA report to comply with the requirements encapsulated in Section 38(3) of the NHRA and the SAHRA Minimum Standards. Digby Wells completed the following activities as part of the SoW:

- Description of the predominant cultural landscape supported through primary and secondary data collection;
- Assessment of the Cultural Significance of the identified heritage resources;
- Identification of potential impacts to heritage resources based on the Project description and Project activities;
- An evaluation of the potential impacts to heritage resources relative to the sustainable socio-economic benefits that may result from the Project;
- Recommending feasible management measures and/or mitigation strategies to avoid and/or minimise negative impacts and enhance potential benefits resulting from the Project; and
- Submission of the HIA (as well as the EIA report and supporting specialist reports) to the HRAs for Statutory Comment as required under Section 38(8) of the NHRA.

1.3. Expertise of the Specialist

Table 1-1 presents a summary of the expertise of the specialists involved in the compilation of this report. Appendix B includes the full curriculum vitae (CVs) of these specialists.

Table 1-1: Expertise of the Specialists

Team Member	Bio Sketch
Shannon Hardwick ASAPA Member: 451 ICOMOS Member 38048 Years' Experience: 4	Shannon joined the Digby Wells team in May 2017 as a Heritage Management Intern and has most recently been appointed as a Heritage Resources Management Consultant. Shannon is an archaeologist who obtained a Master of Science (MSc) degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. She is a published co-author of one paper in *Journal of Ethnobiology*. Since joining Digby Wells, Shannon has gained generalist experience through the compilation of various heritage assessments, including Heritage Scoping Reports (HSRs), HIAs, Heritage Basic Assessment Reports

Team Member	Bio Sketch
	(HBARs) and Section 34 permit applications. Her other experience includes compiling a Community Health, Safety and Security Management Plan (CHSSMP) and various social baselines. Shannon's experience in the field includes pre-disturbance surveys in South Africa, Malawi and the Democratic Republic of the Congo and other fieldwork in Malawi.
Johan Nel ASAPA Member 095 ICOMOS Member Years' Experience: >20	Johan is a qualified archaeologist, heritage specialist and Manager of the Heritage Services department in Digby Wells. He obtained a BA Honours degree in Archaeology from the University of Pretoria in 2001. He also completed a Professional Development Certificate in Integrated Heritage Resources Management through Rhodes University in 2016. Johan is a professional and accredited member of the Association of Southern African Professional Archaeologists (ASAPA) and a member of the International Council on Monuments and Sites (ICOMOS) South Africa. He has more than 20 years' extensive and diverse experience in heritage resource management. Johan has worked in numerous African settings including South Africa, Botswana, the Democratic Republic of Congo, Liberia, and Sierra Leone. His current interests include ways to empower local communities to use, conserve, and manage heritage resources themselves, as well as integrating living and intangible heritage practices with the more traditional heritage approaches to heritage management. Key concepts he is exploring include cultural humility and so-called People-centred Approaches to conservation of both natural and cultural heritage.

2. Project Description

The PR area and proposed MR area is located approximately 10 km east of Hendrina, 25 km west of Carolina, and 50 km southeast of Middelburg. The Project area is located within the Steve Tshwete Local Municipality (STLM) and Chief Albert Luthuli Local Municipality (CALLM), situated in the Nkangala District Municipality (NDM) and Gert Sibanda District Municipality (GSDM) respectively, within the Mpumalanga Province. The Project area forms part of the Witbank Coalfield and is close to two of Eskom's power stations, Hendrina and Arnot. Plan 1 presents the regional and local setting of the Project.

The proposed MR area includes approximately 16 000 ha of land. This area includes the following farms:

- Groblersrecht 175 IS;
- Mooiplaats 165 IS;
- Tweefontein 203 IS;
- Vaalwater 173 IS;
- Weltevreden 174 IS;
- Schoonoord 164 IS;
- Vlakfontein 166 IS;
- Vryplaats 163 LQ;
- Helpmakaar 168 IS;
- Op Goeden Hoop 205 IS;

- Nooitgedacht 493 JS;
- Leeuwpan 494 JS;
- Klipfontein 495 JS; and

The target area for mining and mining-related infrastructure lies mainly on the farms Weltevreden 174 IS, Mooiplaats 165 IS, Vlakfontein 166 IS, and Schoonoord 164 IS. The proposed infrastructure is described in Section 2.1 below.

2.1. Proposed Infrastructure and Activities

Exxaro intends to exploit one economically-viable underground block within the No. 2 Seam. The current application considers the use of bord-and-pillar mining methodologies with continuous miners due to the depth and thickness of the resource. This resource is anticipated to produce approximately 2.4 million tonnes per annum (Mtpa). The Life of Mine (LoM) is confirmed to be 17 years. Additional drilling will be required to confirm a resource to the south of the MR area, which may potentially extend the LoM by 13 years.

The basement floor and local surface topography determine the depth to the top of the No. 2 coal seam. The seam reaches an average depth of approximately 45 m and ranges from 10 m to 110 m. The thickness of the seam averages 1.65 m and varies from 0.5 m to 5 m. Based on the depth distribution provided in the MWP, Digby Wells has determined high risk[3] and low risk areas. The high-risk areas correlate with the shallowest sections of the seam and comprise approximately 5 202 ha of the Project area.

The Project also includes the following supporting infrastructure:

- Adit/ Boxcut;
- Medical facility;
- Temporary guardhouse;
- Possible laydown area;
- Substation;
- Weighbridges;
- ROM stockpiles;
- Vent shaft;
- Discard facility;
- Topsoil stockpiles;
- Overburden stockpiles;
- Fuel dispensary/storage;
- Conveyors;
- Workshop;
- Vehicle wash bay;
- Laundry facility;
- Pollution Control Dam (PCD);
- Washing plant;
- Potable water tank;
- Water storage tank and booster;
- Ventilation shafts (including fans);
- Sewage Treatment Plant (STP);
- Change-house;
- Salvage yard;
- Powerline or powerlines;
- Pipelines;

[3] Risk of subsidence following pillar failure.

- Offices;
- Stores;
- Brake-test ramp;
- Site access (perimeter fencing and gates);
- Stormwater management infrastructure;
- Parking area;
- Water Treatment Plant (WTP);
- New access road (3 km in length); and
- Coal Handling and Processing Plant (CHPP); and
- Upgrade to district road infrastructure (15 km in length).

Plan 2 presents the proposed layout of the infrastructure and the design of the Project. Table 2-1 presents a summary of the Project-related activities expected within each phase of the Project lifecycle.

Table 2-1: Project Phases and Associated Activities

Project Phase	Project Activity
Construction Phase	Removal of vegetation and topsoil for establishment of mining and linear infrastructure;
	Diesel storage and explosives magazine;
	Construction of additional infrastructure, and ventilation fans;
	Construction of access road and haul roads; and
	Stockpiling of soils, rock dump and discard dump establishment.
Operational Phase	Ventilation fans and infrastructure area containing stockpile areas;
	Underground blasting;
	Maintenance of haul roads, pipelines, machinery, water, effluent and stormwater management infrastructure and stockpile areas;
	Blasting and removal of rock; and
	Concurrent rehabilitation as mining progresses.
Decommissioning Phase	Demolition and removal of infrastructure;
	Post-closure monitoring and rehabilitation; and
	Closure of the underground mine.

Plan 1: Geographical Setting of the Project

Plan 2: Proposed Project Infrastructure and Layout

2.2. Alternatives Considered

Table 2-2 presents a summary of the alternatives considered for the proposed Project and describes the consequences of the various alternatives on the assessment of impacts posed to cultural heritage resources within the Project Area. The EIA report includes a more detailed discussion on the Project alternatives.

Table 2-2: Project Alternatives considered in this Assessment

Alternative	Description	Consequence for HRM Process
Project Location	The location of the Project has been influenced by the results of the prospecting activities, the location of the identified coal seam and Exxaro's PR area. No alternative Project locations have been proposed. Should any areas of the Project area be deemed unsuitable for mining, this will be highlighted in the EIA report.	No location alternatives are considered in this HRM process. Identified heritage resources are included in Plan 4 and, where appropriate, Exxaro will need to establish no-go buffer zones around sensitive heritage resources. This may require a change in Project design and/or the mitigation of identified heritage resources.
Mining Method Alternatives	Various opencast and underground mining methods were considered for the operation of the mine. The mine will utilise bord-and-pillar extraction by means of continuous miners.	Opencast mining and underground methods pose different risks and direct impacts to heritage resources, as do different underground extraction methodologies (e.g., bord and pillar or high extraction). This report only considers underground bord-and-pillar mining. Digby Wells has identified high- and low-risk areas based on the depth of the resource.
Technology Alternatives	The mine will utilise bord-and-pillar extraction by means of continuous miners. Coal could be processed through either wet washing or dry washing. The former is the preferred coal beneficiation technology for use in the Project.	The implications of the different mining methodologies are discussed above. There is no anticipated difference in the potential impact posed to heritage resources through the use of different technologies (i.e., potential washing processes). These alternatives have not been considered in this report.

Alternative	Description	Consequence for HRM Process
'No-go' Alternative	Should the Project not obtain approval, or not go ahead for any reason, the potential negative environmental and social (including heritage) impacts associated with the development of the proposed Arnot South Coal Mining Project would not occur. However, the potential benefits associated with the Project (described in Section 13) would also not occur.	The no-go alternative has been considered in this assessment.

3. Relevant Legislation, Standards and Guidelines

This section describes the international, national and regional legislative documents and policy documents that inform the legislative and policy framework of the HRM process. The objective is to ensure that the assessments meet all stipulated requirements to ensure legal compliance and successful integration into the regional planning context.

3.1. National Legislation and Policy

Table 3-1 presents a summary of the national legislation applicable to this HRM process and illustrates how it will be considered in the HIA. Table 3-2 below presents the applicable policies considered in the HRM process.

Table 3-1: Applicable Legislation considered in the HRM Process

Applicable legislation used to compile the report	Reference where applied
National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) The NHRA is the overarching legislation that protects and regulates the management of heritage resources in South Africa, with specific reference to the following Sections: • 5. General principles for HRM • 6. Principles for management of heritage resources • 7. Heritage assessment criteria and grading • 38. Heritage resources management The Act requires that Heritage Resources Authorities (HRAs), be notified as early as possible of any developments that may exceed certain minimum	This report was compiled to comply with Section 5, 38(3), (4) and (8) of the NHRA. This report was submitted to the responsible HRAs, which in this instance is SAHRA and MPHRA.

Applicable legislation used to compile the report	Reference where applied
thresholds in terms of Section 38(1), or when assessments of impacts on heritage resources are required by other legislation in terms of Section 38(8) of the Act.	
NHRA Regulations, 2000 (GN R 548) The NHRA Regulations regulate the general provisions and permit application process in respect of heritage resources included in the national estate. Applications must be made in accordance with these regulations. The following Chapters are applicable to this assessment: • II. Permit Applications and General Provisions for Permits; • III: Application for Permit: National Heritage Site, Provincial Heritage Site, Provisionally Protected Place or Structure older than 60 years; • IV: Application for Permit: Archaeological or Palaeontological or Meteorite; • IX: Application for Permit: Burial Grounds and Graves; • X: Procedure for Consultation regarding Protected Area; • XI: Procedure for Consultation regarding Burial Grounds and Graves; and XII: Discovery of Previously Unknown Graves.	The HRM process was undertaken with cognisance of the applicable regulations. The proposed mitigation strategies and management measures must comply with these requirements.
Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that – i. Prevent pollution and ecological degradation; ii. Promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development	The HRM process was undertaken to identify heritage resources and determine heritage impacts associated with the Project. As part of the HRM process, applicable mitigation measures, monitoring plans and/or remediation were recommended to ensure that any potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution.

Applicable legislation used to compile the report	Reference where applied
National Environmental Management Act, 1998 (Act No. 107 of 1998) The NEMA, as amended, was set in place in accordance with Section 24 of the Constitution of the Republic of South Africa. Certain environmental principles under NEMA have to be adhered to, to inform decision making on issues affecting the environment. Section 24 (1)(a), (b) and (c) of NEMA state that: *The potential impact on the environment, socio-economic conditions and cultural heritage of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.* The Environmental Impact Assessment (EIA) Regulations, Government Notice Regulation (GN) R.982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R.983 (Listing Notice No. 1), GN R.984 (Listing Notice No. 2) and GN R.985 (Listing Notice No. 3) in terms of Sections 24(2) and 24D of the NEMA, as amended.	The application process was undertaken in accordance with the principles of Section 24 of NEMA as well as with the EIA Regulations 2014 (as amended), promulgated in terms of NEMA.
GN R. 982: Environmental Impact Assessment Regulations, 2014 (as amended by GN R 326 of 7 April 2017) These three listing notices set out a list of identified activities which may not commence without an Environmental Authorisation from the relevant Competent Authority through one of the following processes: • Regulation GN R. 983 (as amended by GN R 327) - Listing Notice 1: This listing notice provides a list of various activities which require environmental authorisation, and which must follow a basic assessment process. • Regulation GN R. 984 (as amended by GN R 325) – Listing Notice 2: This listing notice provides a list of various activities which require environmental authorisation, and which must follow an environmental impact assessment process.	Refer to the Notification of Intent to Develop (NID) or EIA report for a full description of the Listed Activities triggered by the proposed Project. To comply with the regulations, an EIA process must be completed in support of EA in terms of the applicable Listing Notice. This HIA was completed to inform the EIA process to comply with Section 24 of the NEMA.

Applicable legislation used to compile the report	Reference where applied
• Regulation GN R. 985 (as amended by GN R 324) – Listing Notice 3: This notice provides a list of various environmental activities which have been identified by provincial governmental bodies which if undertaken within the stipulated provincial boundaries will require environmental authorisation. The basic assessment process will need to be followed.	
National Water Act, 1998 (Act No. 36 of 1998) (NWA) Part 7 of the NWA outlines the requirements for individual applications for licences and Part 8 outlines the requirements in terms of compulsory licences for water use in respect of a specific resource. The responsible authority may request additional information from an applicant in terms of Part 7 or Part 8. Such additional information may include an environmental or other assessment to be undertaken in terms of the NEMA and which is to be considered alongside the application.	An environmental assessment was undertaken in compliance with the NEMA and NEMA EIA Regulations, which also satisfies the requirements of the NWA and may supplement the Water Use Application (WUL). This HIA was completed to inform the environmental assessment and comply with Section 24 of the NEMA and Section 38(8) of the NHRA.

Table 3-2: Applicable policies considered in the HRM process

Applicable policies used to compile the report	Reference where applied
SAHRA Archaeology, Palaeontology and Meteorites (APM) Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports (2007) The guidelines provide the minimum standards that must be adhered to for the compilation of a HIA (2007). Chapter II Section 7 outlines the minimum requirements for inclusion in the heritage assessment as follows: • Background information on the Project; • Background information on the cultural baseline; • Description of the properties or affected environs; • Description of identified sites or resources; • Recommended field rating of the identified sites to comply with Section 38 of the NHRA; • A statement of Cultural Significance in terms of Section 3(3) of the NHRA; and	This report and the PIA report were compiled to adhere to the minimum standards as defined by Chapter II of the SAHRA Minimum Standards (2007 and 2012 respectively).

Applicable policies used to compile the report	Reference where applied
• Recommendations for mitigation or management of identified heritage resources.	

3.2. Regional Regulatory Context

The HRM process was completed to comply with the requirements of the South African national legislative framework as described above. Provincial legislation and municipal by-laws are applicable to graves and cemeteries and are considered in our recommendations where a Grave Relocation Process (GRP) may be required. These include the Mpumalanga Cemeteries, Crematoria and Exhumation of Bodies Act, 2005 (Act No. 8 of 2005) (MCCEBA).

4. Assumptions, Limitations and Exclusions

Digby Wells encountered constraints and limitations during the compilation of this report. Table 4-1 presents an overview of these limitations and the consequences.

Table 4-1: Constraints and Limitations

Description	Consequence
Whilst every attempt was made to obtain the latest available information, the reviewed literature does not represent an exhaustive list of information sources for the various study areas.	The cultural heritage baseline presented in Section 6 below is considered accurate but may not include new data or information which may not have been made available to the public.
The pre-disturbance survey focused on the proposed infrastructure area and included an inspection of the accessible high-risk areas. The pre-disturbance survey did not cover additional areas of the proposed MR area.	Previously unidentified heritage resources may be encountered through Project-related activities. Should this occur, Exxaro must alert the HRAs of the find and may need to enlist the services of a suitably qualified archaeologist or palaeontologist to advise them on the way forward.
At the time of the pre-disturbance survey, access to several properties was denied or could not be obtained. Such properties including high-risk areas included: • Portions 3 and 8 of Helpmakaar 168 IS; • Portions 10, 11, 12 and 14 of Vaalwater 173 IS; and • Portions 2, 5, 8, 10, 13, 19 and Remaining Extent (RE) of Vlakfontein 166 IS.	

Description	Consequence
Overgrown vegetation limited visibility at the time of the pre-disturbance survey. Whilst every attempt was made to survey the extent of the site-specific study area[4], considering the points above, this report does not present an exhaustive list of identified heritage resources.	
Archaeological and palaeontological resources commonly occur at subsurface levels. These types of resources cannot be adequately recorded or documented by assessors without destructive and intrusive methodologies and without the correct permits issued in terms of Section 35 of the NHRA.	The reviewed literature, previously-completed heritage assessments and the results of the field survey are in themselves limited to surface observations. Subsurface tangible heritage may be exposed during Project activities. Should this occur, Exxaro must alert the HRAs of the find and may need to enlist the services of a suitably qualified archaeologist or palaeontologist to advise them on the way forward.

5. Methodology

The following section presents a summary of the methodologies employed in the HRM process. Appendix C includes a more detailed description of the methodologies employed during the HRM process.

5.1. Defining the Study Areas

Heritage resources do not exist in isolation to the greater natural and social environment (which includes the socio-economic, socio-political and socio-cultural aspects). To develop an applicable cultural heritage baseline for the Project, Digby Wells defined four nested study areas to be considered. These include:

- The *site-specific study area*: the farm portions extent that will be affected by the proposed infrastructure and activities associated with the proposed Project, including a 500 m buffer area;
- The *MR area or Project area*: the farm portions' extent contained within the Arnot South MR boundary;
- The *local study area:* the area most likely to be influenced by any changes to heritage resources in the Project area, or where project development could cause heritage impacts. The local study area is defined as the area bounded by the local municipality

[4] Refer to Section 5.1 for a description of the study area.

and includes particular reference to the immediate surrounding properties or farms. The local study area is specifically examined to offer a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provides the local development and planning context that may contribute to cumulative impacts. The MR area is situated in two local municipalities: CALLM and STLM; and

- The *regional study area:* the area bounded by the district municipality demarcation. In this case, the Project is located in two district municipalities: the GSDM and NDM. Where necessary, the regional study area may be extended outside the boundaries of the district municipality to include areas closest to the Project area. The aim of this is to include much wider expressions of specific types of heritage resources and historical events. The regional study area also provides the regional development and planning context that may contribute to cumulative impacts.

5.2. Statement of Significance

Digby Wells designed the significance rating process to provide a numerical rating of the Cultural Significance of identified heritage resources. This process considers heritage resources assessment criteria set out in subsection 3(3) of the NHRA, which determines the intrinsic, comparative, and contextual significance of identified heritage resources. A resource's importance rating is based on information obtained through review of available credible sources and representativity or uniqueness (i.e., known examples of similar resources to exist).

The rationale behind the heritage value matrix takes into account that a heritage resource's value is a direct indication of its sensitivity to change (i.e., impacts). Value, therefore, was determined prior to completing any assessment of impacts.

The matrix rated the potential, or importance, of an identified resource relative to its contribution to certain values – aesthetic, historical, scientific and social. Resource significance is directly related to the impact on it that could result from Project activities, as it provided minimum accepted levels of change to the resource.

5.3. Definition of Heritage Impacts

Potential impacts to heritage resources may manifest differently across geographical areas or diverse communities when one considers the simultaneous effect to the tangible resource and social repercussions associated with the intangible aspects. Furthermore, potential impacts may concurrently influence the Cultural Significance of heritage resources. This assessment therefore considers three broad categories adapted from Winter & Baumann (2005, p. 36). Table 5-1 presents a summary of these impact categories.

Table 5-1: Impact Definition

Category	Description
Direct Impact	Affect the fabric or physical integrity of the heritage resource, for example destruction of an archaeological site or historical building. Direct impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense but can often be erroneously assessed as high-ranking.
Indirect Impact	Occur later in time or at a different place from the causal activity, or as a result of a complex pathway. For example, restricted access to a heritage resource resulting in the gradual erosion of its Cultural Significance that may be dependent on ritual patterns of access. Although the physical fabric of the resource is not affected through any direct impact, its significance is affected to the extent that it can ultimately result in the loss of the resource itself.
Cumulative Impact	Result from in-combination effects on heritage resources acting within a host of processes that are insignificant when seen in isolation, but which collectively have a significant effect. Cumulative effects can be: • Additive: the simple sum of all the effects, e.g., the reclamation of a historical Tailings Storage Facilities (TSFs) will minimise the sense of the historic mining landscape. • Synergistic: effects interact to produce a total effect greater than the sum of the individual effects, e.g., the removal of all historical TSFs will sterilise the historic mining landscape. • Time crowding: frequent, repetitive impacts on a particular resource at the same time, e.g., the effect of regular blasting activities on a nearby rock art site or protected historical building could be high. • Neutralizing: where the effects may counteract each other to reduce the overall effect, e.g., the effect of changes from a historic to modern mining landscape could reduce the overall impact on the sense-of-place of the study area. • Space crowding: high spatial density of impacts on a heritage resource, e.g., density of new buildings resulting in suburbanisation of a historical rural landscape.

5.4. Secondary Data Collection

Data collection assists in the development of a cultural heritage baseline profile of the study area under consideration. Qualitative data was collected to inform this HIA report and was primarily obtained through secondary information sources, i.e., desktop literature review and historical layering.

A survey of diverse information repositories was made to identify appropriate relevant information sources. These sources were analysed for credibility and relevance. These credible, relevant sources were then critically reviewed. The objectives of the literature review include:

- Gaining an understanding of the cultural landscape within which the proposed Project is located; and
- Identify any potential fatal flaws, sensitive areas, current social complexities and issues and known or possible tangible heritage.

Repositories that were surveyed included the South African Heritage Resources Information System (SAHRIS), online/electronic journals and platforms and select internet sources. This report includes a summary and discussion of the most relevant findings. Table 5-2 lists the sources consulted in the literature review (refer to Section 15 for more detailed references).

Table 5-2: Qualitative Data Sources

Reviewed Qualitative Data		
Databases		
Genealogical Society of South Africa (GSSA) database (2011)	SAHRIS Palaeosensitivity Map (PSM)	
Statistics South Africa (2011)	Wazimap (2017)	
SAHRIS Cases		
Map ID: 710 Case ID: 174	Case ID: 479 Case ID: 2077	Case ID: 5817 Case ID: 9599
Cited Text		
Bamford, 2014, 2016	Behrens & Swanepoel, 2008	Brodie, 2008
Clark, 1982	Deacon & Deacon, 1999	Delius & Cope, 2007
Delius, et al., 2014	Eastwood, et al., 2002	Esterhuysen & Smith, 2007
Groenewald & Groenewald, 2014	Johnson, et al., 2006	Landau, 2010
Makhura, 2007	Mitchell, 2002	Mucina & Rutherford, 2010
Pakenham, 1979	Smith & Ouzman, 2004	Swanepoel, et al., 2008
Voortrekkers, 2014	von der Heyde, 2013	

Historical layering is a process whereby diverse cartographic sources from various time periods are layered chronologically using Geographic Information Systems (GIS). The rationale behind historical layering is threefold, as it:

- Enables a virtual representation of changes in the land use of a particular area over time;
- Provides relative dates based on the presence or absence of visible features; and
- Identified potential locations where heritage resources may exist within an area.

5.5. Primary Data Collection

Shannon Hardwick undertook a pre-disturbance survey of the Project area on 19 April 2021. The survey was a combination of a vehicular and pedestrian survey, which was adapted to the terrain and the likelihood of heritage resources occurring in the area. The survey was non-intrusive (i.e., no sampling was undertaken).

The aim of the survey was to:

- Visually record the current state of the cultural landscape; and
- Record a representative sample of the visible, tangible heritage resources present within the development footprint area, site-specific study area and greater study area.

Identified heritage resources were recorded as waypoints using a handheld GPS device. These heritage resources were also recorded through written notes and photographs. Plan 4 presents the results of the pre-disturbance survey, including the waypoints and GPS tracks.

5.6. Site Naming Convention

Heritage resources identified by Digby Wells during the field survey are prefixed by the SAHRIS case identification generated for this Project. Information on the relevant period or feature code and site number follows (e.g., 11829/BGG-001). The site name may be shortened on plans or figures to the period/feature code and site number (e.g., BGG-001). Table 5-3 presents a list of the relevant period and feature codes.

Table 5-3: Relevant Feature and Period Codes

Feature or Period Code	Reference
BGG	Burial Grounds and Graves
HLP	Historical Layering Point
HST	Historical Structure

Heritage resources identified through secondary data collection are prefixed by the relevant SAHRIS case or map identification number (*where applicable*) and the original site name as used by the author of that assessment (e.g., 1668/Site 1).

6. Findings and Discussion

This section presents a description of the cultural heritage baseline informed through primary and secondary data collection. The section also includes a summary of the developmental context within which the Project is located and presents the potential socio-economic benefits anticipated to arise from the Project. As required by Section 38(3)(d) of the NHRA, the socio-economic benefits are compared to the heritage impacts is considered in Section 13.

6.1. Cultural Heritage Baseline Description

The Mpumalanga Province is underlain by valuable geological formations, both in terms of mineral and fossil wealth. Coal is formed through the compression and heat alteration of plant matter. During these processes, alteration happens to such an extent that potential plant fossil remains are no longer recognisable. The shales between the coal horizons, however, have the potential to preserve very good examples of plant fossils (Bamford, 2014; 2016). To a lesser extent, the sandstone surface outcrops may also preserve fossil plants. Coal deposits can potentially also include fossils of mammal-like reptiles and mammals, but these are rarely, if ever, preserved with plant fossils.

The greater study area forms part of the Highveld Coalfield, which extends approximately 7 000 km^2 (Johnson, et al., 2006). The regional and local study areas are predominantly underlain by the Main Karoo Basin, which comprises lithostratigraphic units associated with the Karoo Supergroup. Table 6-1 presents a truncated geological sequence applicable to the regional study area. The specialist Palaeontological Impact Assessment (PIA) report will present the site-specific geological context and the associated palaeontological sensitivities in more detail.

The Main Karoo Basin dates to the late Carboniferous to Middle Jurassic Periods, roughly 320 to 145 million years ago (mya). Within the Karoo Supergroup are the sediments of the Ecca Group. These sediments date to the Permian Period and overlie the *Dywka Formation*. These layers also include significant coal reserves and is the most palaeontologically sensitive unit of the Karoo Supergroup (Johnson, et al., 2006; Groenewald & Groenewald, 2014). The Ecca Group is well known for its wealth of plant fossils, characterised by the assemblage of *Glossopteris* fossils (a plant species defined through fossil leaves).

The Ecca Group includes three formations:

- The *Pietermaritzburg Formation*, which is of moderate palaeontological sensitivity. This formation rarely forms good outcrops and fossils are rare and difficult to find;
- The *Vryheid Formation*, which is the main coal-producing formation in South Africa. This formation has produced a number of fossils, including extensive *Glossopteris* fossil assemblages. Trace fossils, rare insects, possible conchostracans (bivalve crustaceans and shrimp clams, which are still extant), non-marine bivalves and fish scales. This formation is of very high palaeosensitivity; and

- The *Volksrust Formation*: a monotonous sequence of grey shale. Fossils are significant but rare and include temnospondyl amphibian remains, invertebrates and minor coal with plant remains, petrified wood and trace fossils assemblages (Groenewald & Groenewald, 2014).

The *Vryheid Formation* is the predominant geographical present in proximity to the Project area. As indicated above, this feature is known for its wealth of plant fossils. These include fossils of *Breytenia*. These fossils are extremely rare, comprising only four known instances, one of which is available for research. The other three examples were identified during site inspections for a coal mine less than 15 km away from the Prospecting Area.

Table 6-1: Geological sequence and palaeontological sensitivity for the local study area

Eon	Era	Period	Mya	Lithographic Units			Significance	Fossils
				Supergroup	Group	Formation		
Phanerozoic	Palaeozoic	Permian	300	Karoo Supergroup	Ecca Group	Volksrust	High	The Volksrust Formation comprises of trace fossils, rare temnospondyl amphibian remains, invertebrates (bivalves, insects), minor coals with plant remains, petrified wood, organic microfossils (acritarchs), and low-diversity marine to non-marine trace fossil assemblages.
						Vryheid	Very high	Abundant plant fossils of Glossopteris and other plants. Trace fossils. The reptile Mesosaurus has been found in the southern part of the Karoo Basin. Rich fossil plant assemblages of the Permian Glossopteris flora (lycopods, rare ferns and horsetails, abundant glossopterids, cordaitaleans, conifers, ginkgoaleans), rare fossil wood, diverse palynomorphs. Abundant, low diversity trace fossils, rare insects, possible conchostracans, non-marine bivalves, fish scales.

Table 6-2 presents an overview of the broad timeframes for the major periods of the past in Mpumalanga. Figure 6-1 presents a summary of the heritage resources identified within the larger study area. The figure presents the relative abundance of these heritage resources as grouped by the periods listed in Table 6-2.

Table 6-2: Archaeological Periods in Mpumalanga

The Stone Age	Earlier Stone Age (ESA)	2 mya to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era[5])
There appears to be a gap in the record in Mpumalanga between approximately 7000 and 2000 BCE.		
Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period[6]	-	1500 CE to 1850 (Behrens & Swanepoel, 2008)

Adapted from Esterhuysen & Smith (2007)

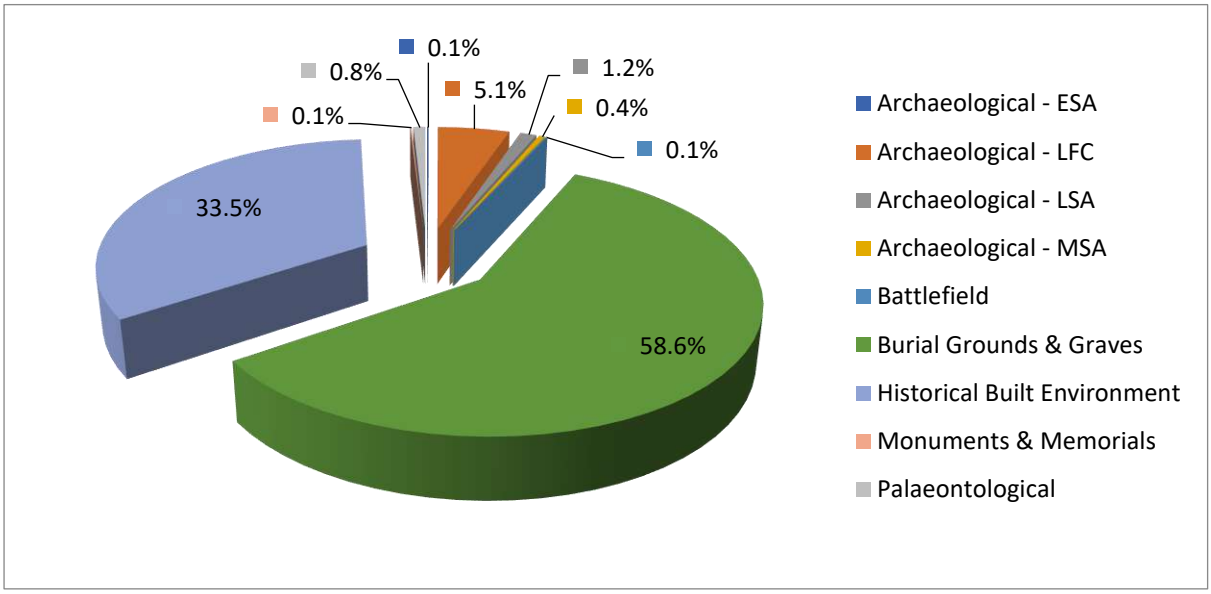

Figure 6-1: Heritage Resources identified within the Greater Study Area

[5] Common Era (CE) refers to the same period as *Anno Domini* ("In the year of our Lord", referred to as AD): i.e. the time after the accepted year of the birth of Jesus Christ and which forms the basis of the Julian and Gregorian calendars. Years before this time are referred to as 'Before Christ' (BC) or, here, BCE (Before Common Era).

[6] The author acknowledges that in southern Africa, especially in Mpumalanga, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented and is being explored through the 500 Year Initiative (Swanepoel, et al., 2008).

In total 948 heritage resources were identified within the regional, local and site-specific study areas. The predominant tangible heritage resources recorded in the area under consideration demonstrate affiliations with the historical period, including the historical built environment and burial grounds and graves. This notwithstanding, expressions of the Stone Age, the Farming Community Period, battlegrounds and monuments and memorials have also been recorded in the regional study area.

The southern African Stone Age comprises three broad phases: the ESA, MSA and LSA. These phases are determined according the various hominid species and the lithic tools and associated materials they created through time.

The ESA is comprised predominantly of large handaxes and cleavers made of coarse-grained materials (Esterhuysen & Smith, 2007). This period occurred between 2 mya and 250 kya and is associated with *Australopithecus* and early *Homo* hominid species. Within the reviewed data, one example of ESA lithics was identified, which comprised a low-density artefact scatter (Huffman, 1999). This represents 0.1% of the data set.

The MSA dates between approximately 300 kya and 20 kya. High proportions of minimally-modified blades, created using the Levallois technique, the use of good quality raw material and the use of bone tools, ochre and pendants characterise the early MSA lithic industries (Clark, 1982; Deacon & Deacon, 1999). These tools were made and used by archaic *Homo sapiens.* The review of available data included 4 records of expressions of MSA (0.4% of the total identified heritage resources). These expressions included an isolated artefact and low-density surface scatters (Fourie, et al., 2000; du Piesanie, et al., 2013; du Piesanie & Nel, 2016a).

The LSA dates from approximately 40 kya to the historical period. LSA lithics are specialised, i.e. specific tools each have specific uses (Mitchell, 2002). Assemblages from this period commonly include diagnostic tools such as scrapers and segments and may include bone points as well. In southern Africa, the LSA is closely associated with hunter-gatherers. The San (including hunter-gatherer, Basarwa and Bathwa groups) are generally accepted as the first inhabitants of southern Africa (and Mpumalanga) (Makhura, 2007).

The review of available data included few expressions of the LSA (11 records or 1.2% of the total identified heritage resources). Within the regional study area, expressions of the LSA include:

- Isolated artefacts and low-density scatters of lithic accumulations (du Piesanie, et al., 2013; Karodia, et al., 2013);
- Rock shelters with deposit and artefacts (Fourie, et al., 2000); and
- Rock Art (van Schalkwyk, 2003a; du Piesanie, et al., 2013; du Piesanie & Nel, 2016a).

In Mpumalanga, three rock art painting traditions occur and are associated with particular cultural groups. These traditions are widely dispersed and include:

- Fine line painting associated with autochthonous LSA hunter-gatherer groups (Eastwood, et al., 2002);
- Finger paintings associated with the later arrival of pastoralists (Smith & Ouzman, 2004; Eastwood, et al., 2002; Smith & Zubieta, 2007); and
- Finger paintings associated with much later, possibly historic, farming communities. No expressions of this tradition are known to occur within the study area under consideration.

The San were later followed by the various peoples of the Farming Community, including ancestors of modern Sotho-Tswana and Nguni peoples (Makhura, 2007). The farming community period correlates to the movements of Bantu-speaking agro-pastoralists moving into southern Africa. Farming Community settlements are identified through stonewalling and secondary tangible surface indicators, such as ceramics and evidence for domesticated animals, i.e. dung deposits or faunal remains.

The Farming Community Period is divided into two phases: the EFC and the LFC. No material associated with the EFC was identified. The LFC resources accounted for 48 (or 5.1%) of the identified heritage resources in the regional study area. The identified LFC heritage resources include:

- Sites of low and medium complexity (van Schalkwyk, 2003a; du Piesanie, et al., 2013; Karodia & Nel, 2014; Van Vollenhoven, 2014);
- Structural sites, including stone walling or structural remains (ruins of homesteads or circular stone structures) (Fourie, et al., 2000; van Schalkwyk, 2003c; 2007; Van Schalkwyk & Moifatswane, 2003; Pelser & van Vollenhoven, 2008; du Piesanie, et al., 2013; Karodia, et al., 2013; Higgit, et al., 2014; Karodia & Nel, 2014);
- Isolated ceramic potsherds and low density surface scatters (de Jong, 2006; du Piesanie, et al., 2013; Karodia, et al., 2013; Karodia & Nel, 2014; Pelser, 2015; Hardwick & du Piesanie, 2018); and
- Ash deposits or middens, which are most likely the remains of cattle kraals or refuse dumps containing artefacts relating to this period (van Schalkwyk, 2003c).

The historical period is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is artificial, as there is a large amount of overlap between the two.

Throughout the transitions between the LFC and the historical period (and through the historical period itself), migration, population growth, climatic variation and trade to the east significantly impacted the Pedi, Koni and other groups on the Mpumalanga Highveld. The rise of power blocs, including violent displacement and political centralisation, characterised this time (Makhura, 2007). Within this region, the Pedi developed a system of centralisation where subordinate communities could retain their independence in exchange for tribute in various

forms. The Pedi grew to become the strongest power in the north-east, amongst the escalating conflict and intensifying violence (Delius, et al., 2014).

An example of the overlap between the LFC and the historical period is the Mfecane or, north of the Orange River, the Difaqane. These terms refer to a period of violence and unrest between approximately 1817 to 1826 AD (Landau, 2010). Many aspects of the Mfecane/Difaqane have been debated and challenged. The traditional understanding of the period is that Mzilikazi and his Ndebele group were pushed out of their territory by the Zulu group led by Shaka. This displacement had a knock-on effect, as multiple groups were subsequently displaced to the north and the west. A drought during this time exacerbated the instability and increased the pressure on food supplies, which were already running low.

European settlers, traders, missionaries and travellers moving into the interior further added to instability and resulting power struggles (Landau, 2010). The Mfecane/Difaqane was characterised by unprecedented (at least within the records of the Europeans travelling within southern Africa) social and political mobilisation and violence across the Highveld as individuals sought personal and food security. The Mpumalanga Highveld was vulnerable to intrusive groups including the Swazi and the *Voortrekkers*.

Groups of Afrikaaners initiated a move from the Cape to the interior to establish an independent state in approximately 1835, in reaction to increased British liberalism and the abolishment of slavery and pass laws. The migration of these *Voortrekkers* is commonly referred to as the Great Trek (or *Groot Trek*) and it started with the first group, the Robert Schoon Party, in 1836. The first permanent settlement that was established as a result of this movement was Ohrigstad in 1845 – the *Voortrekkers* at this time were intruding into an already volatile interior and exacerbated the strife in this area, frequently skirmishing with remnant Pedi, Nduzundza Ndebele and Kopa groups (Delius & Cope, 2007; Voortrekkers, 2014).

In 1852, *Voortrekker* and British representatives signed the Sand River Convention into effect; the convention acknowledged Trekboer independence and officially established the *Zuid-Afrikaansche Republiek* (ZAR). ZAR independence allowed for land to be distributed to its citizens, though the demarcation of farms and the issuing of title deeds. The Trekboers continued their violent encounters with the smaller groups in this region, armed with their perceived right to land under the ZAR. These conflicts resulted in a Trekboer-Swazi alliance: the Swazi besieged and destroyed the Kopa and orchestrated assaults against the Ndzundza Ndebele. The Ndzundza Ndebele remained undefeated, but came to a compromise with the Trekboers where land would be leased by the Trekboers through a system of tribute (Delius & Cope, 2007; Voortrekkers, 2014).

Soon after settling in the area, the Trekboers (now farmers) discovered and exploited the Highveld Coalfields. The coal was initially used by the Boers as a domestic resource; however the discovery of gold in the Witwatersrand in 1886 created an enormous demand for coal (Brodie, 2008; Pistorious, 2008; 2008b). This increase in the demand for coal drove the commercial exploitation of the coal, until the industry was put on hold by the outbreak of war.

The South African War of 1899-1902 (also referred to as the Second Anglo-Boer War) officially started on October 9th, 1899. The war was the result of building tensions and conflicting political agendas between the Trekboers and the British. There are multiple notable battles associated with the South African War within the regional study area, one of which is the Battle of Bakenlaagte (October 30th, 1901). A battlefield relating to this event has been recorded within the greater study area.

Lieutenant Colonel George Benson's No. 3 Flying Column moved from the farm Syferfontein, marching north-west to the Bakenlaagte farmstead, where they intended to camp. The advance guard reached the farmstead and set up the camp, but by midday, the rear-guard had been hampered by unfavourable weather and were still some distance away from the farm. General Botha of the Boer commando and his 800 reinforcements planned to attack Benson's Column and this division of the force provided the Boers with an advantage. Outnumbered four to one, the Boers decimated the rear-guard in a gun battle that lasted just 20 minutes; but the attack did allow the main column to deploy and set up a defensive perimeter. This perimeter prevented the Boers from capturing the main column as they had envisaged and the Boers left with what spoils they could. The British transported their 134 wounded to the entrenched camp during the night (Pakenham, 1979; Willsworth, 2006; Wessels, 2010; von der Heyde, 2013). British losses included at least 66 dead, 120 were taken prisoner and the loss of two British guns. Boer casualties included at least 52 who were killed or wounded (Wessels, 2010)

Other important events associated with the South African War in the broader area include:

- The Battle of Lake Chrissie (February 6th, 1901);
- Trigaardsfontein (10 December 1901),
- Klippan (18 February 1902); and
- Boschmanskop (1 April 1904) (Van Vollenhoven 2012).

Historical heritage resources associated with the early settlement of these groups in the region make up the large majority of the identified heritage resources in the area under consideration. Historical heritage resources within the regional study area are represented as:

- The Bakenlaagte battlefield referred to above (Van Vollenhoven, 2012a; 2014; Hardwick & du Piesanie, 2018);
- Burial grounds and graves, ranging from single burials to graveyards containing over one hundred individuals; (van Schalkwyk, 1997a; 1997b; 2002a; 2002b; 2003a; 2003b; 2003c; 2003d; 2013; Fourie, et al., 2000; Van Schalkwyk & Moifatswane, 2003; Pistorius, 2004a; 2004b; 2007; 2008; 2011; 2012; 2013; 2014; 2015; 2016; de Jong, 2006; 2007; Fourie, 2007; 2008, 2009; Pelser & van Vollenhoven, 2008; Miller, 2010; Birkholtz, 2011; 2013; van Vollenhoven & Pelser, 2011; Van Vollenhoven, 2012a; 2012b; 2015a; 2015b; 2017a; 2017b; Fourie & Hutton, 2012; Fourie, et al., 2012; Magoma, 2013; du Piesanie, et al., 2013; Karodia, et al., 2013; Pelser, 2013a; 2013b; Seliane, 2013; Higgit, et al., 2014; Karodia & Nel, 2014; van Vollenhoven & du Bruyn,

2014; van Wyke Rowe, 2014; Coetzee & Behrens 2015; van der Walt, 2015; du Piesanie & Nel, 2016a; du Piesanie & Nel, 2016b; Coetzee & Fivaz, 2017; Hardwick & du Piesanie, 2018); and

- Historical built environment resources, such as structural remains (stonewall structures, homesteads, farmhouses and functional structures) and structural complexes; middens and ash deposits (Huffman & Calabrese, 1996; Van Schalkwyk *et al* 1996; Van Schalkwyk 1997a, 1997b, 2002a, 2002c, 2003d, 2013; Huffman 1999; De Jong 2006, 2007; Pistorius 2007, 2008, 2011, 2012, 2013, 2016; Van der Walt 2007; Pelser & van Vollenhoven 2008; Miller 2010; Fourie 2012; Van Vollenhoven & Pelser, 2011; Birkholtz, 2013; du Piesanie, et al., 2013; Karodia, et al., 2013; Pelser 2013a, 2013b; Seliane, 2013; Higgit, et al., 2014; Karodia & Nel, 2014; Van Wyk Rowe, 2014; Coetzee & Behrens 2015; Van Vollenhoven 2015a, 2015b, 2017a; du Piesanie & Nel, 2016a, 2016b; Coetzee & Fivaz, 2017; Hardwick & du Piesanie, 2018).

Plan 3: Distribution of Previously Identified Heritage Resources

6.2. Results from the Pre-disturbance Survey

Shannon Hardwick undertook a pre-disturbance survey of the site-specific study area on 19 April 2021. This survey focused on areas covered by proposed infrastructure not investigated in the previous surveys and was predominantly pedestrian. The survey was recorded as GPS tracks and identified heritage resources were marked as waypoints. Identified heritage resources were also recorded through written notes and photographs. The GPS data are provided in Plan 4.

The following sections describe the observations made during the survey and the outcomes of the survey.

6.2.1. Existing Environment

The natural vegetation of the site-specific study area has been disturbed in varying degrees by human activities. Table 6-3 presents a summary description of the natural environment within which the Project is situated. Figure 6-2 below presents an overview of the environment at the time of the pre-disturbance survey.

The environment at the time of the verification survey was disturbed through anthropogenic and animal activities. There is evidence that cattle graze on the land and burrowing animals were present within the Project area. Where noted, burrows were inspected for the presence of any archaeological materials.

Anthropogenic disturbances included farming activities including cultivated and cleared fields and associated infrastructure, such as formal and informal roads. Ornamental exotic plants were noted within the Project area.

Table 6-3: Summary of the Vegetation Setting of the Project

Biome	Bio-region	Vegetation Type
Grassland	Mesic Highveld Grassland	Eastern Highveld Grasslands (Gm12) This vegetation type is characterised by short dense grassland dominated by the usual highveld grasses with small, scattered rocky outcrops with wiry sour grasses and some woody species. This unit occurs on slightly to moderately undulating plains and includes some low hills and pan depressions. This vegetation type is associated with the Vryheid Formation of the Karoo Supergroup. This vegetation type is considered endangered and approximately 44% of the type has been transformed. Cultivation may have had the most extensive impact on this vegetation type and plantations, mines, urbanisation and dams are the other primary contributors to this transformation. Erosion in this type is very low.

Adapted from Mucina & Rutherford (2010)

Figure 6-2: State of the Environment during the Pre-disturbance Survey

6.2.2. Newly Identified Heritage Resources

During the pre-disturbance survey undertaken for the current HRM process, two heritage resources were identified. Table 6-4 includes a summary of this heritage resource and Figure 6-3 includes photographs. Plan 4 includes the results of the pre-disturbance survey.

Table 6-4: Heritage Resources identified during the Survey

Heritage Resource	Description
Wf-01	Structure with one visible internal division. There is no roof and no fittings. The windows and doors are identifiable through the deliberate gaps in the structure. The doors have heavy wood lintels intact. This is likely to be a farmhouse or residential structure. The materials from which the structure is constructed suggest there have been multiple phases of construction or refurbishment. The exterior is largely sandstone, and the visible interior wall was made of mudbrick. In proximity to the structure is a windmill, reservoir and large animal kraal made of ferricrete and rock. The kraal is in good condition. Also near to the house is a small outbuilding made of ferricrete and red brick which has been plastered over. This werf may potentially include a mix of historical (i.e., older than 60 years) and more modern structures. Ornamental exotic plants were identified near this site. *These structures are not visible on the historical layering (refer to Section 6.3 below). However, there are lines of trees visible on the historical imagery at this point. Such features are typically associated with historical structures. As such, this structure is assumed to be older than 60 years and must be assumed to have General Protection under Section 34 of the NHRA.*
Wf-02	Structure with an exterior made of sandstone blocks and interior walls of red brick. The walls are in various states of collapse, from none to total collapse. The number of internal divisions is not clear, but there is at least one. Part of the standing red brick wall was plastered and one side had been painted red. This suggests that the different rooms had been used for specific purposes. This was most likely a farmhouse or residential structure. One doorway is visible and other has been blocked by red brick. The doorways include stone lintels. The roof is missing and no fittings were present. In proximity to the house, a square stone foundation and reservoir are present. Some distance away from the house[7] lies an additional square foundation. Walls occur around the foundation but range from near collapse to a maximum height of two courses. These walls are made of sandstone and ferricrete. The purpose of the structure is not obvious from the remains but are considered here as part of Wf-02. *These structures are not visible on the historical layering (refer to Section 6.3 below). However, there are lines of trees visible on the historical imagery at this point. Such features are typically associated with historical structures. As such, this structure is assumed to be older than 60 years and must be assumed to have General Protection under Section 34 of the NHRA.*

[7] At the point indicated Wf-02b in Plan 4.


Structures present at Wf-001


Structures present at Wf-002

Figure 6-3: Results of the Pre-disturbance Survey showing Newly Identified Heritage Resources

Plan 4: Results of the Pre-disturbance Survey

6.3. Results from Historical Layering

Figure 6-4 presents the results of the historical layering and shows the landscape as it was in 1979[8]. The site-specific study area at that time is comprised almost entirely by cultivated agricultural fields and some roads within the wider area. The Project area has a long history of disturbance through farming activities.

There is one point of interest highlighted in Figure 6-4. This indicates the location of Wf-01 and shows the lines of trees typically associated with historical structures. The structures themselves are not visible on this imagery.

Additional points of interest were identified on the available imagery outside of the site-specific study area. These points represent Wf-02 and additional structures which, if still remaining, would be older than 60 years and which will therefore be afforded general protection under Section 34 of the NHRA. These points were not ground-truthed during the pre-disturbance survey, as they are outside the proposed infrastructure footprint.

[8] No historical imagery showing the site-specific study area 60 years ago was available at the time of this assessment. Figure 6-4 includes the available imagery closest to this period.

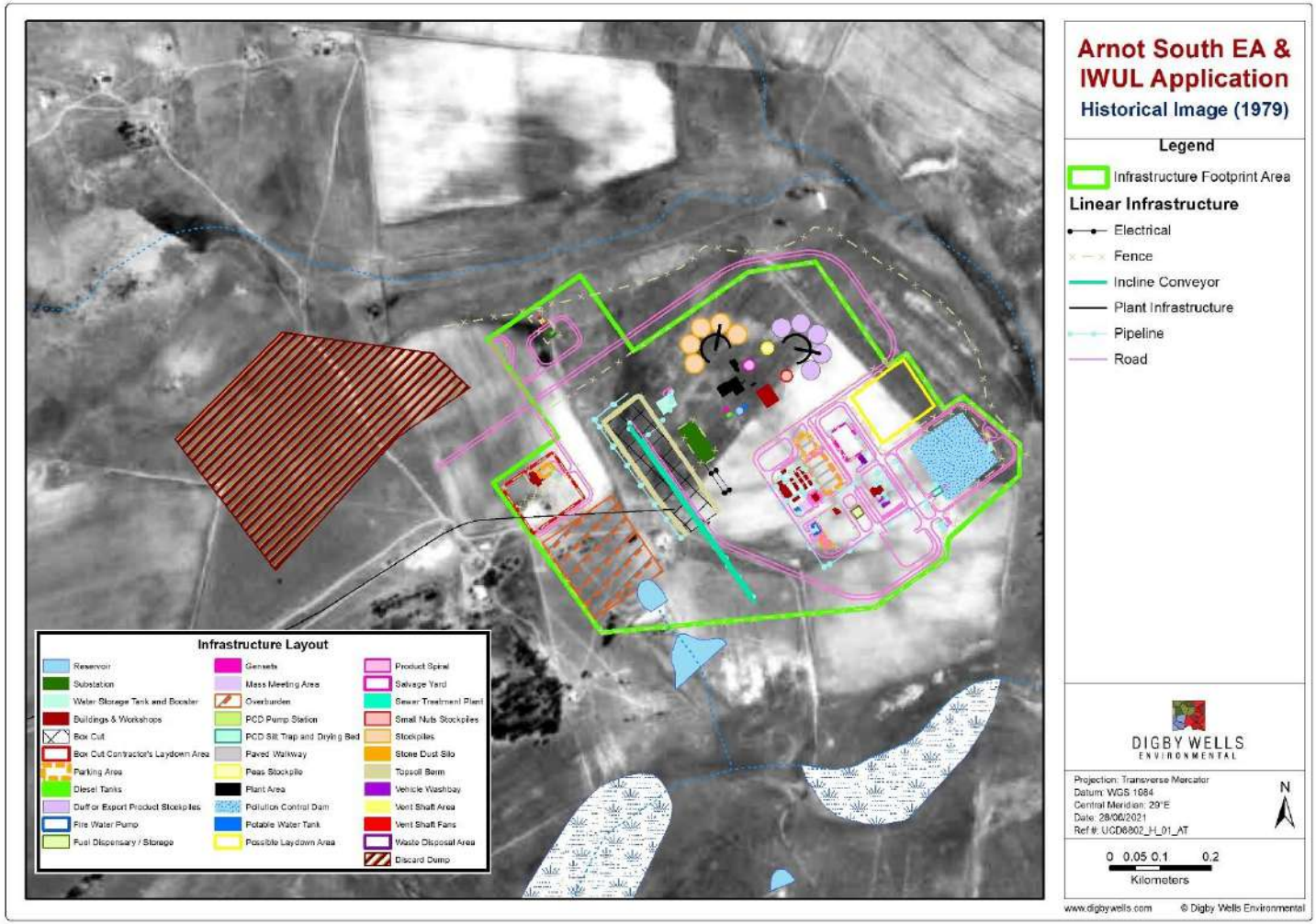

Figure 6-4: Historical Imagery showing the Project Area in 1979 with Points of Interest

6.4. Socioeconomic Setting

This section presents a brief summary of the demographic statistics relevant to the potential socio-economic benefit derived from the Project, informed by data collected during the 2011 Census (Statistics South Africa, 2011)[9].

The Project is located within Wards 3 and 7 of the STLM and Ward 21 of the CALLM. These local municipalities are located within the NDM and GSDM respectively, both within the Mpumalanga Province.

As of the 2011 Census, Mpumalanga had a population of 4 039 939 people, which accounts for approximately 7.8% of the South African population (Wazimap, 2017). The province includes three district municipalities. The GSDM and NDM are the smallest and second smallest respectively in terms of population. The GSDM included 1 043 195 residents (25.8% of the population of the province) and NDM includes a population of 1 308 129 (32.4%).

The GSDM is itself divided into seven local municipalities. The CALLM is the second largest of these by population, with 186 011 residents. This accounts for 17.8% of the population in the GSDM. CALLM includes 25 wards. The MR area includes portions of Ward 21.

Ward 21 includes a population of 8 095 residents. The ward is almost completely rural. This ward covers a comparatively large area and the land within this ward is characterised by agriculture, including cultivation of crops

NDM is divided into six local municipalities. STLM is the fourth largest of the local municipalities in terms of population and included 229 831 people in 2011 (17.6% of the population in the NDM). STLM includes 25 wards, and the MR area includes portions of Ward 3 and Ward 7.

Ward 3 includes a population of 7 801 residents. The ward is almost completely rural, although there are some areas of dense settlement. Similar to Ward 21 of CALLM, Ward 4 is relatively large and is characterised by agriculture, including cultivation of crops. Ward 7 includes a population of 7 801 residents. The ward is almost completely rural and is characterised by agriculture, including cultivation of crops, and mining activities.

Unemployment is a challenge within the regional study area. Table 6-5 presents an overview of the employment status of the populations within the regional study area.

[9] Wazimap (2017) has adjusted these data to conform with the updated ward and municipality boundaries which were altered ahead of the 2016 Municipal Elections (Open Up, 2017).

Table 6-5: Employment Status of the Populations within the NDM

Employment Statistics (Census 2011)	Ward 3		Ward 7		STLM		NDM	
	No.	%	No.	%	No.	%	No.	%
Total Population	7 801	-	5 822	-	229 831	-	1 308 129	-
Working Age (18-64)	4 863	62.3	3 989	68.5	151 241	65.8	796 693	60.9
Employed	2 525	32.4	2 368	40.7	85 968	37.4	355 478	27.2
Discouraged Work Seeker	207	2.7	168	2.9	5 092	2.2	42 554	3.3
Unemployed	851	10.9	292	5.0	21 101	9.2	152 250	11.6
Other not economically active	1 683	21.6	1 422	24.4	50 252	21.9	319 641	24.4

Adapted from Wazimap (2017)

Table 6-6: Employment Status of the Populations within the GSDM

Employment Statistics (Census 2011)	Ward 21		CALLM		GSDM	
	No.	%	No.	%	No.	%
Total Population	8 095	-	186 011	-	1 043 195	-
Working Age (18-64)	4 611	57.0	93 932	50.5	600 878	57.6
Employed	2 539	31.4	29 141	15.7	259 129	24.8
Discouraged Work Seeker	382	4.7	9 282	3.4	35 518	5.0
Unemployed	422	5.2	15 975	8.6	109 658	10.5
Other not economically active	1 757	21.7	53 944	29.0	262 387	25.2

Adapted from Wazimap (2017)

7. Impact Assessment

This section presents a description of the Cultural Significance of identified heritage resources informed through primary and secondary data collection. The Cultural Significance of the heritage resources informs the minimum required mitigation encapsulated in the NHRA and the SAHRA Minimum Standards.

7.1. Cultural Significance of the Identified Landscape

Heritage resources are intrinsic to the history and beliefs of communities. They characterise community identity and cultures and are finite, non-renewable and irreplaceable. Considering the innate value of heritage resources, HRM acknowledges that these have lasting worth as evidence of the origins of life, humanity and society. Notwithstanding the inherent value ascribed to heritage, it is incumbent on the assessor to determine the significance of these resources to allow for the implementation of appropriate management. This is achieved through assessing the value of heritage resources relative to the prescribed criteria encapsulated in policies and legal frameworks.

This section presents a statement of Cultural Significance as is relevant to newly identified heritage resources and the greater cultural landscape of the site-specific study area. The statement of significance considers the importance or the contribution of the identified heritage resources and the landscape to four broad value categories: aesthetic, historical, scientific and social, to summarise the Cultural Significance and other values described in Section 3(3) of the NHRA.

During the pre-disturbance survey, one category of heritage resources was recorded – two built environment resources.

The assessment of the Cultural Significance and Field Ratings demonstrated that the identified resources have very high significance. Table 7-1 presents a summary of this assessment. Sites of the same type that share the same Cultural Significance have been grouped together in terms of the impact assessment (refer to Sections 0 to 7.4 below).

Table 7-1: Cultural Significance and Field Ratings of Newly Identified Heritage Resources within the Project Area

Resource ID	Type	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE	Designation	Recommended Field Rating	Field Rating Description	Minimum Required Mitigation
Wf-01 Wf-02	Built Heritage	**1** The technical skill demonstrated by this resource is commonly represented in diverse cultural landscapes.	**1** This structure is not representative of a specific timeframe or event but represents a more general timeframe commonly represented in diverse cultural landscapes.	**1** The cultural heritage aspects and information potential represented by this resource are commonly represented in a range of cultural landscapes.	**1** This heritage resource is not affiliated with a specific social or cultural group and its social significance is commonly represented in diverse cultural landscapes.	**3** The fabric of this resource is well preserved. The landscape is associated with farming activities and there is limited encroachment. There is minimal information potential little meaning ascribed.	3	Negligible	General Protection IV C	Resources under general protection in terms of NHRA Sections 34 to 37 with negligible significance.	Sufficiently recorded, no additional mitigation required.

The SAHRA Minimum Standards recommend that heritage resources with negligible CS require no mitigation. The inclusion of such resources into an HIA report is considered to be sufficient in terms of recording. The impacts to Wf-01 and Wf-02 are therefore not discussed in depth in this section.

Their significance notwithstanding, Wf-01 and Wf-02 are afforded General Protection under Section 34 of the NHRA. As such, these resources may not be impacted or affected without a permit issued by the HRAs. Given their location to proposed Project activities, no impacts arising from construction activities are expected. However, there is potential for the heritage resources to be impacted from potential subsidence occurring through the operation of the Project. Digby Wells therefore recommends Exxaro obtains a destruction permit issued in terms of Section 34 of the NHRA prior to the commencement of undermining activities.

7.2. Construction Phase

Table 7-2 presents the activities expected to occur during the Construction Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 7-2: Interactions and Impacts of Construction Phase Activities

Interaction	Impact
Removal of vegetation and topsoil for establishment of mining and linear infrastructure;	Digby Wells envisages no impact to the identified heritage resources, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure.
Diesel storage and explosives magazine;	
Construction of additional infrastructure, and ventilation fans;	
Construction of access road and haul roads; and	
Stockpiling of soils, rock dump and discard dump establishment.	

Digby Wells does not envisage any impact to the identified heritage resources from the above-mentioned activities and has therefore not assessed these impacts further in this report.

7.3. Operational Phase

Table 7-3 presents the activities expected to occur during the Operational Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 7-3: Interactions and Impacts of Operational Phase Activities

Interaction	Impact
Ventilation fans and infrastructure area containing stockpile areas;	Digby Wells envisages no impact to the identified heritage resources, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure.
Underground blasting;	
Maintenance of haul roads, pipelines, machinery, water, effluent and stormwater management infrastructure and stockpile areas;	
Blasting and removal of rock; and	
Concurrent rehabilitation as mining progresses.	

Digby Wells does not envisage any impact to the identified heritage resources from the above-mentioned activities and has therefore not assessed these impacts further in this report.

7.4. Decommissioning Phase

Table 7-4 presents the activities expected to occur during the Decommissioning Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 7-4: Interactions and Impacts of Decommissioning Phase Activities

Interaction	Impact
Demolition and removal of infrastructure;	Digby Wells envisages no impact to the identified heritage resources given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure. Should any infrastructure intended for demolition increase in age to older than 60 years during the Project lifecycle, the structure must be considered a heritage structure. Any alterations to these structures will be subject to a NHRA Section 34 permit application process
Post-closure monitoring and rehabilitation; and	
Closure of the underground mine.	

Digby Wells does not envisage any impact to the identified heritage resources from the above-mentioned activities and has therefore not assessed these impacts further in this report.

7.5. Cumulative Impacts

Cumulative impacts occur from in-combination effects of various impacts on heritage resources acting within a host of processes that result in an incremental effect. The importance

of identifying and assessing cumulative impacts is that the whole is often greater than the sum of its parts. This implies that the total effect of multiple stressors or change processes acting simultaneously on a system may be greater than the sum of their effects when acting in isolation.

This Project in conjunction with other planned developments in line with the strategic development plans for the Mpumalanga Province requires consideration to identify the possible in-combination effects of various impacts to known heritage resources. Table 7-5 presents a summary of the possible cumulative impacts of the Project.

Table 7-5: Summary of Potential Cumulative Impacts

Type	Cumulative Impact	Direction of Impact	Extent of Impact
Additive	The proposed construction and operation of the Project will add to the existing infrastructure associated with the local and broader study areas. This Project will contribute to the loss of heritage resources and the gradual sanitising of the cultural heritage landscape. The Project will subtract from the sense of place and will decrease the area in which heritage resources not identified can occur.	Negative	Local study area

7.6. Unplanned and Low Risk Events

This section considers the potential risks to protected heritage resources, as well as the potential heritage risks that could arise for Exxaro in terms of implementation of the Project. These two aspects are discussed separately in this section.

Section 6.2.2 describes the heritage resources identified during the pre-disturbance survey. This list is, however, not an exhaustive list of all heritage resources within the Project area. If heritage resources are subsequently identified, and where Exxaro knowingly does not take proactive management measures, potential risks to Exxaro may include litigation in terms of Section 51 of the NHRA and social or reputational repercussions. Table 7-6 presents a summary of the primary risks that may arise for Exxaro.

Table 7-6: Identified Heritage Risks that may arise for Exxaro

Description	Primary Risk
Heritage resources with a high CS rating are inherently sensitive to any development in so far that the continued survival of the resource could be threatened. In addition to this, certain heritage resources are formally protected thereby restricting various development activities.	Negative Record of Decision (RoD) and/or development restrictions issued by MPHRA and/or SAHRA in terms of Section 38(8) of the NHRA.

Description	Primary Risk
Impacting on heritage resources formally and generally protected by the NHRA without following due process. Due process may include social consultations and/or permit application processes to SAHRA and/or MPHRA.	• Fines; • Penalties; • Seizure of Equipment; • Compulsory Repair / Cease Work Orders; and • Imprisonment.

If additional heritage resources are identified during decommissioning and dismantling of the proposed infrastructure and/or activities undertaken during the rehabilitation processes, potential risks to those heritage resources will need to be assessed. Table 7-7 provides an overview of these potential unplanned events, the subsequent impact that may occur and mitigation measures and management strategies to remove or reduce these risks.

Table 7-7: Identified Unplanned Events and Associated Impacts

Unplanned event	Potential impact	Mitigation / Management / Monitoring
Encountering unidentified in situ remnants of historical built environment resources during the implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 34 of the NHRA	Establish Project-specific Chance Find Procedures (CFPs) as a condition of authorisation. Refer to Section 11 for more detailed recommendations.
Accidental exposure of fossil bearing material implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 35 of the NHRA	
Accidental exposure of *in situ* archaeological material during the implementation of the Project.		
Accidental exposure of *in situ* burial grounds or graves during the implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 36 of the NHRA.	
Accidental exposure of human remains during the decommissioning and rehabilitation and closure phases of the Project.		

8. Environmental Management Plan

Table 8-1 below summarises the outcomes of the HRM process that must be included in the Environmental Management Program (EMPr).

Table 8-1: Heritage Specialist Input into the Environmental Management Program

Activity/ies	Potential Impacts	Aspects Affected	Phase	Mitigation Measure	Mitigation Type	Time period for implementation
• All Activities outlined in Section 2.1 above	Damage to or destruction of previously unidentified heritage resources.	Cultural Heritage	Construction	• Develop and implement CFP.	***Control***	Before the commencement of the Project

9. Monitoring Programme

Section 11 includes recommended mitigation measures and management strategies. These recommendations do not require a monitoring programme.

10. Consultation and Results from Stakeholder Engagement

The Public Participation Process (PPP) required in terms of the NEMA as a component of the EIA process has not been completed in part to date but will be completed as a process separate to the heritage specialist assessment. This consultation process affords Interested and Affected Parties (I&APs) opportunities to engage in the EIA process. The objectives of the PPP or Stakeholder Engagement Process (SEP) include the following:

- To ensure that I&APs are informed about the project;
- To provide I&APs with an opportunity to engage and provide comment on the project;
- To draw on local knowledge by identifying environmental and social concerns associated with the project;
- To involve I&APs in identifying methods in which concerns can be addressed;
- To verify that stakeholder comments have been accurately recorded; and
- To comply with the legal requirements.

No formal consultation was undertaken as part of the heritage assessment as this forms part of the PPP or SEP. Should any I&AP comments be submitted in relevance to heritage resources during the PPP, these will be considered in the final HIA or EIA report.

Site surveys can often present an opportunity for informal consultation with specific stakeholders (usually farm owners, managers and employees). This consultation can result in the identification of burial grounds and graves – importantly, these could include formal burial grounds or graves, sometimes with no visible surface markers – or in the identification of sacred sites or other places of importance, which may not otherwise be identified. No such informal consultation was undertaken as part of this assessment.

11. Recommendations

Considering the nature and the scope of the Project, Digby Wells recommends the following additional recommendations be implemented prior to the commencement of the Project:

- Exxaro must apply for a permit issued in terms of Section 34 of the NHRA to allow for the destruction or alteration of the structures associated with Wf-01 and Wf-02; and
- Exxaro must draft and implement a CFP as part of the EMPr.

12. Reasoned Opinion Whether Project Should Proceed

Based on the understanding of the Project while considering the results of this assessment, Digby Wells does not object to the Project provided the recommendations detailed in Section 11 above are adopted

13. Socio-economic Benefit versus Heritage Impacts

Based on a review of the applicable planning documents and available socio-economic data detailed in Section 6.4 above, the potential socio-economic benefits that will arise from the Project outweigh the identified risks and impacts to the known heritage resources within the site-specific study area. This statement is supported by the following statements:

- The identified impacts to the heritage resources can be mitigated through the recommendations included in Section 11; and
- The Project has the potential to contribute to the creation of short-term and long-term employment opportunities.

14. Conclusion

The aim of the HRM process was to comply with regulatory requirements contained within Section 38 of the NHRA through the following:

- Defining the cultural landscape within which the Project is situated;
- Identifying, as far as is feasible, heritage resources that may be impacted upon by the project as well as define the Cultural Significance;
- Assessing the possible impacts to the identified heritage resources;
- Considering the socio-economic benefits of the Project; and
- Providing feasible mitigation and management measures to avoid, remove or reduce perceived impacts and risks.

These objectives were met as presented in Sections 6 through 12 above. Based on the understanding of the Project while considering the results of this assessment, Digby Wells does not object to the Project provided the recommendations detailed above are adopted.

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Appendix A: Glossary of Terms

GLOSSARY OF TERMS

Term	Definition
Archaeological	Material remains resulting from human activity that are in a state of disuse and older than 100 years, including artefacts, human and hominid remains and artificial features and structures. Rock art created through human agency older than 100 years, including any area within 10 m of such representation. Wrecks older than 60 years - either vessels or aircraft - or any part thereof that was wrecked in South Africa on land, internal or territorial waters, and any cargo, debris or artefacts found or associated therewith. Features, structures and artefacts associated with military history that are older than 75 years and the sites on which they are found, e.g. battlefields.
Archaeologist	A trained professional who uses scientific methods to excavate, record and study archaeological sites and deposits.
Artefact	Any object manufactured or modified by human beings.
Burial Grounds and Graves Consultation (BGGC)	The regulated consultation process required in terms of Section 36 of the NHRA and Regulation GNR 548 to the Act when burial grounds and graves are identified within a project area.
Ceramic (syn. pottery)	In an archaeological context any vessel or other object produced from natural clay that has been fired. Indigenous ceramics associated with Farming Communities are low-fired wares, typically found as potsherds. Imported and more historic ceramics generally include high-fired wares such as porcelain, stoneware, etc.
Ceramic facies / facies	Subgroups of a primary ceramic tradition or sequence. Typically used in ceramic analyses. Various facies are attributed to different temporal periods based of radiometric dates obtained from archaeological contexts. Facies are often used to infer cultural identity of archaeological groups. However, in context of this study identified ceramic facies merely provide a relative temporal context for archaeological sites in the landscape.
Ceramic tradition	The sequence of ceramic styles that develop out of each other and form a continuum. A tradition is the primary group to which subsequent ceramic facies belong. A ceramic tradition can be broadly associated with various linguistic and cultural groups, but do not represent any given ethnic identity, especially during the LFC period.
Conservation	In relation to heritage resources includes the protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance.

Term	Definition
Cultural significance (CS)	The aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. A heritage may have cultural significance or other special value because of its: Importance in the community, or pattern of South Africa's history. Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage. Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects. Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group. Importance in demonstrating a high degree of creative or technical achievement at a particular period. Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons. Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa. Significance relating to the history of slavery in South Africa.
Development	Any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of a 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 of 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 hoardings. Any change to the natural or existing condition or topography of land. Any removal or destruction of trees, or removal of vegetation or topsoil.
Early Farming Community/ies	The first Farming Communities (also known as Early Iron Age) that appear in the southern archaeological record during the early first millennium CE. The EFC period is generally dated from c. 200 CE to 1000 CE.
Early Stone Age	The South African ESA dates from ~3 Mya to c. 250 Kya. This period is associated with later *Australopithecus and* early *Homo* species. The lithic industries that characterise the ESA include Oldowan and Early Acheulian, typically as simple core tools, choppers handaxes and cleavers.
Excavation	The scientific excavation, recording and retrieval of archaeological deposit and objects through the use of accepted archaeological procedures and methods, and excavate has a corresponding meaning.

Term	Definition
Farming Community/ies	Term signifying the appearance in the southern African archaeological of Bantu-speaking agricultural based societies from the early first millennium CE. The term replaces the *Iron Age* as a more accurate description for groups who practiced agriculture and animal husbandry, extensive manufacture and use of ceramics, and metalworking. The Farming Community period is divided into an Early and Late phase. The use of Later Farming Communities especially removes the artificial boundary between archaeology and history.
Field Rating	SAHRA requires heritage resources to be provisionally rated in accordance with Section 7 of the NHRA that provides a three tier grading system of resources that form part of the national estate. The rating system distinguishes between four categories: Grade I: Heritage resources with qualities so exceptional that they are of special national significance. Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region. Grade III: Other heritage resources worthy of conservation. General Protected: i.e. generally protected in terms of Sections 33 to 37 of the NHRA.
Formal protection	Places with qualities so exceptional that they are of special national significance as national heritage sites or that have special qualities as provincial heritage sites.
General protection	General protections are afforded to: Objects protected in terms of laws of foreign states. Structures older than 60 years. Archaeological and palaeontological sites and material and meteorites. Burial grounds and graves. Public monuments and memorials.
Grave	A place of interment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place.

Term	Definition
Heritage Impact Assessment (HIA)	An assessment of the cultural significance of, and possible impacts on, diverse heritage resources that may be affected by a proposed development. A HIA may include several specialist elements such as archaeological, built environment and palaeontological studies. The HIA must supply the heritage authority with sufficient information about the sites to assess, with confidence, whether or not it has any objection to a development, indicate the conditions upon which such development might proceed and assess which sites require permits for destruction, which sites require mitigation and what measures should be put in place to protect sites that should be conserved. The content of HIA reports are clearly outlined in Section 38(3) of the NHRA and SAHRA Minimum Standards.
Heritage resource	Any place or object of cultural significance.
Heritage resources management	Process required when development is intended categorised as: Any linear development exceeding 300m in length. Construction of a bridge or similar structure exceeding 50 m in length. Any activity which will change the character of a site exceeding 0.5 hectares in extent or involving three or more existing erven or subdivisions thereof or that have been consolidated within the past five years or costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority. Re-zoning of a site exceeding one hectare in extent. Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.
Heritage site	Any place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.
Late Farming Community/ies	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millennium / early second millennium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and economic activities, including extensive trade routes. The LFC period is generally dated from c. 1000 CE well into the modern historical period of the nineteenth century.
Late Stone Age	The South African LSA dates from ~30 Kya. This period is associated with modern *Homo sapiens sapiens* and the complex hunter-gatherer societies, ancestral to the Bushmen / San and Khoi. The LSA lithic assemblage contains microlithic technology and composite tools such as arrows commonly produced from fine-grained cryptocrystalines, quarts and chert. The LSA is also associated with archaeological rock art including both paintings and engravings.

Term	Definition
Living / intangible heritage	The intangible aspects of inherited culture that could include cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems, the holistic approach to nature, society and social relationships.
Management	In relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the NHRA.
Middle Stone Age	The South African MSA dates from ~300 Kya to c. 30 Kya. This period is associated with the changing behavioural patterns and the emergence of modern cognitive abilities in early *Homo sapiens species.* The lithic industries that characterise the MSA are typically more complex tools with diagnostic identifiers, including convergent flake scars, multi-faceted platforms, retouch and backing. Assemblages are characterised as refined lithic technologies such as prepared core techniques, retouched blades and points manufactured from good quality raw material.
National estate	The national estate as defined in Section 3 of the NHRA, i.e. heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations. The national estate may include: 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, including ancestral graves, royal graves and graves of traditional leaders, graves of victims of conflict, graves of individuals designated by the Minister by notice in the Gazette, historical graves and cemeteries, and other human remains which are not covered in terms of the National Health Act, 2003. Sites of significance relating to the history of slavery in South Africa. Movable objects, including objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; objects to which oral traditions are attached or which are associated with living heritage; ethnographic art and objects; military objects; objects of decorative or fine art; objects of scientific or technological interest. Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

Term	Definition
Palaeontological	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 trance.
Palaeontologist	A trained professional who uses scientific methods to excavate, collect, record and study palaeontological sites and fossils.
Pedestrian survey	A method of examining a site in which surveyors, spaced at regular intervals, systematically walk over the area being investigated.
Phase 1 Archaeological Impact Assessment (AIA)	Phase 1 AIAs generally involve the identification and assessment of sites during a field survey of a portion of land that is going to be affected by a potentially destructive or landscape-altering activity.
Phase 2 Archaeological Impact Assessment (AIA)	Phase 2 AIAs are primarily based on salvage or mitigation excavations preceding development that will destroy or impact on a site. This may involve collecting of artefacts from the surface and / or excavation of representative samples of the artefactual material to allow characterisation of the site and the collection of suitable materials for dating the sites. Phase 2 AIAs aim to obtain a general idea of the age, significance and meaning of the site that is to be lost and to store a sample that can be consulted at a later date for research purposes. Phase 2 excavations can only be done under a permit issued by SAHRA, or other appropriate heritage agency, to the appointed archaeologist.
Phase 3 Management Plan / Conservation Management Plan (CMP)	On occasion, a site may require a Phase 3 programme involving the modification of the site or the incorporation of the site into the development itself as a site museum, a special conservation area or a display. Alternatively it is often possible to relocate or plan the development in such a way as to conserve the archaeological site or any other special heritage significance the place may have. For example, in a wilderness area or open space when sites are of public interest the development of interpretative material is recommended and adds value to the development. Permission for the development to proceed can be given only once the heritage resources authority is satisfied that measures are in place to ensure that the archaeological sites will not be damaged by the impact of the development or that they have been adequately recorded and sampled. Careful planning can minimise the impact of archaeological surveys on development projects by selecting options that cause the least amount of inconvenience and delay. The process as explained above allows the rescue and preservation of information relating to our past heritage for future generations. It balances the requirements of developers and the conservation and protection of our cultural heritage as required of SAHRA and the provincial heritage resources authorities (ASAPA).

Term	Definition
Pre-disturbance survey (syn. reconnaissance)	A survey to record a site as it exists, with all the topographical and other information that can be collected, without excavation or other disturbance of the site.
Reconnaissance	A broad range of techniques involved in the location of archaeological sites, e.g. surface survey and the recording of surface artefacts and features, the sampling of natural and mineral resources, and sometimes testing of an area to assess the number and extent of archaeological resources. However, in terms of South African practice, reconnaissance during a so-called Phase 1 AIA never includes sampling as this is a permitted activity, usually undertaken during so-called Phase 2 AIAs (ASAPA).
Site	Any area of land, including land covered by water, and including any structures or objects thereon.
Structure	Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.
Tangible heritage	Physical heritage resources such as archaeological sites, historical buildings, burial grounds and graves, fossils, etc. Tangible heritage may be associated with intangible elements, e.g. the living cultural traditions, rituals and performances associated with burial grounds and graves and deceased persons.

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Appendix B: Specialist CV

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Appendix C: HRM Methodology