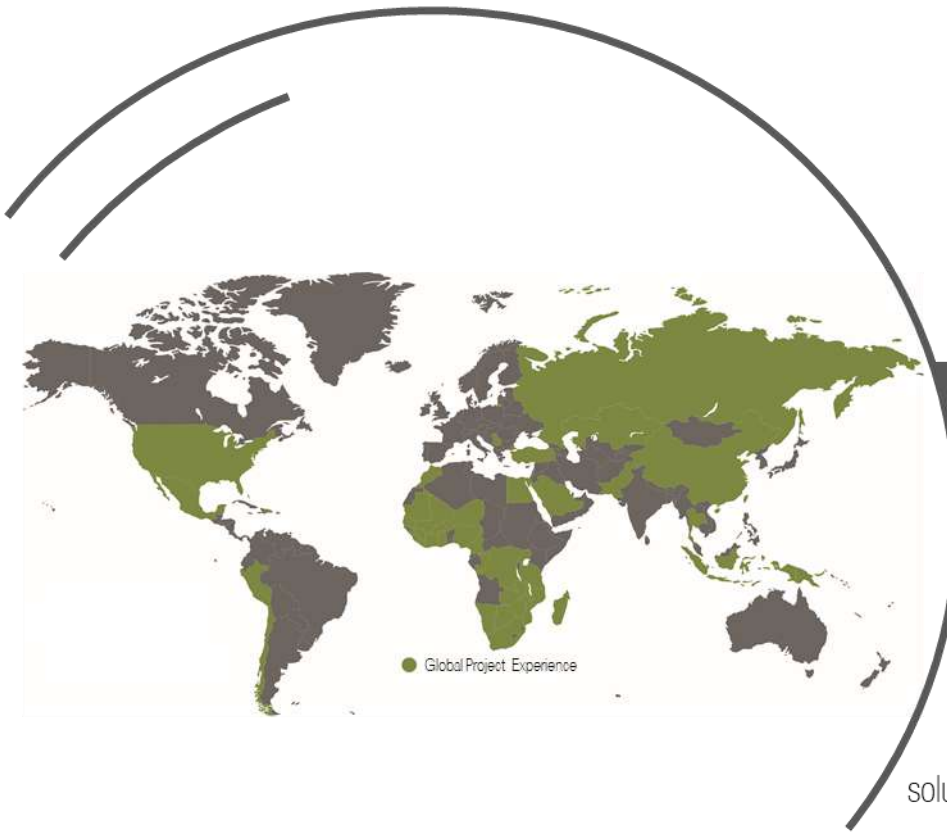




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Exxaro Dorstfontein East Coal Mine Expansion Project near Kriel, Mpumalanga

Heritage Impact Assessment

Prepared for:

Exxaro Coal Central (Pty) Ltd

Project Number:

EXX5725



October 2021



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Report Type:	Heritage Impact Assessment
Project Name:	Exxaro Dorstfontein East Coal Mine Expansion Project near Kriel, Mpumalanga
Project Code:	EXX5725

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

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DETAILS AND DECLARATION OF THE SPECIALIST

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

I, Shannon Hardwick, declare that: –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
 - I declare that there are no circumstances that may compromise my objectivity in performing such work;
 - I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist



Date: October 2021

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

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Any recommendations, statements or conclusions drawn from or based on this report must clearly cite or make reference to this report. Whenever such recommendations, statements or conclusions form part of a main report relating to the current investigation, this report must be included in its entirety.

EXECUTIVE SUMMARY

Exxaro Central Coal (Pty) Ltd (hereinafter ECC) holds an approved Mining Right (MR)¹ for opencast and underground mining at the Dorstfontein East Coal Mine (DCEM) near Kriel in the Mpumalanga Province. ECC intends to extend the existing approved underground mining area associated with the 2 Seam and 4 Seam targets and ECC also intends to construct and operate additional supporting infrastructure (the Project).

ECC further requires an environmental regulatory process comprising an amendment and consolidation of the Environmental Management Programme (EMPr) and Integrated Water Use License (IWUL) for the Project to go ahead. To this effect, ECC appointed Digby Wells Environmental (hereinafter Digby Wells) as the independent Environmental Assessment Practitioner (EAP) to undertake a Scoping and EIA process in support of these processes and in compliance with the relevant legislation.

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

Digby Wells identified two heritage resources within the proposed Project area – one historical structure (HST-001) and one burial ground (BGG-001). The structure is of negligible Cultural Significance and the burial ground is of very high significance. This is summarised in the table below.

Summary of the CS of Identified Heritage Resources

Resource ID	Description	INTEGRITY	Significance
BGG-001	Burial Grounds and Graves	5	Very High
HST-001	Historical werf	3	Negligible

The Project presents risk of direct impact to both heritage resources. Following the SAHRA Minimum Standards, the impacts to HST-001 has not been assessed in detail in this report. This notwithstanding, this structure is afforded General Protection under Section 34 of the NHRA and may not be affected without the applicable permit. The table below summarises the potential impact to BGG-001.

¹ Reference Number MP 30/5/1/2/3/2/1 (51) MR

Summary of the Impact Assessment

Impact	Duration	Extent	Intensity	Consequence	Probability	Significance
Pre-mitigation:						
Direct impact to BGG	Permanent	International	Extremely high - negative	Extremely detrimental	Highly probable	Moderate - negative
Post-mitigation:						
Direct impact to BGG	Beyond project life	Very Limited	High - positive	Moderately beneficial	Highly probable	Minor - positive

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

Summary of the potential risk to heritage resources

Unplanned event	Potential impact
Accidental exposure of fossil bearing material implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 35 of the NHRA.
Accidental exposure of <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.	

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

- ECC must avoid impacts to BGG-001 through an amendment of the proposed underground expansion area to implement a 100 m no-go buffer zone around the heritage resource;
- ECC must develop and implement an HSMP to conserve BGG-001 *in situ*. Where ECC have developed such a management plan, this must be updated to include BGG-001;

- Where Project design amendments are not feasible, ECC will need to embark on a consultation process to assess whether a GRP is feasible;
- ECC must obtain a destruction permit in terms of Section 34 of the NHRA to demolish HST-001 prior to the commencement of the Project; and
- To mitigate against potential direct impacts against previously unidentified heritage resources and where ECC has not done so already, ECC must develop and implement a CFP prior to the commencement of Project activities. This CFP must be approved by the HRAs prior to implementation.

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



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ACRONYMS, ABBREVIATIONS AND DEFINITIONS

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

Abbreviation	Meaning
Kya	Thousand years ago
LED	Local Economic Development
LFC	Late Farming Community also known as Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MPHRA	Mpumalanga Provincial Heritage Resources Authority
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MR	Mining Right (boundary)
MRA	Mining Right Application
MSA	Middle Stone Age
MSc	Master of Science
Mtpa	Million tonnes per annum
Mya	Million years ago
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID	Notification of Intent to Develop
PCD	Pollution Control Dam
PHRA	Provincial Heritage Resources Authority
RoD	Record of Decision
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SCF	Statutory Comment Feedback
SEP	Stakeholder Engagement Process
SoW	Scope of Work
ToR	Terms of Reference
Wits	University of the Witwatersrand
Werf	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)	-	1.11.2
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 15
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment.	1(d)	-	5.5
Provides the baseline cultural landscape.	-	38(3)(a)	6.1
Motivates for the defined CS of the identified heritage resources and landscape.	-	38(3)(b)	7.1
A description of the potential impacts to heritage resources by project related activities, including: <ul style="list-style-type: none"> - Existing impacts on the site; - Possible risks to heritage resources; - Cumulative impacts of the proposed development; - Acceptable levels of change; and - Heritage-related risks to the project. 	1(cB)	38(3)(c)-	7
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities.	1(j)	38(3)(c)	
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives.	1(f)	-	7 Plan 4

Description	App. 6	NHRA	Section
Considers the development context to assess the socio-economic benefits of the project in relation to the presented impacts and risks.	-	38(3)(d)	6.3 13
A description of any consultation process that was undertaken during the course of preparing the specialist report and the results of such consultation.	1(o)	38(3)(e)	10
A summary and copies of any comments received during any consultation process and where applicable all responses thereto.	1(p)	38(3)(e)	
Details the specific recommendations based on the contents of the HIA.	-	38(3)(g)	11
An identification of any areas to be avoided, including buffers.	1(g)		8
Any mitigation measures for inclusion in the Environmental Management Programme (EMPr)	1(k)		11
Any conditions for inclusion in the environmental authorisation.	1(l)		9
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)	14
Lists the source material used in the development of the report.	1(cA)	-	15
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	1(h)	-	Plan 4
Any other information requested by the competent authority.	1(q)	-	N/A

1. Introduction

Exxaro Central Coal (Pty) Ltd (hereinafter ECC) holds an approved Mining Right (MR)² for opencast and underground mining at the Dorstfontein East Coal Mine (DCEM), near Kriel in the Mpumalanga Province. ECC intends to extend the existing approved underground mining area associated with the 2 Seam and 4 Seam targets. ECC further intends to construct and operate additional supporting infrastructure (the Project). The supporting infrastructure is described in Section 2.1.

ECC requires an environmental regulatory process comprising an amendment and consolidation of the Environmental Management Programme (EMPr) and Integrated Water Use License (IWUL) for the Project to go ahead. The proposed infrastructure triggers Listed Activities in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R 982 of 4 December 2014 as amended by GN R 326 of 7 April 2017) (EIA Regulations, 2014) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

To this effect, ECC appointed Digby Wells Environmental (hereinafter Digby Wells) as the independent Environmental Assessment Practitioner (EAP) to undertake a Scoping and EIA process in support of these processes. The application for Environmental Authorisation (EA) additionally complied with the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) and the National Water Act, 1998 (Act No. 36 of 1998) (NWA).

The EIA process includes a specialist Heritage Resources Management (HRM) process in compliance with the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). This document comprises the specialist Heritage Impact Assessment (HIA) report in support of the EIA process for submission to the Heritage Resources Authorities (HRAs). In this case, the applicable HRAs include the South African Heritage Resources Agency (SAHRA) and the Mpumalanga Provincial Heritage Resources Authority (MPHRA).

1.1. Terms of Reference

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

1.2. Scope of Work

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

- Description of the predominant cultural landscape supported through primary and secondary data collection;

² Reference Number MP 30/5/1/2/3/2/1 (51) MR

- 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 (as well as the EIA report and supporting specialist reports) to the HRAs for Statutory Comment as required under Section 38(8) of the NHRA.

1.3. Expertise of the Specialist

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

Table 1-1: Expertise of the Specialists

Team Member	Bio Sketch
<p>Shannon Hardwick</p> <p>ASAPA Member: 451</p> <p>ICOMOS Member 38048</p> <p>Years' Experience: 4</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>.</p> <p>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. Shannon's experience in the field includes pre-disturbance surveys in South Africa, Malawi and the Democratic Republic of the Congo and other fieldwork in Malawi.</p>

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

2. Project Description

The DECM comprises portions of the farms³ Bosch Krans 53 IS, Dorstfontein 71 IS, Fentonia 54 IS and Welstand 55 IS covering 3288,53 ha. These farms are located approximately 16 km northeast of Kriel within the Emalahleni Local Municipality (ELM) and Goven Mbeki Local Municipality (GMLM). These local municipalities are located within the Gert Sibande District Municipality (GSDM) and Nkangala District Municipality (NDM) of the Mpumalanga Province. Plan 1 presents the regional setting within which the Project is located.

DECM was previously owned by Total Coal South Africa (Pty) Ltd (hereinafter Total) and was ceded to ECC on 20 August 2015. The operation has an approved EIA and EMP⁴ and ECC has approval to mine Lower 2 Seam, Lower 4 Seam and three open pits.

DECM is in possession of the following environmental-related authorisations opencast and underground mining related activities:

- EMP^r in terms of the MPRDA, dated 2009;
- EA for Listed Activities associated with the Pit 1 Extension and Water Transportation Pipeline Project dated 2017 (Reference no. MP 30/5/1/2/3/2/1 (51) (EM)) issued by the Mpumalanga Department of Mineral Resources;

³ Refer to the Notification of Intent to Develop (NID) or the Draft EIA Report for a full list of these farm portions.

⁴ Dated 2017, these documents were compiled by SRK Consulting (Pty) Ltd.

- EA for the construction of a conveyor and railway loop (Reference no. 17/2/2/2 NK-7) issued on 9 November 2009 by the Mpumalanga Department of Agriculture and Land Management;
- EA for Listed Activities in terms of the NEMA associated with diesel storage tanks (EA Reference no. 17/2/3 N-19) issued on 19 May 2011 by the Mpumalanga Department of Economic Development, Environment and Tourism; and
- Integrated Water Use Licence (IWUL) for the water use related activities in terms of the NWA dated September 2019 (Licence no. 06/B11B/ACIJ/9138).

As part of the Project, Digby Wells will align the following EMPs into one operational EMP for the DECM operations:

- EMP for Mining Right [Ref. No. MP 30/5/1/2/2/51MR] (April 2008);
- EMP Amendment for Mining Right [Ref. No. MP 30/5/1/2/2/51MR] (August 2009); and
- EIA/EMP for the Dorstfontein East Mine Extension of Pit 1 and Water Transportation Pipeline from Dorstfontein West to Dorstfontein East (SRK, October 2017).

ECC further intends to expand the mining operation through the expansion of the underground areas and establishment of additional surface infrastructure. The infrastructure and activities associated with this component of the Project are described in further detail below.

2.1. Proposed Infrastructure and Activities

ECC proposes to expand the approved underground mining areas to mine additional reserves within the 2 Seam and 4 Seam. Exploiting these reserves will extend the Life of Mine (LoM) for an additional 14 years.

ECC proposes to establish and operate the following surface infrastructure to support the extension:

- Portal ventilation fan;
- Sewage Treatment Plant (STP);
- Water Treatment Plant (WTP);
- Potable Water storage tank;
- Erikson Pond;
- A new 22 kV overhead powerline from the existing substation to a new 22 kV substation;
- Run of Mine (ROM) Stockpile conveyor at portal;
- Change house;
- Lamp room;
- Office;

- Clinic;
- Stores;
- Workshop area;
- Stone dust silo; and
- Coal discard processing plant.

Plan 2 presents the proposed Project layout design, including the proposed surface infrastructure and underground extension areas.














Table 2-1: Project Phases and Associated Activities

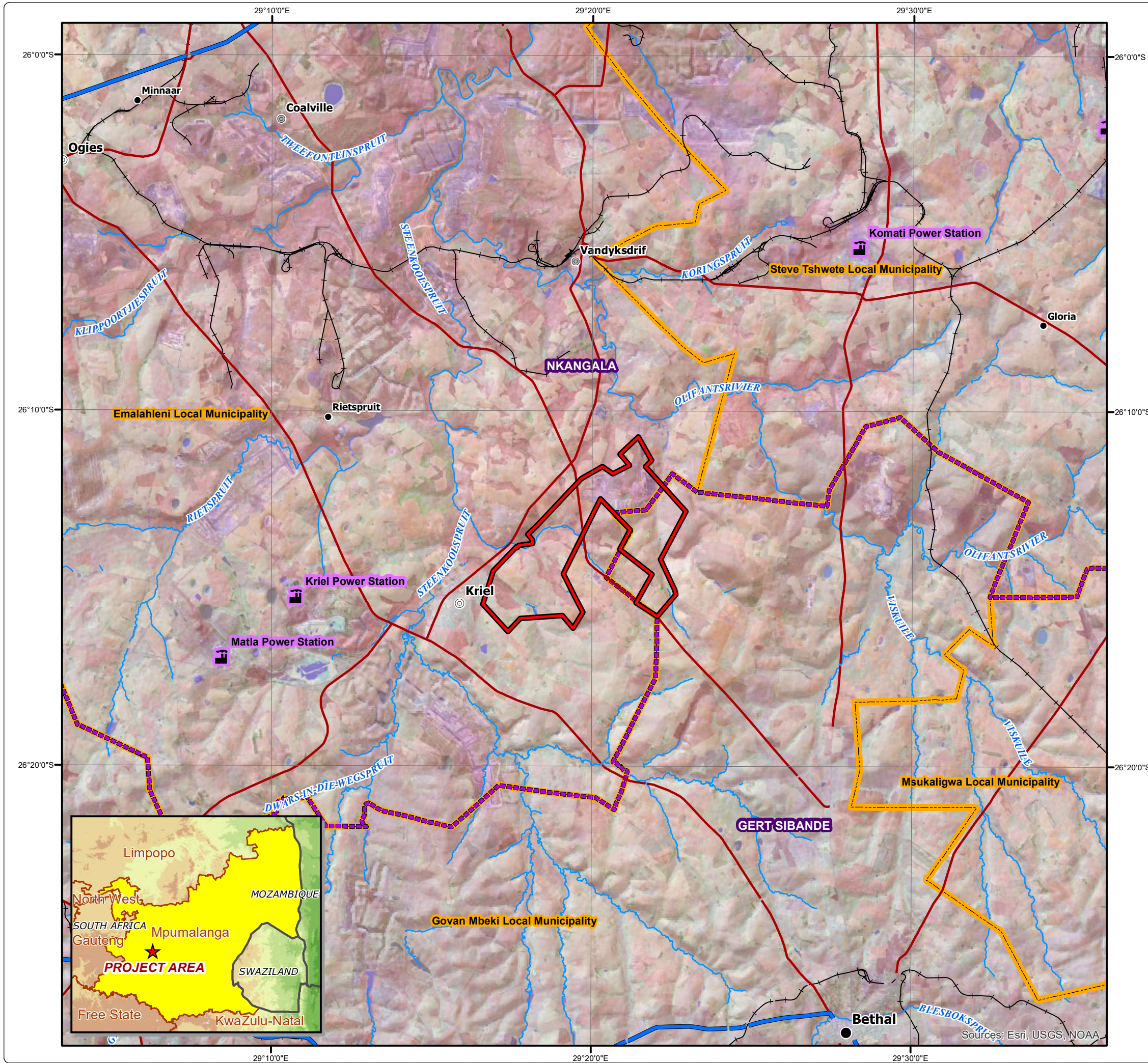
Project Phase	Activities
Construction Phase	In-pit ROM stockpiling.
Operational Phase	Blasting (when geological features are encountered).
	In-pit ROM Stockpiling.
	Transportation of coal from pit for further processing.
	Underground Mining Machinery Maintenance.
	Operation of water and sewer reticulation.
	Use of existing haul roads.
Decommissioning Phase	Demolition and removal of infrastructure (in preparation for final land rehabilitation, once mining activities have been concluded).
	Rehabilitation (including but not limited to the spreading of the preserved subsoil and topsoil, profiling of the land and re-vegetation).
	Post-closure monitoring and rehabilitation.


Dorstfontein East

Regional Setting

Legend

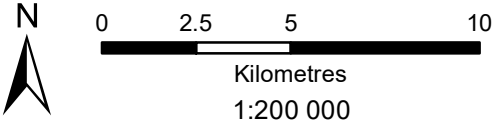
-  Mining Right
 -  Power Station
 -  City
 -  Major Town
 -  Secondary Town
 -  Other Town
 -  Settlement
- Road Network**
-  National Route
 -  Main Road
 -  Railway Line
- Rivers and Streams**
-  Perennial River/Stream
 -  District Municipalities (2016)
 -  Local Municipalities Boundary (2016)




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Projection: Transverse Mercator	Ref #: ajm.EXX5725.202001.117
Datum: WGS 1984	Revision Number: 1
Central Meridian: 29°E	Date: 31/01/2020



N
0 2.5 5 10
Kilometres
1:200 000

Sources: Esri, USGS, NOAA
www.digbywells.com © Digby Wells Environmental

Dorstfontein East

Infrastructure Layout

Legend

- Mining Right Area
- Seam 2 Extension Areas
- Seam 4 Extension Areas

Rivers and Streams

- Non-Perennial
- Perennial

Road Network

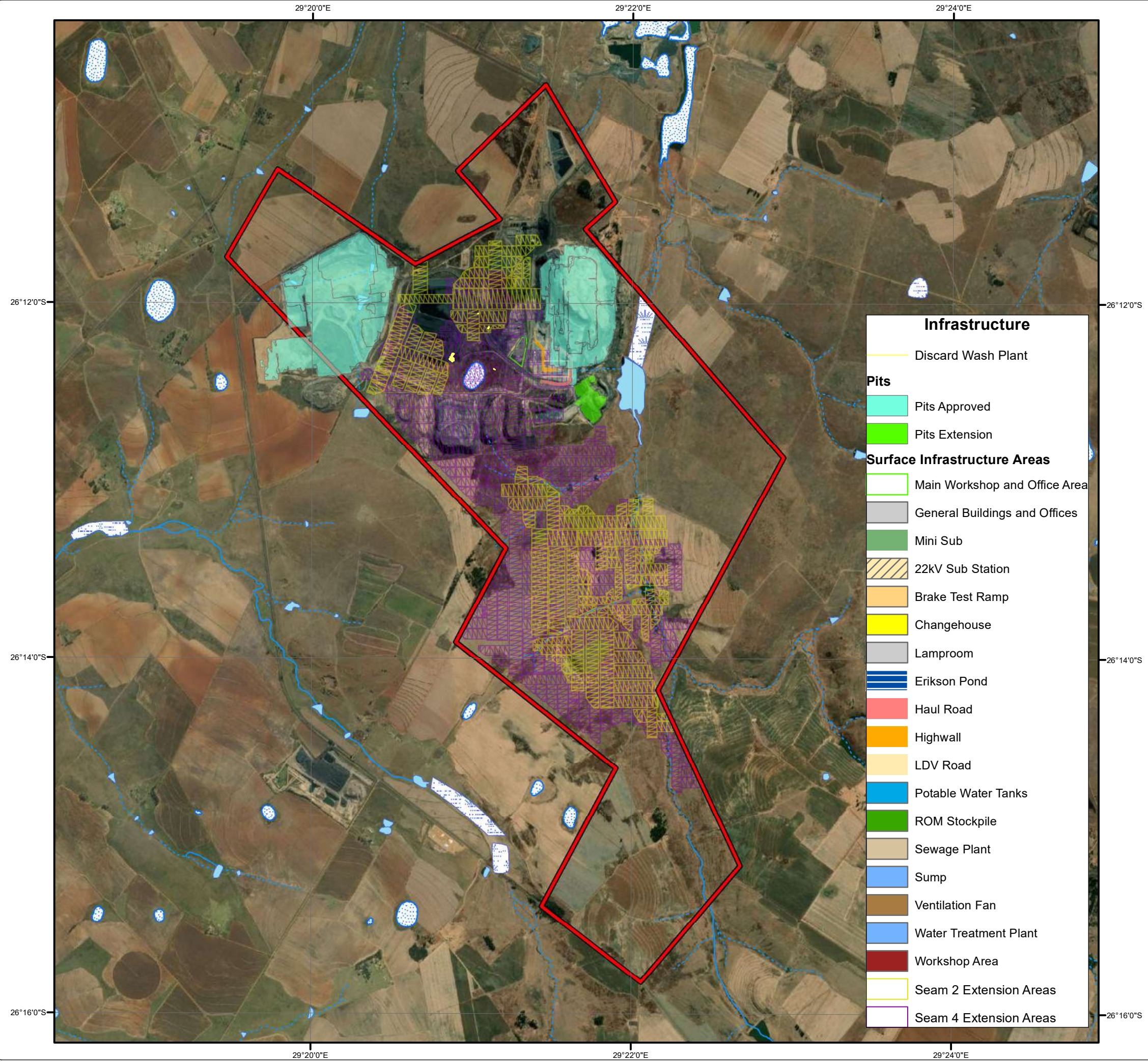
- National Route
- Main Road
- Secondary Road
- Street

Inland Water

- Dams and lakes
- Dry pans
- Reservoirs and water tanks
- Marsh and swamps
- Non-perennial pans

Infrastructure

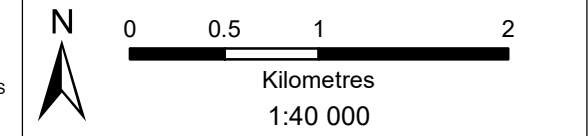
- Discard Wash Plant
- ### Pits
- Pits Approved
 - Pits Extension
- ### Surface Infrastructure Areas
- Main Workshop and Office Area
 - General Buildings and Offices
 - Mini Sub
 - 22kV Sub Station
 - Brake Test Ramp
 - Changehouse
 - Lamproom
 - Erikson Pond
 - Haul Road
 - Highwall
 - LDV Road
 - Potable Water Tanks
 - ROM Stockpile
 - Sewage Plant
 - Sump
 - Ventilation Fan
 - Water Treatment Plant
 - Workshop Area
 - Seam 2 Extension Areas
 - Seam 4 Extension Areas



DIGBY WELLS
ENVIRONMENTAL

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

Projection: Transverse Mercator Ref #: ajm.EXX5725.202001.118
 Datum: WGS 1984 Revision Number: 1
 Central Meridian: 29°E Date: 31/01/2020



2.2. Alternatives Considered

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

Table 2-2: Project Alternatives considered in this Assessment

Alternative	Description	Consequence for HRM Process
Mining Method Alternatives	Various opencast and underground mining methods were considered for the operation of the mine. Due to the sensitivity of the wetlands present on the surface, underground mining is the preferred option.	Opencast mining and underground methods pose different risks and direct impacts to heritage resources, as do different underground extraction methodologies (e.g., bord and pillar or high extraction). This report only considers impacts associated with underground mining.
'No-go' Alternative	Should the Project not obtain approval, or not go ahead for any reason, the potential negative environmental and social (including heritage) impacts associated with the development of the proposed Project would not occur. However, the potential socioeconomic benefits associated with the Project (described in Section 13) would also not occur.	The no-go alternative has been considered in this assessment.

3. Relevant Legislation, Standards and Guidelines

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

3.1. National Legislation and Policy

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

Table 3-2 below presents the applicable policies considered in the HRM process.

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

Applicable legislation used to compile the report	Reference where applied
<p><u>Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</u></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"> i. Prevent pollution and ecological degradation; ii. Promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development 	<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>
<p><u>National Environmental Management Act, 1998 (Act No. 107 of 1998)</u></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 24 of NEMA as well as with the EIA Regulations 2014 (as amended), promulgated in terms of NEMA.</p>

Applicable legislation used to compile the report	Reference where applied
<p><u>GN R. 982: Environmental Impact Assessment Regulations, 2014 (as amended by GN R 326 of 7 April 2017)</u></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"> • Regulation GN R. 983 (as amended by GN R 327) - Listing Notice 1: This listing notice provides a list of various activities which require environmental authorisation and which must follow a basic assessment process. • Regulation GN R. 984 (as amended by GN R 325) – Listing Notice 2: This listing notice provides a list of various activities which require environmental authorisation and which must follow an environmental impact assessment process. • 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. 	<p>Refer to 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 the EA application. This HIA report was completed to inform the EIA process to comply with Section 24 of the NEMA.</p>
<p><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></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"> • 5. General principles for HRM • 6. Principles for management of heritage resources • 7. Heritage assessment criteria and grading • 38. Heritage resources management <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</p>	<p>The HIA report was compiled to comply with Section 5, 38(3), (4) and (8) of the NHRA. This report was submitted to the responsible HRAs, which in this instance is SAHRA and MPHRA.</p>

Applicable legislation used to compile the report	Reference where applied
<p>assessments of impacts on heritage resources are required by other legislation in terms of Section 38(8) of the Act.</p>	
<p><u>NHRA Regulations, 2000 (GN R 548)</u></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"> • II. Permit Applications and General Provisions for Permits; • III: Application for Permit: National Heritage Site, Provincial Heritage Site, Provisionally Protected Place or Structure older than 60 years; • IV: Application for Permit: Archaeological or Palaeontological or Meteorite; • IX: Application for Permit: Burial Grounds and Graves; • X: Procedure for Consultation regarding Protected Area; • XI: Procedure for Consultation regarding Burial Grounds and Graves; and • XII: Discovery of Previously Unknown Graves. 	<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><u>SAHRA Archaeology, Palaeontology and Meteorites (APM) Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports (2007)</u></p> <p>The guidelines provide the minimum standards that must be adhered to for the compilation of a HIA (2007). Chapter II Section 7 outlines the minimum requirements for inclusion in the heritage assessment as follows:</p> <ul style="list-style-type: none"> • Background information on the Project; • Background information on the cultural baseline; 	<p>The HIA report was compiled to adhere to the minimum standards as defined by Chapter II of the SAHRA Minimum Standards (2007).</p>

Applicable policies used to compile the report	Reference where applied
<ul style="list-style-type: none"> • Description of the properties or affected environs; • Description of identified sites or resources; • Recommended field rating of the identified sites to comply with Section 38 of the NHRA; • A statement of Cultural Significance in terms of Section 3(3) of the NHRA; and • Recommendations for mitigation or management of identified heritage resources. 	

3.2. Regional Regulatory Context

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

4. Assumptions, Limitations and Exclusions

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

Table 4-1: Constraints and Limitations

Description	Consequence
<p>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.</p>	<p>The cultural heritage baseline presented in Section 6.1 below is considered accurate, but may not include new data or information which may not have been made available to the public.</p>
<p>The pre-disturbance survey focused on the proposed infrastructure footprint area and did not re-assess heritage resources identified to date through any other assessments undertaken to inform the current authorisations.</p>	<p>It is assumed the previously recorded heritage resources are accurate and true. It is also assumed that the <i>status quo</i> and the condition of these heritage resources has remained unchanged since their identification.</p> <p>Previously unidentified heritage resources may be encountered. Should this occur, ECC must alert the HRAs of the find and may need to enlist the services of a suitably qualified archaeologist to advise them on the way forward.</p>

Description	Consequence
<p>At the time of the pre-disturbance survey, access was not possible for the entire proposed expansion area, as mining-related activities were ongoing above ground and this area was unsafe to access and survey,</p>	<p>Operational areas were not surveyed during this HRM process. Digby Wells assumes this area was considered during previous assessments and all necessary mitigation measures were implemented prior to the commencement of mining activities.</p> <p>Previously unidentified heritage resources may be encountered. Should this occur, ECC must alert the HRAs of the find and may need to enlist the services of a suitably qualified archaeologist to advise them on the way forward.</p>
<p>Whilst every attempt was made to survey the extent of the site-specific study area⁵ (considering the points above), this report does not present an exhaustive list of identified heritage resources. Overgrown vegetation limited visibility at the time of the pre-disturbance survey.</p>	<p>Previously unidentified heritage resources may be encountered. Should this occur, ECC must alert the HRAs of the find and may need to enlist the services of a suitably qualified archaeologist to advise them on the way forward.</p>
<p>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.</p>	<p>The reviewed literature, previously completed heritage assessments and the results of the field survey are themselves limited to surface observations.</p> <p>Subsurface tangible heritage may be exposed during Project activities. Should this occur, ECC 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.</p>

5. Methodology

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

⁵ Refer to Section 5.1 for a description of the study area.

5.1. Defining the Study Areas

Heritage resources do not exist in isolation to the greater natural and social⁶ environment. To develop an applicable cultural baseline for the Project, Digby Wells defined three nested study areas to be considered. These include:

- The *site-specific* study area: the farm portions extent associated with the proposed Project, including a 500 m buffer area;
- 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 two local municipalities: Emalahleni Local Municipality (ELM) and Goven Mbeki Local Municipality (GMLM); and
- The *regional* study area: the area bounded by the district municipality demarcation. In this case, the Project is located in two district municipalities: the Gert Sibande District Municipality (GSDM) and Nkangala District Municipality (NDM). Where necessary, the regional study area may be extended outside the boundaries of the district municipality to include areas closest to the Project area. The aim of this is to include much wider expressions of specific types of heritage resources and historical events. The regional study area also provides the regional development and planning context that may contribute to cumulative impacts.

5.2. Statement of Significance

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

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.

⁶ The social environment consists of socio-economic, socio-political and socio-cultural aspects.

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). Table 5-1 presents a summary of these categories.

Table 5-1: Impact Definition

Category	Description
Direct Impact	Affect the fabric or physical integrity of the heritage resource, for example destruction of an archaeological site or historical building. Direct impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense, but can often be erroneously assessed as high-ranking.
Indirect Impact	Occur later in time or at a different place from the causal activity, or as a result of a complex pathway. For example, restricted access to a heritage resource resulting in the gradual erosion of its 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	<p>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:</p> <ul style="list-style-type: none"> ● Additive: the simple sum of all the effects, e.g., the reclamation of a historical Tailings Storage Facilities (TSFs) will minimise the sense of the historic mining landscape. ● Synergistic: effects interact to produce a total effect greater than the sum of the individual effects, e.g., the removal of all historical TSFs will sterilise the historic mining landscape. ● Time crowding: frequent, repetitive impacts on a particular resource at the same time, e.g. the effect of regular blasting activities on a nearby rock art site or protected historical building could be high. ● Neutralizing: where the effects may counteract each other to reduce the overall effect, e.g., the effect of changes from a historic to modern mining landscape could reduce the overall impact on the sense-of-place of the study area. ● Space crowding: high spatial density of impacts on a heritage resource, e.g., density of new buildings resulting in suburbanisation of a historical rural landscape.

5.4. Secondary Data Collection

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

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

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

Repositories that were surveyed included the South African Heritage Resources Information System (SAHRIS), online/electronic journals and platforms and select internet sources. This 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 15 for more detailed references).

Table 5-2: Qualitative Data Sources

Reviewed Qualitative Data		
Databases		
Genealogical Society of South Africa (GSSA) database (2011)	SAHRIS Palaeosensitivity Map (PSM)	
Statistics South Africa (2011)	Wazimap (2017)	
SAHRIS Cases		
Map ID: 710	Case ID: 479	Case ID: 5817
Case ID: 174	Case ID: 2077	Case ID: 9599
Cited Text		
Behrens & Swanepoel, 2008	Brodie, 2008	Clark, 1982
Deacon & Deacon, 1999	Delius & Cope, 2007	Delius, et al., 2014
Esterhuysen & Smith, 2007	Higgitt & Nel, 2012	Landau, 2010
Maggs, 1976	Makhura, 2007	Mitchell, 2002
Mucina & Rutherford, 2010	Pakenham, 1979	Swanepoel, et al., 2008
VKLM, 2020	Voortrekkers, 2014	Wessels, 2010
Willsworth, 2006	Winter & Baumann, 2005	von der Heyde, 2013

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

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

Table 5-3 presents the sources of historical imagery.

Table 5-3: Aerial imagery considered

Aerial photographs						
Job no.	Flight plan	Photo no.	Map ref.	Area	Date	Ref.
201	201, strip 2	03506	2629	Kinross / Trichardt	1955	National Geographical Institute
		03507				

5.5. Primary Data Collection

Shannon Hardwick undertook a pre-disturbance survey of the Project area between 26 and 27 August 2019. The survey was a combination of a vehicular and pedestrian survey, which was adapted to the terrain and the likelihood of heritage resources occurring in the area. The 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. 11829/BGG-001). The site name may be shortened on plans or figures to the period/feature code and site number (e.g. BGG-001). Table 5-4 presents a list of the relevant period and feature codes.

Table 5-4: Relevant Feature and Period Codes

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

Heritage resources identified through secondary data collection 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., 102/Site 1).

6. Findings and Discussion

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

6.1. Cultural Heritage Baseline Description

The Mpumalanga Province is underlain by valuable geological formations, both in terms of mineral and fossil wealth. The greater study area forms part of the Highveld Coalfield, which extends approximately 7 000 km² (Johnson, et al., 2006). The regional and local study areas are predominantly underlain by the Main Karoo Basin, which is made of the lithostratigraphic units associated with the Karoo Supergroup. The Bushveld Complex and the Transvaal Supergroup occur within the greater study area. These geological features are represented by the Rooiberg Group and the Lebowa Granite Suite respectively.



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

Eon	Era	Period	Mya	Lithographic Units			Significance	Fossils
				Supergroup	Group	Formation		
Phanerozoic	Mesozoic	Jurassic	145			Karoo dolerites	Negligible	None
			200					
	Palaeozoic	Permian	300	Karoo Supergroup	Ecca Group	Volksrust	High	The Volksrust Formation comprises of trace fossils, rare temnospondyl amphibian remains, invertebrates (bivalves, insects), minor coals with plant remains, petrified wood, organic microfossils (acritarchs), and low-diversity marine to non-marine trace fossil assemblages.
Vryheid						Very-high	Abundant plant fossils of Glossopteris and other plants. Trace fossils. The reptile Mesosaurus has been found in the southern part of the Karoo Basin. Rich fossil plant assemblages of the Permian Glossopteris Flora (lycopods, rare ferns and horsetails, abundant glossopterids, cordaitaleans, conifers, ginkgoaleans), rare fossil wood, diverse palynomorphs. Abundant, low diversity trace fossils, rare insects, possible conchostracans, non-marine bivalves, fish scales.	
Proterozoic	Vaalian		2050	Bushveld Complex		Lebowa Granite Suite	Negligible	None
			2100					
			2500	Transvaal Supergroup	Rooiberg Group		Low	Fossils within the minor sedimentary units included in the group are unlikely because of the fluvial depositional setting, which has subsequently been metamorphosed. If found, fossils may potentially include stromatolites.

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

Fossils associated with the Transvaal Supergroup include stromatolitic dolomite and thick deposits of stromatolites (Groenewald & Groenewald, 2014). Stromatolites are the ancient predecessors of modern algal mats. Although these fossils have been recorded within other formations of the Transvaal Supergroup, no such fossils have been recorded in the Rooiberg Group. Fossils are unlikely to occur within this group due to its fluvial depositional setting and the subsequent metamorphic processes which have taken place within the layers.

The specialist Palaeontological Impact Assessment (PIA) report will present the site-specific geological context and the associated palaeontological sensitivities in more detail.

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

Table 6-2: Archaeological Periods in Mpumalanga

The Stone Age	Earlier Stone Age (ESA)	2 mya to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era ⁷)
There appears to be a gap in the record in Mpumalanga between approximately 7000 and 2000 BCE.		
Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period⁸	-	1500 CE to 1850 (Behrens & Swanepoel, 2008)

Adapted from Esterhuysen & Smith (2007)

⁷ 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).

⁸ The author acknowledges that in southern Africa, especially in Mpumalanga, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented and is being explored through the 500 year initiative (Swanepoel, et al., 2008).

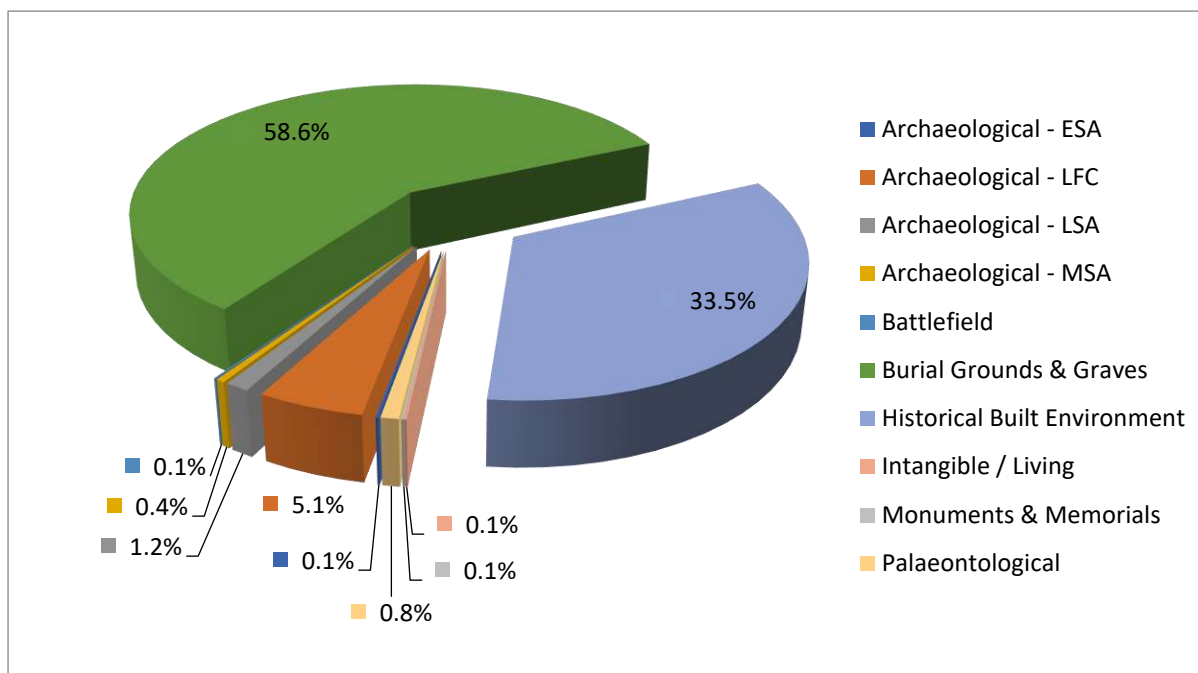


Figure 6-1: Heritage Resources identified within the Regional, Local and Site-specific Study Areas

In total 949 heritage resources were identified within the regional, local and site-specific study areas. The predominant tangible heritage resources recorded in the area under consideration demonstrate affiliations with the historical period, including the historical built environment and burial grounds and graves. This notwithstanding, expressions of the Stone Age, the Farming Community Period, intangible or living heritage, battlegrounds and monuments and memorials have also been recorded in the greater study area.

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. Within the reviewed data, one example of ESA lithics was identified. This represents 0.1% of the data set. The ESA resource comprised a low-density artefact scatter (Huffman, 1999)

The MSA dates between approximately 300 kya and 20 kya. High proportions of minimally-modified blades, created using the Levallois technique, the use of good quality raw material and the use of bone tools, ochre and pendants characterise the early MSA lithic industries (Clark, 1982; Deacon & Deacon, 1999). These tools were made and used by archaic *Homo sapiens*.

The review of available data highlighted very few expressions of MSA (4 records or 0.4% of the total identified heritage resources). The MSA is represented in the regional study area as

an isolated artefact and low-density surface scatters (Fourie, et al., 2000; du Piesanie, et al., 2013; du Piesanie & Nel, 2016a).

The LSA dates from approximately 40 kya to the historical period. LSA lithics are specialised 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.

The review of available data highlighted very few expressions of the LSA (11 records or 1.2% of the total identified heritage resources). Within the regional study area, expressions of the LSA include⁹:

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

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

- Fine line painting associated with autochthonous LSA hunter-gatherer groups. This tradition is the first and oldest tradition and produced using fine brushes, quills or sticks. These images are predominantly painted in red, white and black and, more rarely, in bichrome or polychrome. Images generally include realistic and proportionally correct animals such as various antelope species, human figures and symbolic beings (Eastwood, et al., 2002);
- Finger paintings associated with the later arrival of pastoralists. This tradition was first described by Ben Smith and Sven Ouzman (Smith & Ouzman, 2004) and is typified by finger-painted geometric images. These include circles, finger lines, finger dots and handprints and are mostly created in red pigment. Images are sometimes created in red and white pigments and occasionally only in white. The tradition extends in linear bands following the proposed migration routes of the pastoralists from southern Angola and western Zambia to the southern Cape (Smith & Ouzman, 2004; Eastwood, et al., 2002; Smith & Zubieta, 2007); and
- Finger paintings associated with much later, possibly historic, farming communities. No expressions of this tradition are known to occur within the study area under consideration.

No material associated with the EFC was identified. This period is not considered further in this assessment. The LFC resources accounted for 48 (or 5.1%) of the identified heritage resources in the regional study area. The identified LFC heritage resources include:

⁹ The SAHRIS Case and Map IDs for these reports are listed in **Error! Reference source not found..**

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

The historical period¹⁰ is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is artificial, as there is a large amount of overlap between the two.

Throughout the transitions between the LFC and the historical period (and through the historical period itself), migration, population growth, climatic variation and trade to the east significantly impacted the Pedi, Koni and other groups on the Mpumalanga Highveld. The rise of power blocs, including violent displacement and political centralisation, characterised this time (Makhura, 2007). Within this region, the Pedi developed a system of centralisation where subordinate communities could retain their independence in exchange for tribute in various forms. The Pedi grew to become the strongest power in the north-east, amongst the escalating conflict and intensifying violence (Delius, et al., 2014).

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

European settlers, traders, missionaries and travellers moving into the interior further added to instability and resulting power struggles (Landau, 2010). The Mfecane/Difaqane was characterised by unprecedented (at least within the records of the Europeans travelling within southern Africa) social and political mobilisation and violence across the Highveld as

¹⁰ In southern Africa, especially in Mpumalanga, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented but is being explored through the 500 year initiative (Swanepoel, et al., 2008).

individuals sought personal and food security. The Mpumalanga Highveld was vulnerable to intrusive groups including the Swazi and the *Voortrekkers*.

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

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

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

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

Lieutenant Colonel George Benson's No. 3 Flying Column moved from the farm Syferfontein, marching north-west to the Bakenlaagte farmstead, where they intended to camp. The advance guard reached the farmstead and set up the camp, but by midday, the rear-guard had been hampered by unfavourable weather and were still some distance away from the farm. General Botha of the Boer commando and his 800 reinforcements planned to attack Benson's Column and this division of the force provided the Boers with an advantage. Outnumbered four to one, the Boers decimated the rear-guard in a gun battle that lasted just 20 minutes; but the attack did allow the main column to deploy and set up a defensive perimeter. This perimeter prevented the Boers from capturing the main column as they had envisaged and the Boers left with what spoils they could. The British transported their 134

wounded to the entrenched camp during the night (Pakenham, 1979; Willsworth, 2006; Wessels, 2010; von der Heyde, 2013). British losses included at least 66 dead, 120 were taken prisoner and the loss of two British guns. Boer casualties included at least 52 who were killed or wounded (Wessels, 2010)

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

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

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

- A battlefield (Van Vollenhoven, 2012a; 2014);
- Burial grounds and graves, ranging from single burials to graveyards containing over one hundred individuals; (van Schalkwyk, 1997a; 1997b; 2002a; 2002b; 2003a; 2003b; 2003c; 2003d; 2013; Fourie, et al., 2000; Van Schalkwyk & Moifatswane, 2003; Pistorius, 2004a; 2004b; 2007; 2008; 2011; 2012; 2013; 2014; 2015; 2016; de Jong, 2006; 2007; Fourie, 2007; 2009; Fourie & van der Walt, 2008; Pelser & van Vollenhoven, 2008; Miller, 2010; Birkholtz, 2011; 2013; van Vollenhoven & Pelser, 2011; Van Vollenhoven, 2012a; 2012b; 2015a; 2015b; 2017a; 2017b; Fourie & Hutton, 2012; Fourie, et al., 2012; Magoma, 2013; du Piesanie, et al., 2013; Karodia, et al., 2013; Higgitt, et al., 2013; 2014; Pelser, 2013a; 2013b; Seliane, 2013; Karodia & Nel, 2014; van Vollenhoven & de Bruyn, 2014; van Wyke Rowe, 2014; Coetzee & Behrens 2015; van der Walt, 2015; du Piesanie & Nel, 2016a; du Piesanie & Nel, 2016b; Coetzee & Fivaz, 2017; Hardwick & du Piesanie, 2018; and
- Historical built environment resources, such as structural remains (stonewall structures, homesteads, farmhouses and functional structures) and structural complexes; middens and ash deposits (Huffman & Calabrese, 1996; Van Schalkwyk *et al* 1996; Van Schalkwyk 1997a, 1997b, 2002a, 2002c, 2003d, 2013; Huffman 1999; De Jong 2006, 2007; Pistorius 2007, 2008, 2011, 2012, 2013, 2016; Van der Walt 2007; Pelser & van Vollenhoven 2008; Miller 2010; Fourie 2010, 2012a, 2012b; Van Vollenhoven & Pelser, 2011; Birkholtz, 2013; Digby Wells 2013a, 2013b, 2016a, 2016b; Higgitt 2013, 2014a; Pelser 2013a, 2013b; Seliane, 2013; Karodia, 2014; Van Wyk, 2014; Kruger 2015; van Wyke Rowe, 2014; Coetzee & Behrens 2015; Van Vollenhoven 2015a, 2015b, 2017; Coetzee & Fivaz, 2017; Hardwick & du Piesanie, 2018).


Dorstfontein East

Site Matrix

Legend

- Site Matrix
- Mining Right Area
- Seam 2 Extension Areas
- Seam 4 Extension Areas
- Secondary Town
- Railway Line
- Road Network**
- National Route
- Main Road
- Secondary Road
- Street
- Rivers and Streams**
- Non-Perennial River/Stream
- Perennial River/Stream
- Inland Water**
- Dams and lakes
- Dry pans
- Reservoirs and water tanks
- Marsh and swamps
- Non-perennial pans


- Infrastructure**
- Discard Wash Plant
- Seam 2 Extension Areas
- Seam 4 Extension Areas
- Pits**
- Pits Approved
- Pits Extension
- Surface Infrastructure Areas**
- Main Workshop and Office Area
- General Buildings and Offices
- Mini Sub
- 22kV Sub Station
- Brake Test Ramp
- Changehouse
- Lamproom
- Erikson Pond
- Haul Road
- Highwall
- LDV Road
- Potable Water Tanks
- ROM Stockpile
- Sewage Plant
- Sump
- Ventilation Fan
- Water Treatment Plant
- Workshop Area



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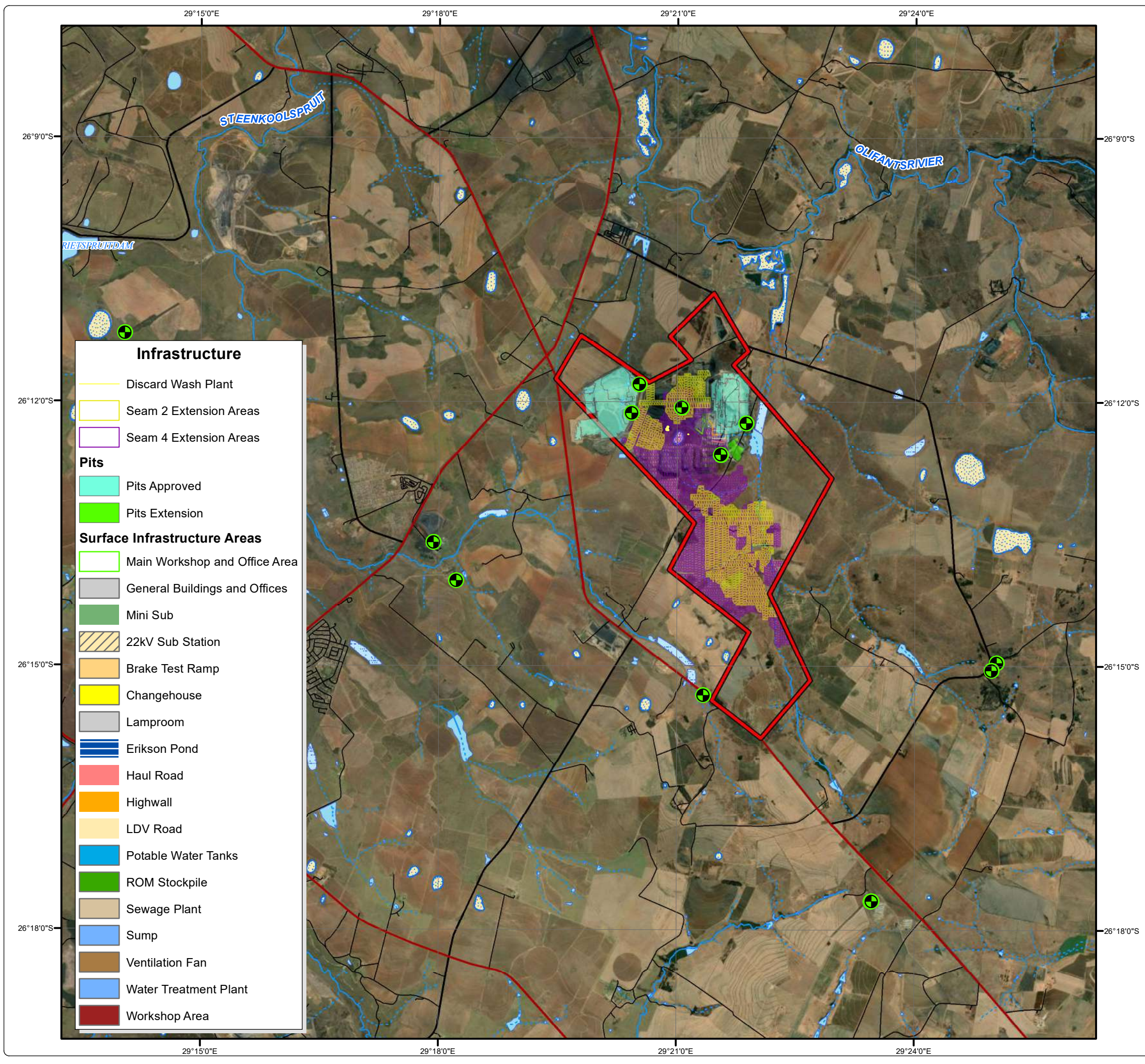
• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator Ref #: ajm.EXX5725.202001.118
 Datum: WGS 1984 Revision Number: 1
 Central Meridian: 29°E Date: 31/01/2020



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6.2. Results from the Pre-disturbance Survey

Shannon Hardwick undertook a pre-disturbance survey of the site-specific study area on 08 and 09 July 2020. This survey focused on areas covered by proposed infrastructure not investigated in the previous surveys and was predominantly pedestrian. The survey was recorded as GPS tracks and identified heritage resources were marked as waypoints. Identified heritage resources were also recorded through written notes and photographs. The GPS data are provided in Plan 4.

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

6.2.1. Existing Environment

The Project area has been disturbed through anthropogenic activity, farming and mining activities. Houses and modern structures, agricultural infrastructure (including cattle kraals, dams and boreholes), electrical infrastructure, and informal/untarred roads have been established within the Project area. Part of the area had recently been burned, which improved visibility. In other areas, the natural grass was overgrown, limiting ground visibility. Some other areas had been disturbed through animal activity. Burrows were inspected for the presence of any archaeological materials.



Figure 6-2: The existing environment at the time of the pre-disturbance survey

6.2.2. Newly-identified Heritage Resources

Table 6-3 includes descriptions of the heritage resources identified during the pre-disturbance and ground-truthing surveys. Figure 6-3 below presents photographs of heritage resources identified during the pre-disturbance survey and conditions at the time of the survey. Plan 4 presents the spatial distribution of these sites and includes the tracks, indicating the areas that were surveyed.

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 6-3: Heritage Resources Identified Through the Pre-Disturbance Survey¹¹

Site Name	Description
BGG-001	Burial ground of approximately 19 graves. These are marked through various dressings, including: cement fittings, brick fittings, possible laterite and stone and soil heaps, with or without headstones. Headstones consist of cement or a single upright stone or brick. Two headstones have legible inscriptions although only one has a legible date (1985). The burial ground had a fence at some time, but this is now in a state of disrepair.
HST-001	Remains of what appears to be a one-roomed structure built on a small platform / raised foundation. The structure has one door and no windows were present. The structure was made of stone and plaster. The structure is surrounded by four small rectangles made of brick – it would appear these are gardens.



Graves at BGG-001



Remains of main structure at HST-001

Figure 6-3: Photographs of select heritage resources identified during the pre-disturbance survey

¹¹ In accordance with SAHRA procedures, the GPS co-ordinates of these heritage resources have not been included in documents available to the public.

6.2.3. Results of the Historical Layering

Figure 6-4 below presents the results of the historical imagery. There is a gap in the historical imagery, as seen in the figure. It appears that this area was never photographed, as the flight plan that should have included the northern portion of the Project area include photographs of the area beyond the Project extent. The age of any structures in this section of the Project area must therefore be verified through other means before they are impacted by the Project.

HST-001 is not visible on the imagery; however, features in this area suggest there is a structure present and HST-001 is therefore assumed to represent the historical built environment. The historical imagery presents a landscape that is a mix of cultivated land and natural flora. Some parts of the Project area include large stands of dense trees. There are several roads within the Project area, some of which are still in use today.

Several additional points of interest have been included in Figure 6-4: Historical imagery showing the Project area in 1955 with points of interest. These represent potential structures or werfs which, if still standing, will be considered built heritage resources. These structures will be afforded general protection under Section 34 of the NHRA. HLP-001 is within the vicinity of the Project but no impacts to this resource are envisaged.

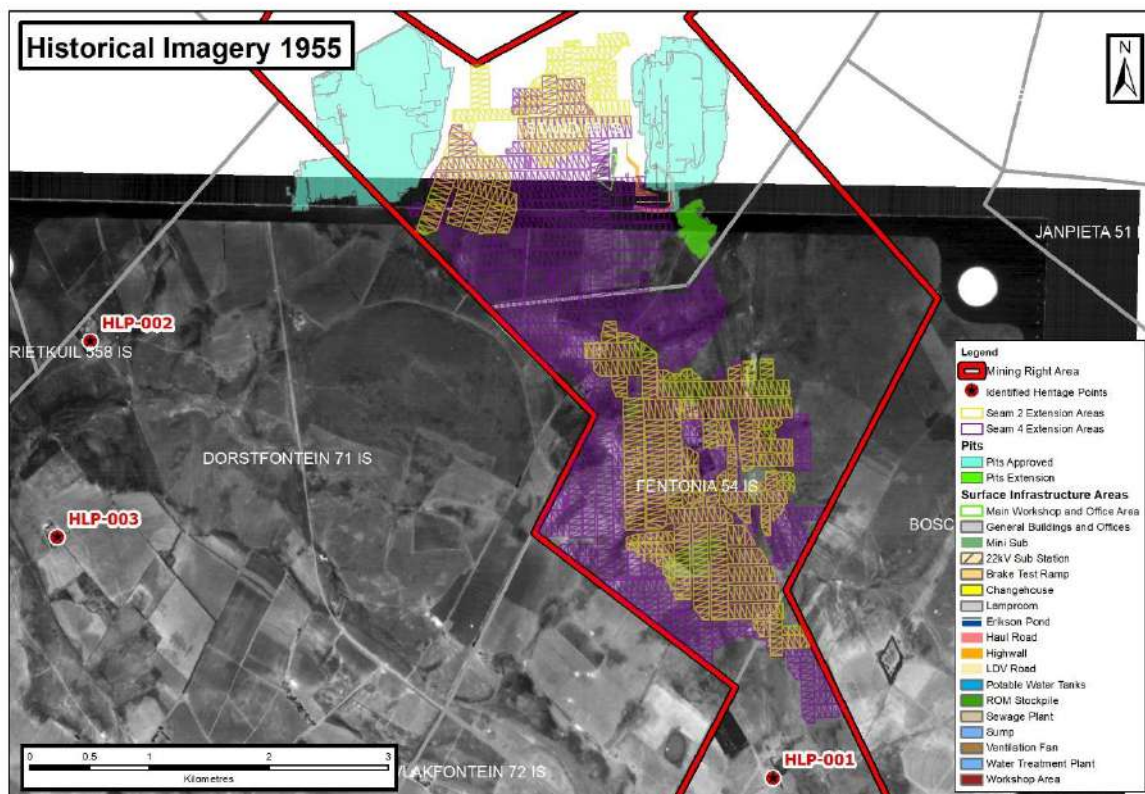


Figure 6-4: Historical imagery showing the Project area in 1955 with points of interest

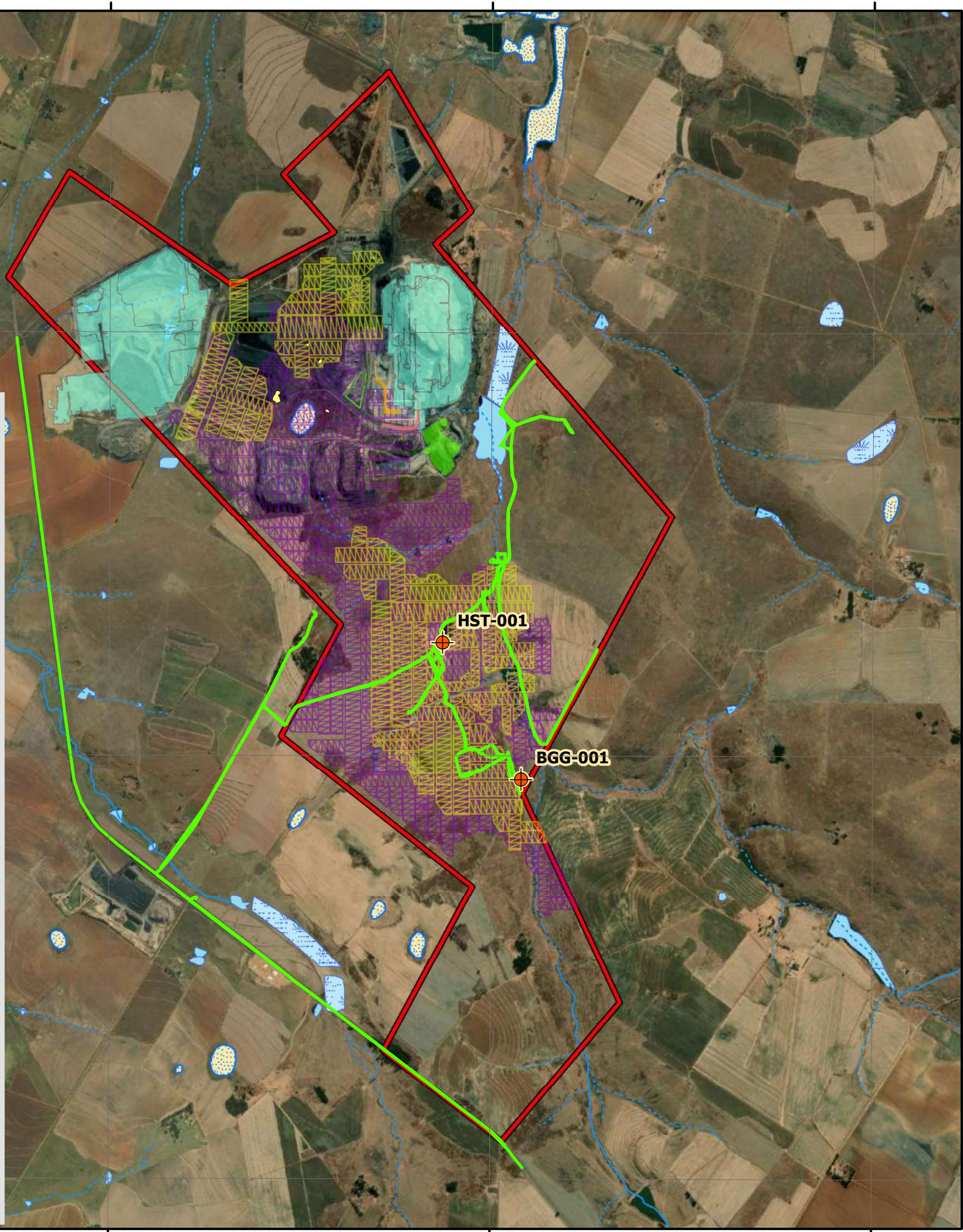
Dorstfontein East

Pre-Disturbance Sites

Legend

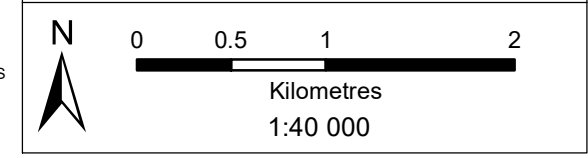
- GPS Points
- Discard Wash Plant
- Mining Right Area
- Railway Line
- Road Network**
 - National Route
 - Main Road
 - Secondary Road
 - Street
- Rivers and Streams**
 - Non-Perennial River/Stream
 - Perennial River/Stream
- Inland Water**
 - Dams and lakes
 - Dry pans
 - Reservoirs and water tanks
 - Marsh and swamps
 - Non-perennial pans

- Infrastructure**
 - Discard Wash Plant
- Pits**
 - Pits Approved
 - Pits Extension
- Surface Infrastructure Areas**
 - Main Workshop and Office Area
 - General Buildings and Offices
 - Mini Sub
 - 22kV Sub Station
 - Brake Test Ramp
 - Changehouse
 - Lamproom
 - Erikson Pond
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 - Highwall
 - LDV Road
 - Potable Water Tanks
 - ROM Stockpile
 - Sewage Plant
 - Sump
 - Ventilation Fan
 - Water Treatment Plant
 - Workshop Area
 - Seam 2 Extension Areas
 - Seam 4 Extension Areas



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

Projection: Transverse Mercator Ref #: ajm.EXX5725.202001.118
 Datum: WGS 1984 Revision Number: 1
 Central Meridian: 29°E Date: 31/01/2020



6.3. Socioeconomic Setting

This section presents a brief summary of the demographic statistics relevant to the potential socio-economic benefit derived from the Project, informed by data collected during the 2011 Census (Statistics South Africa, 2011)¹².

The Project is located within Ward 25 of the ELM and Ward 15 of the GMLM. These local municipalities are located within the NDM and GSDM respectively, both within the Mpumalanga Province.

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

The GSDM is itself divided into seven local municipalities. The GMLM is the largest of these by population, with 294 538 residents. This accounts for 28.2% of the population in the GSDM. GMLM includes 32 wards. The Project area includes portions of Ward 15.

Ward 15 includes a population of 10 334 residents. The ward is almost completely rural, although it includes settlements adjacent to and the outskirts of the town of Bethel (although not including the entire town itself). This ward covers a very large land area and is characterised by agriculture, including cultivation of crops. Mines are present within this ward.

NDM is divided into six local municipalities. Of these, ELM is the largest in terms of population size, including 395 466 people (30.2% of the population in the NDM). ELM includes 34 wards, and the Project area includes parts of Ward 25.

Ward 25 includes a population of 14 938 residents. The boundary of the ward lies adjacent to the extent of the town of Kriel and excludes this town entirely. The ward is predominantly rural, although there are some areas of dense settlement. Ward 25 is characterised by agriculture, including cultivation of crops, as well as mining activities.

Within the regional study area, unemployment is significant. Table 6-4 presents an overview of the employment status of the populations within the regional study area.

¹² Wazimap (2017) has adjusted these data to conform with the updated ward and municipality boundaries which were altered ahead of the 2016 Municipal Elections (Open Up, 2017).

Table 6-4: Employment Status of the Populations within the NDM

Employment Statistics (Census 2011)	Ward 25		ELM		NDM	
	No.	%	No.	%	No.	%
Total Population	14 938	-	395 466	-	1 308 129	-
Working Age (18-64)	9 482	63.5	263 427	66.6	796 693	60.9
Employed	4 805	32.2	138 548	35.0	355 478	27.2
Discouraged Work Seeker	445	3.0	52 114	11.6	42 554	3.3
Unemployed	2 559	17.1	9 612	2.4	152 250	11.6
Other not economically active	2 483	16.6	113 698	28.8	319 641	24.4

Adapted from Wazimap (2017)

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

Employment Statistics (Census 2011)	Ward 15		GMLM		GSDM	
	No.	%	No.	%	No.	%
Total Population	10 334	-	294 538	-	1 043 195	-
Working Age (18-64)	6 353	61.5	189 436	64.3	600 878	57.6
Employed	3 711	35.9	99 138	33.7	259 129	24.8
Discouraged Work Seeker	173	1.7	6 787	2.3	35 518	3.4
Unemployed	761	7.4	35 249	12.0	109 658	10.5
Other not economically active	2 305	22.3	63 301	21.5	262 387	25.2

Adapted from Wazimap (2017)

The largest contributors to the ELM economy are mining, trade and finance which contribute 55%, 9% and 8% to the economy respectively (ELM, 2020). The ELM is the largest contributor to the NDM economy and the second largest contributor to the provincial economy.

7. Impact Assessment

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

7.1. Cultural Significance of the Identified Landscape

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

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

The assessment of the significance and Field Ratings demonstrated that the identified resources have negligible and very high significance. Table 7-1 presents a summary of this assessment. Sites of the same type that share the same significance have been grouped together in terms of the impact assessment (refer to Sections 7.2 to 0 below).

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

Resource ID	Type	Aesthetic	Historic	Scientific	Social	INTEGRITY	Designation	Recommended Field Rating	Field Rating Description	Minimum Required Mitigation ¹³
BGG-001	Burial Grounds & Graves	- Burial grounds and graves were not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA.	- Burial grounds and graves were not assessed against historic criteria as defined in Section 3(3) of the NHRA.	- Burial grounds and graves were not assessed against scientific criteria as defined in Section 3(3) of the NHRA.	5 Burial grounds and graves have specific connections to communities or groups for spiritual reasons. The significance is universally accepted.	4 The integrity of burial grounds is considered to be excellent with both tangible and intangible fabric preserved.	Very High 20	Grade I¹⁴	Heritage resources with qualities so exceptional that they are of special national significance.	Project design must change to avoid the resource completely and resources must be included in Heritage Site Management Plan (HSMP). A GRP may be necessary should the project design not be changed.
HST-001	Built Heritage	1 The technical skill demonstrated by this resource is commonly represented in diverse cultural landscapes.	1 This structure is not representative of a specific timeframe or event but represents a more general timeframe commonly represented in diverse cultural landscapes.	1 The cultural heritage aspects and information potential represented by this resource are commonly represented in a range of cultural landscapes.	1 This heritage resource is not affiliated with a specific social or cultural group and its social significance is commonly represented in diverse cultural landscapes.	3 The fabric of this resource is well preserved. The landscape is associated with farming activities and there is limited encroachment. There is minimal information potential little meaning ascribed.	Negligible 3	General Protection IV C	Resources under general protection in terms of NHRA Sections 34 to 37 with negligible significance.	Sufficiently recorded, no additional mitigation required.

¹³ Please note: this recommended mitigation refers to the minimum mitigation requirements as encapsulated in the NHRA. Project-specific mitigation measures are presented in Sections **Error! Reference source not found.** to **Error! Reference source not found.**

¹⁴ The recommended field rating designates the level of governance associated with the resource. In this instance, the SAHRA Burial Grounds and Graves Unit is the designated competent authority responsible for the management of heritage resources contemplated in terms of Section 36 of the NHRA.

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

Their significance notwithstanding, HST-001 is afforded General Protection under Section 34 of the NHRA. As such, this resource may not be impacted or affected without a permit issued by the HRAs. Given their location to proposed Project activities, it is likely that the heritage resource will be damaged or destroyed through Project activities. Digby Wells therefore recommends ECC obtains a destruction permit issued in terms of Section 34 of the NHRA prior to the commencement of the Project.

7.2. Construction Phase

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

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

Interaction	Impact
Surface preparation for infrastructure	Direct negative impacts to BGG-001

Given its location to proposed Project activities, there is potential for direct negative impacts to BGG-001. These are described in Section 7.2.1 below.

7.2.1. Impact Description

BGG-001 is located within 100 m of the proposed expansion area and, as such, it may be directly impacted through the establishment of the proposed expansion of the underground mining area. Table 7-3 presents a summary of the potential direct impact to this heritage resource.

Table 7-3: Summary of the potential direct impact to Burial Grounds and Graves

IMPACT DESCRIPTION: Direct impact to Heritage Resource BGG-001				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated change will result in permanent damage to the heritage resource.	Consequence: Extremely detrimental (-21)	Significance: Moderate – negative (-105)
Extent	International (7)	Damage to these resources could potentially have an international effect in terms of ECC's (which could have a knock-on effect in terms of investment) and NoK could potentially reside outside South Africa.		
Intensity x type of impact	Extremely high - negative (-7)	Destruction would constitute a major change to resource of Very High significance.		
Probability	Likely (5)	Considering the location of the heritage resource relative to the planned underground expansion area given the expected limited impact to the surface, a direct impact to this resource may occur.		
MITIGATION:				
<p>The project related mitigation must aim to amend the project design to avoid the potential negative impact to the heritage resource and implement a 100 m no-go buffer zone around the heritage resource. Where it is determined that the negative impact may not manifest, the heritage resource must be incorporated into an HSMP for implementation. Should ECC have an existing HSMP, BGG-001 must be incorporated into the existing HSMP and be subject to the same requirements encapsulated therein.</p> <p>Where Project redesign and <i>in situ</i> conservation is not feasible based on the current mining operations and location of the mineral resources, heritage related mitigations must be employed. Heritage related mitigations will need to be undertaken in accordance with the requirements of the NHRA and NHRA Regulation, 2000 (GN R 548) will be required. Such mitigations may include a Burial Grounds and Graves Consultation (BGGC) to assess whether a GRP (which must be undertaken in accordance with Section 36 of the NHRA and Chapter IX and XI of the NHRA Regulations) is feasible.</p> <p>Digby Wells assumes that Project design amendment to include a buffer is the preferred alternative, and the post-mitigation impact assessment considers this mitigation strategy.</p>				

IMPACT DESCRIPTION: Direct impact to Heritage Resource BGG-001				
Dimension	Rating	Motivation		
POST-MITIGATION				
Duration	Beyond project life (6)	If the mitigation measures are put into place, specifically the <i>in situ</i> conservation and management of the resource through an HSMP, the benefits may continue after the Project is complete.	Consequence: Moderately beneficial (12)	Significance: Moderate – positive (72)
Extent	Very Limited (1)	The selection of the alternative routing will avoid the identified impact, which will result in a very limited impact.		
Intensity x type of impact	High - positive (5)	<i>In situ</i> conservation and management would constitute a minor change to a resource of Very High significance.		
Probability	Highly probable (1)	Should ECC implement the mitigations effectively, it is highly probable that the anticipated benefits will manifest.		

7.3. Operational Phase

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

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

Interaction	Impact
Blasting (when geological features are encountered).	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure.
In-pit ROM Stockpiling.	
Transportation of coal from pit for further processing.	
Underground Mining Machinery Maintenance.	

Interaction	Impact
Operation of water and sewer reticulation.	
Use of existing haul roads.	

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

7.4. Decommissioning Phase

Table 7-5 presents the activities expected to occur during the Decommissioning Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 7-5: Interactions and Impacts of Decommissioning Phase Activities

Interaction	Impact
Demolition and removal of infrastructure (in preparation for final land rehabilitation, once mining activities have been concluded).	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure. Should any infrastructure intended for demolition increase in age to older than 60 years during the Project lifecycle, the structure must be considered a heritage structure. Any alterations to these structures will be subject to a NHRA Section 34 permit application process
Rehabilitation (including but not limited to the spreading of the preserved subsoil and topsoil, profiling of the land and re-vegetation).	
Post-closure monitoring and rehabilitation.	

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

7.5. Cumulative Impacts

Cumulative impacts occur from in-combination effects of various impacts on heritage resources acting within a host of processes that result in an incremental effect. The importance of identifying and assessing cumulative impacts is that the whole is often greater than the sum of its parts. This implies that the total effect of multiple stressors or change processes acting simultaneously on a system may be greater than the sum of their effects when acting in isolation.

This Project in conjunction with other planned developments in line with the strategic development plans for the Mpumalanga Province requires consideration to identify the possible in-combination effects of various impacts to known heritage resources. Table 7-6 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	The proposed construction and operation of the Project will add to the existing infrastructure associated with the local and broader study areas. This Project will contribute to the loss of heritage resources and the gradual sanitising of the cultural heritage landscape. The Project will subtract from the sense of place and will decrease the area in which heritage resources not identified can occur.	Negative	Local study area

7.6. Unplanned and Low Risk Events

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

Section 6.2.2 describes the heritage resources identified by Digby Wells within the Project area. This list is, however, not an exhaustive list of all heritage resources within the Project area. If heritage resources are subsequently identified, and where ECC knowingly does not take proactive management measures, potential risks to ECC 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 ECC.

Table 7-7: Identified Heritage Risks that may arise for ECC

Description	Primary Risk
Heritage resources with a high CS rating are inherently sensitive to any development in so far that the continued survival of the resource could be threatened. In addition to this, certain heritage resources are formally protected thereby restricting various development activities.	Negative Record of Decision (RoD) and/or development restrictions issued by MPHRA and/or SAHRA in terms of Section 38(8) of the NHRA.
Impacting on heritage resources formally and generally protected by the NHRA without following due process. Due process may include social consultations and/or permit application processes to SAHRA and/or MPHRA.	<ul style="list-style-type: none"> • Fines; • Penalties; • Seizure of Equipment; • Compulsory Repair / Cease Work Orders; and • Imprisonment.

If additional heritage resources are identified during the Project activities described in Section 2, 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 Project-specific Chance Find Procedures (CFPs) as a condition of authorisation. Refer to Section 11 for more detailed recommendations.
Accidental exposure of fossil bearing material implementation of the Project.	Damage or destruction of heritage resources generally protected under Section 35 of the NHRA	
Accidental exposure of <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 Program (EMPr).

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

Activity/ies	Potential Impacts	Aspects Affected	Phase	Mitigation Measure	Mitigation Type	Time period for implementation
<ul style="list-style-type: none"> All Activities outlined in Section 2 above 	Damage to or destruction of previously unidentified heritage resources.	Cultural Heritage	Construction	<ul style="list-style-type: none"> Develop and implement CFP. 	Control	Before the commencement of the Project

9. Monitoring Programme

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

10. Consultation and Results from Stakeholder Engagement

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

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

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

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

11. Recommendations

Considering the nature and the scope of the Project, the following recommendations must be implemented prior to the commencement of the Project:

- ECC must avoid impacts to BGG-001 through an amendment of the proposed underground expansion area to implement a 100 m no-go buffer zone around the heritage resource;
- ECC must develop and implement an HSMP to conserve BGG-001 *in situ*. Where ECC have developed such a management plan, this must be updated to include BGG-001;

- Where Project design amendments are not feasible, ECC will need to embark on a consultation process to assess whether a GRP is feasible;
- ECC must obtain a destruction permit in terms of Section 34 of the NHRA to demolish HST-001 prior to the commencement of the Project; and
- To mitigate against potential direct impacts against previously unidentified heritage resources and where ECC has not done so already, ECC must develop and implement a CFP prior to the commencement of Project activities. This CFP must be approved by the HRAs prior to implementation.

12. Reasoned Opinion Whether Project Should Proceed

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

13. Socioeconomic Benefit versus Heritage Impacts

Based on a review of the applicable planning documents and available socio-economic data detailed in Section 6.3 above, the potential socio-economic benefits that will arise from the Project outweigh the identified risks and impacts to the known heritage resources within the site-specific study area. This statement is supported by the following statements:

- The identified impacts to the heritage resources can be mitigated through the recommendations included in Section 11;
- The Project will contribute long-term employment opportunities and will generate revenue feeding into the regional and national; and
- The construction of the proposed surface infrastructure will create short-term employment opportunities and will generate revenue which will feed into the local economy.

14. Conclusion

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

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

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

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Appendix A: Glossary

GLOSSARY OF TERMS

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



Term	Definition
Cultural significance (CS)	<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: Importance in the community, or pattern of South Africa's history. Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage. Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects. Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group. Importance in demonstrating a high degree of creative or technical achievement at a particular period. Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons. Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa. Significance relating to the history of slavery in South Africa.</p>
Development	<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: Construction, alteration, demolition, removal or change of use of a place or a structure at a place. Carrying out any works on or over or under a place. Subdivision or consolidation of land comprising, a place, including the structures or airspace of a place. Constructing or putting up for display signs or hoardings. Any change to the natural or existing condition or topography of land. Any removal or destruction of trees, or removal of vegetation or topsoil.</p>
Early Farming Community/ies	<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>
Early Stone Age	<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>
Excavation	<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
Farming Community/ies	Term signifying the appearance in the southern African archaeological of Bantu-speaking agricultural based societies from the early first millennium CE. The term replaces the <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.
Field Rating	SAHRA requires heritage resources to be provisionally rated in accordance with Section 7 of the NHRA that provides a three tier grading system of resources that form part of the national estate. The rating system distinguishes between four categories: Grade I: Heritage resources with qualities so exceptional that they are of special national significance. Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region. Grade III: Other heritage resources worthy of conservation. General Protected: i.e. generally protected in terms of Sections 33 to 37 of the NHRA.
Formal protection	Places with qualities so exceptional that they are of special national significance as national heritage sites or that have special qualities as provincial heritage sites.
General protection	General protections are afforded to: Objects protected in terms of laws of foreign states. Structures older than 60 years. Archaeological and palaeontological sites and material and meteorites. Burial grounds and graves. Public monuments and memorials.
Grave	A place of interment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place.



Term	Definition
Heritage Impact Assessment (HIA)	An assessment of the cultural significance of, and possible impacts on, diverse heritage resources that may be affected by a proposed development. A HIA may include several specialist elements such as archaeological, built environment and palaeontological studies. The HIA must supply the heritage authority with sufficient information about the sites to assess, with confidence, whether or not it has any objection to a development, indicate the conditions upon which such development might proceed and assess which sites require permits for destruction, which sites require mitigation and what measures should be put in place to protect sites that should be conserved. The content of HIA reports are clearly outlined in Section 38(3) of the NHRA and SAHRA Minimum Standards.
Heritage resource	Any place or object of cultural significance.
Heritage resources management	Process required when development is intended categorised as: Any linear development exceeding 300m in length. Construction of a bridge or similar structure exceeding 50 m in length. Any activity which will change the character of a site exceeding 0.5 hectares in extent or involving three or more existing erven or subdivisions thereof or that have been consolidated within the past five years or costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority. Re-zoning of a site exceeding one hectare in extent. Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.
Heritage site	Any place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.
Late Farming Community/ies	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millennium / early second millennium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and economic activities, including extensive trade routes. The LFC period is generally dated from c. 1000 CE well into the modern historical period of the nineteenth century.
Late Stone Age	The South African LSA dates from ~30 Kya. This period is associated with modern <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
Living / intangible heritage	The intangible aspects of inherited culture that could include cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems, the holistic approach to nature, society and social relationships.
Management	In relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the NHRA.
Middle Stone Age	The South African MSA dates from ~300 Kya to c. 30 Kya. This period is associated with the changing behavioural patterns and the emergence of modern cognitive abilities in early <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.
National estate	The national estate as defined in Section 3 of the NHRA, i.e. heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations. The national estate may include: Places, buildings, structures and equipment of cultural significance. Places to which oral traditions are attached or which are associated with living heritage. Historical settlements and townscapes. Landscapes and natural features of cultural significance. Geological sites of scientific or cultural importance. Archaeological and palaeontological sites. Graves and burial grounds, including ancestral graves, royal graves and graves of traditional leaders, graves of victims of conflict, graves of individuals designated by the Minister by notice in the Gazette, historical graves and cemeteries, and other human remains which are not covered in terms of the National Health Act, 2003. Sites of significance relating to the history of slavery in South Africa. Movable objects, including objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; objects to which oral traditions are attached or which are associated with living heritage; ethnographic art and objects; military objects; objects of decorative or fine art; objects of scientific or technological interest. Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).



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

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



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Appendix B: Specialist CV



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

1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2019	Heritage Resources Management short course (Continued Professional Development Programme)	University of Cape Town
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 have 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 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 undertaken heritage mitigations including those permitted under Section 35 of the NHRA and I am currently gaining experience in Grave Relocation Processes (GRPs).

Besides heritage experience, 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. I have also had experience in terms of auditing clients according to their environmental commitments.

My fieldwork experience includes heritage pre-disturbance surveys and impact assessments in South Africa, Malawi and the Democratic Republic of the Congo and social fieldwork in Malawi. All but one of these international projects conformed to the requirements of the International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability (PS) (2012).

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

The table below presents the Projects in which I have participated in Digby Wells throughout my employment.

Project Experience at Digby Wells

Project Title	Client	Project Location	Completed	Project Experience
Cultural Heritage Management and Grave Relocation Process in support of the North Eastern Waste Rock Dump Extension Readiness at the Mogalakwena Platinum Mining Complex	Anglo American Platinum	Mokopane, Limpopo	Ongoing	Section 35 Permit Application Process Section 36 Permit Application and Grave Relocation Processes
Mafube Resettlement Action Plan and Grave Relocation Process	Mafube Coal Mining (Pty) Ltd	Middelburg, Mpumalanga	Ongoing	Section 36 Permit Application and Grave Relocation Processes
Environmental and Social Impact Assessment for the Sanankora Gold Mine Project	Cora Gold Limited	Koulikoro Region, Mali	Ongoing	Heritage Impact Assessment Process In-country consultant support
Environmental Authorisation Process for the Expansion of the Copper Sunset Mining Right Area	Copper Sunset Sands (Pty) Ltd	Viljoensdrift, Free State	Ongoing	Heritage Impact Assessment Process
Amendments to Environmental Licences associated with the West Rand Tailings Retreatment Project	Far West Gold Recoveries (Pty) Ltd	West Rand District Municipality, Gauteng	Ongoing	Heritage Impact Assessment Process
Regional Tailings Storage Facility Heritage Mitigations	Ergo Mining (Pty) Ltd	Randfontein, Gauteng	Ongoing	Section 34 Permit Application Process
City Deep 4L2 Mine Dump Heritage Management	Ergo Mining (Pty) Ltd	Johannesburg, Gauteng	Ongoing	Rescue Permit Application Process



Project Title	Client	Project Location	Completed	Project Experience
Exxaro Dorstfontein East Coal Mine Expansion Project	Exxaro Coal Central (Pty) Ltd	Kriel, Mpumalanga	Ongoing	Heritage Impact Assessment Process
Grave Relocation Process at the Exxaro Matla Mine 1 Development Footprint	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga	Ongoing	Section 36 Permit Application and Grave Relocation Processes
Environmental Authorisation for the proposed Musina-Makhado Special Economic Zone Development Project, Limpopo Province	Limpopo Economic Development Agency	Vhembe District Municipality, Limpopo	Ongoing	Heritage Impact Assessment Process Project Management
Lesotho Lowlands Water Development Project Phase II Heritage Impact Assessment	Lesotho Lowlands Water Development Project Phase II	Leribe and Berea Districts, Lesotho	Ongoing	Heritage Impact Assessment Process In-country consultant support Project Management
Songwe Hills Rare Earth Elements Project	Mkango Resources Limited	Phalombe District, Malawi	Ongoing	Heritage Impact Assessment Process
Environmental Authorisation Processes for the Blinkwater, Lisbon and Moorddrift Prospecting Right Applications	PalRho Exploration (Pty) Ltd	Mokopane, Limpopo	Ongoing	Heritage Basic Assessment Report (desktop)
Environmental and Social Impact Assessment for the Kalimva and Ikamva Satellite Pits and Updating of the Kibali Gold Project	Kibali Gold Mine	Orientele Province, Democratic Republic of the Congo	Ongoing	Heritage Impact Assessment Process In-country consultant support



Project Title	Client	Project Location	Completed	Project Experience
The South African Radio Astronomy Observatory Square Kilometre Array Phase 2 Heritage Mitigations	South African Radio Astronomy Observatory	Carnarvon, Northern Cape	Ongoing	Section 34 Permit Application Process Section 35 Permit Application Process and Mitigations Heritage Impact Assessment – Addendum Training Development and Implementation
Kroonstad Gas Exploration Project	Shango Solutions (Pty) Ltd	Kroonstad, Free State	Ongoing	Heritage Impact Assessment Process Project Management
Kroonstad South Section 102 Amendment Project	Shango Solutions (Pty) Ltd	Kroonstad, Free State	Ongoing	Heritage Impact Assessment Process Project Management
Rustenburg Base Metals Refinery Bulk Chemical Storage Facility Relocation Project	SRK Consulting (South Africa) Pty Ltd	Rustenburg, North West	Ongoing	Heritage Impact Assessment Process Project Management
Regulation 31 Amendment Report and Environmental Management Programme for Listed Activities and Amendment associated with the Sweet Sensation Sand Mine	Sweet Sensations Vaal Sand (Pty) Ltd	Vaal Eden, Free State	Ongoing	Heritage Site Management Plan Chance Finds Procedure

Project Title	Client	Project Location	Completed	Project Experience
Environmental Authorisation for the Proposed New Infrastructure at the Universal Coal Development III (Pty) Ltd Ubuntu Colliery	Universal Coal Development III (Pty) Ltd	Delmas, Mpumalanga	Ongoing	Heritage Impact Assessment Process
Proposed Dalyshope Coal Mining Project	Anglo Operations (Pty) Ltd	Lephalale, Limpopo	Ongoing	Heritage Impact Assessment Process
Proposed Environmental Regulatory Process for the Middeldrift Resources within the Existing New Clydesdale Colliery Mining Right	Universal Coal Development IV (Pty) Ltd	Kriel, Mpumalanga	Ongoing	Heritage Impact Assessment Process
Proposed Arnot South Coal Mining Project	Exxaro Coal Mpumalanga (Pty) Ltd	Hendrina, Mpumalanga	Ongoing	Heritage Impact Assessment Process
Basic Assessment Process for the Closure of the Cooke Underground Operations	Sibanye Gold Limited	Randfontein, Gauteng	March 2021	Heritage Impact Assessment Process
Weltevreden Mine Environmental Authorisation, Water Use Licence and Mining Right Application Project	Mbuyelo Group (Pty) Ltd	Belfast, Mpumalanga	March 2021	Heritage Impact Assessment Process
Basic Assessment and Regulation 31 Amendment Processes for the Authorisation of Listed Activities and Amendment of the Environmental Impact Assessment and Environmental Management Plan for the Ixia Coal (Pty) Ltd Imvula Mine	Ixia Coal (Pty) Ltd	Kriel, Mpumalanga	November 2020	Heritage Basic Assessment Report
Burial Ground Site Inspection adjacent to the Goedgevonden Colliery	Glencore Operations South Africa (Pty) Ltd	Ogies, Mpumalanga	November 2020	Site Inspection and Report



Project Title	Client	Project Location	Completed	Project Experience
Belfast Coal Mine Grave Inspection	Exxaro Coal Mpumalanga (Pty) Ltd	Belfast, Mpumalanga	September 2020	Site Inspection and Report
Basic Assessment and Regulation 31 Amendment / Consolidation for Sigma Colliery: Mooikraal and Sigma Colliery: 3 Shaft	Sasol Mining (Pty) Ltd	Sasolburg, Free State	September 2020	Notification of Intent to Develop and Request for Exemption
Mining Permit Applications to undertake Sand Mining at the New Vaal Colliery	Copper Sunset (Pty) Ltd	Vereeniging, Free State	July 2020	Heritage Basic Assessment Report
Environmental Impact Assessment for the Klipspruit Colliery Water Treatment Plant and associated pipeline, Mpumalanga	South32 SA Coal Holdings (Pty) Ltd	Ogies, Mpumalanga	May 2020	Notification of Intent to Develop and Request for Exemption Social baseline
Environmental Authorisation for the Dagsoom Coal Mining Project near Ermelo, Mpumalanga Province	Dagsoom Coal Mining (Pty) Ltd	Ermelo, Mpumalanga	April 2020	Heritage Impact Assessment Process
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	March 2020	Heritage Impact Assessment Process
External Environmental Audits of the Sasol Retail Stations in the Limpopo, North West, Free State, Mpumalanga and Northern Cape Province	Sasol Limited's South African Energy Business	Thirteen locations in Mpumalanga, North West, Free State and Northern Cape	March 2020	Environmental Audit and Report



Project Title	Client	Project Location	Completed	Project Experience
Environmental Management Programme Performance Assessment for the Impumelelo Colliery near Greylingstad, Mpumalanga	Sasol Mining (Pty) Ltd	Greylingstad, Mpumalanga	January 2020	Environmental Performance Audit and Report
Environmental Authorisation for the Temo Mine proposed Rail, Road and Pipeline Development, Limpopo Province	Temo Coal Mining (Pty) Ltd	Lephalale, Limpopo	November 2019	Heritage Impact Assessment Process Social baseline
Heritage Resources Management Process for the Proposed Upgrade of the Dersley Outfall Sewer Line, Ekurhuleni, Gauteng	Information Decision Systems (Pty) Ltd	Ekurhuleni (Johannesburg), Gauteng	July 2019	Archaeological Impact Assessment Process Project Management
Environmental Authorisation for the proposed Lephalale Pipeline Project, Limpopo Province	MDT Environmental (Pty) Ltd	Lephalale, Limpopo	October 2019	Notification of Intent to Develop & Request for Exemption
Heritage Resources Management Process Update for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga	September 2019	Heritage Site Management Plan Update
Environmental Authorisation Process to Decommission a Conveyor Belt Servitude, Road and Quarry at Twistdraai East Colliery	Sasol Mining (Pty) Ltd	Secunda, Mpumalanga	August 2019	Notification of Intent to Develop and Request for Exemption
Environmental Impact Assessment for the proposed Future Developments within the Sun City Resort Complex	Sun International (Pty) Ltd	Rustenburg, North West	August 2019	Heritage Impact Assessment Process Conservation Management Plan Social Baseline



Project Title	Client	Project Location	Completed	Project Experience
Environmental Authorisation for the Nomalanga Estates Expansion Project, KwaZulu-Natal	Nomalanga Property Holdings (Pty) Ltd	Greytown. KwaZulu-Natal	July 2019	Heritage Impact Assessment Process
City Deep 4L2 Mine Dump Heritage Management Process	Ergo Mining (Pty) Ltd	Johannesburg, Gauteng	July 2019	Site Inspection and Report
Proposed John Dube Extension 3 Township situated on Portions of Remaining Extent 1 and 83 of the farm Grootfontein 165 IR, Gauteng Province	Envirolution Consulting (Pty) Ltd	Ekurhuleni (Johannesburg), Gauteng	July 2019	Desktop Social Assessment
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 and Social Impact Assessment for the Bougouni Lithium Project, Mali	Kodal Minerals Limited	Sikasso region, Mali	May 2019	Heritage Impact Assessment Process In-country consultant support
Belfast Implementation Project	Exxaro Coal Mpumalanga (Pty) Ltd	Belfast, Mpumalanga	March 2019	Section 34 Permit Application
Newcastle Landfill Project	GCS Water and Environmental Consultants	Newcastle, KwaZulu-Natal	March 2019	Heritage Impact Assessment Process
Elandsfontein Colliery Burial Grounds and Graves Chance Finds	Anker Coal and Mineral Holdings SA (Pty) Ltd Elandsfontein Colliery (Pty) Ltd	Clewer, Emalahleni, Mpumalanga	December 2018	Site Inspection and Report Project Management



Project Title	Client	Project Location	Completed	Project Experience
Environmental Impact Assessment for the Blyvoor Gold Mining Project near Carletonville, Gauteng Province	Blyvoor Gold Capital (Pty) Ltd	Carletonville, Gauteng	December 2018	Notification of Intent to Develop and Request for Exemption Social Baseline
Gorumbwa RAP Audit	Randgold Resources Limited	Kibali Sector, Democratic Republic of the Congo	December 2018	Resettlement Action Plan Audit (data management)
Sasol Sigma Defunct Colliery Surface Mitigation Project: Proposed Rover Diversion and Flood Protection Berms	Sasol Mining (Pty) Ltd	Sasolburg, Free State	November 2018	Notification of Intent to Develop and Request for Exemption
Heritage Resources Management Process for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga	October 2018	Heritage Impact Assessment Process
Environmental and Social Input for the Pre-Feasibility Study	Birimium Gold	Bougouni, Mali	October 2018	Pre-Feasibility Study; Heritage Impact Assessment Process
Environmental and Social Impact Assessment for the Bougouni Lithium Project, Mali	Future Minerals S.A.R.L.	Bougouni, Mali	July 2018	Heritage Impact Assessment Process
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	July 2018	Heritage Impact Assessment Process Conservation Management Plan
Sasol Mining Sigma Colliery Ash Backfilling Project, Sasolburg, Free State Province	Sasol Mining (Pty) Ltd	Sasolburg, Free State	July 2018	Heritage Basic Assessment Report Update



Project Title	Client	Project Location	Completed	Project Experience
Liwonde Additional Studies	Mota-Engil Africa	Liwonde, Malawi	June 2018	Community Health, Safety and Security Management Plan Social Fieldwork
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	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	February 2018	Heritage Basic Assessment Report
Heritage Resources Management Process for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga	January 2018	Heritage Impact Assessment Process
Environmental Impact Assessment for the Millsite TSF Complex	Sibanye-Stillwater	Randfontein, Gauteng	December 2017	Heritage Baseline Compilation
Environmental Fatal Flaw Analysis for the Mabula Filling Station	Mr van den Bergh	Waterberg, Limpopo	November 2017	Fatal Flaw Analysis
NHRA Section 35 Archaeological Investigations, Lanxess Chrome Mine, North-West Province	Lanxess Chrome Mine (Pty) Ltd	Rustenburg, North West	August 2017	Archaeological Phase 2 Mitigation
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 and Request for Exemption

6 Professional Affiliations and Registrations

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.



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Name	Johan Nel
Profession	Manager: Heritage Resources
Department	Heritage Resources Management
Education	2012: Professional Development Certificate, Integrated Heritage Resources Management, Rhodes University 2002: BA (Honours) Archaeology, University of Pretoria 2001: BA, University of Pretoria
Registrations / Affiliations	International Council on Monuments and Sites (ICOMOS). ASAPA Cultural Resources Management (CRM) section (Registration Number - 095)

1 Overview

Specialisation Heritage Resource Management

Expertise

Johan has more than 20 years' experience as an archaeologist and heritage specialist. He is currently Manager of the Heritage Resources Management department. He also served on the Council of the uMsunduzi Museum in Pietermaritzburg from December 2017 to November 2020. Johan has worked in both urban settings and remote rural landscapes throughout South Africa, as well as Botswana, the Democratic Republic of the Congo, Liberia Sierra Leone and Swaziland. In addition, I have also acted as a specialist reviewer of heritage studies undertaken by local specialists in countries such as Cameroon, Malawi, Mali, and Tanzania. His experience includes archaeological and heritage impact assessments, general research projects, grave relocations including consultation and permitting, and exhibition research and design.



Employment

2021 to present: Digby Wells Environmental; Manager: Heritage Resources Management

2019: Department of Anthropology and Archaeology, University of Pretoria; Part-time, contract lecturer

2018-2021: The Heritage Foundation; Head: Heritage Resources Management

2017-2020: uMsunduzi; Museum Council Member

Languages

English

Afrikaans

2 Project Experience

Client Lesotho Lowlands Water Development Project II

Location Lesotho

Name of Project LLWDP-II HRM Process

Year Completed 2021

Project Description Heritage Impact Assessment

Client Ergo (Pty) Ltd

Location Johannesburg, Gauteng, South Africa

Name of Project Ergo City Deep Heritage Mitigations

Year Completed 2021

Project Description Heritage Impact Assessment, Rescue Permit Application and Monitoring

Client Exxaro Coal Mpumalanga (Pty) Ltd

Location Kriel, Mpumalanga, South Africa

Name of Project Matla Mine 1 GRP

Year Completed 2021

Project Description Grave Relocation

Client Mafube Coal

Location Middelburg, Mpumalanga, South Africa

Name of Project Mafube RAP and GRP

Year Completed 2021

Project Description Grave Relocation

Client SARAO

Location Carnarvon, Northern Cape, South Africa

Name of Project SARAO SKA Project: Heritage Mitigations

Year Completed 2021

Project Description Heritage Management and Mitigation

Client Ergo (Pty) Ltd

Location Johannesburg, Gauteng, South Africa

Name of Project Ergo City Deep HSMP

Year Completed 2021

Project Description Heritage Site Management Plan

Client Ergo (Pty) Ltd

Location Westonaria, Gauteng, South Africa

Name of Project Ergo RTSF Section 34 Process

Year Completed 2021

Project Description Section 34 Destruction Permit Applications

Client Sun International

Location Pilanesberg, North-West Province, South Africa

Name of Project Sun City EIA and CMP

Year Completed	2019
Project Description	Heritage Impact Assessment and Conservation Management Plan
Client	Exxaro Coal Mpumalanga (Pty) Ltd
Location	Belfast, Mpumalanga, South Africa
Name of Project	Exxaro Belfast GRP
Year Completed	2018
Project Description	Grave Relocation

Publications

- Antonites, A. R. & Nel, J. 2018. The Voortrekker Monument as memory institution: mediating collective memory, tourism and educational programming for a local and global audience. In: Ngulube, P (ed.) Handbook of Research on Advocacy, Promotion and Public Programming for Memory Institutions. Pretoria: UNISA Press.
- Nel, J. 2001. Cycles of Initiation in Traditional South African Cultures. South African Encyclopaedia (MWEB).
- Nel, J. 2009. Un-archaeologically speaking: the use, abuse and misuse of archaeology in popular culture. The Digging Stick. April 2009. 26(1): 11-13: Johannesburg: The South African Archaeological Society.
- Nel, J. 2011. Gods, Graves and Scholars: returning Mapungubwe human remains to their resting place. In: Mapungubwe Remembered. University of Pretoria commemorative publication. Johannesburg: Chris van Rensburg Publishers.

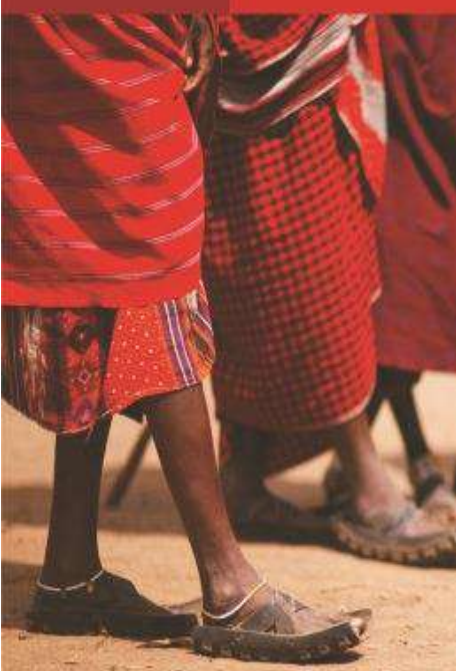


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Appendix C: HRM Methodology



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Cultural Significance, Field Rating and Impact Assessment

Methodology Statement

Project Number:

ZZZ9999

Prepared for:

Internal Document

June 2019

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This document has been prepared by Digby Wells Environmental.

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

Revision History

Name	Responsibility	Version	Date
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 significance¹ (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 tangible² and intangible³ 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.

¹ 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.

² (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.

³ 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

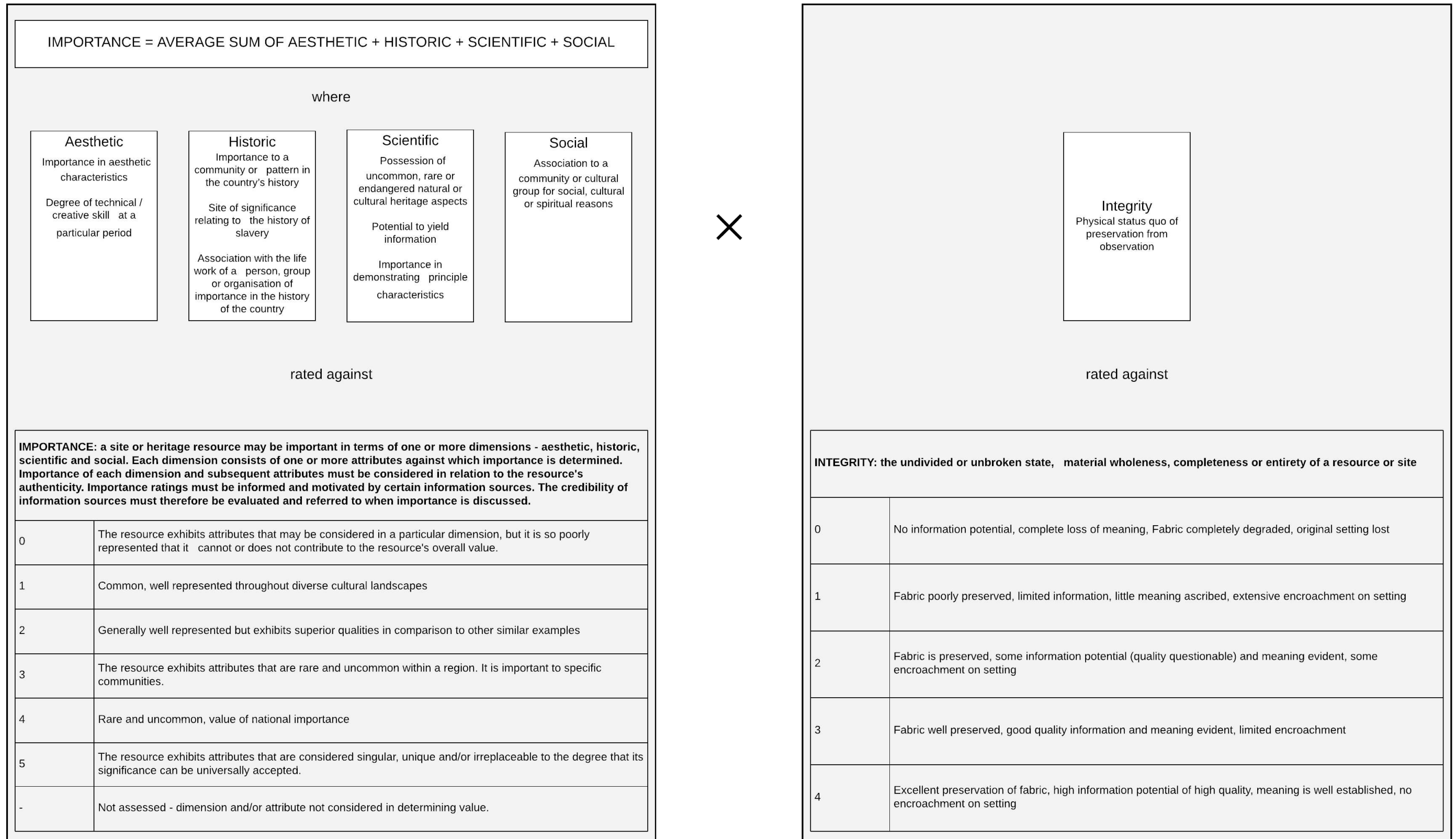


Figure 2-2: CS Determination Methodology

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.

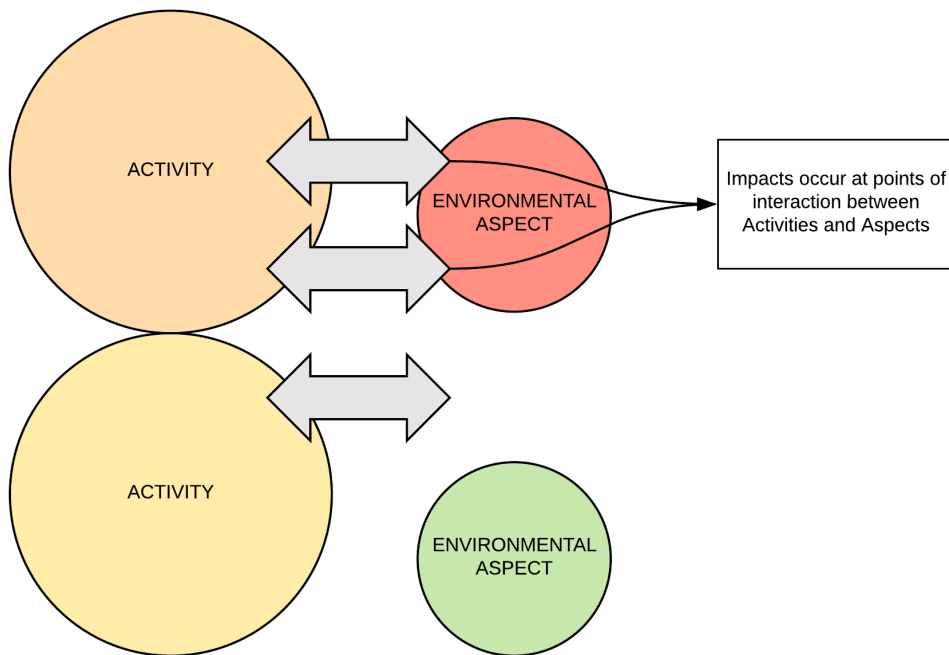


Figure 3-1: Graphical Representation of Impact Assessment Concept

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. Example: Construction	This refers to one or more of the activities that will be undertaken during the corresponding phase of the project. Example: Topsoil clearing	This identifies and considers the various aspects that will be affected by the project activity. Example: Heritage, Biophysical, and Social	This identifies and considers the interdependencies between the various aspects and how they may be impacted upon by the relevant activity. Example: Removal of topsoil will impact on flora which may have heritage and social implications	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. Example: Physical alteration of the land	Potential impacts are a culmination of the various categories evaluated as part of the impact assessment. Example: Topsoil clearing will remove medicinal plants that will erode indigenous knowledge systems and cultural significance.

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	Permanent	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)	International	Impacts on heritage resources will have international repercussions, issues or effects, i.e. in context of international cultural significance, legislation, associations, etc.	Extremely high	Major change to Heritage Resource with High-Very High Value	Certain/Definite	Happens frequently. The impact will occur regardless of the implementation of any preventative or corrective actions.
6	Beyond Project Life	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)	National	Impacts on heritage resources will have national repercussions, issues or effects, i.e. in context of national cultural significance, legislation, associations, etc.	Very high	Moderate change to Heritage Resource with High-Very High Value	High probability	Happens often. It is most likely that the impact will occur.
5	Project Life	The impact will cease after project life.	Region	Impacts on heritage resources will have provincial repercussions, issues or effects, i.e. in context of provincial cultural significance, legislation, associations, etc.	High	Minor change to Heritage Resource with High-Very High Value	Likely	Could easily happen. The impact may occur.
4	Long Term	Impact will remain for >50% - Project Life	Municipal area	Impacts on heritage resources will have regional repercussions, issues or effects, i.e. in context of the regional study area.	Moderately high	Major change to Heritage Resource with Medium-Medium High Value	Probable	Could happen. Has occurred here or elsewhere
3	Medium Term	Impact will remain for >10% - 50% of Project Life	Local	Impacts on heritage resources will have local repercussions, issues or effects, i.e. in context of the local study area.	Moderate	Moderate change to Heritage Resource with Medium - Medium High Value	Unlikely / Low probability	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	Short Term	Impact will remain for <10% of Project Life	Limited	Impacts on heritage resources will have site specific repercussions, issues or effects, i.e. in context of the site-specific study area.	Low	Minor change to Heritage Resource with Medium - Medium High Value	Rare / Improbable	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	Transient	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.	Very Limited	Impacts on heritage resources will be limited to the identified resource and its immediate surroundings, i.e. in context of the specific heritage site.	Very low	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value	Highly Unlikely /None	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

Determined CS	Minimum Management / Mitigation Requirements⁴
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.

⁴ 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 permits⁵ 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.

⁵ 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.