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## Proposed Dalyshope Coal Mining Project, situated in the Magisterial District of Lephalale, Limpopo Province

### Heritage Impact Assessment

**Prepared for:**

Anglo Operations (Pty) Ltd

**Project Number:**

UCD6170

January 2021

Department of Mineral Resources (DMR) Reference Number:

LP30/1/2/3/2/1(10183)MR



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<b>Report Type:</b>	Heritage Impact Assessment
<b>Project Name:</b>	Proposed Dalyshope Coal Mining Project, situated in the Magisterial District of Lephalale, Limpopo Province
<b>Project Code:</b>	UCD6170

<b>Name</b>	<b>Responsibility</b>	<b>Signature</b>	<b>Date</b>
Shannon Hardwick HRM Consultant ASAPA Member: 451	Report Compilation Pre-disturbance Survey		January 2021
Justin du Piesanie Divisional Manager: Social and Heritage Services ASAPA Member 270	Technical Review		
Xan Taylor Environmental Consultant	Project Manager Report Review		

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## DETAILS AND DECLARATION OF THE SPECIALIST

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

**Contact person: Shannon Hardwick**


Digby Wells House  
Turnberry Office Park  
48 Grosvenor Road  
Bryanston  
2191

Tel: 011 789 9495  
Fax: 011 789 9498  
E-mail: [shannon.hardwick@digbywells.com](mailto:shannon.hardwick@digbywells.com)

<b>Full name:</b>	Shannon Hardwick
<b>Title/ Position:</b>	Heritage Resources Management Consultant
<b>Qualification(s):</b>	Master of Science (MSc) Archaeology
<b>Experience (years):</b>	3 Years
<b>Registration(s):</b>	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*

January 2021

*Date*

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## EXECUTIVE SUMMARY

Anglo Operations (Pty) Ltd (hereinafter Anglo) and Universal Coal Development IV (Pty) Ltd (hereinafter Universal) have partnered together for the proposed Dalyshope Coal Mining Project located near Lephalale in the Limpopo Province (the Project). The Project will consist of an opencast coal mine and associated infrastructure. The current Prospecting Rights owned by Anglo will be included in the Mining Right area but the proposed opencast pit and mine infrastructure layout focus on two properties: Dalyshope 232 LQ and Klaarwater 231 LQ.

Universal, on behalf of Anglo, appointed Digby Wells Environmental (hereinafter Digby Wells) to undertake the Environmental Impact Assessment (EIA) process necessary for the Mining Right Application (MRA), Environmental Authorisation (EA) and additional licenses required for the Project. The required applications were undertaken in compliance with:

- The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA);
- National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA); and
- The EIA Regulations, 2014 (Government Notice Regulation [GN R] 326), as amended, promulgated in terms of the NEMA.

This document constitutes the Heritage Impact Assessment (HIA) report in support of the EIA process in compliance with Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). Digby Wells completed the following activities as part of the HIA process:

- Description of the predominant cultural landscape supported through primary and secondary data collection;
- Assessment of the Cultural Significance (CS) 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 report to the Heritage Resource Authorities (HRAs) for Statutory Comment as required under Section 38(8) of the NHRA.

Digby Wells undertook an extensive pre-disturbance survey of the Project area from 12 to 19 November 2012 and 5 to 7 August 2013 in support of a previous Heritage Resources

Management (HRM) process<sup>1</sup>. During this process, Digby Wells identified 30 heritage resources on the properties earmarked for this Project. Digby Wells undertook a verification survey of the affected properties between 11 and 13 February 2020. During this survey, one additional heritage resource was identified. The table below summarises the CS of the identified heritage resources.

### Summary of the CS of Identified Heritage Resources

Resource ID	Description	INTEGRITY	CS
S.35-001; S.35-002; S.35-003; S.35-004; S.35-005; S.35-006; S.35-007; S.35-008; S.35-009; S.35-010; S.35-011; S.35-012; S.35-013; S.35-014; S.35-015; S.35-016; S.35-017; S.35-018; S.35-019; S.35-020; S.35-024; S.35-025; S.35-026; S.35-027; S.35-034; S.35-043; S.35-044; S.35-045; S.35-050; S.35-051; S.35-052	Isolated Stone Age or Farming Community occurrences	0	Negligible
S.35-069		1	Negligible

The SAHRA Minimum Standards recommend that heritage resources with negligible CS require no mitigation and their inclusion into an HIA report is considered to be sufficient in terms of recording these resources. As such, the impacts to these heritage resources is not considered in more detail. There is no direct impact on heritage resources of significance resulting from the Project activities envisaged for the Construction, Operational or Decommissioning phases of the Project. This notwithstanding, there are residual impacts to heritage resources that have not been identified in the Project area that may be encountered during Project-related activities.

<sup>1</sup> This HRM process was in support of an EIA process for a similar process. The client put a stop to the project during the impact assessment of that project and the HRM process was not completed.

### 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 <i>in situ</i> archaeological material during the implementation of the Project.	
Accidental exposure of <i>in situ</i> 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 <i>in situ</i> 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.	

Based on Digby Wells' understanding of the Project, while considering the defined cultural landscape, known heritage resources and the requirements of the International Finance Corporation (IFC) Performance Standards of Environmental and Social Sustainability (PS) 8: Cultural Heritage, Digby Wells recommends that Anglo and/or Universal develop and implement a Project-specific Chance Finds Protocol (CFP) prior to the commencement of the construction phase of the Project. Where these recommendations are adopted, Digby Wells does not object to the implementation of the Project from a heritage perspective.



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## ACRONYMS, ABBREVIATIONS AND DEFINITIONS

Abbreviation	Meaning
<b>ASAPA</b>	Association of Southern African Professional Archaeologists
<b>BA</b>	Bachelor of Arts, or Basic Assessment ( <i>the applicable term will be defined in the report</i> )
<b>BCE</b>	Before Common Era (also: Before Christ or BC)
<b>BID</b>	Background Information Document
<b>BSc</b>	Bachelor of Science
<b>c.</b>	Circa, meaning approximately
<b>CE</b>	Common Era (also: <i>Anno Domini</i> or AD)
<b>CFP</b>	Chance Find Protocol
<b>CRR</b>	Comments and Response Report
<b>CS</b>	Cultural Significance
<b>Digby Wells</b>	Digby Wells Environmental
<b>EA</b>	Environmental Authorisation
<b>EAP</b>	Environmental Assessment Practitioner
<b>EFC</b>	Early Farming Community ( <i>also known as Early Iron Age, see below</i> )
<b>EIA</b>	Environmental Impact Assessment. <i>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'.</i>
<b>EMP</b>	Environmental Management Plan
<b>EMPr</b>	Environmental Management Programme
<b>ESA</b>	Early Stone Age
<b>GIS</b>	Geographical Information System
<b>GN R</b>	Government Notice Regulation
<b>GPS</b>	Global Positioning System
<b>HIA</b>	Heritage Impact Assessment
<b>Hons</b>	Honours degree
<b>HRAs</b>	Heritage Resources Authorities
<b>HRM</b>	Heritage Resources Management
<b>HSMP</b>	Heritage Site Management Plan
<b>ICOMOS</b>	International Council on Monuments and Sites

<b>Abbreviation</b>	<b>Meaning</b>
<b>Kya</b>	Thousand years ago
<b>LED</b>	Local Economic Development
<b>LFC</b>	Late Farming Community also known as Late Iron Age
<b>LIHRA</b>	Limpopo Heritage Resources Authority
<b>LSA</b>	Late Stone Age
<b>MIA</b>	Middle Iron Age
<b>MPRDA</b>	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
<b>MR</b>	Mining Right (boundary)
<b>MRA</b>	Mining Right Application
<b>MSA</b>	Middle Stone Age
<b>MSc</b>	Master of Science
<b>Mtpa</b>	Million tonnes per annum
<b>Mya</b>	Million years ago
<b>NEMA</b>	National Environmental Management Act, 1998 (Act No. 107 of 1998)
<b>NHRA</b>	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
<b>NID</b>	Notification of Intent to Develop
<b>PCD</b>	Pollution Control Dam
<b>PHRA</b>	Provincial Heritage Resources Authority
<b>RoD</b>	Record of Decision
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SAHRIS</b>	South African Heritage Resources Information System
<b>SCF</b>	Statutory Comment Feedback
<b>SEP</b>	Stakeholder Engagement Process
<b>SoW</b>	Scope of Work
<b>ToR</b>	Terms of Reference
<b>Wits</b>	University of the Witwatersrand
<b>Werf</b>	A farmstead or multiple outbuildings associated with a farmhouse or agricultural activities. Plural: <i>werwe</i> (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.	-	-	3
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 14
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
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: <ul style="list-style-type: none"> <li>- Existing impacts on the site;</li> <li>- Possible risks to heritage resources;</li> <li>- Cumulative impacts of the proposed development;</li> <li>- Acceptable levels of change; and</li> <li>- Heritage-related risks to the project.</li> </ul>	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)	-	



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 12.1
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)	8 9 11 Plan 4
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)		
Any conditions for inclusion in the environmental authorisation.	1(l)		
Any monitoring requirements for inclusion in the EMPr or environmental authorisation.	1(m)		
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)	13
Lists the source material used in the development of the report.	1(cA)	-	14
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

Anglo Operations (Pty) Ltd (hereinafter Anglo) and Universal Coal Development IV (Pty) Ltd (hereinafter Universal) have partnered together to participate in the proposed Dalyshope Coal Mining Project located near Lephalale in the Limpopo Province (the Project). This partnership includes the following authorisations and licences:

- A Mining Right Application (MRA) in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA);
- An Integrated Environmental Authorisation (IEA) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- A Waste Management Licence (WML);
- An Integrated Water Use Licence (IWUL); and
- Tree Permit for protected plants that may be impacted upon by the Project.

Universal, on behalf of Anglo, appointed Digby Wells Environmental (hereinafter Digby Wells) to undertake the Environmental Impact Assessment (EIA) process in support of the above-mentioned licences and authorisations and in compliance with the EIA Regulations, 2014 (Government Notice Regulation [GN R] 326), as amended, promulgated in terms of the NEMA. The EIA process includes a Heritage Resources Management (HRM) process in compliance with the National Heritage Resources Management Act, 1999 (Act No. 25 of 1999) (NHRA).

This document constitutes the Heritage Impact Assessment (HIA) report to identify and quantify positive- and negative impacts on the cultural heritage landscape as a result of the Project and for submission to the South African Heritage Resources Agency (SAHRA) and the Limpopo Heritage Resources Authority (LIHRA).

### 1.1. Terms of Reference

Universal appointed Digby Wells to undertake an EIA process in support of the EA applications and licences applicable to the Dalyshope Coal Mining Project. The EIA process includes a specialist HRM process in compliance with Section 38 of 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. 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 (CS) 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 report 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 CVs of these specialists.

**Table 1-1: Expertise of the specialists**

Team Member	Bio Sketch
<p><b>Shannon Hardwick</b></p> <p>ASAPA Member: 451 ICOMOS Member 38048</p> <p>Years' Experience: 3</p>	<p>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 <i>Journal of Ethnobiology</i>. 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 (HBARs) and Section 34 permit applications. Her other experience includes compiling a Community Health, Safety and Security Management Plan (CHSSMP) and various social baselines, including researching Artisanal and Small-Scale Mining as part of a Livelihood Restoration Framework (LRF). Shannon's experience in the field includes pre-disturbance surveys in South Africa, Malawi and the Democratic Republic of the Congo and fieldwork in Malawi.</p>



Team Member	Bio Sketch
<p><b>Justin du Piesanie</b></p> <p>ASAPA Member 270 ASAPA CRM Unit ICOMOS Member 14274 IAIAsa Member</p> <p>Years' Experience: 12</p>	<p>Justin is the Divisional Manager for Social and Heritage Services at Digby Wells. Justin joined the company in August 2011 as an archaeologist and was subsequently made HRM Manager in 2016 and Divisional Manager in 2018. He obtained his Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. Justin also attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. Justin is a professional member of the Association of Southern African Professional Archaeologists (ASAPA) and accredited by the association's Cultural Resources Management (CRM) section. He is also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. He has over 12 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, NHRA Section 34 application processes, and Conservation Management Plans (CMPs). Justin has gained further generalist experience since his appointment at Digby Wells in Botswana, Burkina Faso, Cameroon, the Democratic Republic of Congo, Liberia, Malawi, Mali and Senegal on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, Justin has acted as a technical expert reviewer of HRM projects undertaken in Cameroon, Malawi and Senegal. Justin's current focus at Digby Wells is to develop the HRM process as an integrated discipline following international HRM principles and standards. This approach aims to provide clients with comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving strategic objectives.</p>

## 2. Project Description

Anglo is the holder of two Prospecting Rights to prospect for coal as approved by the Department of Mineral Resources and Energy (DMRE):

- Reference Number LP 30/5/1/1/2/10648 PR (as renewed); and
- Reference Number LP 30/5/1/1/2/10649 PR (as renewed).

The Prospecting Rights include 24 properties, some of which have since had boundaries realigned and have been renamed<sup>2</sup> (the Mining Right area). The proposed Mining Right boundary will encompass all these properties; however, the proposed mining activities will

<sup>2</sup> Refer to the Notification of Intent to Develop for a complete list of the affected farms and farm portions.

occur only on the farms Dalyshope 232 LQ and Klaarwater 231 LQ (the Project area). As such, the HRM process (and EIA) considers only these two farms and excludes all other properties.

These farms are located near the town of Lephalale and fall within the Lephalale Local Municipality (LLM) and the Waterburg District Municipality (WDM) of the Limpopo Province. Plan 1 presents the regional and local setting within which the Project is located.

The Project will entail the establishment of an opencast coal mine operated by contractors and utilising truck and shovel strip mining methods. The Project is expected to produce approximately 2.4 million tonnes per annum (Mtpa) of thermal coal product for approximately five years before increasing production to approximately 12 Mtpa for an additional estimated 25 years, resulting in a total estimated Life of Mine (LoM) of 30 years. All coal will be extracted from a single opencast pit. Section 2.1 presents the details regarding the additional proposed infrastructure and activities associated with the Project.

## 2.1. Proposed Infrastructure and Activities

The Project will include the following infrastructure, as indicated in Plan 2:

- Contractors laydown yard;
- Temporary stockpiles for construction;
- Opencast 1 ("OC1") pit
- ROM stockpiles;
- Slew product stockpiles;
- Discard facility;
- Topsoil and subsoil stockpiles;
- Stores;
- Overburden (Hards/Softs) stockpiles
- Weighbridges;
- Conveyers belts;
- Workshop;
- Two PCDs;
- Washing plant;
- Crush and Screen plant;
- Offices;
- Change-house;
- Temporary Pollution Control Dam (PCD) for construction;
- Laboratory;
- Laundry facility
- Water tanks;
- Potable water Pipeline and distribution;
- Dirty water pipeline;
- Sewage Treatment Plant
- Water Treatment Plant;
- Brine Pond
- Diesel/wash bay and oil separator;
- Explosives magazine;
- Stormwater management infrastructure
- Powerline/s
- Substation
- Rail link and Rail loadout facility
- Brake-test ramp;
- LDV and light vehicle access road;
- Truck access road; and
- Road upgrade (Steenbokpan to site)

Table 2-1 presents a summary of the Project-related activities to be considered in the impact assessment.

**Table 2-1: Project Phases and Associated Activities**

<b>Project Phase</b>	<b>Project Activity</b>
Construction Phase	Site and/or vegetation clearance
	Temporary PCD
	Contractors laydown yard
	Construction of access and haul roads
	Construction of infrastructure
	Diesel storage and explosives magazine
	Topsoil stockpiling
Operational Phase	Establishment of the open pit
	Blasting and removal of rock
	Establishment and operation of stockpiling infrastructure (for example, rock dumps, soft dumps, soils, ROM, product, discard dump)
	Diesel storage and explosives magazine
	Operation of the open pit workings
	Operation of the crush and screen and coal washing plant
	Operation of the sewage treatment plant and water treatment plant
	Storage, handling and treatment of hazardous products (including fuel, explosives and oil) and waste
	<u>Water use and storage on-site:</u> During the operational phase, water will be required for various domestic and industrial uses, including: <ul style="list-style-type: none"> <li>● Workshop and storage of chemicals;</li> <li>● Laundry and Laboratory services;</li> <li>● Backfilling and concurrent rehabilitation;</li> <li>● Weighing of coal trucks;</li> <li>● Coal transportation through trucking, rail and conveyer belts;</li> <li>● Washing of mine vehicles; and</li> <li>● Fuelling of diesel on site.</li> </ul>
	Water Management infrastructure will include two PCDs. The PCDs will capture water from the mining area, which will be stored and used as required.

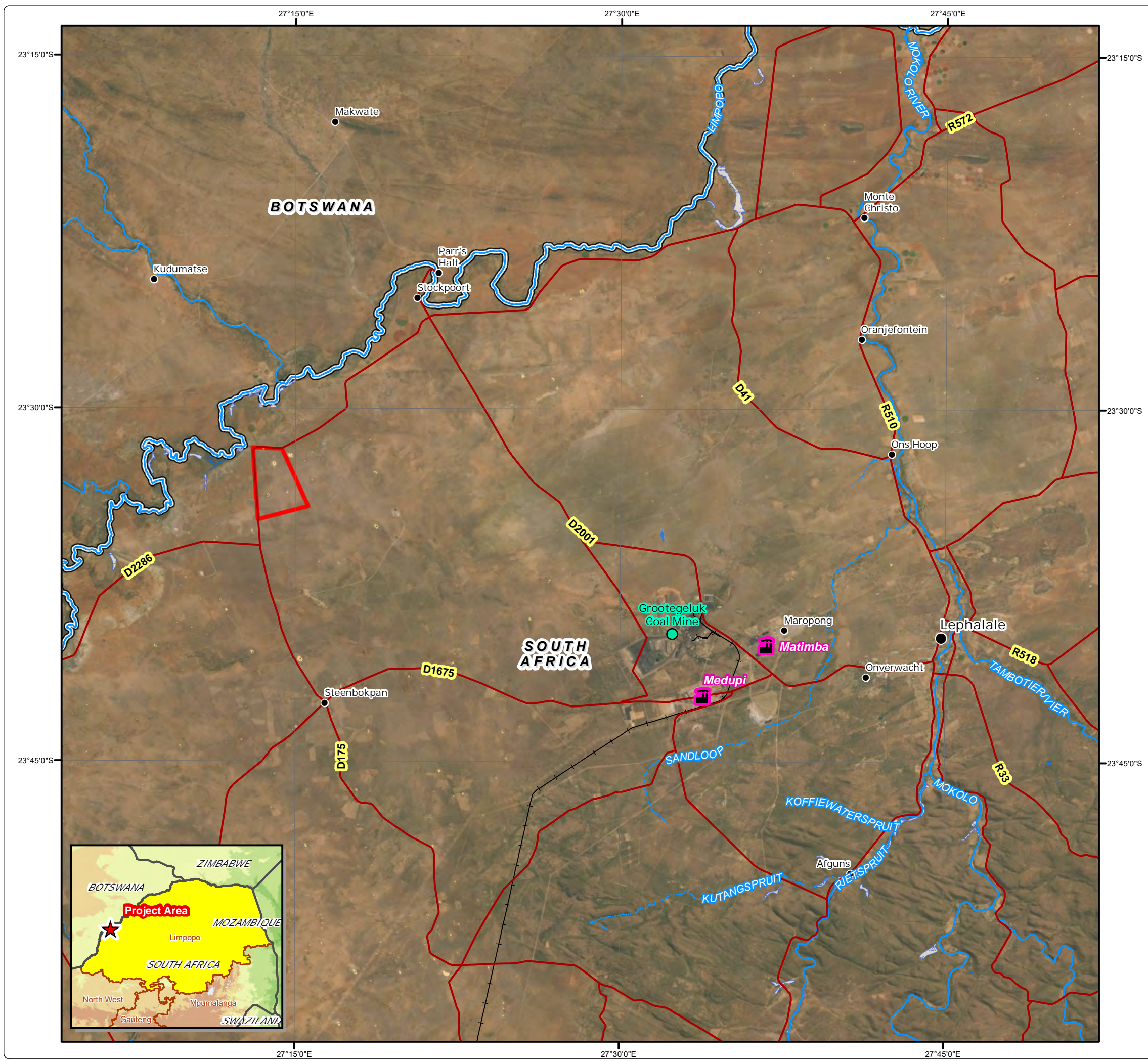
Project Phase	Project Activity
	<p><u>Maintenance activities:</u></p> <p>Through the operational phase, the established mine will need to undertake maintenance activities to ensure that all infrastructure is operating optimally and does not pose a threat to human or environmental health. Maintenance will include (but is not limited to) haul roads, the crushing and washing plant, machinery, water and stormwater management infrastructure, stockpile areas and dumps.</p>
Decommissioning Phase	<p><u>Demolition and removal of infrastructure:</u></p> <p>Once mining activities have been concluded, the infrastructure will be demolished in preparation of the rehabilitation of the disturbed land.</p>
	<p><u>Rehabilitation:</u></p> <p>Rehabilitation activities will include (but are not limited to) spreading of the preserved subsoil and topsoil, profiling of the land and re-vegetation.</p>
	<p>Post-closure monitoring and rehabilitation</p>

# Dalyshope Coal Mine

## Regional Setting

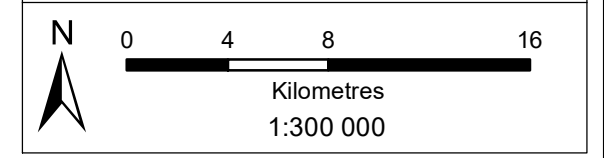
### Legend

- Project Area
- Power Station
- Grootegeluk Coal Mine
- Major Town
- Settlement
- Main Road
- Railway Line
- Perennial Stream
- Non-Perennial Stream
- Dam / Lake
- Non-Perennial Pan
- Marsh / Swamp
- International Boundary



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Projection: Transverse Mercator      Ref #: UCD6170\_H\_01\_KR\_v2  
 Datum: WGS 1984                              Revision Number: 1  
 Central Meridian: 27°E                        Date: 13/03/2020

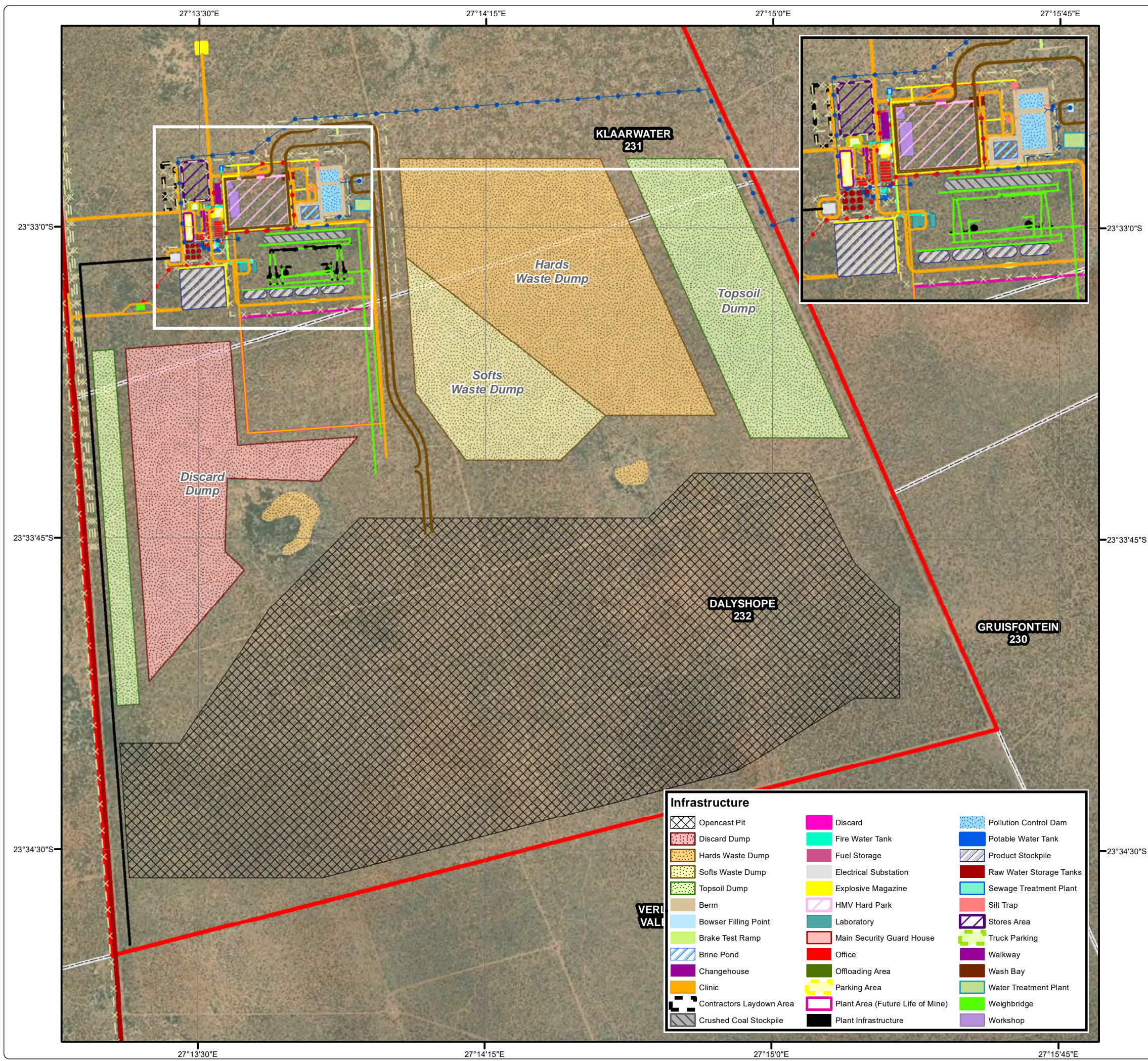


# Dalyshope Coal Mine

## Infrastructure Layout

### Legend

-  Project Area
  -  Non-Perennial Pan
  -  Parent Farm
- ### Infrastructure Layout
-  Access Road
  -  Trunk Access Road
  -  Conveyor
  -  Haul Road
  -  Fence
  -  Fire Pipeline
  -  Overhead Powerline
  -  Potable Water Pipeline
  -  Bulk Water Pipeline (Supply Alternative)
  -  Pollution Drain
  -  Sewer
  -  Walkway
  -  Plant

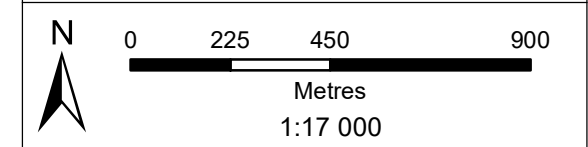


Infrastructure					
	Opencast Pit		Discard		Pollution Control Dam
	Discard Dump		Fire Water Tank		Potable Water Tank
	Hards Waste Dump		Fuel Storage		Product Stockpile
	Softs Waste Dump		Electrical Substation		Raw Water Storage Tanks
	Topsoil Dump		Explosive Magazine		Sewage Treatment Plant
	Berm		HMV Hard Park		Silt Trap
	Bowser Filling Point		Laboratory		Stores Area
	Brake Test Ramp		Main Security Guard House		Truck Parking
	Brine Pond		Office		Walkway
	Changehouse		Offloading Area		Wash Bay
	Clinic		Parking Area		Water Treatment Plant
	Contractors Laydown Area		Plant Area (Future Life of Mine)		Weighbridge
	Crushed Coal Stockpile		Plant Infrastructure		Workshop



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Projection: Transverse Mercator Ref #: UCD6170\_H\_02\_KR\_v2  
 Datum: WGS 1984 Revision Number: 1  
 Central Meridian: 27°E Date: 17/08/2020



## 2.2. Alternatives Considered

Table 2-2 presents a summary of the proposed alternatives considered for the proposed Project is 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
Design and layout	Digby Wells produced a sensitivity map in the pre-application phase of the Project to determine 'no-go' areas to inform the development of the mine infrastructure layout plan.  Various layout alternatives were proposed within the Project Area and are considered in more detail in the EIA report.	Identified heritage resources were included in the sensitivity map to inform the proposed layout of the Project.  Only the final Project infrastructure design layout is assessed in this report.
Mining Method Alternatives	Various opencast and underground mining methods were considered for the operation of the mine. The mine will utilise truck and shovel opencast strip mining using selective mining techniques.	Opencast mining methods pose the risk of different direct impacts to heritage resources than underground mining.  This report considers only the chosen mining method.
Water Supply Alternatives	At the time of the compilation of this report, various alternatives for securing the water necessary for the Project have been proposed and are under investigation, but the approach has not been decided. As a result, no water supply infrastructure has been included in the proposed layout.	Digby Wells has not assessed heritage impacts that may result from the installation or construction of the water supply infrastructure.  Refer to Section 4 for more details on this exclusion. Section 11 includes details on the recommended way forward.
Electricity Supply Alternatives	Most of the mining operations will be carried out by diesel operated equipment and only the offices and bulk material handling facilities will require electricity.  Power will be supplied through diesel generators until the Project can secure a firm supply from Eskom.	No powerlines or any associated infrastructure has been included in this assessment.  Refer to Section 4 for more details on this exclusion. Section 11 includes details on the recommended way forward.



Alternative	Description	Consequence for HRM Process
Coal Transportation Alternatives	<p>Proposed options for the transport of coal are being investigated, in part through the Traffic Impact Assessment (TIA) included in the EIA. The proposed alternatives include transport by:</p> <ul style="list-style-type: none"> <li>● Rail, should this be possible considering the rail infrastructure at neighbouring mines; and</li> <li>● Road, which is considered in the TIA. Due to the limited haulage routes in the area, the proposed preferred route currently comprises the Steenbokpan road.</li> </ul>	<p>The haul roads and access roads assessed in the HRM process are indicated in Plan 2. No additional roads or any rail infrastructure have been included in this assessment.</p> <p>Refer to Section 4 for more details on this exclusion. Section 11 includes details on the recommended way forward.</p>
'No-go' Alternative	<p>Should the Project not obtain approval, or not go ahead for any reason, the potential negative environmental impacts associated with the development of the proposed Dalyshope Coal Mine would not occur. However, the potential benefits associated with the Project would also not occur.</p>	<p>The no-go alternative has been considered in this assessment.</p>

### 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. International Conventions

The Project is located in proximity to the international border between Botswana and South Africa. This notwithstanding, this assessment does not consider the requirements of the Botswanan legal framework.

Anglo internal policy requires all Anglo projects conform to the International Finance Corporation (IFC) Performance Standards of Environmental and Social Sustainability (PS). IFC PS 8: Cultural Heritage is of particular reference to this assessment.

IFC PS 8 requires proponents to identify and protect heritage resources in line with the United Nations Educational, Scientific and Cultural Organisation (UNESCO) Convention Concerning the Protection of World Cultural and Natural Heritage (1972). This standard aims to:

- Protect cultural heritage from the adverse impacts of project activities and support its preservation; and
- Promote the equitable sharing of benefits from the use of cultural heritage in business activities.

The HRM process has been completed to conform with the requirements of the IFC PS 8, including the identification of heritage resources that may be impacted upon (*so far as is possible*), assessing the significance of such heritage resources, assessing the potential impacts posed to the heritage resources and recommending feasible mitigation measures and management techniques to avoid or minimise negative impacts. The mitigation measures and management techniques included in this report have been recommended to allow the Project to conform to the requirements of IFC PS 8.

Digby Wells does not foresee Anglo, Universal or the Dalyshope Coal Mining Project making use of cultural heritage resources in a business context or benefitting financially from such activities. Should Anglo, Universal or the Project benefit financially from heritage resources in any way, such benefits must be fairly distributed to the communities.

### 3.2. 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 HIA process.

**Table 3-1: Applicable legislation considered in the HRM process**

Applicable legislation used to compile the report	Reference where applied
<p><b><u>Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</u></b></p> <p>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 –</p> <ol style="list-style-type: none"> <li>Prevent pollution and ecological degradation;</li> <li>Promote conservation; and</li> <li>Secure ecologically sustainable development and use of natural resources</li> </ol>	<p>The HRM process was undertaken to identify heritage resources and determine heritage impacts associated with the Project.</p> <p>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.</p>

Applicable legislation used to compile the report	Reference where applied
<p>while promoting justifiable economic and social development</p>	
<p><b><u>National Environmental Management Act, 1998 (Act No. 107 of 1998)</u></b></p> <p>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:</p> <p><i>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.</i></p> <p>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.</p>	<p>The application process was undertaken in accordance with the principles of Section 2 of NEMA as well as with the EIA 2017 Regulations, promulgated in terms of NEMA.</p>
<p><b><u>GN R. 982: Environmental Impact Assessment Regulations, 2014 (as amended by GN R 326 of 7 April 2017)</u></b></p> <p>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:</p> <ul style="list-style-type: none"> <li>▪ 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.</li> <li>▪ 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</li> </ul>	<p>Refer to the Notification of Intent to Develop (NID) or the EIA report for a full description of the Listed Activities triggered by the proposed Project.</p> <p>To comply with the regulations, an EIA process must be completed in support of Environmental Authorisation in terms of Listing Notice 2. This HIA was completed to inform the EIA process to comply with Section 24 of the NEMA.</p>

Applicable legislation used to compile the report	Reference where applied
<p>follow an environmental impact assessment process.</p> <ul style="list-style-type: none"> <li>▪ 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.</li> </ul>	
<p><b><u>National Water Act, 1998 (Act No. 36 of 1998) (NWA)</u></b></p> <p>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.</p> <p>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.</p>	<p>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).</p> <p>This HIA was completed to inform the environmental assessment and comply with Section 24 of the NEMA and Section 38(8) of the NHRA.</p>
<p><b><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></b></p> <p>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:</p> <ul style="list-style-type: none"> <li>▪ 5. General principles for HRM</li> <li>▪ 6. Principles for management of heritage resources</li> <li>▪ 7. Heritage assessment criteria and grading</li> <li>▪ 38. Heritage resources management</li> </ul> <p>The Act requires that Heritage Resources Authorities (HRAs), be notified as early as possible of any developments that may exceed certain minimum 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.</p>	<p>The HIA was compiled to comply with Section 5, 38(3), (4) and (8) of the NHRA. This HIA was submitted to the responsible HRAs, which in this instance is SAHRA and LIHRA.</p>

Applicable legislation used to compile the report	Reference where applied
<p><b><u>NHRA Regulations, 2000 (GN R 548)</u></b></p> <p>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:</p> <ul style="list-style-type: none"> <li>▪ II: Permit Applications and General Provisions for Permits;</li> <li>▪ III: Application for Permit: National Heritage Site, Provincial Heritage Site, Provisionally-Protected Place or Structure older than 60 years;</li> <li>▪ IV: Application for Permit: Archaeological or Palaeontological or Meteorite;</li> <li>▪ IX: Application for Permit: Burial Grounds and Graves;</li> <li>▪ X: Procedure for Consultation regarding Protected Area;</li> <li>▪ XI: Procedure for Consultation regarding Burial Grounds and Graves; and</li> <li>▪ XII: Discovery of Previously Unknown Graves.</li> </ul>	<p>The HRM process was undertaken with cognisance of the applicable regulations. The proposed mitigation strategies and management measures must comply with these requirements.</p>

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

Applicable policies used to compile the report	Reference where applied
<p><b><u>SAHRA Archaeology, Palaeontology and Meteorites (APM) Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports (2007)</u></b></p> <p>The guidelines provide the minimum standards that must be adhered to for the compilation of a HIA (2007) and/or Palaeontological Impact Assessment (PIA) report (2012).</p> <p>Chapter II Section 7 outlines the minimum requirements for inclusion in the heritage assessment as follows:</p> <ul style="list-style-type: none"> <li>▪ Background information on the Project;</li> <li>▪ Background information on the cultural baseline;</li> <li>▪ Description of the properties or affected environs;</li> <li>▪ Description of identified sites or resources;</li> <li>▪ Recommended field rating of the identified sites to comply with Section 38 of the NHRA;</li> <li>▪ A statement of Cultural Significance in terms of Section 3(3) of the NHRA; and</li> <li>▪ Recommendations for mitigation or management of identified heritage resources.</li> </ul> <p>Chapter II, Section 8 outlines the minimum requirements for a PIA report. The information requirements are similar as for the HIA report but must additionally include a 1:50 000 geological map showing the geological context of the Project.</p>	<p>The HIA and PIA reports were compiled to adhere to the minimum standards as defined by Chapter II of the SAHRA Minimum Standards (2007, 2012)</p>

### 3.3. Regional Regulatory Context

No applicable regional by-laws were identified or considered for this assessment. The HRM process was completed to comply with the requirements of the South African national legislative framework and to conform to the requirements of IFC PS 8 as described above.

## 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 6.1 below is considered up to date and accurate.
Heritage resources identified previously within the Project area through the previous pre-disturbance survey or other heritage assessments were not verified in-field.	It is assumed the previously recorded heritage resources are accurate and true and that the <i>status quo</i> of the heritage resources has remained unchanged.
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, Universal / Anglo 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.
The final infrastructure design layout was not available at the time of the pre-disturbance survey or compilation of this report.	Every effort was made to cover the extent of the Project area <sup>3</sup> . The survey was focused on the proposed infrastructure layout current at the time of the survey; however, this has been altered since. Some heritage resources in the Project may therefore not have been identified.
Details regarding the infrastructure required for the water supply, electricity supply and transportation of the coal were not confirmed at the time of the pre-disturbance survey or compilation of this report, as described in Table 2-2.	The infrastructure layout will be informed in part by the results of the heritage assessment. Previously unidentified heritage resources may be encountered during Project activities. Should this occur, Universal / Anglo 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 B includes a more detailed description of the HRM process methodologies.

<sup>3</sup> Refer to Section 5.1 for a description of the study area.

## 5.1. Defining the study area

Heritage resources do not exist in isolation to the greater natural and social environment, including the socio-cultural, socio-economic and socio-political environments. In addition, the NHRA requires the grading of heritage resources in terms of national, provincial and local concern based on their importance and consequent official (i.e. State) management effort required. The type and level of baseline information required to adequately predict heritage impacts varies between these categories. Four nested study areas were defined for the purposes of this study, and include:

- The *regional* study area: the area bounded by the district municipality demarcation, which in this case refers to the WDM. 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;
- 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 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 Project is situated in the LLM;
- The *Mining Right Boundary* study area or *Mining Right Area*: the farm portions extent associated with the Prospecting Right and Mining Right area<sup>4</sup>, including a 500 m buffer area; and
- The *Project area*: the farm portions extent associated with the proposed Project and which includes the Project infrastructure. This refers to the farms Klarwater and Dalyshope and includes a 100 m buffer.

## 5.2. Statement of Cultural Significance

Digby Wells designed the significance rating process to provide a numerical rating of the CS 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).

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<sup>4</sup> Refer to the Notification of Intent to Develop for a complete list of the affected farms and farm portions.



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 CS of heritage resources. This assessment therefore considers three broad categories adapted from Winter & Baumann (2005, p. 36). These are described in Table 5-1.

**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 CS 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: <ul style="list-style-type: none"> <li>● Additive: the simple sum of all the effects, e.g. the reclamation of a historical Tailings Storage Facility (TSF) will minimise the sense of the historic mining landscape.</li> <li>● 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.</li> <li>● 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.</li> </ul>

Category	Description
	<ul style="list-style-type: none"> <li>● 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.</li> <li>● 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.</li> </ul>

#### 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 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 HIA includes a summary and discussion of the most relevant findings. Table 5-2 lists the sources consulted in the literature review (refer to Section 14 for more detailed references).

**Table 5-2: Qualitative data sources**

Reviewed Qualitative Data	
Databases	
Genealogical Society of South Africa (GSSA) database (2011)	University of the Witwatersrand (WITS) Archaeological Database (2010)
SAHRIS	SAHRIS Palaeosensitivity Map (PSM)
Statistics South Africa (2011)	Wazimap (Wazimap, 2017)

Reviewed Qualitative Data		
SAHRIS Cases		
MapID: 00655	Map ID: 00719	Case ID: 4309
Map ID: 00659	Map ID: 01025	Case ID: 5472
Map ID: 00662	Case ID: 1487	Case ID: 6251
Map ID: 00672	Case ID: 1722	Case ID: 9404
Map ID: 00710	Case ID: 1724	Case ID: 11496
		Case ID: 12164
Cited Text		
Bamford, 2012, 2014, 2016	Behrens & Swanepoel, 2008	Biemond, 2014
Clark, 1982	Deacon & Deacon, 1999	Environomics CC & NRM Consulting, 2010
Esterhuysen & Smith, 2007	Groenewald & Groenewald, 2014	Huffman, 2007
Johnson, et al., 2006	LLM, 2019	Limpopo Provincial Government, 2015
Mitchell, 2002	Mucina & Rutherford, 2010	Schapera, 1953
WDM, 2019	Winter & Baumann, 2005	

Table 5-3 below lists the sources of historical imagery. 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.

**Table 5-3: Aerial imagery considered**

Aerial photographs						
Job no.	Flight plan	Photo no.	Map ref.	Area	Date	Ref.
515	515 of 1	01421	2630	Mbabane	1964	National Geographical Institute
		01423				
		01425				

Aerial photographs						
Job no.	Flight plan	Photo no.	Map ref.	Area	Date	Ref.
		01455				
		01457				
		01459				

## 5.5. Primary data collection

Digby Wells undertook an extensive pre-disturbance survey of the Project area between 12 and 19 November 2012 and 5 to 7 August 2013. As part of this HRM process, Shannon Hardwick undertook a verification survey of the Project area between 11 and 13 February 2020.

The surveys were 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 surveys were non-intrusive (i.e. no sampling was undertaken). The aim of the surveys 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. The heritage resources were also recorded through written and photographic records. 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. 13794/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 5-4 presents a list of the relevant period and feature codes (refer to Section 6.1 for an explanation of what these terms mean).

**Table 5-4: Feature and period codes relevant to this HIA**

Feature or Period Code	Reference
BGG	Burial Grounds and Graves
STE	(Historical) Structure
HLP	Historical Layering Point

Feature or Period Code	Reference
HST	Historical Site
LFC	Late Farming Community site
Wf	(Historical) Werf

Heritage resources identified through secondary data collection were 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. 2881/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 location 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 12.1.

### 6.1. Regional Cultural Heritage Baseline Description

The Project area overlies the Waterberg Basin and the Ellisras Basin. These features include lithologies of the Karoo Supergroup and the Waterberg Group respectively.

The Waterberg Group is thought be deposited between 2 000 and 1 700 million years ago (mya) in succession with two other geological formations (Johnson, et al., 2006). This period represents the first time in the Earth's geological past where free oxygen was available in large enough quantities to result in the oxidisation of ferruginous metals. This resulted in the formation of deposits referred to as "red beds".

The Waterberg Group is divided into three subgroups: the Nylstroom, Matlabas and Kransberg Subgroups (Johnson, et al., 2006). Within the regional Project area, the Kransberg Subgroup represents the Waterberg Group. The Kransberg Subgroup consists of four formations: the *Mogalakwena*, *Sandriversberg*, *Cleremont* and *Vaalwater Formations*. These formations consist of sandstones and conglomerates with minor mudrocks. The geomorphology of these deposits suggests they were formed within braided stream environments, and may include beach, lacustrine and tidal flat or marine shelf deposits as well as Aeolian deposits (Johnson, et al., 2006; SAHRA, 2013). All four of these formations are considered of low palaeontological sensitivity although they have the potential to include fossilised terrestrial cyanobacterial mats from playa lake deposits (SAHRA, 2013).

The Ellisras Basin consists of deposits representing seven formations of the Karoo Supergroup and of varying palaeosensitivity and different depositional environments. Table 6-1 includes a description of these formations, from oldest to most recent (Johnson, et al., 2006; SAHRA, 2013; Groenewald & Groenewald, 2014).

**Table 6-1: Description of the Formations within the Ellisras Basin**

Formation	Description
<i>Waterkloof</i>	The basal unit of the Ellisras Formation, these layers lie unconformably on Waterberg and pre-Waterberg rocks. The unit comprises diamictite and conglomerates which appear to have been deposited in a glaciolacustrine environments ahead of retreating glaciers.
<i>Wellington</i>	A unit developed only in the southern portion of the Ellisras Basin. This unit is characterised by mudstone and siltstone with some sandstone lenses and scattered granule-sized clasts. This unit represents suspension deposits which were formed in a large body of standing water. The scattered granules may represent 'rain out' episodes derived from drifting ice.
<i>Swartant</i>	This unit reaches a maximum thickness of 130 m and has been divided into three zones. Collectively, these zones include layers of mudstones, siltstones and sandstones in repetitive layers. The upper zone may represent a depositional crevasse-play environment with deposits also occurring as infills of small channels and isolated swamps. The middle zone appears to have been formed through a glaciolacustrine environment with scattered icebergs. The lower zone appears to have been formed through a delta front which formed through the east.
<i>Goedgedacht</i>	This unit occurs only in the central and northern parts of the Ellisras Basin. This unit consists of mudstones and includes angular grains of quartz, intraformational clay pellets and impure coal. The depositional environment was most likely a proglacial environment with depositional action undertaken by braided streams on the fan surface.
<i>Grootegeluk</i>	The most economically important unit in the Ellisras Basin, as it includes several thick coal seams. This unit consists of coal, carbonaceous shale and mudstone and imprints of <i>Glossopteris</i> <sup>5</sup> flora are common throughout this formation. These layers were most likely deposited in an environment characterised by poorly-drained swamps which led to the formation of peat. This maximum thickness of this layer is 110 m and, in the central and northern areas, it interdigitates with the <i>Goedgedacht Formation</i>
<i>Eendragtpan</i>	Geological layers composed entirely of variegated mudstones with scattered white reduction spots occurring throughout. This formation signifies a change in environment from the <i>Grootegeluk Formation</i> through the complete absence of coal as well as changes in colour. These mudstones are reddish and, towards the top of the feature, more purplish. This suggests that the layers were deposited in oxidising conditions under subaerial conditions. The depositional environment was most likely a low-energy, well-drained environment such as a flood-basin or floodplain.

<sup>5</sup>Plant species which occur together and are typified by the dominant fossil leaves that belong to the glossopterid group

<b>Formation</b>	<b>Description</b>
<i>Greenwich</i>	This formation comprises mainly of sandstone or granulestone with local, thin conglomerate lenses and thin intercalations of mudstones may also be present. The thickness of this layer ranges from 7 m to 33 m and appear to have been formed as channel deposits from braided streams.
<i>Lisbon</i>	A succession of (dominantly red) mudstone and siltstone, the latter of which includes many calcareous concentrations. These deposits may have been created through deposition on an extensive floodplain by meandering rivers, although some deposits appear to be Aeolian in nature. The red colour and lack of plant material indicate that these layers were formed in dry and warm (oxidising) conditions.
<i>Clarens</i>	Predominantly comprised of sandstones, these deposits appear to comprise Aeolian deposits. Some deposits may have been created by small, ephemeral streams.

Table 6-2: Truncated geological sequence and palaeontological sensitivity for the local study area

Eon	Era	Period	MYA	Lithographic Units				Significance	Fossils				
				Supergroup	Group	Subgroup	Formation						
Phanerozoic	Mesozoic	Triassic	180	Karoo Supergroup (Ellisras Basin)			Clarens	High	Dinosaur remains and tracks are expected within this unit. The levels of surface exposure are very poor, however, and most data comes from borehole cores.				
							Lisbon	Very High	Potential fossils include large sauropodomorph dinosaurs (such as <i>Euskelsaurus</i> ). There are records of dinosaur remains identified in this unit from the 1920s. Trace fossils include extension bioturbation, possible fossil termitaria, rhizoliths and evidence of <i>Cruziana</i> and <i>Skolithos</i> . Exposure levels are generally very poor.				
							Greenwich	Moderate	No coal seams present within these formations, but plant fossils are still possible.				
	Eendrachtpan	Moderate											
	Palaeozoic	Permian					325				Grootegeeluk	Very High	Abundant Glossopterid coal flora. This is associated with the thick coal seams. Some <i>Stigmara</i> roots have been recorded within the <i>Swartrant Formation</i> (Bamford, 2018).
											Goedgedracht	Very High	
											Swartrant	Very High	
											Wellington	Moderate	
	Carboniferous										Waterkloof	Moderate	No fossils recorded to date, but the presence of Glossopterid fossilised flora is possible.
Proterozoic	Mokolian	Kheisian	1700				Vaalwater	Low	Terrestrial cyanobacterial mats recorded from playa lake deposits. The earliest known terrestrial cyanobacterial mats were recorded from the playa lake deposits of the <i>Makgabeng Formation</i> (Matlabas Subgroup). Early Proterozoic 'red beds' provide evidence for the development of an oxygenated atmosphere after approximately 2 000 mya.				
							Cleremont	Low					
							Sandriviersberg	Low					
							Mogalakwena,	Low					
							Matlabas	Low					
							Nylstroom	Low					
			2000										

Adapted from Groenewald and Groenewald (2014) and SAHRA (2013)



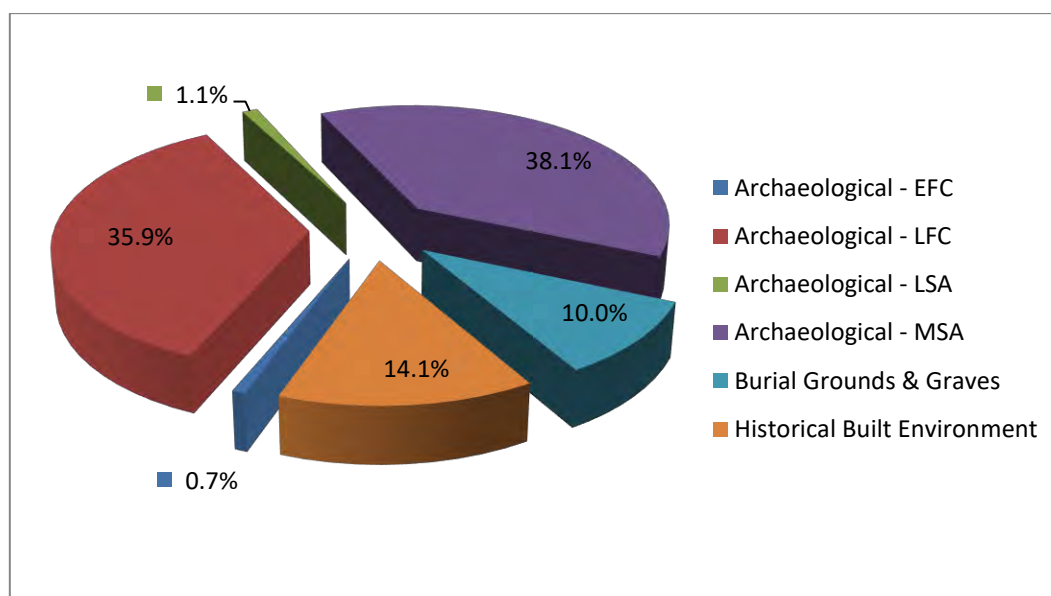
Table 6-3 presents an overview of the broad timeframes for the major periods of the past in South Africa.

**Table 6-3: Archaeological Periods in South Africa**

<b>The Stone Age</b>	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 <sup>6</sup> )
<b>Farming Communities</b>	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
<b>Historical Period</b>	-	1500 CE to 1850 (Behrens & Swanepoel, 2008)

Adapted from Esterhuysen & Smith (2007)

During a review of available previously-completed heritage assessments, 270 heritage resources were identified within the regional, local and site-specific study areas. Plan 3 represents the spatial layout of these heritage resources. Figure 6-1 illustrates the breakdown of the identified heritage resources according to the archaeological periods. Expressions of resources representing with palaeontological, LSA, LFC and historical periods have been recorded within the greater study area. However, the MSA and burial grounds and graves, dominate the tangible heritage resources identified within the area under consideration.



**Figure 6-1: Heritage resources identified within the greater study area**

<sup>6</sup> 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).

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

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. Archaeological evidence within the Limpopo Province suggests that hominids have inhabited the present-day province since the ESA. No expressions of the ESA have been identified within the regional study area, and so this period is not considered further in this report.

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*. MSA artefacts are usually associated with water sources, for example pans and the Limpopo River. However, these finds are often not found *in situ* and therefore offer limited contextual information.

The MSA accounts for 38.1% of the identified heritage resourced. This period is represented in the regional study area as isolated artefacts, artefacts embedded in the surface matrix, and low- to medium-density surface scatters (Huffman & Van der Walt, 2011; Nel, 2011b; Karaodia & Higgitt, 2013; Higgitt & du Piesanie, 2016).

The LSA dates from approximately 40 kya to the historical period. LSA lithics are specialised as 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. As with the MSA artefacts, LSA artefacts are usually associated with water sources and are not usually found *in situ*.

In southern Africa, the LSA is closely associated with hunter-gatherers. This period is further defined by evidence of ritual practices and complex societies (Deacon & Deacon, 1999). This is commonly expressed through rock art. No such expressions of the LSA were recorded within the greater study area. The period was instead expressed through isolated artefacts and a low density scatter of lithics (Nel, 2011a; Karaodia & Higgitt, 2013). The LSA accounted for 1.1% of the total identified heritage resources within the regional study area.

Hunter-gatherers were later followed by the various peoples of the Farming Community period. This time is characterised by the movements of Bantu-speaking agro-pastoralists moving into southern Africa and is divided into an early and late phase (EFC and LFC).

EFC and LFC sites can be identified through secondary tangible surface indicators, such as ceramics and evidence for the domestication of animals (such as faunal remains or dung deposits). Both the EFC and LFC periods are represented by ceramics in the identified cultural heritage landscape, although the EFC accounts for only 0.7% of the records (2 records). The EFC is represented within the regional study area by isolated ceramic sherds (*fragments of*

*pottery*), decorated in styles associated with the Baratani / Happy Rest / Mambo ceramic facies (Karaodia & Higgitt, 2013).

The LFC accounts for 35.9% of the identified heritage resources. Besides ceramics, the LFC can be identified through evidence for temporary or permanent settlement. This includes cattle posts which have been identified along the escarpment and settlements that were briefly occupied and which have been identified close to the workable soils along the Limpopo River (Huffman & Van der Walt, 2011). Ethnographic evidence suggests that the cattle posts may be associated with users of the *Letsibogo* ceramics; these users may have been the baKaa (Schapera, 1953; Huffman, 2007; Huffman & Van der Walt, 2011; Biemond, 2014). The *Letsibogo* ceramics are characterised by lines of punctates separated by red and black zones (Huffman, 2007; Huffman & Van der Walt, 2011; Biemond, 2014). These ceramics date between 1500 CE and 1700 CE.

Within the identified literature, the LFC is represented by:

- Isolated artefacts (Fourie, 2009; Nel, 2011a; 2011b; Karaodia & Higgitt, 2013; Higgitt & du Piesanie, 2016);
- Low- and medium-density surface scatters (Fourie, 2009; 2010; Huffman & Van der Walt, 2011; Karaodia & Higgitt, 2013; Karaodia Khan, 2013; Higgitt & du Piesanie, 2016);
- Sites of low and medium complexity (Fourie, 2009; 2010; Huffman & Van der Walt, 2011; Higgitt & du Piesanie, 2016); and
- Deposits associated with cattle kraals (Huffman & Van der Walt, 2011).

The LFC transition to the Historical Period is characterised by the emergence of large agricultural settlements associated with the baTswana. Archaeological excavations within the regional study area indicate that the baTswana occupation of the area may have been brief (Nel, 2012). As demonstrated in the history of the baKwena, periods of political turbulence caused disruptions during the 18<sup>th</sup> and 19<sup>th</sup> centuries (Schapera, 1953). It is these disruptions that are suggested to be the cause of the ephemeral remains of the archaeological sites (Nel, 2012).

The historical period<sup>7</sup> 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. The built environment sites within the regional study area include historical farmsteads and farmhouses and churches. The historical sites include surveyor posts and middens.

The first Potgietersrus Platinum Mine was established in the 1920s near the town of Potgietersrus (now known as Mokopane) (Environomics CC & NRM Consulting, 2010). The

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<sup>7</sup> In southern Africa, 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 but is being explored through the 500 year initiative (Swanepoel, et al., 2008).

Platreef was mined until the 1930s, when the platinum industry collapsed. This industry only boomed again during the latter half of the 1900s.

The closest large town to the Project is Lephalale. The town was established in 1960 and was originally called Ellisras after the two original farm owners Patric Ellis and Piet Erasmus who settled on the farm Waterkloof 502 LQ in the area in the 1930s (Environomics CC & NRM Consulting, 2010).

Historical heritage resources associated with the early settlement of these groups in the region make up 14.1% of the identified heritage resources in the area under consideration. Historical heritage resources within the regional study area are represented as structural remains (Fourie, 2009; Huffman & Van der Walt, 2011; Nel, 2011a; Nel, 2011b; Karaodia & Higgitt, 2013; Karodia Khan, 2013). Burial grounds and graves account for a further 10% of the records. These are expressed as single graves and burial grounds with fewer than 10 graves (Pistorius, 2010; Huffman & Van der Walt, 2011; Nel, 2011a; Nel, 2011b; Karaodia & Higgitt, 2013; Karodia Khan, 2013).

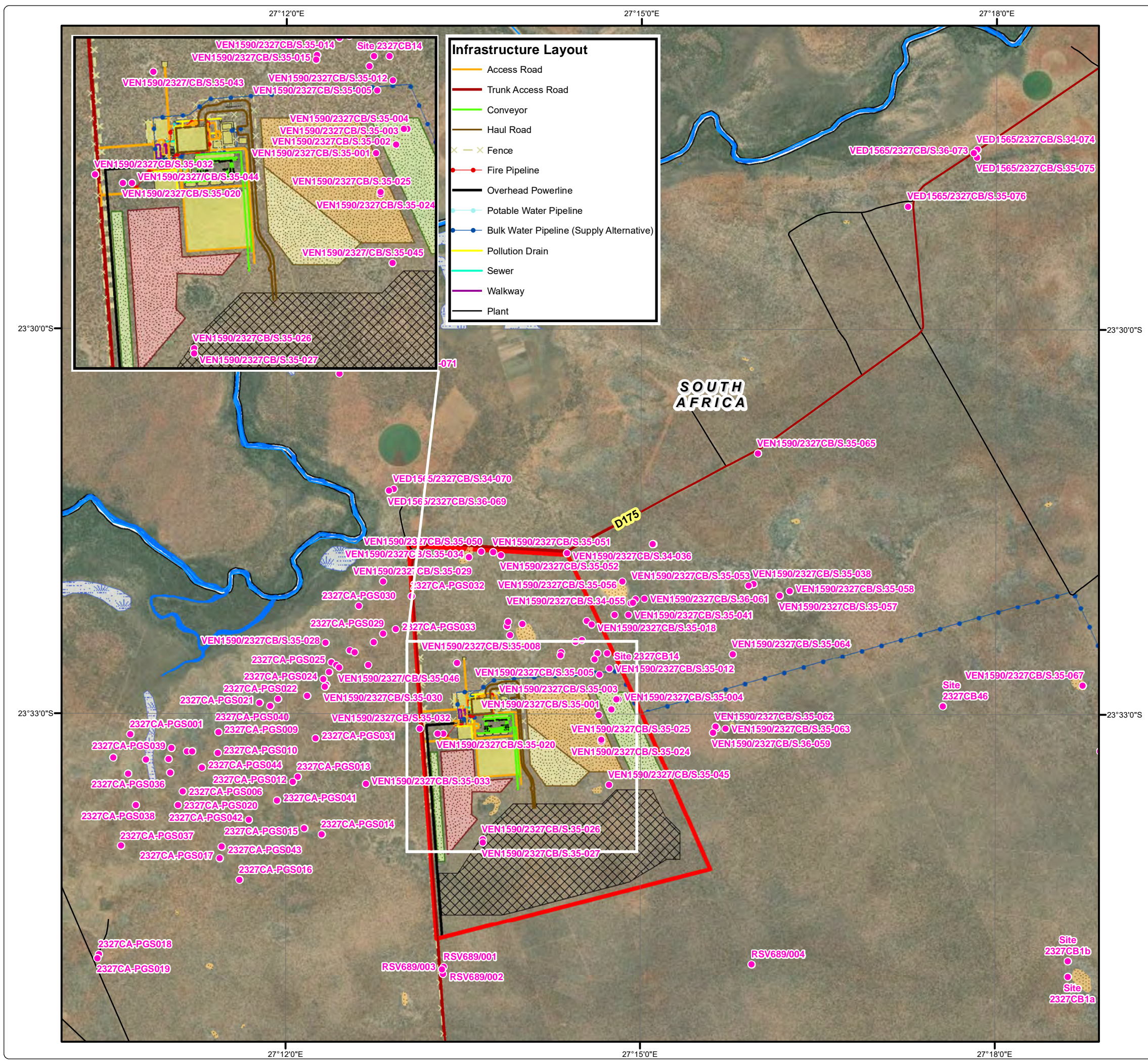
# Dalyshope Coal Mine Identified Heritage Resources


## Legend

- Project Area
  - Identified Heritage Resources
  - Main Road
  - Street
  - Perennial Stream
  - Dam / Lake
  - Non-Perennial Pan
  - Marsh / Swamp
  - International Boundary
- ### Infrastructure Layout
- Infrastructure
  - Opencast Pit
  - Discard Dump
  - Hards Waste Dump
  - Softs Waste Dump
  - Topsoil Dump

### Infrastructure Layout

- Access Road
- Trunk Access Road
- Conveyor
- Haul Road
- ✕ Fence
- Fire Pipeline
- Overhead Powerline
- Potable Water Pipeline
- Bulk Water Pipeline (Supply Alternative)
- Pollution Drain
- Sewer
- Walkway
- Plant







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Projection: Transverse Mercator	Ref #: UCD6170_H_03_KR_v2
Datum: WGS 1984	Revision Number: 1
Central Meridian: 27°E	Date: 17/08/2020

Kilometres  
1:55 000

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## 6.2. Site-Specific Cultural Heritage Baseline

Digby Wells undertook an extensive pre-disturbance survey of the Project area between 12 and 19 November 2012 and 5 to 7 August 2013 as part of a prior HRM process<sup>8</sup>. Digby Wells surveyed the farms Klaarwater and Dalyshope, as well as neighbouring farms which are not applicable to the current Project and the results of the surveys on these farms are not considered in this report.

Table 6-4 presents a summary of the heritage resources identified in the pre-disturbance survey. The GPS data are provided in Plan 4.

**Table 6-4: Summary of Heritage Resources identified in Pre-Disturbance Survey**

Site Name	Description
S.35-001	Isolated Farming Community Period Occurrence. One undiagnostic potsherd found near an animal burrow.
S.35-002	Isolated Farming Community Period Occurrence. One undiagnostic potsherd found near an animal burrow.
S.35-003	Isolated Stone Age Occurrence. One MSA quartzite flake found near an animal burrow.
S.35-004	Isolated Farming Community Period Occurrence. One undiagnostic potsherd found near an animal burrow.
S.35-005	Isolated Stone Age Occurrence. One MSA quartzite flake found near a drill area.
S.35-006	Isolated Stone Age Occurrence. Two MSA quartzite flakes found near an animal burrow.
S.35-007	Isolated Stone Age Occurrence. One MSA quartzite flake found on the surface.
S.35-008	Isolated Stone Age Occurrence. Two MSA quartzite flakes found on the surface.
S.35-009	Isolated Stone Age Occurrence. One MSA quartzite flake found on the surface
S.35-010	Isolated Stone Age Occurrence. Three MSA quartzite flakes found on the surface.
S.35-011	Isolated Stone Age Occurrence. Three MSA quartzite flakes found on the surface near an animal burrow.
S.35-012	Isolated Stone Age Occurrence. One MSA quartzite flake found on the surface
S.35-013	Isolated Stone Age Occurrence. One MSA quartzite artefact found on the surface
S.35-014	Isolated Stone Age Occurrence. One MSA quartzite flake found on the surface
S.35-015	Isolated Stone Age Occurrence. Two MSA quartzite flakes found on the surface.

<sup>8</sup> The HRM process was conducted as part of an EIA process in support of the proposed Dalyshope Phase 1 Coal Mine Project. Anglo appointed Digby Wells as the Environmental Assessment Practitioner (EAP) but closed the Project before the final EIA was submitted to the authorities.

Site Name	Description
S.35-016	Isolated Farming Community Period Occurrence. Isolated decorated ( <i>Mambo</i> facies) undiagnostic potsherd found on the surface at the edge of a floodplain.
S.35-017	Isolated Farming Community Period Occurrence. Isolated undiagnostic potsherd found on the surface at the edge of a floodplain.
S.35-018	Isolated Stone Age Occurrence. One quartzite hammerstone found on the surface.
S.35-020	Isolated Stone Age Occurrence. One MSA quartzite flake found on the surface.
S.35-024	Farming Community Period Open Scatter. Undiagnostic and diagnostic potsherds with associated iron slag fragment identified in a clearing.
S.35-025	Isolated Farming Community Period Occurrence. Two undiagnostic potsherds found near an animal burrow.
S.35-026	Isolated Farming Community Period Occurrence. One undiagnostic potsherd found near an animal burrow
S.35-027	Isolated Stone Age Occurrence. One MSA quartzite flake found on the surface.
S.35-034	Isolated Stone Age Occurrence. One MSA quartzite flake found on the surface
S.35-043	Isolated Stone Age Occurrence. One MSA quartzite flake found on the surface.
S.35-044	Isolated Farming Community Period Occurrence. One undiagnostic potsherd found near an animal burrow.
S.35-045	Isolated Stone Age Occurrence. One MSA quartzite flake found on the surface.
S.35-050	Isolated Stone Age Occurrence. One MSA shale flake found on the surface
S.35-051	Isolated Stone Age Occurrence. One MSA shale flake found near an animal burrow.
S.35-052	Isolated Stone Age Occurrence. One MSA quartzite flake found on the surface.

### 6.3. Results from the Verification Survey

Shannon Hardwick undertook a non-intrusive vehicular and pedestrian verification survey of the affected infrastructure footprints on 11 to 13 February 2020. 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.

#### 6.3.1. Existing Environment

Table 6-5 presents a summary description of the natural environment within which the Project is situated. The environment at the time of the verification survey was disturbed through anthropogenic and animal activities. Anthropogenic disturbances included the establishment of informal roads, fences and other farm infrastructure including dams and windmills. Cattle

and game are kept on the property. Other animal disturbance includes burrows. These were inspected for archaeological material. Figure 6-2 presents an overview of the environment at the time of the verification survey.

**Table 6-5: Summary of the Vegetation Setting of the Project**

Biome	Bio-region	Vegetation Type
Savanna	Central Bushveld	<p><u>Limpopo Sweet Bushveld (SVcb 19)</u></p> <p>Vegetation consists of short, open woodland which occurs in plains (which may be undulating or irregular) traversed by several tributaries of the Limpopo River. Where disturbed, thickets of woodland may become impenetrable. This vegetation occurs on a range of geological formations including:</p> <ul style="list-style-type: none"> <li>• The gneisses, metasediments and metavolcanics of the Malala Drift Group (within the Beit Bridge Complex of the Swazian Erathem) in the northern half of the region;</li> <li>• The basalts of the Letaba Formation (from the Lebombo Group of the Karoo Supergroup) in the northeast;</li> <li>• The sandstone, siltstone and mudstone comprising the Clarens Formation of the Karoo Supergroup to the south and west; and</li> <li>• The lithologies of the Matlabas Subgroup of the Mokolian Waterberg Group, also in the south and west portions of the region covered by this vegetation unit.</li> </ul> <p>This vegetation type is considered 'least threatened'. A small portion of the vegetation has been transformed, mostly through cultivation. Erosion within this vegetation unit ranges from low to high.</p>

Adapted from Mucina & Rutherford (2010)





**Figure 6-2: Results of the Verification Survey showing the Existing Environment**

### 6.3.2. Newly Identified Heritage Resources

A preliminary assessment of the Genealogical Society of South Africa (2011) database did not indicate additional burial grounds are known to exist within the Project area.

Table 6-6 provides a description of newly identified heritage resources during the verification survey (refer to Section 5.6 for a description of the site naming convention). Figure 6-3 presents photographs of these heritage resources.

**Table 6-6: Heritage Resources Identified Through the Pre-Disturbance Survey<sup>9</sup>**

Site Name	Description
S.35-069	Isolated Stone Age Occurrence. Heavily-weathered lithic found on edge of pan.

<sup>9</sup> In accordance with SAHRA procedures, the GPS co-ordinates of these heritage resources have not been included in documents available to the public.







**Individual lithic identified in the Infrastructure Area (S35.-069)**

**Figure 6-3: Results of the Verification Survey showing newly-identified Heritage Resources**



# Dalyshope Coal Mine

## Heritage Tracks & Points



### Legend

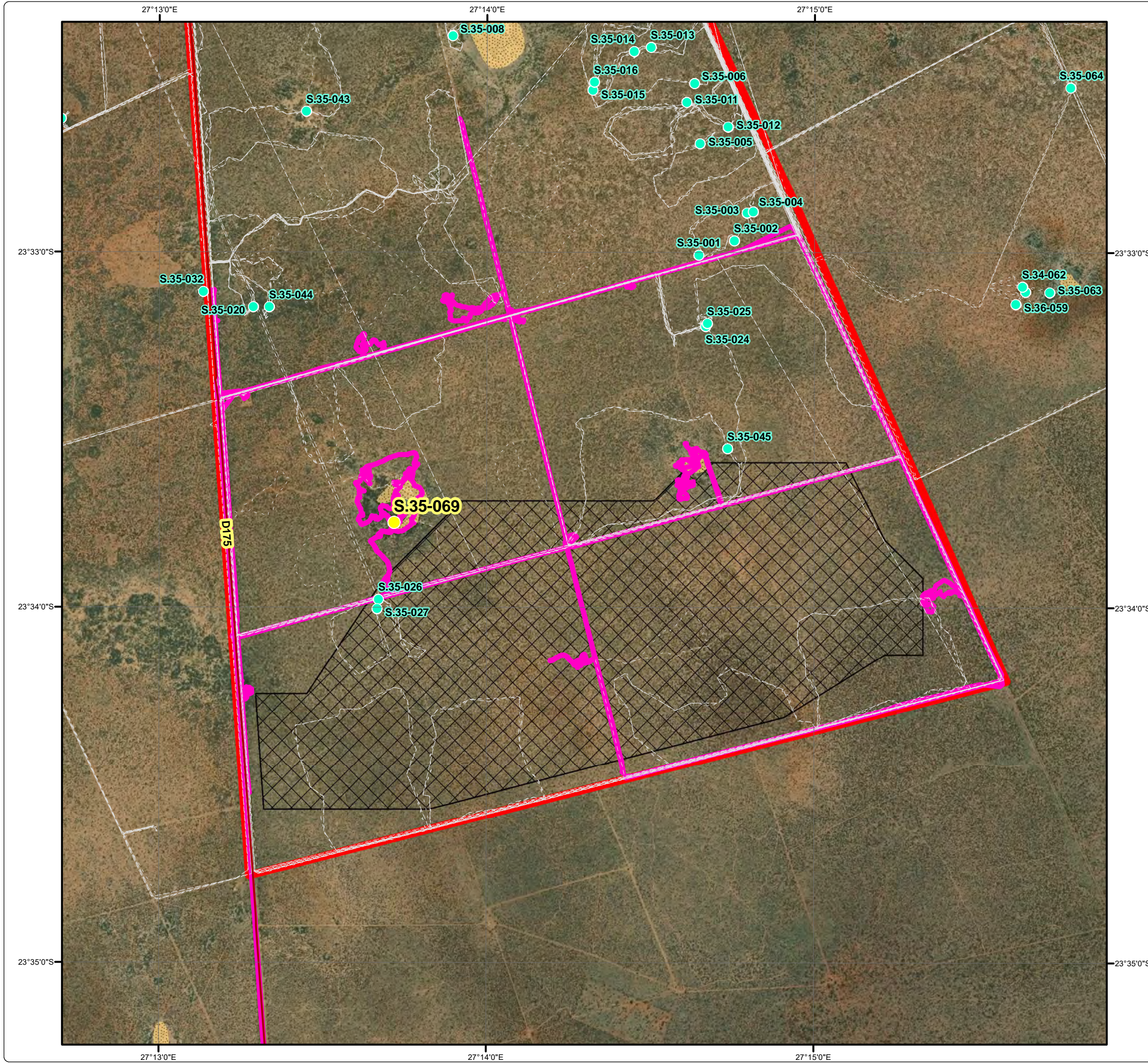
-  Project Area
-  Open Cast Pit (OC1)
-  Main Road
-  Non-Perennial Pan

### Verification Survey

-  Verification Survey Point
-  Verification Survey Track

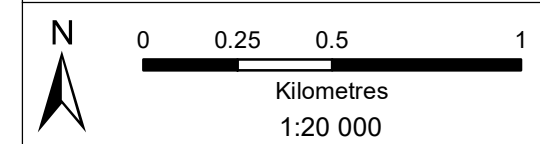
### Original Pre-disturbance Survey

-  Pre-disturbance Survey Point
-  Pre-disturbance Survey Track



• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

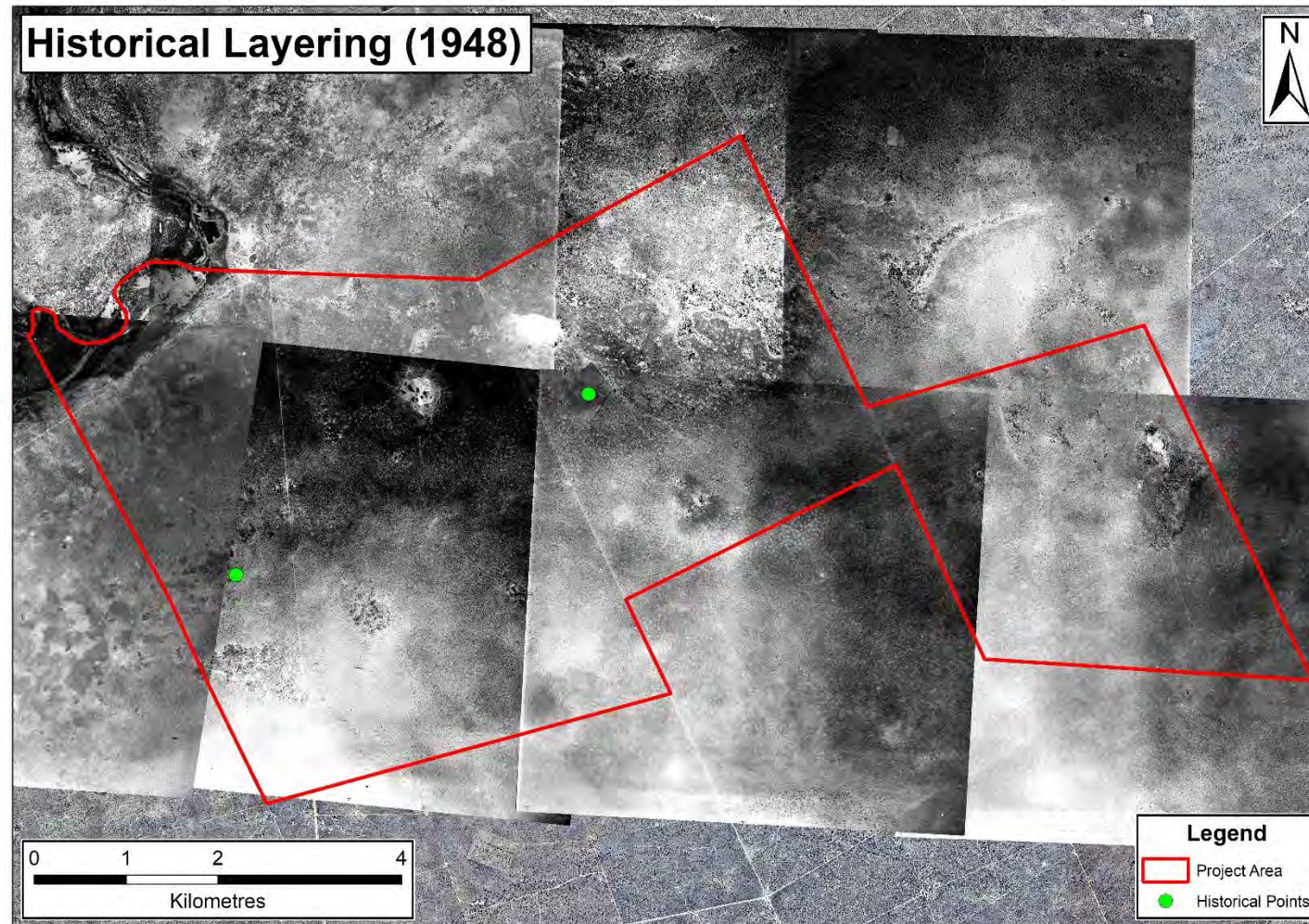
Projection: Transverse Mercator      Ref #: UCD6170\_H\_04\_KR\_v2  
 Datum: WGS 1984                              Revision Number: 1  
 Central Meridian: 27°E                        Date: 13/03/2020



### 6.3.3. Results of Historical Layering

Figure 6-1 presents the results of the historical layering exercise. The historical imagery presents a largely undisturbed area characterised by the flora expected of this region. Multiple drainage lines are visible in the imagery. Visible anthropogenic disturbance includes roads and fence lines. These largely match the existing roads and fence lines currently within the Project area.

Two points of interest have been included in Figure 6-4. One shows an area of land that had been cleared and appears to have been fenced off or enclosed in some way. The other point is located at a square of trees that may represent a structure. Neither of these features were groundtruthed as the former is more than 100 m from the proposed infrastructure layout and the latter is outside the proposed infrastructure area.



**Figure 6-4: Historical Layering showing the Project area in 1948 with Points of Interest**

## 6.4. Developmental Context and Anticipated Socio-economic Benefit<sup>10</sup>

The 2011 census registered 5 404 868 people residing in the Limpopo province, which accounts for approximately 10.44% of the South African population (Statistics South Africa, 2011; Wazimap, 2017). In terms of population, the WDM is the smallest of the district municipalities by population and includes 679 336 people or 12.57% of the population of Limpopo. Within WDM, Lephalale is the second largest local municipality in terms of population with 118 865 people (17.50% of the WDM population).

The Project is located in Ward 3 of the LLM. Ward 3 covers an extensive area and is mostly rural in nature. It includes the Mepudi Power Station and a portion of the Grootegeluk Coal Mine. There are no major towns within this ward. This notwithstanding, the ward has a relatively large population compared to the other wards in the LLM, despite not being the largest ward.

Table 6-7 below presents an overview of the employment status of the population. In this table, 'not applicable' refers to those who are not considered to be of working age (i.e. individuals younger than 18 and older than 65 years of age). Discouraged work-seekers refers to individuals who are unemployed but who are not actively seeking work.

**Table 6-7: Employment Statistics within the Regional Study Area**

Statistics (2011)	WDM		LLM		Ward 3	
	No.	%	No.	%	No.	%
Population	679 336	-	118 865	-	10 836	-
Working Age Population (18 to 64)	397 331	58.49	76 544	64.40	8 090	74.67
Employed	167 809	24.70	35 861	30.17	5 519	50.93
Unemployed	65 612	9.66	10 439	8.78	544	5.02
Discouraged work-seeker	16 259	2.39	1 665	1.40	75	0.69
Not applicable	242 475	35.69	36 431	30.65	2 355	21.73
Other not economically active	187 181	27.55	34 468	29.00	2 344	21.63

Adapted from Statistics SA (2011) and Wazimap (2017)

The key sectors contributing to the WDM economy include agriculture, manufacture, mining and tourism (WDM, 2019). The LLM IDP (2019) includes the listed development potential identified within the mining sector:

- Beneficiation;

<sup>10</sup> Refer to the Social Impact Assessment (SIA) for a more detailed description of the current socio-economic baseline condition, the developmental context and the anticipated social benefits arising from the Project.

- Mining Tourism;
- Platinum Corridor; and
- Mining logistics hub.

Mining activities centre around Mokopane, Lephalale and the Northam-Thabazimbi area. Minerals mined within the WDM include chrome, coal, iron nickel, platinum, tin, and tungsten. The Waterberg field contains an estimated 76 billion tons of coal, which is more than 40% of the national coal reserve. The WDM produces the most platinum within the Limpopo Province and contributes the most in terms of GDP to the national mining sector. Mining contributes 47.4% of the WDM GDP. One of the Strategic Implementation Projects (SIPs) is to 'unlock the northern mineral belt with the Waterberg as a catalyst'.

The 2015-2019 Limpopo Development Plan (LDP), in part, outlines the Limpopo Province's contribution to the national Medium-Term Strategic Framework (MTSF) for this period and through to 2030 (Limpopo Provincial Government, 2015). The vision of the province for 2015-2019 is "to fulfil the potential for prosperity in a socially cohesive, sustainable and peaceful manner" (Limpopo Provincial Government, 2015, p. 9). The LDP highlights 14 development outcomes to achieve this vision. These outcomes encompass a range of social and environmental issues with goals for 2030. Meaningful employment with a focus on career development is a key consideration in this document.

The establishment of a new coal line to unlock the coal deposits of the Waterberg is a priority highlighted in the LDP (Limpopo Provincial Government, 2015). This notwithstanding, a second priority is to procure renewable energy and decommission a portion of the aging coal-fired power stations. Both these priorities are included in the province's five-year plan.

The vision and mission of the WDM was revised during the strategic planning session to inform the 2019-2020 IDP document (WDM, 2019). The vision and mission both centre around energy and minerals, as well as ecotourism. The State of the Province Address (SOPA) highlighted the importance of the mining industry in terms of its contribution to the province's Gross Domestic Product (GDP) as well as employment opportunities. The IDP identified the development potential of the mining industry within the WDM. This includes beneficiation, mining tourism, the platinum corridor and a mining logistics hub. The proposed Musina-Makhado Special Economic Zone (SEZ) project was also described in the SOPA. This is a mineral beneficiation project that will result in a projected total investment of approximately R 150 billion and 21 000 jobs for the province. Additional mining projects have been recently completed within the province or are expected to be completed in the near future, as shown in Figure 6-5.

The importance of job creation, service delivery and infrastructure is highlighted throughout these documents at all three levels (Limpopo Provincial Government, 2015; LLM, 2019; WDM, 2019). Lephalale town has been identified as a Provincial Growth Point (PGP) and a Potential Development Area (PDA) (LLM, 2019). Areas close to the nodes within Lephalale (Ellisras, Onverwacht and Marapong) have been associated with mining potential but are also strategically placed for future residential development and human settlement.

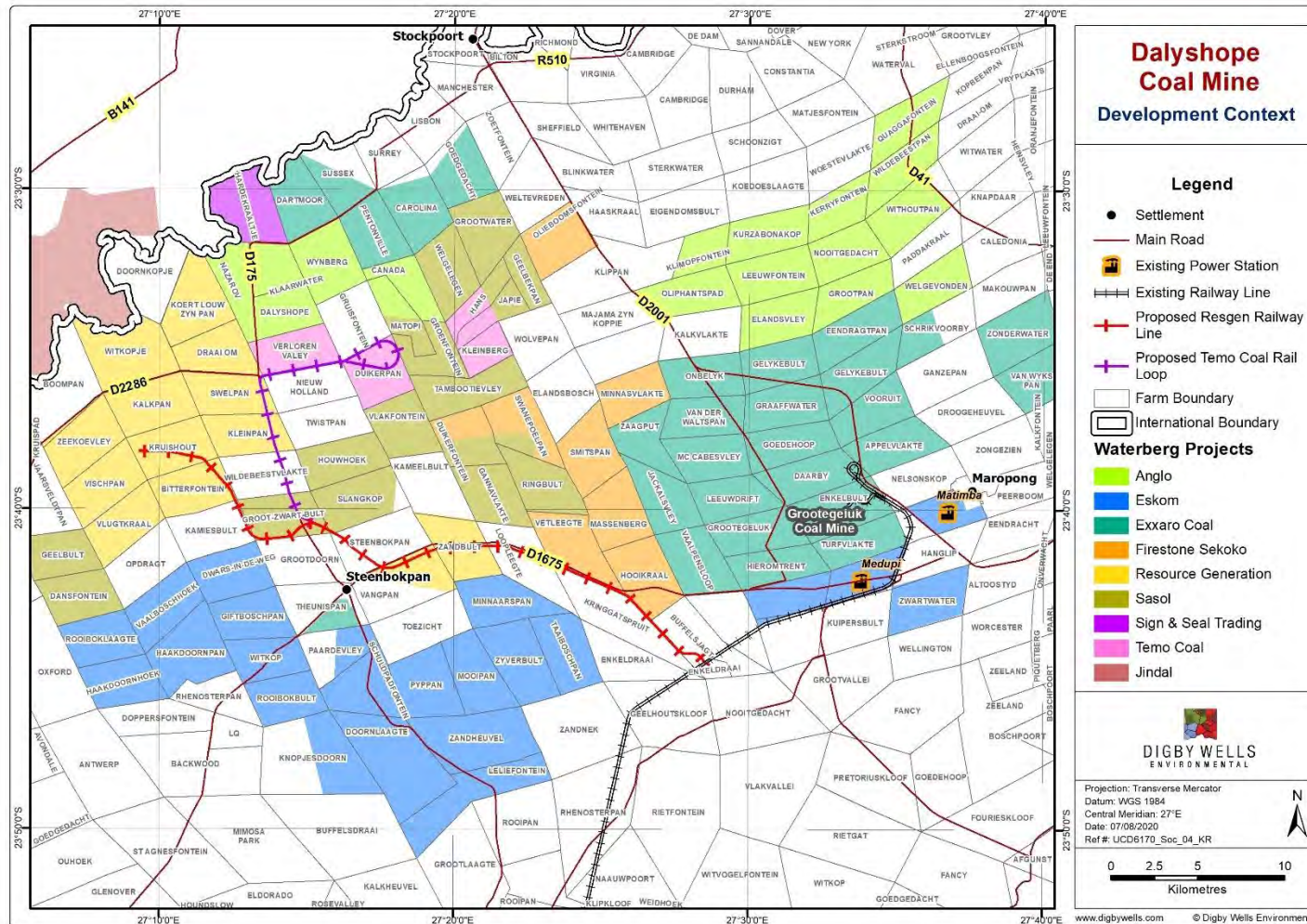


Figure 6-5: Development Context within which the Project is located



## 7. Impact Assessment

### 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 CS 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 CS and other values described in Section 3(3) of the NHRA.

Two categories of heritage resources were recorded during the field survey and the verification survey, totalling 32 heritage resources. These comprised:

- Isolated occurrence representing the Stone Age; and
- Isolated occurrence representing the Farming Community Period.

The assessment of the CS and Field Ratings demonstrated that the identified archaeological resources have negligible CS. Table 7-1 presents a summary of the CS assessment as included in the previous HIA assessment process and Table 7-2 presents the CS of the heritage resources identified in the verification survey. Sites of the same type that share the same CS have been grouped together in terms of the impact assessment (refer to Section 7.2). The palaeontological baseline and potential impacts to the fossil heritage will be considered in the specialist PIA report.

**Table 7-1: CS and Field Ratings of Heritage Resources identified in the Pre-disturbance Survey**

Resource ID	Type	Description	Aesthetic	Historic	Scientific	Social	INTEGRITY	Designation	Recommended Field Rating	Field Rating Description	Minimum Mitigation <sup>11</sup>
S.35-001	Occurrence	Isolated Stone Age or Farming Community artefacts	0	-	0	-	0	Negligible	General Protection IV C	Resources under general protection in terms of NHRA sections 34 to 37 with Negligible significance	Sufficiently recorded, no mitigation required
S.35-002											
S.35-003											
S.35-004											
S.35-005											
S.35-006											
S.35-007											
S.35-008											
S.35-009											
S.35-010											
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S.35-025											
S.35-026											
S.35-027											
S.35-034											
S.35-043											
S.35-044											
S.35-045											

<sup>11</sup> Please note: this recommended mitigation refers to the minimum mitigation requirements as encapsulated in the NHRA. Project-specific mitigation measures are presented in Section **Error! Reference source not found.**

Resource ID	Type	Description	Aesthetic	Historic	Scientific	Social	INTEGRITY	Designation	Recommended Field Rating	Field Rating Description	Minimum Mitigation <sup>11</sup>
S.35-050											
S.35-051											
S.35-052											

**Table 7-2: CS and Field Ratings of Heritage Resources identified in the Verification Survey**

Resource ID	Type	Description	Aesthetic	Historic	Scientific	Social	INTEGRITY	Designation	Recommended Field Rating	Field Rating Description	Minimum Mitigation <sup>12</sup>
S.35-069	Occurrence	Isolated Stone Age artefact	2 The technical skill represented here is commonly represented in diverse cultural landscapes but is not common in this region.	1 This resource represents a time period which is commonly represented in diverse landscapes across South Africa.	0 The information potential of this resource is very limited and does not contribute to the value of the object.	- Stone Age materials were not assessed against social criteria as defined in Section 3(3) of the NHRA.	1 This resource was found out of context and, as such, there is limited information potential and the original setting has been lost.	Negligible	General Protection IV C	Resources under general protection in terms of NHRA sections 34 to 37 with Negligible significance	Sufficiently recorded, no mitigation required

<sup>12</sup> Please note: this recommended mitigation refers to the minimum mitigation requirements as encapsulated in the NHRA. Project-specific mitigation measures are presented in Section **Error! Reference source not found.**

## 7.2. Heritage Impact Assessment

The assessment of potential impacts to heritage resources considers the aforementioned activities associated with the Project, specifically the construction and operation of the proposed Dalyshope Coal Mine and associated infrastructure (*where applicable*). Impacts to the palaeontological resources are discussed in the specialist PIA report.

The SAHRA Minimum Standards recommend that heritage resources with negligible CS require no mitigation and their inclusion into an HIA report is considered to be sufficient in terms of recording these resources. Their inclusion into Table 6-4 and Table 6-6 and Figure 6-3 is considered sufficient to meet these requirements. To this effect, potential impacts posed to the identified heritage resources are not considered in this section.

### 7.2.1. Construction Phase

Table 7-3 presents a summary of the activities comprising the construction phase of the Project (as described in Section 2.1) and summarises the potential risks of impacts to the heritage landscape posed by these activities.

**Table 7-3: Construction Phase Interactions and Impacts of Activity**

Interaction	Impact
Site and/or vegetation clearance	Where Project infrastructure layouts occur on or in proximity to heritage resources, these Project-related activities present the risk of a direct negative impacts to heritage resources afforded general protection under Sections 34, 35 and/or 36 of the NHRA (i.e., historical structure, archaeological and palaeontological resources and/or burial grounds and graves). Direct impacts can include damage to or destruction of the heritage resource.
Temporary PCD	
Contractors laydown yard	
Construction of access and haul roads	
Construction of infrastructure	
Diesel storage and explosives magazine	
Topsoil stockpiling	

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

### 7.2.2. Operational Phase

Table 7-4 presents a summary of the activities comprising the construction phase of the Project (as described in Section 2.1) and summarises the potential risks of impacts to the heritage landscape posed by these activities.

**Table 7-4: Operational Phase Interactions and Impacts of Activity**

Interaction	Impact
Establishment of the open pit	Where Project infrastructure layouts occur on or in proximity to heritage resources, these Project-related activities present the risk of a direct negative impacts to heritage resources afforded general protection under Sections 34, 35 and/or 36 of the NHRA (i.e., historical structure, archaeological and palaeontological resources and/or burial grounds and graves). Direct impacts can include damage to or destruction of the heritage resource.
Blasting and removal of rock	
Establishment and operation of stockpiling infrastructure	
Diesel storage and explosives magazine	
Operation of the open pit workings	
Operation of the crush and screen and coal washing plant	
Operation of the sewage treatment plant and water treatment plant	
Storage, handling and treatment of hazardous products (including fuel, explosives and oil) and waste	
Water use and on-site storage	
Maintenance activities	

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

### 7.2.3. Decommissioning Phase

Table 7-5 presents a summary of the activities comprising the construction phase of the Project (as described in Section 2.1) and summarises the potential risks of impacts to the heritage landscape posed by these activities.

**Table 7-5: Decommissioning Phase Interactions and Impacts of Activity**

Interaction	Impact
Demolition and removal of infrastructure	Where Project infrastructure layouts occur on or in proximity to heritage resources, these Project-related activities present the risk of a direct negative impacts to heritage resources afforded general protection under Sections 34, 35 and/or

Interaction	Impact
Rehabilitation activities	36 of the NHRA (i.e. historical structure, archaeological and palaeontological resources and/or burial grounds and graves). Direct impacts can include damage to or destruction of the heritage resource.
Post-closure monitoring and rehabilitation	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.

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

### 7.3. 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 Limpopo Province requires consideration to identify the possible in-combination effects of various impacts to known heritage resources. Table 7-6 presents a summary of the possible cumulative impacts of the Project.

**Table 7-6: Summary of Potential Cumulative Impacts**

Type	Cumulative Impact	Direction of Impact	Extent of Impact
Additive, Synergistic	The development and operation of the proposed Project will add to the existing and proposed infrastructure in the area and will contribute to the degradation of the sense-of-place of the cultural landscape.  Considering the greater development landscape, the effects from the various proposed developments will interact to produce a total greater effect on the cultural landscape and degradation thereof.	Negative	Local

## 7.4. 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 Universal and Anglo in terms of implementation of the Project. These two aspects are discussed separately.

Sections 6.2 and 6.3 describes the heritage resources identified during the pre-disturbance and verification surveys; however, this is not an exhaustive list of all heritage resources within the Mining Right and Project areas. If heritage resources are identified during Project activities, and where Universal or Anglo knowingly does not take proactive management measures, potential risks to Universal and Anglo may include litigation in terms of Section 51 of the NHRA and social or reputational repercussions. Table 7-7 presents a summary of the primary risks that may arise for Universal and/or Anglo.

**Table 7-7: Identified heritage risks that may arise for Universal and Anglo**

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 LIHRA and/or SAHRA in terms of Section 38(8) of the NHRA.
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 LIHRA.	<ul style="list-style-type: none"> <li>● Fines;</li> <li>● Penalties;</li> <li>● Seizure of Equipment;</li> <li>● Compulsory Repair / Cease Work Orders; and</li> <li>● Imprisonment.</li> </ul>

If additional heritage resources are identified during Project-related activities, the potential risks to those heritage resources will need to be assessed. Table 7-8 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 7-8: Identified unplanned events and associated impacts**

Unplanned event	Potential impact	Mitigation / Management / Monitoring
Encountering unidentified <i>in situ</i> 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 Chance Find Procedures (CFPs) as a condition of authorisation and in conformance with IFC PS 8. 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 <i>in situ</i> archaeological material during the implementation of the Project.		
Accidental exposure of <i>in situ</i> 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 Plan (EMP).



**Table 8-1: HRM Specialist Recommendations for the Environmental Management Plan**

Activities	Potential Impacts	Aspects Affected	Phase	Mitigation Measure	Mitigation Type	Time period for implementation
<ul style="list-style-type: none"> <li>All Activities outlined Section 2.1</li> </ul>	Damage to or destruction of previously unidentified heritage resources.	Cultural Heritage	Decommissioning Closure	<ul style="list-style-type: none"> <li>Develop and implement CFP.</li> </ul>	<b>Control</b>	Before the commencement of the Project

## 9. Monitoring Programme

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

## 10. Stakeholder Engagement Comments Received

The consultation process affords Interested and Affected Parties (I&APs) opportunities to engage in the EIA process. The objectives of the 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.

The PPP has been completed in part, as a process separate to the heritage specialist assessment. No formal consultation was undertaken as part of this assessment. Table 10-1 presents a summary of the Comments and Responses included in the Final Scoping Report and their relevance to the HRM process. Should any I&AP comments be submitted in relevance to heritage resources during the SEP, these will be considered in the final 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 engagement was undertaken during the verification survey.

**Table 10-1: Summary of Comments and Responses Received with Reference to HRM Process**

Details of Comment	Comment (as received)	Response (as sent to I&AP)	Considerations in the HRM Process
<p><b>Contributor:</b> L Molefe <b>Representing:</b> Lesedi Community <b>Date:</b> 16/07/2020 <b>Comment Method:</b> Focus Group Meeting</p>	<p>Mining companies wanting to work in the area should seek to understand our history.</p>	<p>Noted</p>	<p>Section 6.1 presents a summary of the cultural heritage baseline which is based on available literature and is not considered exhaustive. Should the community be aware of references which represent their history, and which have not been included in the baseline, they can make these references known through the PPP.</p>
	<p>One of the mines in the area relocated people’s graves (about 15 graves) without any notifications given to the population or compensation. The mine then changed its name when people started questioning what happened to their graves and it was eventually sold. So Universal should not do the same.</p>	<p>Noted</p>	<p>A Grave Relocation Process (GRP) is beyond the current scope of the HRM process.  Where a GRP may be considered necessary, this process must be undertaken in compliance with Section 36 of the NHRA and Chapter XI of the NHRA Regulations.</p>



Details of Comment	Comment (as received)	Response (as sent to I&AP)	Considerations in the HRM Process
<p><b>Contributor:</b> J Nkoati  <b>Representing:</b> Lesedi Community  <b>Date:</b> 16/07/2020  <b>Comment Method:</b> Focus Group Meeting</p>	<p>We used to work and live full time on some of these farms, and we buried our people in some of them; thus, we need to be consulted if there are graves that will be affected.</p> <p>Which farms will be affected by the project, are there any graves on the site?</p>	<p>Noted, the project affected farms are Dalyshope and Klaarwater. These are owned by Anglo Coal. The cultural heritage specialist report will provide more information regarding the presence or lack thereof graves and how they will be affected.</p>	<p>No graves were identified during the pre-disturbance survey or the verification survey.</p> <p>Where graves are known by the community to occur on the farms Dalyshope or Klaarwater, the community can make the location of these graves known so that they can be included in the HRM process and impact assessment.</p>

## 11. Recommendations

All heritage resources identified within the Project area are of negligible CS. As per the SAHRA Minimum Standards, their inclusion into this HIA report is considered sufficient in terms of mitigation and no further actions are required.

At the time of the verification survey and the compilation of this report, the water supply, electricity supply and the coal transportation requirements and infrastructure layout are still under consideration. No design options or layouts were considered in this report. Anglo and/or Universal must appoint a suitably-qualified heritage specialist to undertake a walk-down of the proposed infrastructure layout, when finalised, and assess the impacts posed to any heritage resources identified in that process.

To minimise unplanned direct impacts to unidentified heritage resources and to conform with the requirements of IFC PS 8, Anglo and/or Universal must develop a generic CFP which must be approved by the HRAs and which must be implemented prior to the commencement of the Project. Given the nature and scope of the Project, Digby Wells recommends that Anglo and/or Universal develop and implement a Project-specific CFP, which will include details on the types of heritage resources likely to occur in the Project area and will include roles, responsibilities and communication strategies specific to this operation.

## 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 above are adopted.

### 12.1. Socio-economic Benefit versus Heritage Impacts

At present, the proposed positive socio-economic benefits arising from the Project will include short-term and long-term employment opportunities. The Project will also contribute to the strategic development goals at the provincial, regional and local level.

The potential socio-economic benefits that may result from the Project outweigh the identified impacts and risks to known heritage resources within the site-specific study area. This statement is supported by the following:

- Given Digby Wells' understanding of the Project, there are no envisaged impacts to the heritage resources of significance from Project activities. Impacts and risks to unidentified heritage resources can be managed through the proposed recommendations; and
- The proposed Project will provide potential opportunities for long-term and short-term employment to people within the area; and
- The Project will contribute to strategic development goals.

## 13. 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 CS;
- 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
<b>Archaeological</b>	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.
<b>Archaeologist</b>	A trained professional who uses scientific methods to excavate, record and study archaeological sites and deposits.
<b>Artefact</b>	Any object manufactured or modified by human beings.
<b>Burial Grounds and Graves Consultation (BGGC)</b>	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.
<b>Ceramic (syn. pottery)</b>	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.
<b>Ceramic facies / facies</b>	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.
<b>Ceramic tradition</b>	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.
<b>Conservation</b>	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
<b>Cultural significance (CS)</b>	<p>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:</p> <ul style="list-style-type: none"> <li>Importance in the community, or pattern of South Africa's history.</li> <li>Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage</li> <li>Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.</li> <li>Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects.</li> <li>Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.</li> <li>Importance in demonstrating a high degree of creative or technical achievement at a particular period.</li> <li>Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.</li> <li>Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.</li> <li>Significance relating to the history of slavery in South Africa.</li> </ul>
<b>Development</b>	<p>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:</p> <ul style="list-style-type: none"> <li>Construction, alteration, demolition, removal or change of use of a place or a structure at a place.</li> <li>Carrying out any works on or over or under a place.</li> <li>Subdivision or consolidation of land comprising, a place, including the structures or airspace of a place.</li> <li>Constructing or putting up for display signs or hoardings.</li> <li>Any change to the natural or existing condition or topography of land.</li> <li>Any removal or destruction of trees, or removal of vegetation or topsoil.</li> </ul>
<b>Early Farming Community/ies</b>	<p>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.</p>
<b>Early Stone Age</b>	<p>The South African ESA dates from ~3 Mya to c. 250 Kya. This period is associated with later <i>Australopithecus</i> and early <i>Homo</i> species. The lithic industries that characterise the ESA include Oldowan and Early Acheulian, typically as simple core tools, choppers handaxes and cleavers.</p>
<b>Excavation</b>	<p>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.</p>



Term	Definition
<b>Farming Community/ies</b>	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 <i>Iron Age</i> 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.
<b>Field Rating</b>	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.
<b>Formal protection</b>	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.
<b>General protection</b>	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.
<b>Grave</b>	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
<b>Heritage Impact Assessment (HIA)</b>	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.
<b>Heritage resource</b>	Any place or object of cultural significance.
<b>Heritage resources management</b>	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.
<b>Heritage site</b>	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.
<b>Late Farming Community/ies</b>	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.
<b>Late Stone Age</b>	The South African LSA dates from ~30 Kya. This period is associated with modern <i>Homo sapiens sapiens</i> 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 cryptocrystallines, quartz and chert. The LSA is also associated with archaeological rock art including both paintings and engravings.



Term	Definition
<b>Living / intangible heritage</b>	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.
<b>Management</b>	In relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the NHRA.
<b>Middle Stone Age</b>	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 <i>Homo sapiens species</i> . 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.
<b>National estate</b>	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).



<b>Term</b>	<b>Definition</b>
<b>Palaeontological</b>	Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.
<b>Palaeontologist</b>	A trained professional who uses scientific methods to excavate, collect, record and study palaeontological sites and fossils.
<b>Pedestrian survey</b>	A method of examining a site in which surveyors, spaced at regular intervals, systematically walk over the area being investigated.
<b>Phase 1 Archaeological Impact Assessment (AIA)</b>	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.
<b>Phase 2 Archaeological Impact Assessment (AIA)</b>	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.
<b>Phase 3 Management Plan / Conservation Management Plan (CMP)</b>	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
<b>Pre-disturbance survey (syn. reconnaissance)</b>	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.
<b>Reconnaissance</b>	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).
<b>Site</b>	Any area of land, including land covered by water, and including any structures or objects thereon.
<b>Structure</b>	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.
<b>Tangible heritage</b>	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.



DIGBY WELLS  
ENVIRONMENTAL

## Appendix B: Specialist CV



Miss Shannon Hardwick  
 Heritage Resources Management Consultant  
 Social and Heritage Services  
 Digby Wells Environmental

## 1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2013	MSc (Archaeology)	University of the Witwatersrand
2010	BSc (Honours) (Archaeology)	University of the Witwatersrand
2009	BSc	University of the Witwatersrand
2006	Matric	Rand Park High School

## 2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Fair	Basic

## 3 Employment

Period	Company	Title/position
2019 to Present	Digby Wells Environmental	Heritage Resources Management Consultant
2017 to 2019	Digby Wells Environmental	Assistant Heritage Resources Management Consultant
2017 to 2017	Digby Wells Environmental	Social and Heritage Services Intern
2016 to 2017	Tarsus Academy	Facilitator
2011 to 2016	University of the Witwatersrand	Teaching Assistant
2011	University of the Witwatersrand	Collections Assistant

## 4 Experience

I 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. I am an archaeologist and obtained a Master of Science (MSc) degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. I am a published co-author of one paper in *Journal of Ethnobiology*.

Since joining Digby Wells, I have gained generalist experience through the compilation of various heritage assessments, including Notification of Intent to Develop (NIDs), Heritage Scoping Reports (HSRs), Heritage Impact Assessment (HIA) reports, Heritage Basic Assessment Reports (HBARs) and permit applications to undertake permitted activities in terms of Sections 34 and 35 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). I have also obtained experience in compiling socio-economic documents, including a Community Health, Safety and Security Management Plan (CHSSMP) and social baselines and data analysis for Projects in South Africa, Malawi, Mali and Sierra Leone. My fieldwork experience includes heritage pre-disturbance surveys in South Africa, Malawi and the Democratic Republic of the Congo and social fieldwork in Malawi.

I am a registered member of the Association of Southern African Professional Archaeologists (ASAPA) and the International Council on Monuments and Sites (ICOMOS).

## 5 Project Experience

My project experience is listed in the table below.

**Project Experience**

Project Title	Name of Client	Project Location	Date of Completion	Project / Experience Description
Environmental Authorisation for the Dagsoom Coal Mining Project near Ermelo, Mpumalanga Province	Dagsoom Coal Mining (Pty) Ltd	Ermelo, Mpumalanga Province	Ongoing	Heritage Impact Assessment
Regional Tailings Storage Facility Heritage Mitigations	Ergo Mining (Pty) Ltd	Randfontein, Gauteng	Ongoing	Section 34 Permit Application Process
Weltervreden Mine Environmental Authorisation, Water Use Licence and Mining Right Application Project	Mbuyelo Group (Pty) Ltd	Belfast, Mpumalanga	Ongoing	Heritage Impact Assessment



<b>Project Title</b>	<b>Name of Client</b>	<b>Project Location</b>	<b>Date of Completion</b>	<b>Project / Experience Description</b>
Environmental Authorisation for the proposed Lephalale Pipeline Project, Limpopo Province	MDT Environmental (Pty) Ltd	Lephalale, Limpopo Province	2019	Notification of Intent to Develop
Heritage Resources Management Process Update for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga Province	2019	Heritage Site Management Plan Update
Environmental Authorisation for the proposed Musina-Makhado Special Economic Zone Development Project, Limpopo Province	Limpopo Economic Development Agency	Vhembe District Municipality, Limpopo Province	Ongoing	Heritage Impact Assessment Project Management
Songwe Hills Rare Earth Elements Project	Mkango Resources Limited	Phalombe District, Malawi	Ongoing	Heritage Impact Assessment
Elandsfontein Colliery Burial Grounds and Graves Chance Finds	Anker Coal and Mineral Holdings SA (Pty) Ltd Elandsfontein Colliery (Pty) Ltd	Clewer, Emalahleni, Mpumalanga Province	December 2018	Site Inspection Project Management
Environmental Authorisation Process to Decommission a Conveyor Belt Servitude, Road and Quarry at Twistdraai East Colliery	Sasol Mining (Pty) Ltd	Secunda, Mpumalanga Province	Ongoing	Notification of Intent to Develop
Environmental and Social Impact Assessment for the Bougouni Lithium Project, Mali	Future Minerals S.A.R.L.	Bougouni, Mali	Ongoing	Heritage Impact Assessment
Environmental Authorisation for the Nomalanga Estates Expansion Project, KwaZulu-Natal	Nomalanga Property Holdings (Pty) Ltd	Greytown, KwaZulu-Natal	Ongoing	Heritage Impact Assessment
Environmental Authorisation for the Temo Mine proposed Rail, Road and Pipeline Development, Limpopo Province	Temo Coal Mining (Pty) Ltd	Lephalale, Limpopo Province	Ongoing	Heritage Impact Assessment



<b>Project Title</b>	<b>Name of Client</b>	<b>Project Location</b>	<b>Date of Completion</b>	<b>Project / Experience Description</b>
Gorumbwa RAP Audit	Randgold Resources Limited	Kibali Sector, Democratic Republic of the Congo	December 2018	Resettlement Action Plan Audit
Sasol Sigma Defunct Colliery Surface Mitigation Project: Proposed Rover Diversion and Flood Protection Berms	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	November 2018	Notification of Intent to Develop
Basic Assessment and Regulation 31 Amendment / Consolidation for Sigma Colliery: Mooikraal and Sigma Colliery: 3 Shaft	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	Ongoing	Notification of Intent to Develop
Sasol Mining Sigma Colliery Ash Backfilling Project, Sasolburg, Free State Province	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	July 2018	Heritage Basic Assessment Report Update
Constructed Landfill Site for the Sierra Rutile Limited Mining Operation, Southern Province, Sierra Leone	Sierra Rutile Limited	Southern Province, Sierra Leone	May 2019	Social Impact Assessment
Environmental Impact Assessment for the Klipspruit Colliery Water Treatment Plant and associated pipeline, Mpumalanga	South32 SA Coal Holdings (Pty) Ltd	Ogies, Mpumalanga Province	Ongoing	Notification of Intent to Develop; Social baseline
Proposed construction of a Water Treatment Plant and associated infrastructure for the Treatment of Mine-Affected Water at the Kilbarchan Colliery	Eskom Holdings SOC Limited	Newcastle, KwaZulu-Natal Province	Ongoing	Heritage Impact Assessment
Belfast Implementation Project	Exxaro Coal Mpumalanga (Pty) Ltd	Belfast, Mpumalanga Province	Ongoing	Section 34 Permit Application



<b>Project Title</b>	<b>Name of Client</b>	<b>Project Location</b>	<b>Date of Completion</b>	<b>Project / Experience Description</b>
Newcastle Landfill Project	GCS Water and Environmental Consultants	Newcastle, KwaZulu-Natal	March 2019	Heritage Impact Assessment
NHRA Section 34 Permit Application process for the Davin and Queens Court Buildings on Erf 173 and 174, West Germiston, Gauteng Province	IDC Architects	Johannesburg, Gauteng Province	May 2018	Section 34 Permit Application Process
Basic Assessment and Environmental Management Plan for the Proposed pipeline from the Mbali Colliery to the Tweefontein Water Reclamation Plant, Mpumalanga Province	HCI Coal (Pty) Ltd Mbali Colliery	Ogies, Mpumalanga Province	February 2018	Heritage Basic Assessment Report
The South African Radio Astronomy Observatory Square Kilometre Array Heritage Impact Assessment and Conservation Management Plan Project	The South African Radio Astronomy Observatory (SARAO)	Carnarvon, Northern Cape Province	July 2018	Heritage Impact Assessment; Conservation Management Plan
Environmental Impact Assessment for the proposed Future Developments within the Sun City Resort Complex	Sun International (Pty) Ltd	Rustenburg, North West Province	Ongoing	Heritage Impact Assessment Conservation Management Plan Social Baseline
Environmental Fatal Flaw Analysis for the Mabula Filling Station	Mr van den Bergh	Waterberg, Limpopo Province	November 2017	Fatal Flaw Analysis
Environmental Impact Assessment for the Blyvoor Gold Mining Project near Carletonville, Gauteng Province	Blyvoor Gold Capital (Pty) Ltd	Carletonville, Gauteng	Ongoing	Notification of Intent to Develop; Social Baseline

Project Title	Name of Client	Project Location	Date of Completion	Project / Experience Description
Heritage Resources Management Process for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga Province	October 2018	Heritage Impact Assessment
Liwonde Additional Studies	Mota-Engil Africa	Liwonde, Malawi	June 2018	Community Health, Safety and Security Management Plan
Environmental Impact Assessment for the Millsite TSF Complex	Sibanye-Stillwater	Randfontein, Gauteng	December 2017	Heritage Impact Assessment
Heritage Resources Management Process for the Portion 296 of the farm Zuurfontein 33 IR Proposed Residential Establishment Project	Shuma Africa Projects (Pty) Ltd	Ekurhuleni (Johannesburg), Gauteng	June 2017	Notification of Intent to Develop
NHRA Section 35 Archaeological Investigations, Lanxess Chrome Mine, North-West Province	Lanxess Chrome Mine (Pty) Ltd	Rustenburg, North West Province	August 2017	Archaeological Phase 2 Mitigation
Environmental and Social Input for the Pre-Feasibility Study	Birimium Gold	Bougouni, Mali	October 2018	Pre-Feasibility Study; Heritage Impact Assessment

## 6 Professional Registration

Position	Professional Body	Member Number
Member	Association of Southern African Professional Archaeologists (ASAPA)	451
Member	International Council on Monuments and Sites (ICOMOS)	38048



## 7 Publications

Esterhuysen, A.B. & Hardwick, S.K. 2017. Plant remains recovered from the 1854 siege of the Kekana Ndebele, Historic Cave, Makapan Valley, South Africa. *Journal of Ethnobiology* 37(1): 97-119.



Mr. Justin du Piesanie  
 Divisional Manager  
 Social and Heritage Services  
 Digby Wells Environmental

## 1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2015	Continued Professional Development, Intermediate Project Management Course	PM.Ideas: A division of the Mindset Group
2013	Continued Professional Development Programme, Architectural and Urban Conservation: Researching and Assessing Local Environments	University of Cape Town
2008	MSc	University of the Witwatersrand
2005	BA (Honours) (Archaeology)	University of the Witwatersrand
2004	BA	University of the Witwatersrand
2001	Matric	Norkem Park High School

## 2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Proficient	Good

### 3 Employment

<b>Period</b>	<b>Company</b>	<b>Title/position</b>
2018 to present	Digby Wells Environmental	Divisional Manager: Social and Heritage Services
2016-2018	Digby Wells Environmental	Unit Manager: Heritage Resources Management
2011-2016	Digby Wells Environmental	Heritage Management Consultant: Archaeologist
2009-2011	University of the Witwatersrand	Archaeology Collections Manager
2009-2011	Independent	Archaeologist
2006-2007	Maropeng & Sterkfontein Caves UNESCO World Heritage Site	Tour guide

### 4 Experience

I joined the company in August 2011 as an archaeologist. Subsequently, Digby Wells appointed me as the Heritage Unit Manager and Divisional Manager for Social and Heritage Services in 2016 and 2018 respectively. I obtained my Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. I further attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. I am a professional member of the Association of Southern African Professional Archaeologists (ASAPA), and accredited by the association's Cultural Resources Management (CRM) section. I am also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. I have over 10 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, and NHRA Section 34 application processes. I gained further generalist experience since my appointment at Digby Wells in Botswana, Burkina Faso, Cameroon, the Democratic Republic of Congo, Liberia, Malawi, Mali, Senegal and Tanzania on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, I have acted as a technical expert reviewer of HRM projects undertaken in Cameroon and Senegal. As Divisional Manager for Social and Heritage Services at Digby Wells Environmental, I manage several large capital Projects and multidisciplinary teams placing me in the best position to identify and exploit points of integration between the HRM process and greater social landscape. This approach to HRM, as an integrated discipline, is grounded in

international HRM principles and standards that has allowed me to provide comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving the strategic objectives of our clients, as well as maintain or enhance Cultural Significance of the relevant cultural heritage resources.

## 5 Project Experience

Please see the following table for relevant Project experience:

PROJECT		LOCATION	DATES		PROJECT TYPE		CLIENT		
LLWDP-II Process	HRM	Lesotho	2020	-	Heritage Assessment	Impact	Lesotho Lowlands Development Project II	Water	
Ergo City Heritage Mitigations	Deep	Johannesburg, Gauteng, South Africa	2020	-	Heritage Assessment, Rescue Permit Application and Monitoring	Impact	Ergo (Pty) Ltd		
Marshall Barracks Archaeological Monitoring	Street	Johannesburg, Gauteng, South Africa	2020	-	Archaeological Monitoring		GVK-Siya Zama Construction		
Exxaro Belfast Inspection	Site	Belfast, Mpumalanga, South Africa	2020	2020	Site Inspection		Exxaro Coal Mpumalanga (Pty) Ltd		
Matla Mine 1 GRP		Kriel, Mpumalanga, South Africa	2020	-	Grave Relocation		Exxaro Coal Mpumalanga (Pty) Ltd		
Mafube RAP and GRP		Middelburg, Mpumalanga, South Africa	2019	-	Grave Relocation		Mafube Coal		
SARAO SKA Project: Heritage Mitigations		Carnarvon, Northern Cape, South Africa	2019	-	Heritage Management and Mitigation		SARAO		
Kibali Kalimva & Ikamva Pit ESIA		Orientele Province, Democratic Republic of Congo	2019	2019	Heritage Assessment	Impact	Barrick Gold Corporation		
Ergo City Deep HSMP		Johannesburg, Gauteng, South Africa	2019	2019	Heritage Management Plan	Site	Ergo (Pty) Ltd		
Ergo RTSF Section 34 Process		Westonaria, Gauteng, South Africa	2019	-	Section 34 Destruction Permit Applications		Ergo (Pty) Ltd		

PROJECT	LOCATION	DATES		PROJECT TYPE		CLIENT
Twyfelaar EIA	Ermelo, Mpumalanga, South Africa	2019	2019	Heritage Assessment	Impact	Dagsoom Coal Mining (Pty) Ltd
Sasol River Diversion	Sasolburg, Free State, South Africa	2019	2019	Heritage Assessment	Impact	Sasol Mining
Sun City EIA and CMP	Pilanesberg, North-West Province, South Africa	2018	2019	Heritage Assessment and Conservation Management Plan	Impact and	Sun International
Exxaro Matla HRM	Kriel, Mpumalanga, South Africa	2017	2019	Heritage Assessment and Conservation Management Plan	Impact	Exxaro Coal Mpumalanga (Pty) Ltd
Exxaro Belfast GRP	Belfast, Mpumalanga, South Africa	2013	2019	Grave Relocation		Exxaro Coal Mpumalanga (Pty) Ltd
Eskom Northern KZN Strengthening	KwaZulu- Natal, South Africa	2016	2018	Heritage Assessment	Impact	ILISO Consulting
Thabametsi GRP	Lephalale, Limpopo Province, South Africa	2017	2018	Grave Relocation		Exxaro Resources Ltd
SKA HIA and CMP	Carnarvon, Northern Cape, South Africa	2017	2018	Heritage Assessment and Conservation Management Plan	Impact and	SARAO
Grootegeeluk Watching Brief	Lephalale, Limpopo Province, South Africa	2017	2017	Watching Brief		Exxaro Resources Ltd
Matla HSMP	Kriel, Mpumalanga Province, South Africa	2017	2017	Heritage Management Plan	Site	Exxaro Coal Mpumalanga (Pty) Ltd
Ledjadja Coal Borrow Pits	Lephalale, Limpopo Province, South Africa	2017	2017	Heritage Assessment	Basic	Ledjadja Coal (Pty) Ltd
Exxaro Belfast Implementation Project PIA	Belfast, Mpumalanga, South Africa	2017	2017	Palaeontological Impact Assessment		Exxaro Coal Mpumalanga (Pty) Ltd

PROJECT	LOCATION	DATES	PROJECT TYPE	CLIENT	
Lanxess Chrome Mine Archaeological Mitigation	Rustenburg, North West Province, South Africa	2017	2017	Phase 2 Excavations	Lanxess Chrome Mine (Pty) Ltd
Tharisa Apollo EIA Project	KwaZulu-Natal, South Africa	2017	2017	Heritage Assessment Impact	GCS (Pty) Ltd
Queen Street Section 34 Process	Germiston, Johannesburg, Gauteng, South Africa	2017	2017	Section 34 Destruction Permit Applications	IDC Architects
Goulamina EIA Project	Goulamina, Sikasso Region, Mali	2017	2017	Heritage Assessment Impact	Birimian Limited
Zuurfontein Residential Establishment Project	Ekurhuleni, Gauteng, South Africa	2017	2017	Notification of Intent to Develop	Shuma Africa Projects
Kibali Grave Relocation Training and Implementation	Orientele Province, Democratic Republic of Congo	2017	2017	Grave Relocation	Randgold Resources Limited
Massawa EIA	Senegal	2016	2017	Heritage Assessment and Technical Reviewer Impact	Randgold Resources Limited
Beatrix EIA and EMP	Welkom, Free State, South Africa	2016	2017	Heritage Assessment Impact	Sibanye Stillwater
Sun City Chair Lift	Pilanesberg, North-West Province, South Africa	2016	2017	Notification of Intent to Develop and Heritage Assessment Basic	Sun International
Hendrina Underground Coal Mine EIA	Hendrina, Mpumalanga, South Africa	2016	2017	Heritage Assessment Impact	Umcebo Mining (Pty) Ltd
Elandsfontein Update	Clewer, Mpumalanga, South Africa	2016	2017	Heritage Assessment Impact	Anker Coal
Groningen and Inhambane PRA	Limpopo Province, South Africa	2016	2016	Heritage Assessment Basic	Rustenburg Platinum Mines Limited

PROJECT	LOCATION	DATES		PROJECT TYPE		CLIENT
Palmietkuilen MRA	Springs, Gauteng, South Africa	2016	2016	Heritage Assessment	Impact	Canyon Resources (Pty) Ltd
Copper Sunset Sand Mining S.102	Free State, South Africa	2016	2016	Heritage Assessment	Basic	Copper Sunset Sand (Pty) Ltd
Grootvlei MRA	Springs, Gauteng, South Africa	2016	2016	Notification of Intent to Develop		Ergo (Pty) Ltd
Lambda EMP	Mpumalanga, South Africa	2016	2016	Palaeontological Impact Assessment		Eskom Holdings SOC Limited
Kilbarchan Basic Assessment and EMP	Newcastle, KwaZulu- Natal, South Africa	2016	2016	Heritage Assessment	Basic	Eskom Holdings SOC Limited
Grootegeeluk Amendment	Lephalale, Limpopo Province, South Africa	2016	2016	Notification of Intent to Develop		Exxaro Coal Resources (Pty) Ltd
Garsfontein Township Development	Pretoria, Gauteng, South Africa	2016	2016	Notification of Intent to Develop		Leungo Construction Enterprises
Louis Botha Phase 2	Johannesburg, Gauteng, South Africa	2016	2016	Phase 2 Excavations		Royal Haskoning DHV
Sun City Heritage Mapping	Pilanesberg, North-West Province, South Africa	2016	2016	Phase 2 Mapping		Sun International
Gino's Building Section 34 Destruction Permit Application	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Assessment Section 34 Destruction Application	Impact and 34 Permit	Bigen Africa Services (Pty) Ltd
EDC Block Refurbishment Project	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Assessment Section 34 Application	Impact and Permit	Bigen Africa Services (Pty) Ltd
Namane IPP and Transmission Line EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Assessment	Impact	Namane Resources (Pty) Ltd

PROJECT	LOCATION	DATES	PROJECT TYPE	CLIENT
Temo Coal Road Diversion and Rail Loop EIA	Steenbokpan, Limpopo Province, South Africa	2015 2016	Heritage Assessment Impact	Namane Resources (Pty) Ltd
Sibanye WRTRP	Gauteng, South Africa	2014 2016	Heritage Assessment Impact	Sibanye Stillwater
NTEM Iron Ore Mine and Pipeline Project	Cameroon	2014 2016	Technical Review	IMIC plc
NLGM Constructed Wetlands Project	Liberia	2015 2015	Heritage Assessment Impact	Aureus Mining
ERPM Section 34 Destruction Permits Applications	Johannesburg, Gauteng, South Africa	2015 2015	Section 34 Destruction Permit Applications	Ergo (Pty) Ltd
JMEP II EIA	Botswana	2015 2015	Heritage Assessment Impact	Jindal
Oakleaf ESIA Project	Bronkhorstspuit, Gauteng, South Africa	2014 2015	Heritage Assessment Impact	Oakleaf Investment Holdings
Imvula Project	Kriel, Mpumalanga, South Africa	2014 2015	Heritage Assessment Impact	Ixia Coal
VMIC Vanadium EIA Project	Mokopane, Limpopo, South Africa	2014 2015	Heritage Assessment Impact	VM Investment Company
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012 2015	Heritage Assessment Impact	Aquarius Resources
Nzoro 2 Hydro Power Project	Orientele Province, Democratic Republic of Congo	2014 2014	Social consultation	Randgold Resources Limited
Eastern Basin AMD Project	Springs, Gauteng, South Africa	2014 2014	Heritage Assessment Impact	AECOM
Soweto Cluster Reclamation Project	Soweto, Gauteng, South Africa	2014 2014	Heritage Assessment Impact	Ergo (Pty) Ltd
Klipspruit South Project	Ogies, Mpumalanga, South Africa	2014 2014	Heritage Assessment Impact	BHP Billiton



PROJECT		LOCATION	DATES		PROJECT TYPE		CLIENT
Klipspruit Extension: Weltevreden Project		Ogies, Mpumalanga, South Africa	2014	2014	Heritage Assessment	Impact	BHP Billiton
Ergo Pipeline Assessment	Rondebult Basic	Johannesburg, South Africa	2014	2014	Heritage Assessment	Basic	Ergo (Pty) Ltd
Kibali Project	ESIA Update	Orientele Province, Democratic Republic of Congo	2014	2014	Heritage Assessment	Impact	Randgold Resources Limited
GoldOne Consolidation	EMP	Westonaria, Gauteng, South Africa	2014	2014	Gap analysis		Gold One International
Yzermite PIA		Wakkerstroom, Mpumalanga, South Africa	2014	2014	Palaeontological Impact Assessment		EcoPartners
Sasol Mooikraal Assessment	Basic	Sasolburg, Free State, South Africa	2014	2014	Heritage Assessment	Basic	Sasol Mining
Rea Vaya Project	Phase II C	Johannesburg, Gauteng, South Africa	2014	2014	Heritage Assessment	Impact	ILISO Consulting
New Project	Liberty Gold	Liberia	2013	2014	Grave Relocation		Aureus Mining
Putu Project	Iron Ore Mine	Petroken, Liberia	2013	2014	Heritage Assessment	Impact	Atkins Limited
Sasol Twistdraai Project		Secunda, Mpumalanga, South Africa	2013	2014	Notification of Intent to Develop		ERM Southern Africa
Kibali Project	Gold Power Project	Hydro- Orientele Province, Democratic Republic of Congo	2012	2014	Heritage Assessment	Impact	Randgold Resources Limited
SEGA Project	Gold Mining	Burkina Faso	2013	2013	Technical Reviewer		Cluff Gold PLC
Consbrey and Collieries Project	Harwar	Breyton, Mpumalanga, South Africa	2013	2013	Heritage Assessment	Impact	Msobo Coal
Falea Environmental Assessment	Uranium Mine	Falea, Mali	2013	2013	Heritage Scoping		Rockgate Capital

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Daleside Acetylene Gas Production Facility	Gauteng, South Africa	2013	2013	Heritage Impact Assessment	ERM Southern Africa
SEGA Gold Mining Project	Burkina Faso	2012	2013	Socio Economic and Asset Survey	Cluff Gold PLC
Kibali Gold Project Grave Relocation Plan	Orientele Province, Democratic Republic of Congo	2011	2013	Grave Relocation	Randgold Resources Limited
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012	2012	Heritage Impact Assessment	Aquarius Resources
Environmental Authorisation for the Gold One Geluksdal TSF and Pipeline	Gauteng, South Africa	2012	2012	Heritage Impact Assessment	Gold One International
Platreef Burial Grounds and Graves Survey	Mokopane, Limpopo Province, South Africa	2012	2012	Burial Grounds and Graves Survey	Platreef Resources
Resgen Boikarabelo Coal Mine	Limpopo Province, South Africa	2012	2012	Phase 2 Excavations	Resources Generation
Bokoni Platinum Road Watching Brief	Burgersfort, Limpopo Province, South Africa	2012	2012	Watching Brief	Bokoni Platinum Mine
Transnet NMPP Line	Kwa-Zulu Natal, South Africa	2010	2010	Heritage survey	Umlando Consultants
Archaeological Impact Assessment – Witpoortjie Project	Johannesburg, Gauteng, South Africa	2010	2010	Archaeological Impact Assessment	ARM
Der Brochen Archaeological Excavations	Steelpoort, Mpumalanga, South Africa	2010	2010	Phase 2 Excavations	Heritage Contracts Unit
De Brochen and Booyesdal Archaeology Project	Steelpoort, Mpumalanga, South Africa	2010	2010	Site Mapping Recording:	Heritage Contracts Unit
Eskom Thohoyandou Electricity Master Network	Limpopo Province, South Africa	2010	2010	Heritage Statement	Strategic Environmental Focus

PROJECT		LOCATION	DATES		PROJECT TYPE		CLIENT
Bathako Expansion	Mine	North-West Province, South Africa	2010	2010	Phase 2 Mapping		Heritage Contracts Unit
Wenzelrust Excavations		Shoshanguve, Gauteng, South Africa	2009	2009	Phase 2 Excavations		Heritage Contracts Unit
University of the Witwatersrand LIA Shelter Project	Parys	Free State, South Africa	2009	2009	Phase 2 Mapping		University of the Witwatersrand
Archaeological Assessment of Modderfontein Holdings	of AH	Johannesburg, Gauteng, South Africa	2008	2008	Heritage Assessment	Basic	ARM
Heritage Assessment of Rhino Mines		Thabazimbi, Limpopo Province, South Africa	2008	2008	Heritage Assessment	Impact	Rhino Mines
Cronimet Project		Thabazimbi, Limpopo Province, South Africa	2008	2008	Archaeological surveys		Cronimet
Eskom Thohoyandou SEA Project		Limpopo Province, South Africa	2008	2008	Heritage Statement		Eskom
Witbank Archaeological Assessment	Dam Impact	Witbank, Mpumalanga, South Africa	2007	2007	Archaeological survey		ARM
Sun City Archaeological Site Mapping		Sun City, Pilanesberg, North West Province, South Africa	2006	2006	Site Mapping	Recording:	Sun International
Klipriviersberg Archaeological Survey		Meyersdal, Gauteng, South Africa	2005	2006	Archaeological surveys		ARM

## 6 Professional Registration

Position	Professional Body	Registration Number
Member	Association for Southern African Professional Archaeologists (ASAPA);	270

Position	Professional Body	Registration Number
	ASAPA Cultural Resources Management (CRM) section	
Member	International Council on Monuments and Sites (ICOMOS)	14274
Member	Society for Africanist Archaeologists (SAfA)	N/A
Member	International Association of Impact Assessors (IAIA) South Africa	5494

## 7 Publications

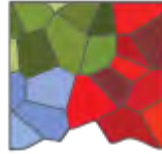
Huffman, T.N. & du Piesanie, J.J. 2011. Khami and the Venda in the Mapungubwe Landscape. *Journal of African Archaeology* 9(2): 189-206

du Piesanie, J.J., 2017. Book Review: African Cultural Heritage Conservation and Management. *South African Archaeological Bulletin* 72(205)



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## Appendix C: HRM Methodology



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## Cultural Significance, Field Rating and Impact Assessment

### Methodology Statement

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**Project Number:**

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**Prepared for:**

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June 2019

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Digby Wells and Associates (South Africa) (Pty) Ltd  
Co. Reg. No. 2010/008577/07. Turnberry Office Park, 48 Grosvenor Road, Bryanston, 2191. Private Bag  
X10046, Randburg, 2125, South Africa  
Tel: +27 11 789 9495, Fax: +27 11 069 6801, info@digbywells.com, www.digbywells.com

Directors: GE Trusler (C.E.O), LF Stevens, J Leaver (Chairman)\*, NA Mehlomakulu\*, DJ Otto  
\*Non-Executive

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<b>Report Type:</b>	<b>Methodology Statement</b>
<b>Project Name:</b>	<b>Cultural Significance, Field Rating and Impact Assessment</b>
<b>Project Code:</b>	<b>ZZZ9999</b>

#### Revision History

<b>Name</b>	<b>Responsibility</b>	<b>Version</b>	<b>Date</b>
Johan Nel ASAPA Member 095	HRM Unit Manager	Ver. 1	May 2014
		Ver. 2	October 2014
		Ver. 3	May 2015
Justin du Piesanie ASAPA Member 270	Divisional Manager: Social and Heritage Services	Ver. 4	January 2016
		Ver. 5	June 2016
		Ver. 6	June 2019

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## 1 Introduction

Cultural heritage resources are intrinsic to the history and beliefs of communities. They characterise community identity and cultures, are finite, non-renewable and irreplaceable. Considering the innate value of cultural heritage resources, Heritage Resources Management (HRM) acknowledges that these have lasting worth as evidence of the origins of life, humanity and society. It is incumbent of the assessor to determine the cultural significance<sup>1</sup> (CS) of cultural heritage resources to allow for the implementation of appropriate management. This is achieved through assessing cultural heritage resources' value relative to certain prescribed criteria encapsulated in policies and legal frameworks, such as the South African National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Commensurate to the NHRA, with specific reference to Section 38, this methodology aims to ensure that clients protect cultural heritage during implementation of project activities by either avoiding, removing or reducing the intensity of adverse impacts to tangible<sup>2</sup> and intangible<sup>3</sup> cultural heritage resources within the defined area of influence.

The methodology to define CS and assess the potential effects of a project is discussed separately in the sections below.

## 2 Evaluation of Cultural Significance and Field Ratings

### 2.1 Cultural Significance Determination

Digby Wells developed a CS Determination Methodology to assign identified cultural heritage resources with a numerical CS rating in an objective as possible way and that can be independently reproduced provided that the same information sources are used, should this be required.

This methodology determines the intrinsic, comparative and contextual significance of identified cultural heritage resources by considering their:

1. Importance rated on a six-point scale against four criteria; and
2. Physical integrity rated on a five-point scale.

---

<sup>1</sup> Cultural significance is defined as the intrinsic "aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance" of a cultural heritage resource. These attributes are combined and reduced to four themes used in the Digby Wells significance matrix: aesthetic, historical, scientific and social.

<sup>2</sup> (i) Moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls.

<sup>3</sup> Cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.

The assigned ratings consider information obtained through a review of available credible sources and representativity or uniqueness (i.e. known examples of similar resources to exist), as well as the current preservation *status-quo* as observed.

Figure 2-2 depicts the CS formula and importance criteria, and it describes ratings on the importance physical integrity scales

## 2.2 Field Rating Determination

Grading of heritage resources remains the responsibility of heritage resources authorities. However, the South African Heritage Resources Agency (SAHRA) Minimum Standards requires heritage reports include Field Ratings for identified resources to comply with section 38 of the NHRA. Section 7 of the NHRA provides for a system of grading of heritage resources that form part of the national estate and distinguishes between three categories.

The field rating process is designed to provide a numerical rating of the recommended grading of identified heritage resources. The evaluation is done as objectively as possible by integrating the field rating into the significance matrix.

Field ratings guide decision-making in terms of appropriate minimum required mitigation measures and consequent management responsibilities in accordance with Section 8 of the NHRA. Figure 2-1 presents the formula and the parameters used to determine the Field Ratings.

Field Rating = Average Sum of Aesthetic + Historic + Scientific + Social			
rated against			
Value	Field Rating	Designation	Authority
0	Resource not assessed	None	None
1	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with negligible significance	Grade IV C	Local
2	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with low significance	Grade IV B	
3	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with medium-high significance	Grade IV A	
4	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with high significance	Grade III B	
5	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with very high significance	Grade II A	
6	Resources under formal protection that can be considered to have special qualities that make them significant within a province or region	Grade II	Provincial
7	Resources under formal protection that can be considered to have special qualities that make them significant within a national or international context	Grade I	National

**Figure 2-1: Field Ratings Methodology**

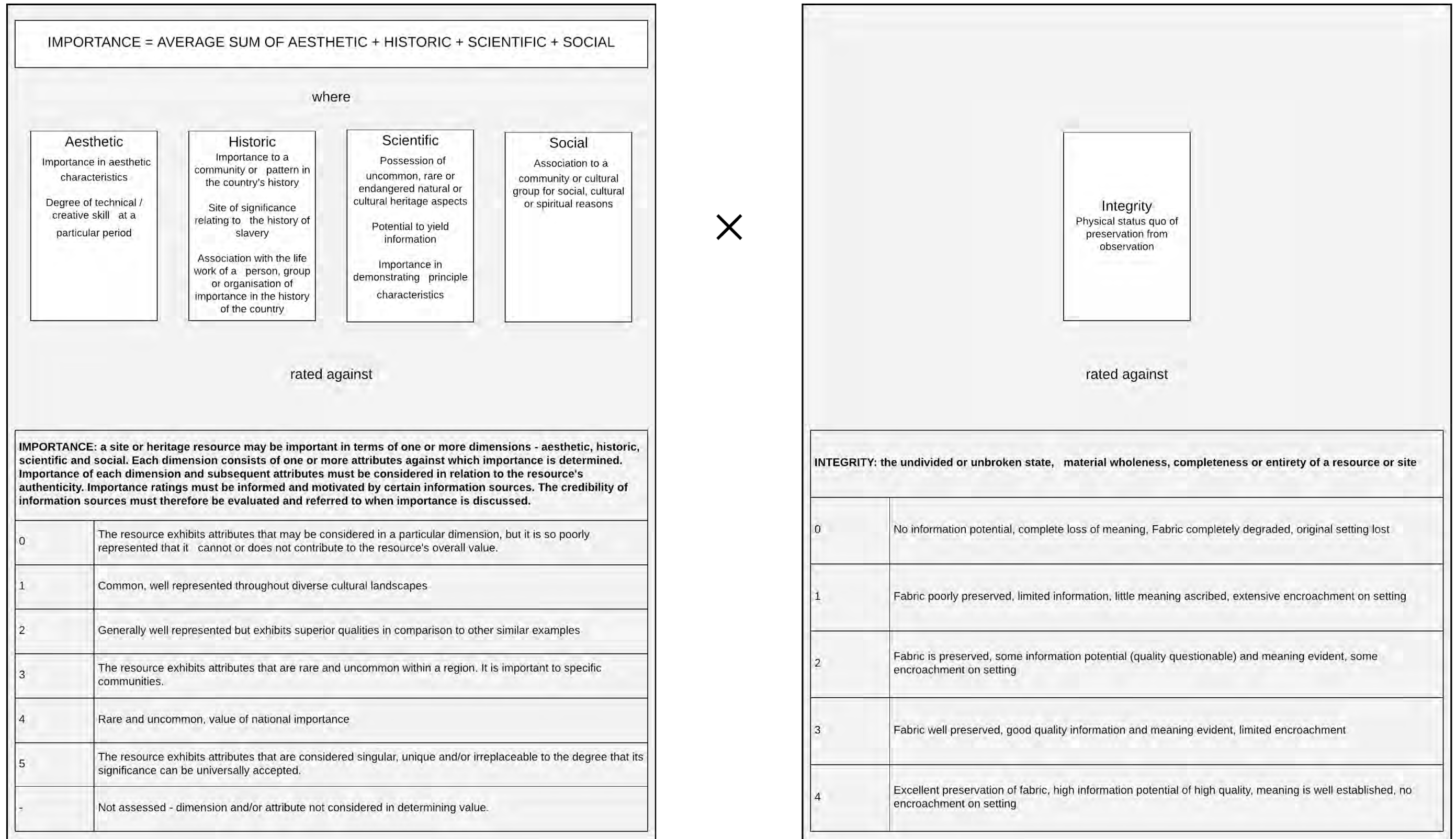


Figure 2-2: CS Determination Methodology

### 3 Impact Assessment Methodology

The rationale behind CS determination recognises that the value of a cultural heritage resource is a direct indication of its sensitivity to change (impacts) as well as the maximum acceptable levels of change to the resource. Therefore, the assessor must determine CS prior to the completion of any impact assessment.

These requirements in terms of international best practice standards are integrated into the impact assessment methodology to guide both assessments of impacts and recommendations for mitigation and management of resources.

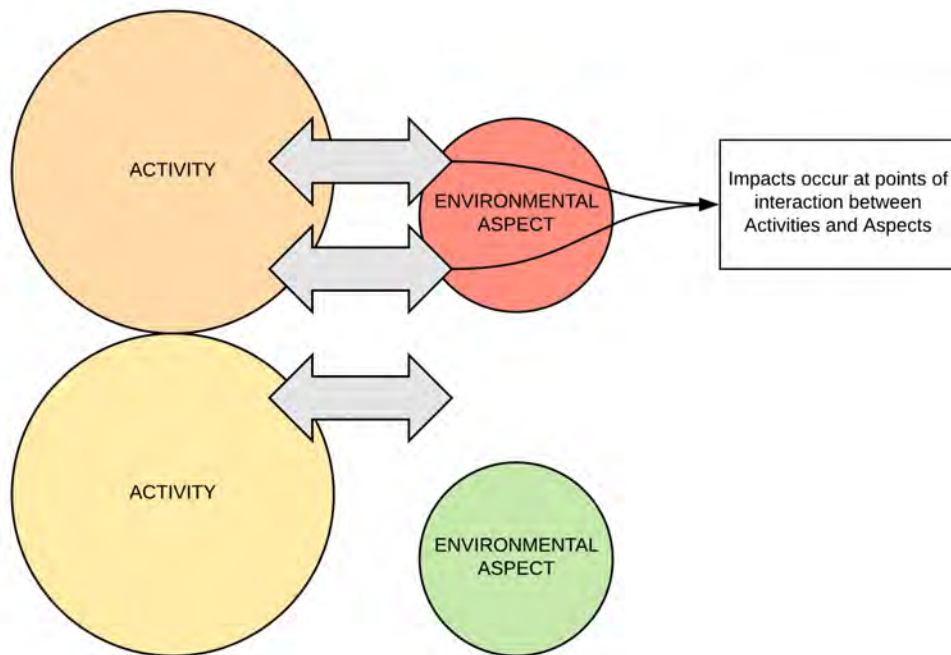
The following are terms and definitions applicable to the Environmental Impact Assessment (EIA) concept (ISO 14001):

- **Project Activity:** Activities associated with the Project that result in an environmental interaction during various phases, i.e. construction, operation and decommissioning, e.g., new processing plant, new stockpiles, development of open pit, dewatering, water treatment plant;
- **Environmental Interaction:** An element or characteristic of an activity, product, or service that interacts or can interact with the environment. Environmental interactions can cause environmental impacts (but may not necessarily do so). They can have either beneficial impacts or adverse impacts and can have a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change;
- **Environmental Aspect:** Various natural and human environments that an activity may interact with. These environments extend from within the activity itself to the global system, and include air, water, land, flora, fauna (including people) and natural resources of all kinds; and
- **Environmental Impact:** A change to the environment that is caused either partly or entirely by one or more environmental interactions. An environmental interaction can have either a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change. In addition, it can have either a beneficial environmental impact or an adverse environmental impact.

The assessment process identified potential issues and impacts through examination of:

- Project phases and activities,
- Interactions between activities and the environmental aspect; and
- The interdependencies between environmental aspects.

Figure 3-1 presents a graphical summary of this concept and Figure 3-2 provides an example of the process.



**Figure 3-1: Graphical Representation of Impact Assessment Concept**

Project Activity & Interaction		Environmental Aspect		Potential Environmental Impact	
Project Phase	Activity	Aspect	Interdependencies	Issue	Potential Impact
This relates to the consideration of the relevant phase of the project. <b>Example: Construction</b>	This refers to one or more of the activities that will be undertaken during the corresponding phase of the project. <b>Example: Topsoil clearing</b>	This identifies and considers the various aspects that will be affected by the project activity. <b>Example: Heritage, Biophysical, and Social</b>	This identifies and considers the interdependencies between the various aspects and how they may be impacted upon by the relevant activity. <b>Example: Removal of topsoil will impact on flora which may have heritage and social implications</b>	The issues considers the activity in relation to the identified aspects and interdependencies. Note: Activities and Aspects can have several issues resulting in various impacts. <b>Example: Physical alteration of the land</b>	Potential impacts are a culmination of the various categories evaluated as part of the impact assessment. <b>Example: Topsoil clearing will remove medicinal plants that will erode indigenous knowledge systems and cultural significance.</b>

**Figure 3-2: Example of how Potential Impacts are considered**



### 3.1 Categorising Impacts to Cultural Heritage

Impacts may manifest differently among geographical areas and diverse communities. For instance, impacts to cultural heritage resources can simultaneously affect the tangible cultural heritage resource and have social repercussions. The severity of the impact is compounded when the intensity of physical impacts and social repercussions differ significantly, e.g. removal of a grave surface dressings results in a minor physical impact but has a significant social impact. In addition, impacts to cultural heritage resources can influence the determined CS without a physical impact taking place. Given this reasoning, impacts as considered here are generally placed into three broad categories (adapted from Winter & Bauman 2005: 36):

- **Direct or primary impacts** affect the fabric or physical integrity of the cultural heritage resource, for example destruction of an archaeological site or historical building. Direct or primary 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. For example, the destruction of a low-density scatter of archaeological material culture may be assessed as a negatively high impact if CS is not considered;
- **Indirect, induced or secondary impacts** can occur later in time or at a different place from the causal activity, or because of a complex pathway. For example, restricted access to a cultural heritage resource resulting in the gradual erosion of its CS that may be dependent on ritual patterns of access. Although the physical fabric of the cultural heritage resource is not affected through any primary impact, its CS is affected, which can ultimately result in the loss of the resource itself; and
- **Cumulative impacts** result from in-combination effects on cultural 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 total number of development activities that will occur within the study area;
  - **Synergistic:** effects interact to produce a total effect greater than the sum of the individual effects, e.g. the effect of each different activity on the archaeological landscape in the study area;
  - **Time crowding:** frequent, repetitive impacts on a cultural heritage resource at the same time, e.g. the effect of regular blasting activities on a nearby rock art site or protected historical building;
  - **Neutralizing:** where the effects may counteract each other to reduce the overall effect, e.g. the effect of changes in land use could reduce the overall impact on sites within the archaeological landscape of the study area; and/or

- **Space crowding:** high spatial density of impacts on a cultural heritage resource, e.g. density of new buildings resulting in suburbanisation of a historical rural landscape.

The fact that cultural heritage resources do not exist in isolation from the wider natural, social, cultural and heritage landscape demonstrates the relevance of the above distinctions: CS is therefore also linked to rarity / uniqueness, physical integrity and importance to diverse communities.

### 3.2 Impact Assessment

The impact assessment process is designed to provide a numerical rating of the identified potential impacts. This methodology follows the established impact assessment formula:

*Impact = consequence of an event x probability of the event occurring*

*where:*

*Consequence = type of impact x (Duration + Extent + Intensity)*

*and*

*Probability = Likelihood of an impact occurring*

*In the formula for calculating consequence:*

*Type of impact = +1 (positive) or -1 (negative)*

Table 3-1 presents a description of the duration, extent, intensity and probability ratings. The intensity rating definitions consider the determined CS of the identified cultural heritage resources. These criteria are used to determine the impact ratings as defined in Table 3-2 below. Table 3-3 represents the relationship between consequence, probability and significance.

The impact assessment process considers pre- and post-mitigation scenarios with the intention of managing and/or mitigating impacts in line with the EIA Mitigation Hierarchy, i.e. avoiding all impacts on cultural heritage resources. Where Project-related mitigation does not avoid or sufficiently minimise negative impacts on cultural heritage resources, mitigation of these resources may be required.

Table 3-1: Description of Duration, Extent, Intensity and Probability Ratings Used in the Impact Assessment

Value	CONSEQUENCE						PROBABILITY RATING - A measure of the chance that consequences of that selected level of severity could occur during the exposure window.	
	DURATION RATING - A measure of the lifespan of the impact		EXTENT RATING A measure of how wide the impact would occur		INTENSITY RATING- A measure of the degree of harm, injury or loss.		Probability	Description
	Probability	Description	Exposure	Description	Intensity	Description		
7	<b>Permanent</b>	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)	<b>International</b>	Impacts on heritage resources will have international repercussions, issues or effects, i.e. in context of international cultural significance, legislation, associations, etc.	<b>Extremely high</b>	Major change to Heritage Resource with High-Very High Value	<b>Certain/Definite</b>	Happens frequently. The impact will occur regardless of the implementation of any preventative or corrective actions.
6	<b>Beyond Project Life</b>	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)	<b>National</b>	Impacts on heritage resources will have national repercussions, issues or effects, i.e. in context of national cultural significance, legislation, associations, etc.	<b>Very high</b>	Moderate change to Heritage Resource with High-Very High Value	<b>High probability</b>	Happens often. It is most likely that the impact will occur.
5	<b>Project Life</b>	The impact will cease after project life.	<b>Region</b>	Impacts on heritage resources will have provincial repercussions, issues or effects, i.e. in context of provincial cultural significance, legislation, associations, etc.	<b>High</b>	Minor change to Heritage Resource with High-Very High Value	<b>Likely</b>	Could easily happen. The impact may occur.
4	<b>Long Term</b>	Impact will remain for >50% - Project Life	<b>Municipal area</b>	Impacts on heritage resources will have regional repercussions, issues or effects, i.e. in context of the regional study area.	<b>Moderately high</b>	Major change to Heritage Resource with Medium-Medium High Value	<b>Probable</b>	Could happen. Has occurred here or elsewhere
3	<b>Medium Term</b>	Impact will remain for >10% - 50% of Project Life	<b>Local</b>	Impacts on heritage resources will have local repercussions, issues or effects, i.e. in context of the local study area.	<b>Moderate</b>	Moderate change to Heritage Resource with Medium - Medium High Value	<b>Unlikely / Low probability</b>	Has not happened yet, but could happen once in a lifetime of the project. There is a possibility that the impact will occur.



Value	CONSEQUENCE						PROBABILITY RATING - A measure of the chance that consequences of that selected level of severity could occur during the exposure window.	
	DURATION RATING - A measure of the lifespan of the impact		EXTENT RATING A measure of how wide the impact would occur		INTENSITY RATING- A measure of the degree of harm, injury or loss.		Probability	Description
	Probability	Description	Exposure	Description	Intensity	Description		
2	<b>Short Term</b>	Impact will remain for <10% of Project Life	<b>Limited</b>	Impacts on heritage resources will have site specific repercussions, issues or effects, i.e. in context of the site-specific study area.	<b>Low</b>	Minor change to Heritage Resource with Medium - Medium High Value	<b>Rare / Improbable</b>	Conceivable, but only in extreme circumstances. Have not happened during the lifetime of the project, but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures
1	<b>Transient</b>	Impact may be sporadic/limited duration and can occur at any time. E.g. Only during specific times of operation, and not affecting heritage value.	<b>Very Limited</b>	Impacts on heritage resources will be limited to the identified resource and its immediate surroundings, i.e. in context of the specific heritage site.	<b>Very low</b>	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value	<b>Highly Unlikely /None</b>	Expected never to happen. Impact will not occur.

**Table 3-2: Impact Significance Scores, Descriptions and Ratings**

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the heritage resources.	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the heritage resources.	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the heritage resources.	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the heritage resources.	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the heritage resources.	Minor (negative)
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the heritage resources and result in severe effects.	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	Major (negative)

**Table 3-3 Relationship between Consequence, Probability and Significance**

Relationship between consequence, probability and significance ratings																																							
		Significance																																					
Probability	7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
	6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
	5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
	4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
	3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
	2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
	1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		Consequence																																					

## 4 Recommended Management and Mitigation Measures

The CS of an identified heritage resource informs the level of the identified potential impact to that resource which in turn informs the recommended management and mitigation requirements. Table 4-1 presents an overview of the minimum recommended mitigation requirements considering the CS of the heritage resource.

**Table 4-1: Minimum Recommended Management or Mitigation Requirements Considering CS**

<b>Determined CS</b>	<b>Minimum Management / Mitigation Requirements<sup>4</sup></b>
Negligible	Sufficiently recorded through assessment, no mitigation required
Low	Resource must be recorded before destruction, may include detailed mapping or surface sampling
Medium	Mitigation of the resource to include detailed recording and limited test excavations
Medium-High	Project design must aim to minimise impacts; Mitigation of resources to include extensive sampling through test excavations and analysis
High	Project design must aim to avoid impacts; Cultural heritage resource to be partially conserved, must be managed by way of Conservation Management Plan
Very High	Project design must be amended to avoid all impacts; Cultural heritage resources to be conserved in entirety and conserved and managed by way of Conservation Management Plan

The desired outcome of an impact assessment is the avoidance of all negative impacts and enhancement of positive ones. While this is not always possible, the recommended management or mitigation measures must be reasonable and feasible taking into consideration the determined CS and nature of the Project.

Two categories of impact management options are considered: avoidance and mitigation.

Avoidance requires changes or amendments to Project design, planning and siting of infrastructure to avoid physical impacts on heritage resources. It is the preferred option, especially where cultural heritage resources with high – very-high CS will be impacted.

<sup>4</sup> Based on minimum requirements encapsulated in guidelines developed by SAHRA



Mitigation of cultural heritage resources may be necessary where avoidance is not possible, thus resulting in partial or complete changes (including destruction) to a resource. Such resources need to be protected until they are fully recorded, documented and researched before any negative impact occurs. Options for mitigating a negative impact can include minimization, offsets, and compensation. Examples of mitigation measures specific to cultural heritage include:

- Intensive detailed recording of sites through various non-intrusive techniques to create a documentary record of the site – “preservation by record”; and
- Intrusive recording and sampling such as shovel test pits (STPs) and excavations, relocation (usually burial grounds and graves, but certain types of sites may be relocated), restoration and alteration. Any form of intrusive mitigation is normally a regulated permitted activity for which permits<sup>5</sup> need to be issued by the Heritage Resource Authorities (HRAs). Such mitigation may result in a reassessment of the value of a cultural heritage resource that could require conservation measures to be implemented. Alternatively, an application for a destruction permit may be made if the resource has been sufficiently sampled.

Where resources have negligible CS, the specialist may recommend that no further mitigation is required, and the site may be destroyed where authorised.

Community consultation is an integral activity to all above-mentioned avoidance and mitigation measures.

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<sup>5</sup> Permit application processes must comply with the relevant Section of the NHRA and applicable Chapter(s) of the NHRA Regulations, 2000 (Government Notice Regulation [GN R] 548) and must be issued by SAHRA or the Provincial Heritage Resources Authority (PHRA) as is applicable.