



DIGBY WELLS
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City Deep 4L2 Mine Dump Heritage Management

Site Inspection Report

Project Number:

ERG5884

Prepared for:

Ergo Mining (Pty) Ltd

July 2019

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



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



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This document has been prepared by Digby Wells Environmental.

Report Type:	Site Inspection Report
Project Name:	City Deep 4L2 Mine Dump Heritage Management
Project Code:	ERG5884

Name	Responsibility	Signature	Date
Shannon Hardwick Heritage Resources Management Consultant ASAPA Member: 451	Report Compilation Site Visit		July 2019
Justin du Piesanie Divisional Manager : Social and Heritage Services ASAPA Member 270	Technical Review Site Visit		

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EXECUTIVE SUMMARY

Ergo Mining (Pty) Ltd (hereinafter Ergo) recently identified exposed human remains from a burial ground adjacent to the City Deep 4L2 Mine Dump in Johannesburg (hereinafter 4L2 Dump). Ergo appointed Digby Wells Environmental (hereinafter Digby Wells) to provide specialist support in respect of the discovery.

Digby Wells completed two site visits between May and June of 2019. During these site inspections, the heritage specialist recorded the *status quo* of the burial ground and a total of 28 individual graves based on visible surface indicators.

To comply with the SAHRA BGG Unit requirements, issued, the heritage specialist completed an assessment of the manifested impacts to the burial ground and the manually excavated grave. A summary of this assessment is presented in the following table.

Impact Assessment Summary

Code	Impact	Pre-mitigation:						Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Cemetery	Surface damage from silt and wash	Permanent	International	Extremely high - negative	Extremely detrimental	Certain	Major - negative	Permanent	Local	High - negative	Highly detrimental	Likely	Moderate - negative
Grave	Exposure of human remains	Short term	International	Extremely high - negative	Highly detrimental	Certain	Major - negative	Permanent	Very limited	High - negative	Moderately detrimental	Likely	Minor - negative

To mitigate against these impacts, Digby Wells has recommended the following remedial actions:

- Reinternment of the *ex-situ* human remains with the authorisation of the SAHRA BGG Unit;
- The immediate establishment of a buffer zone of 25 m that is clearly and visibly demarcated; and
- The development and implementation of an HSMP to detail *inter alia*:
 - The extent of the burial ground;
 - Applicable management structure, roles and responsibilities;
 - Required remedial actions to mitigate manifested impacts;

- Identified current and future risks; and
- Required management measures to avoid or reduce the intensity of risks.

Where these recommendations are approved by the SAHRA BGG Unit and implemented by Ergo, Digby Wells believes the burial ground can be conserved *in situ* with minimal future risk to the individual graves.

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1 Introduction

Ergo Mining (Pty) Ltd (hereinafter Ergo) recently identified exposed human remains from a burial ground adjacent to the City Deep 4L2 Mine Dump in Johannesburg (hereinafter 4L2 Dump). Ergo appointed Digby Wells Environmental (hereinafter Digby Wells) to provide specialist support in respect of the discovery.

This document serves as the Site Inspection Report (SIR), detailing the results of a site inspection to comply with the requirements issued by the South African Heritage Resource Agency (SAHRA) Burial Grounds and Graves (BGG) Unit in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

1.1 Project Details

1.1.1 Project Background

In 2011, the then Crown Gold Recoveries (Pty) Ltd (hereinafter Crown Gold Recoveries) applied for a Section 102 Amendment to the existing City Deep Environmental Management Plan (EMP), to include reclamation of the 4L2 Dump into the authorisation. Crown Gold Recoveries appointed Digby Wells to complete this process in respect of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). This process included a Heritage Statement to comply with Section 38(8) of the NHRA. During this process, Digby Wells did not identify any known sites of archaeological or heritage significance¹.

Subsequent to the 2011 study, Ergo representatives identified exposed human remains in a manually-excavated hole adjacent to the 4L2 Dump. These remains originate from a previously-unidentified burial ground. The South African Police Service (SAPS) immediately inspected the site and contacted the SAHRA BGG Unit in turn.

The SAHRA BGG Unit inspected the site and noted the following:

- *Ex-situ* human remains were visible on the surface;
- The cemetery did not have any defined boundaries;
- There was no evidence that buffers had been implemented around the cemetery;
- Silt and wash resulting from mining activities and mine dump run-off had caused damage to the surface' and
- There are service roads within proximity to visible graves.

¹ These results were supported by a site inspection and consultation with surrounding landowners who indicated no known graves occurred within the immediate vicinity.

Digby Wells undertook a site inspection, accompanied by Ergo representatives. Following this inspection, Digby Wells contacted the SAHRA BGG Unit telephonically to confirm a suitable way forward.



Figure 1-1: Photographs of the Manually- Excavated Hole and the Exposed Human Remains

1.1.2 Project Location

The burial ground is situated adjacent to the 4L2 Dump on the property Doornfontein 92 IR. This is within an industrial development zone, south-east of the Johannesburg City Centre. Plan 1 presents an overview of the geographical setting of the Project.














1.2 Terms of Reference

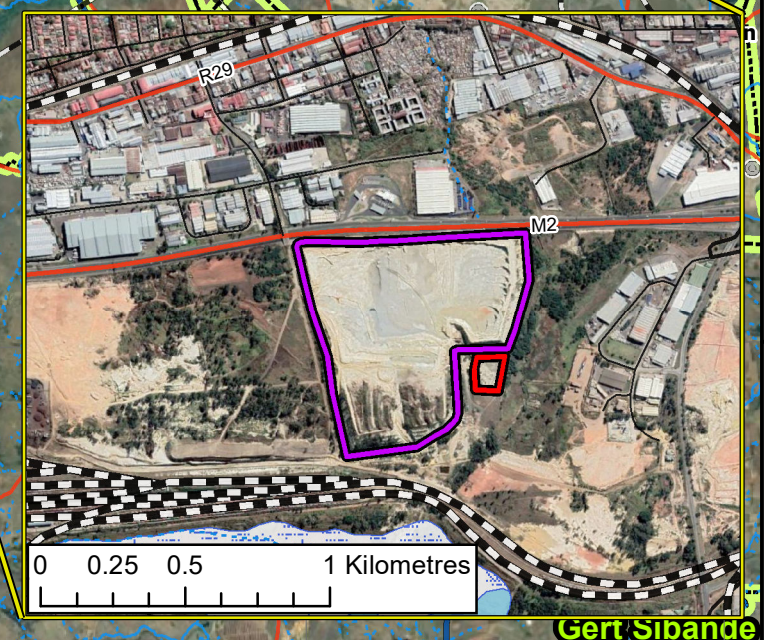

To provide specialist heritage support regarding the newly-identified graves at the 4L2 Dump to comply with the requirements stipulated by the SAHRA BGG Unit in terms of the NHRA.

HERITAGE SITE MANAGEMENT PLAN

Regional Setting

Legend

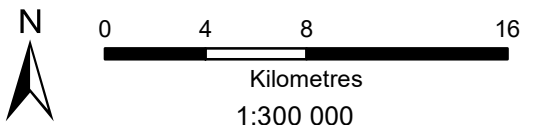
-  4L2 Dump
-  City
-  Major Town
-  Secondary Town
-  Other Town
-  Settlement
-  Railway Line
-  Non-Perennial River/Stream
-  Perennial River/Stream
-  National Route
-  Main Road
-  Grave Extent
-  District Municipality Boundary

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

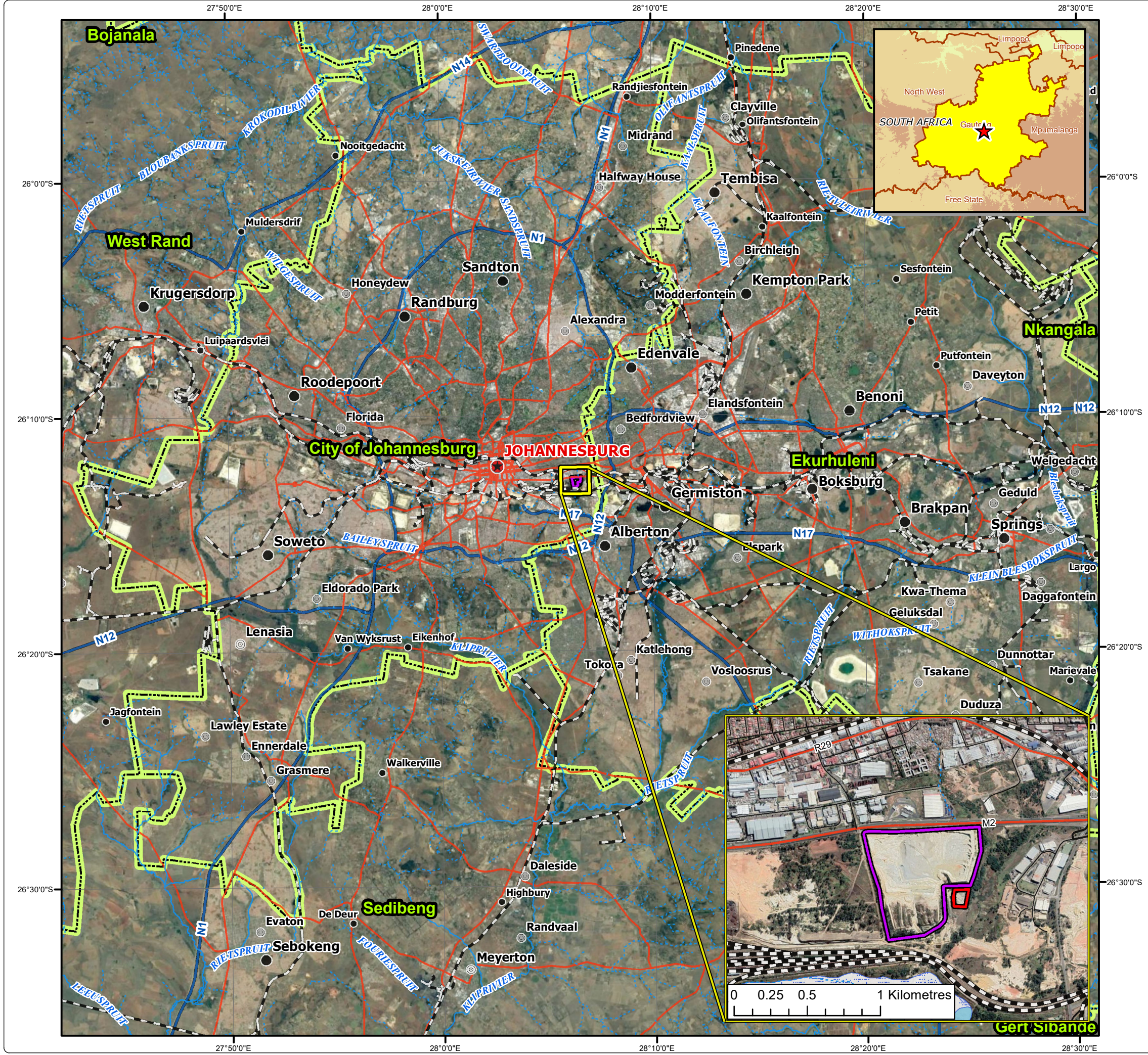
Projection: Transverse Mercator Ref #: prv.ERG5884.201907.013
 Datum: WGS 1984 Revision Number: 1
 Central Meridian: 29°E Date: 03/07/2019



0 0.25 0.5 1 Kilometres

Kilometres
1:300 000

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1.3 Scope of Work

In respect of this report, Digby Wells completed the following Scope of Work (SoW):

- On-site inspection of the finds by a qualified archaeologist;
- Liaison with the SAHRA BGG Unit;
- Compiled an SIR with recommended remedial actions.

1.4 Expertise of the Specialist

Table 1-1 presents a summary of the expertise of the specialists involved in the compilation of this report. Appendix A includes the full CVs of the 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: 2</p>	<p>Shannon joined the Digby Wells team in May 2017 as a Heritage Management Intern and has most recently been appointed as a Heritage Resources Management Consultant. Shannon is an archaeologist who obtained a Master of Science (MSc) degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. She is a published co-author of one paper in <i>Journal of Ethnobiology</i>. Since joining Digby Wells, Shannon has gained generalist experience through the compilation of Notification of Intent to Develop (NID) applications as well as Heritage Scoping Reports (HSRs) and HIAs. Her other experience includes compiling a Community Health, Safety and Security Management Plan (CHSSMP) and researching Artisanal and Small-Scale Mining for input into a Livelihood Restoration Framework (LRF). Shannon's experience in the field includes pre-disturbance surveys in South Africa and fieldwork in Malawi.</p>
<p>Justin du Piesanie</p> <p>ASAPA Member 270</p> <p>ICOMOS Member 14274</p> <p>IAIAsa Member</p> <p>Years' Experience: 13</p>	<p>Justin is the Divisional Manager for Social and Heritage Services at Digby Wells. Justin joined the company in August 2011 as an archaeologist and was subsequently made HRM Manager and Divisional Manager in 2016 and 2018 respectively. He obtained his MSc degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. Justin also attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. Justin is a professional member of the Association of Southern African Professional Archaeologists (ASAPA), and accredited by the association's Cultural Resources Management (CRM) section. He is also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. He has over 12 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, NHRA Section 34 application processes, and Conservation Management Plans (CMPs). Justin has gained further generalist experience since his appointment at Digby Wells in Botswana, Burkina Faso, Cameroon, the Democratic Republic of Congo, Liberia, Malawi, Mali and Senegal on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, Justin has acted as a technical expert reviewer of HRM projects undertaken in Cameroon, Malawi and Senegal. Justin's current focus at Digby Wells is to develop the HRM</p>

Team Member	Bio Sketch
	process as an integrated discipline following international HRM principles and standards. This approach aims to provide clients with comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving strategic objectives.

2 Results of the Site Inspection

Justin du Piesanie, in conjunction with Ergo representatives, undertook an inspection of the burial ground on 28 May 2019. The purpose of this inspection was to demonstrate compliance with instruction issued by SAHRA on 23 May 2019. Furthermore, it afforded the heritage practitioner the opportunity to recommend immediate remedial action² to safeguard the burial ground from further impacts.

Justin du Piesanie and Shannon Hardwick on 26 June 2019 undertook a second site inspection to record, as far as possible, the number of individual graves and, in turn, the areal extent of the burial ground. The identified graves were based on visible surface indicators recorded through GPS waypoints and photographs. Digby Wells did not employ any Ground Penetrating Radar (GPR) technology or intrusive methodologies.

The burial ground comprises a minimum of 33 possible graves. Considering the extent of the burial ground however, the number is likely to far exceed that identified by surface indicators. Of the identified graves, only two had headstones. One legible headstone dates to 1938. Digby Wells assumes the rest of the graves are approximately contemporaneous and the entire graveyard is older than 60 years.

2.1 Illustrative Material

The SIR includes the following illustrative material:

- Plan 1 presents the geographical setting of the Project;
- Figure 1-1 presents the manually-excavated hole which resulted in the human remains being exposed;
- Figure 2-1 presents photographs of the graves identified during the site inspection.
- Figure 2-2 present 1952 aerial imagery of the 4L2 Dump;
- Figure 2-3 presents the distribution of the identified individual graves.

² It was recommended that the approximate extent of the burial ground be clearly demarcated and any works within the possible boundaries cease immediately.



Figure 2-1: Images of Individual Graves Identified During the Site Inspection

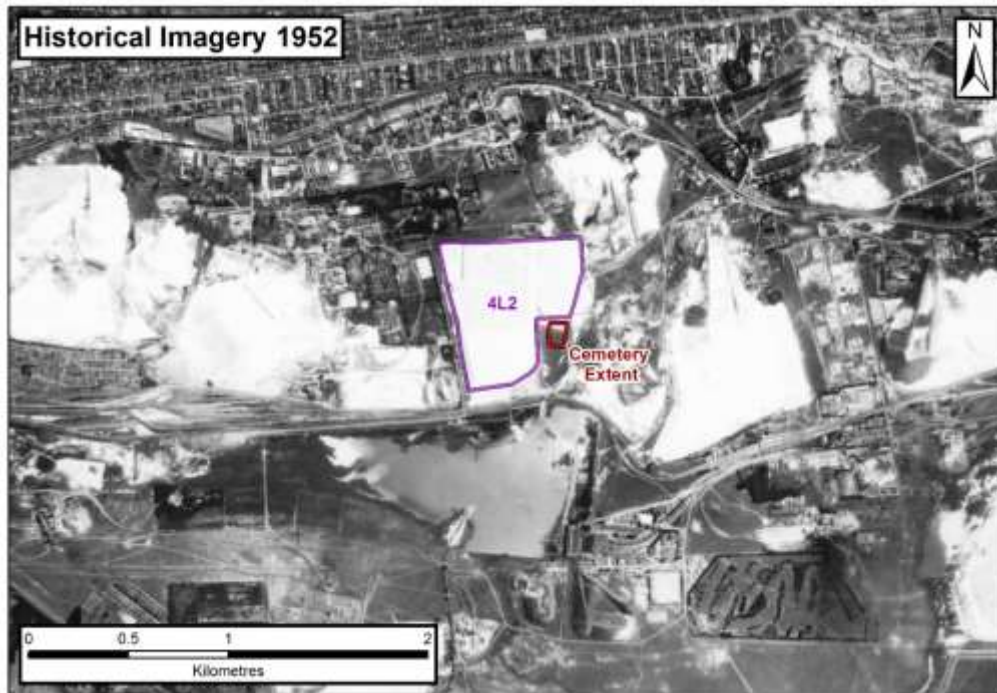


Figure 2-2: 1952 Aerial Imagery Depicting 4L2 Dump. Burial ground not visible on imagery.

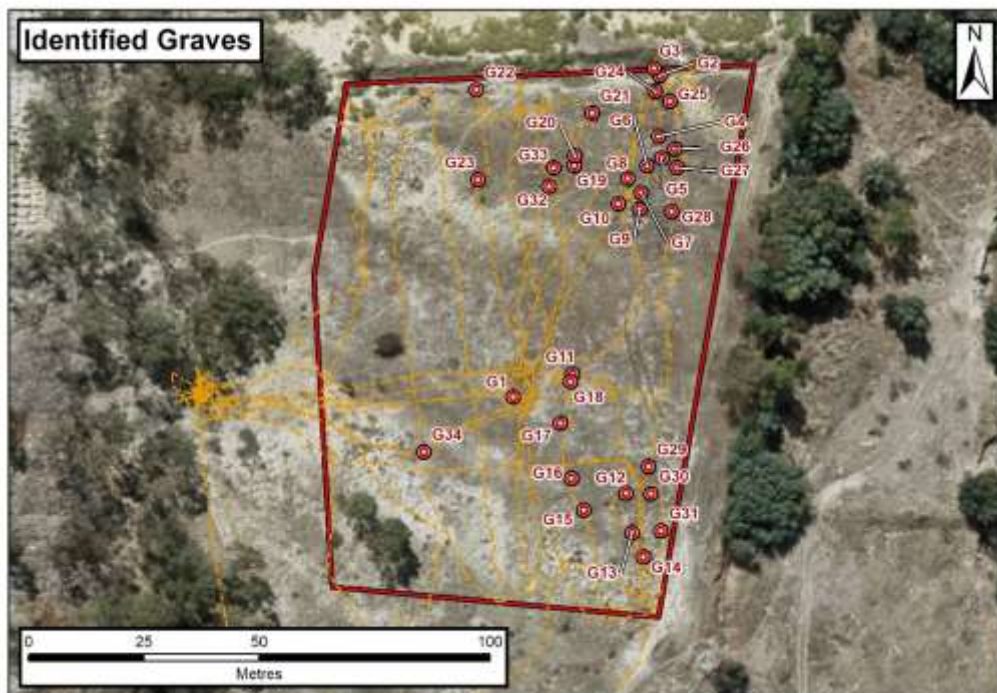


Figure 2-3: Distribution of the Identified Graves and Areal Extent of the Burial Ground

2.2 Statement of Cultural Significance

Cultural Significance (CS) is defined as the intrinsic aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value of a cultural heritage resource. This section provides an abbreviated methodology to determine CS, a Significance Statement for the burial ground, and an impact assessment. These aspects are discussed separately below.

2.2.1 Methodology

Digby Wells developed a CS Determination Methodology to assign numerical CS values to identified heritage resources in an objective way and in a manner that could be reproduced independently by another assessor using the same information, should it be required. The Digby Wells methodology combines the nine attributes above to form four themes: aesthetic, historical, scientific and social.

The Digby Wells methodology determines the intrinsic, comparative and contextual significance of identified cultural heritage resources against the abovementioned criteria and themes. The result of these values is averaged to produce a numerical representation of a resource's importance. This importance rating is informed by a review of available credible sources and the uniqueness or representativity of the resource. The final CS value considers the physical integrity of the fabric of the resource.

Grading of heritage resources is the responsibility of Heritage Resource Authorities (HRAs). This notwithstanding, the SAHRA Minimum Standards require heritage assessments include Field Ratings for identified resources to comply with Section 38 of the NHRA. Section 7 of the NHRA provides for the system of grading heritage resources that form part of the national estate.

The CS value of a heritage resource directly relates to the sensitivity of a heritage resource to change (i.e. impacts) and determines the minimum accepted levels of change to the heritage resource (i.e. the mitigations required) in terms of the SAHRA Minimum Standards. The Field Ratings determine the management responsibilities required for the identified heritage resource (i.e. local, provincial or national) and guide any related decision-making processes.

2.2.2 Significance Statement

Table 2-1 presents the CS statement regarding the burial ground. This site is a heritage resource with Very High CS and a Grade I Field Rating³. Such heritage resources are considered heritage resources with whose significance is universally accepted.

As per the NHRA and SAHRA Minimum Standards, the minimum required mitigation requirements for heritage resources of this significance include:

³ This grading denotes the proposed level of management that the heritage resource will require. Burial Grounds and Graves fall under the SAHRA BGG Unit's ambit, which is a national body.

- The Project design must change to avoid any change to these resources⁴;
- The heritage resource must be conserved *in situ*; and
- The heritage resource(s) must be included in a Heritage Site Management Plan (HSMP).

Project-specific recommendations are presented in Section 2.3.

⁴ Should it not be possible to alter the Project design, Ergo will be required to undertake a Grave Relocation Process (GRP). This is not anticipated based on Digby Wells' understanding of the Project.

Table 2-1: CS and Field Ratings

Resource ID	Description	Aesthetic	Historic	Scientific	Social	INTEGRITY	Designation	Recommended Field Rating	Management Level
4L2 Dump Cemetery	Burial Ground & Graves	- Burial ground and graves were not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA.	- Burial ground and graves were not assessed against historic criteria as defined in Section 3(3) of the NHRA.	- Burial ground and graves were not assessed against scientific criteria as defined in Section 3(3) of the NHRA.	5 Burial ground and graves have specific connections to communities or groups for spiritual reasons. The significance is universally accepted.	4 The integrity of the burial ground is considered to be excellent with both tangible and intangible fabric preserved.	Very High 20	Grade I	National

2.3 Impact Assessment

This section presents an assessment of manifested impacts to the burial ground and graves. The assessment considers the following manifested impacts:

- Surface damage by silt and wash from reclamation activities; and
- Exposure of human remains from manual excavations.

Table 2-2: Assessment of Surface Damage

IMPACT DESCRIPTION: Surface Damage from Silt and Wash				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	The damage to surface dressing has permanently altered the cemetery.		Significance: Major - negative (-147)
Extent	International (7)	Next-of-Kin may reside outside of the local and regional area, as well as internationally. Furthermore, the manifestation of the impact may have reputational repercussions that could extend to an internationally.	Consequence: Extremely detrimental (-21)	
Intensity x type of impact	Extremely high - negative (-7)	The manifested impact is considered a major change to a heritage resource with very high CS		
Probability	Certain (7)	The impact as manifested.		

IMPACT DESCRIPTION: Surface Damage from Silt and Wash				
Dimension	Rating	Motivation		
MITIGATION:				
The proponent must develop a Heritage Site Management Plan (HSMP). Remedial measures will be defined in detail in the HSMP.				
POST-MITIGATION				
Duration	Permanent (7)	The original surface dressing of the graves within the cemetery are permanently lost.	Consequence: Highly detrimental (-15)	Significance: Moderate - negative (-75)
Extent	Local (3)	The development and implementation of the HSMP will be limited to the extent of the burial ground.		
Intensity x type of impact	High - negative (-5)	The implementation of the HSMP and remedial actions will result in a minor change to the status quo of a heritage resource with very high CS		
Probability	Likely (5)	With the implementation of recommended mitigation measures, it is possible that risks to the burial ground manifest at a later date.		

Table 2-3: Assessment of Human Remains Exposure

IMPACT DESCRIPTION: Exposure of human remains				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Short term (2)	The exposure of human remains has only recently occurred and will be reinterred into the grave in the immediate future.	Consequence: Highly detrimental (-16)	Significance: Major - negative (-112)
Extent	International (7)	Next-of-Kin may reside outside of the local and regional area, as well as internationally. Furthermore, the manifestation of the impact may have reputational repercussions that could extend to an internationally.		
Intensity x type of impact	Extremely high - negative (-7)	The manifested impact is considered a major change to a heritage resource with very high CS		
Probability	Certain (7)	The impact as manifested.		
MITIGATION:				
<p>With the authorisation of the SAHRA BGG Unit, reinter the remains in their original position and rehabilitate the grave.</p> <p>The proponent must develop an HSMP. Remedial measures to manage similar risks to the burial ground will be defined in detail in the HSMP.</p>				

IMPACT DESCRIPTION: Exposure of human remains				
Dimension	Rating	Motivation		
POST-MITIGATION				
Duration	Permanent (7)	The impact has permanently altered the fabric of the individual grave.	Consequence: Moderately detrimental (-13)	Significance: Minor - negative (-65)
Extent	Very limited (1)	The implementation of the recommendations will affect isolated aspects of the individual grave		
Intensity x type of impact	High - negative (-5)	The implementation of the HSMP and remedial actions will result in a minor change to the status quo of a heritage resource with very high CS		
Probability	Likely (5)	With the implementation of recommended mitigation measures, it is possible that risks to the burial ground manifest at a later date.		

3 Recommendations and Way Forward

The current *status quo* of the exposed human remains is that they are *ex-situ*. It is recommended the exposed human remains be reinterred within the manually excavated whole immediately, and the grave rehabilitated. The SAHRA BGG Unit must authorise this prior to implementation.

Other immediate remedial actions to consider include the establishment of a buffer zone of no less than 25 m, and clear demarcation of the extent of the burial ground.

Given the nature of the reclamation activities, it is recommended Ergo develop an HSMP to promote the continued *in-situ* conservation of the individual graves within the burial ground. The HSMP will serve as a procedural document to detail *inter alia*:

- The extent of the burial ground;

- Applicable management structure, roles and responsibilities;
- Required remedial actions to mitigate manifested impacts;
- Identified current and future risks; and
- Required management measures to avoid or reduce the intensity of risks.

Should the Project-related activities at the 4L2 Mine Dump preclude *in situ* conservation of the burial ground, Ergo are required to complete a Grave Relocation Process (GRP) in accordance with Section 36 of the NHRA, and Chapter IX and XI of the NHRA Regulations, 2000 (GN R 548). This notwithstanding, it is not envisaged a GRP will be required.

4 Conclusion

Ergo representatives identified exposed human remains adjacent to Mine Dump 4L2. Upon discovery, representative contacted the SAPS and SAHRA BGG Unit to notify these authorities of the discovery. To comply with the instruction issued by the SAHRA BGG Unit, Ergo appointed Digby Wells to undertake a site inspection to recommend a commensurate remedial actions in accordance with Section 36 of the NHRA and NHRA Regulations, 2000.

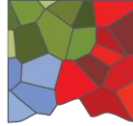
Digby Wells completed two site visits between May and June of 2019. During these site inspections, the heritage specialist recorded the *status quo* of the burial ground and a total of 33 individual graves based on visible surface indicators.

This report presents an assessment of the manifested impacts, namely the surface damage resulting from silt and wash from reclamation activities, and the exposure of human remains from a manually excavated hole. To mitigate against these impacts, Digby Wells has recommended the following remedial actions:

- Reinternment of the *ex-situ* human remains with the authorisation of the SAHRA BGG Unit;
- The immediate establishment of a buffer zone of 25 m that is clearly and visibly demarcated; and
- The development and implementation of an HSMP to detail *inter alia*:
 - The extent of the burial ground;
 - Applicable management structure, roles and responsibilities;
 - Required remedial actions to mitigate manifested impacts;
 - Identified current and future risks; and
 - Required management measures to avoid or reduce the intensity of risks.

Where these recommendations are approved by the SAHRA BGG Unit and implemented by Ergo, Digby Wells believes the burial ground can be conserved *in situ* with minimal future risk to the individual graves.

Appendix A: Specialist CV



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Mr. Justin du Piesanie

Divisional Manager: Social and Heritage Services

Social and Heritage Services Department

Digby Wells Environmental

1 Education

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

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Proficient	Good

3 Employment

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

4 Experience

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

project-specific solutions that promote ethical heritage management and assist in achieving the strategic objectives of our clients, as well as maintain or enhance Cultural Significance of the relevant cultural heritage resources.

5 Project Experience

Please see the following table for relevant project experience:

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Ergo RTSF Section 34 Process	Westonaria, Gauteng, South Africa	2019	-	Section 34 Destruction Permit Applications	Ergo (Pty) Ltd
Sun City EIA and CMP	Pilanesberg, North-West Province, South Africa	2018	-	Heritage Impact Assessment and Conservation Management Plan	Sun International
Exxaro Matla HRM	Kriel, Mpumalanga, South Africa	2017	-	Heritage Impact Assessment and Conservation Management Plan	Exxaro Coal Mpumalanga (Pty) Ltd
Exxaro Belfast GRP	Belfast, Mpumalanga, South Africa	2013	-	Grave Relocation	Exxaro Coal Mpumalanga (Pty) Ltd
Eskom Northern KZN Strengthening	KwaZulu-Natal, South Africa	2016	2018	Heritage Impact Assessment	ILISO Consulting
Thabametsi GRP	Lephalale, Limpopo Province, South Africa	2017	2018	Grave Relocation	Exxaro Resources Ltd
SKA HIA and CMP	Carnarvon, Northern Cape, South Africa	2017	2018	Heritage Impact Assessment and Conservation Management Plan	SARAO
Grootegeeluk Watching Brief	Lephalale, Limpopo Province, South Africa	2017	2017	Watching Brief	Exxaro Resources Ltd
Matla HSMP	Kriel, Mpumalanga Province, South Africa	2017	2017	Heritage Site Management Plan	Exxaro Coal Mpumalanga (Pty) Ltd

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



PROJECT		LOCATION	DATES		PROJECT TYPE		CLIENT		
Elandsfontein Update	EMP	Clewer, Mpumalanga, South Africa	2016	2017	Heritage Assessment	Impact	Anker Coal		
Groningen and Inhambane PRA		Limpopo Province, South Africa	2016	2016	Heritage Assessment	Basic	Rustenburg Limited	Platinum	Mines
Palmietkuilen MRA		Springs, Gauteng, South Africa	2016	2016	Heritage Assessment	Impact	Canyon Resources (Pty) Ltd		
Copper Sunset Mining S.102	Sand	Free State, South Africa	2016	2016	Heritage Assessment	Basic	Copper Sunset Sand (Pty) Ltd		
Grootvlei MRA		Springs, Gauteng, South Africa	2016	2016	Notification of Intent to Develop		Ergo (Pty) Ltd		
Lambda EMP		Mpumalanga, South Africa	2016	2016	Palaeontological Impact Assessment		Eskom Holdings SOC Limited		
Kilbarchan Assessment and EMP	Basic	Newcastle, KwaZulu-Natal, South Africa	2016	2016	Heritage Assessment	Basic	Eskom Holdings SOC Limited		
Grootegeeluk Amendment		Lephalale, Limpopo Province, South Africa	2016	2016	Notification of Intent to Develop		Exxaro		
Garsfontein Township Development		Pretoria, Gauteng, South Africa	2016	2016	Notification of Intent to Develop		Leungo Construction Enterprises		
Louis Botha Phase 2		Johannesburg, Gauteng, South Africa	2016	2016	Phase 2 Excavations		Royal Haskoning DHV		
Sun City Mapping	Heritage	Pilanesberg, North-West Province, South Africa	2016	2016	Phase 2 Mapping		Sun International		
Gino's Building Section 34 Destruction Permit Application		Johannesburg, Gauteng, South Africa	2015	2016	Heritage Assessment and Section 34 Destruction Application	Impact and Section 34 Permit	Bigen Africa Services (Pty) Ltd		
EDC Refurbishment Project	Block	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Assessment and Section 34 Application	Impact and Permit	Bigen Africa Services (Pty) Ltd		

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



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

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

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

6 Professional Registrations

Position	Professional Body	Registration Number
Member	Association for Southern African Professional Archaeologists (ASAPA); ASAPA Cultural Resources Management (CRM) section	270
Member	International Council on Monuments and Sites (ICOMOS)	14274
Member	Society for Africanist Archaeologists (SAfA)	N/A
Member	International Association of Impact Assessors (IAIA) South Africa	5494

7 Publications

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

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



DIGBY WELLS

ENVIRONMENTAL

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

1 Education

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

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Fair	Basic

3 Employment

Period	Company	Title/position
2017 to present	Digby Wells Environmental	Junior Heritage Resources Management Consultant
2016-2017	Tarsus Academy	Facilitator
2011-2016	University of the Witwatersrand	Teaching Assistant
2011	University of the Witwatersrand	Collections Assistant

4 Experience

I joined the Digby Wells in April 2017 as an archaeologist and a Heritage Resources Management intern in the Social and Heritage Services Division and have most recently been promoted to a Junior Consultant. I received my Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2013, specialising in archaeobotany and historical archaeology. I have fieldwork experience in historical archaeology as well as in Stone Age archaeology in South Africa; since joining Digby Wells, this has been expanded to include pre-disturbance surveys across South Africa and fieldwork in Malawi.

Since joining Digby Wells, I have gained generalist experience through the compilation of various heritage assessment reports in South Africa, Malawi and Mali and Section 34 Permit Applications. 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 in South Africa, Malawi, Mali and Sierra Leone.

5 Project Experience

My project experience is listed in the table below.

Project Title	Name of Client	Project Location	Date:		Project / Experience Description
Environmental Authorisation for the Dagsoom Coal Mining Project near Ermelo, Mpumalanga Province	Dagsoom Coal Mining (Pty) Ltd	Ermelo, Mpumalanga Province	April 2019	Ongoing	Heritage Impact Assessment
Regional Tailings Storage Facility Heritage Mitigations	Ergo Mining (Pty) Ltd	Randfontein, Gauteng	April 2019	Ongoing	Section 34 Permit Application Process
Weltevreden Mine Environmental Authorisation, Water Use Licence and Mining Right Application Project	Mbuyelo Group (Pty) Ltd	Belfast, Mpumalanga	April 2019	Ongoing	Heritage Impact Assessment
Environmental Authorisation for the proposed Lephalale Pipeline Project, Limpopo Province	MDT Environmental (Pty) Ltd	Lephalale, Limpopo Province	April 2019	Ongoing	Notification of Intent to Develop
Heritage Resources Management Process Update for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga Province	February 2019	Ongoing	Heritage Site Management Plan Update
Environmental Authorisation for the proposed Musina-Makhado Special Economic Zone Development Project, Limpopo Province	Limpopo Economic Development Agency	Vhembe District Municipality, Limpopo Province	February 2019	Ongoing	Heritage Impact Assessment
Songwe Hills Rare Earth Elements Project	Mkango Resources Limited	Phalombe District, Malawi	February 2019	Ongoing	Heritage Impact Assessment

Project Title	Name of Client	Project Location	Date:		Project / Experience Description
Elandsfontein Colliery Burial Grounds and Graves Chance Finds	Anker Coal and Mineral Holdings SA (Pty) Ltd Elandsfontein Colliery (Pty) Ltd	Clewer, Emalahleni, Mpumalanga Province	November 2018	December 2018	Site Inspection
Environmental Authorisation Process to Decommission a Conveyor Belt Servitude, Road and Quarry at Twistdraai East Colliery	Sasol Mining (Pty) Ltd	Secunda, Mpumalanga Province	November 2018	Ongoing	Notification of Intent to Develop
Environmental and Social Impact Assessment for the Bougouni Lithium Project, Mali	Future Minerals S.A.R.L.	Bougouni, Mali	October 2018	Ongoing	Heritage Impact Assessment
Environmental Authorisation for the Nomalanga Estates Expansion Project, KwaZulu-Natal	Nomalanga Property Holdings (Pty) Ltd	Greytown. KwaZulu-Natal	October 2018	Ongoing	Heritage Impact Assessment
Environmental Authorisation for the Temo Mine proposed Rail, Road and Pipeline Development, Limpopo Province	Temo Coal Mining (Pty) Ltd	Lephalale, Limpopo Province	August 2018	Ongoing	Heritage Impact Assessment
Gorumbwa RAP Audit	Randgold Resources Limited	Kibali Sector, Democratic Republic of the Congo	July 2018	December 2018	Resettlement Action Plan Audit
Sasol Sigma Defunct Colliery Surface Mitigation Project: Proposed Rover Diversion and Flood Protection Berms	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	June 2018	November 2018	Notification of Intent to Develop

Project Title	Name of Client	Project Location	Date:		Project / Experience Description
Basic Assessment and Regulation 31 Amendment / Consolidation for Sigma Colliery: Mooikraal and Sigma Colliery: 3 Shaft	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	April 2018	Ongoing	Notification of Intent to Develop
Sasol Mining Sigma Colliery Ash Backfilling Project, Sasolburg, Free State Province	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	April 2018	July 2018	Heritage Basic Assessment Report Update
Constructed Landfill Site for the Sierra Rutile Limited Mining Operation, Southern Province, Sierra Leone	Sierra Rutile Limited	Southern Province, Sierra Leone	April 2018	May 2019	Social Impact Assessment
Environmental Impact Assessment for the Klipspruit Colliery Water Treatment Plant and associated pipeline, Mpumalanga	South32 SA Coal Holdings (Pty) Ltd	Ogies, Mpumalanga Province	March 2018	Ongoing	Notification of Intent to Develop; Social baseline
Proposed construction of a Water Treatment Plant and associated infrastructure for the Treatment of Mine-Affected Water at the Kilbarchan Colliery	Eskom Holdings SOC Limited	Newcastle, KwaZulu-Natal Province	February 2018	Ongoing	Heritage Impact Assessment
Belfast Implementation Project	Exxaro Coal Mpumalanga (Pty) Ltd	Belfast, Mpumalanga Province	February 2018	Ongoing	Section 34 Permit Application
Newcastle Landfill Project	GCS Water and Environmental Consultants	Newcastle, KwaZulu-Natal	January 2018	March 2019	Heritage Impact Assessment

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

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

6 Professional Registration

Position	Professional Body	Registration 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.

Appendix B: HRM Methodology



DIGBY WELLS
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Cultural Significance, Field Rating and Impact Assessment

Methodology Statement

Project Number:

ZZZ9999

Prepared for:

Internal Document

June 2019

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

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



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

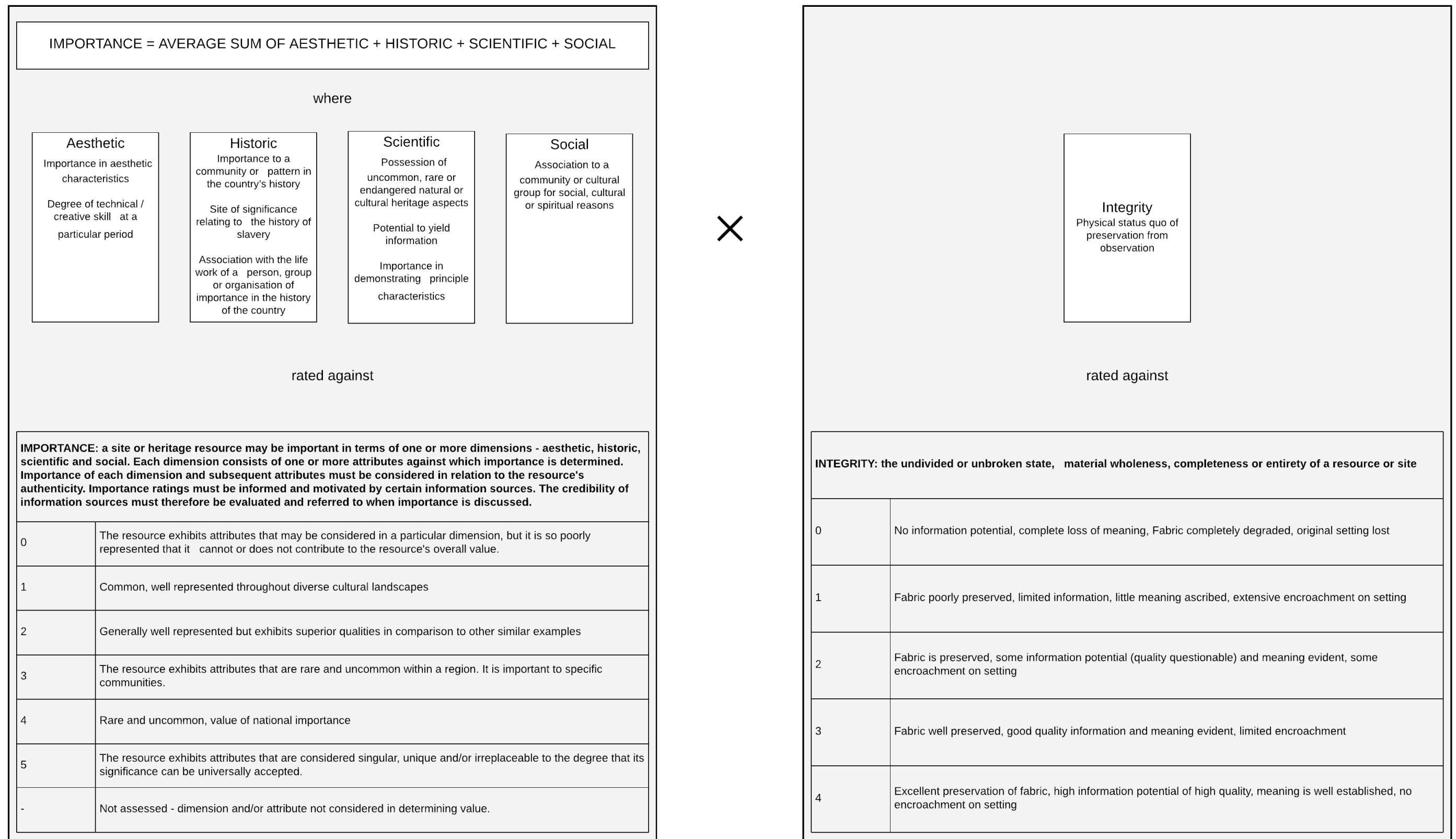


Figure 2-2: CS Determination Methodology

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.

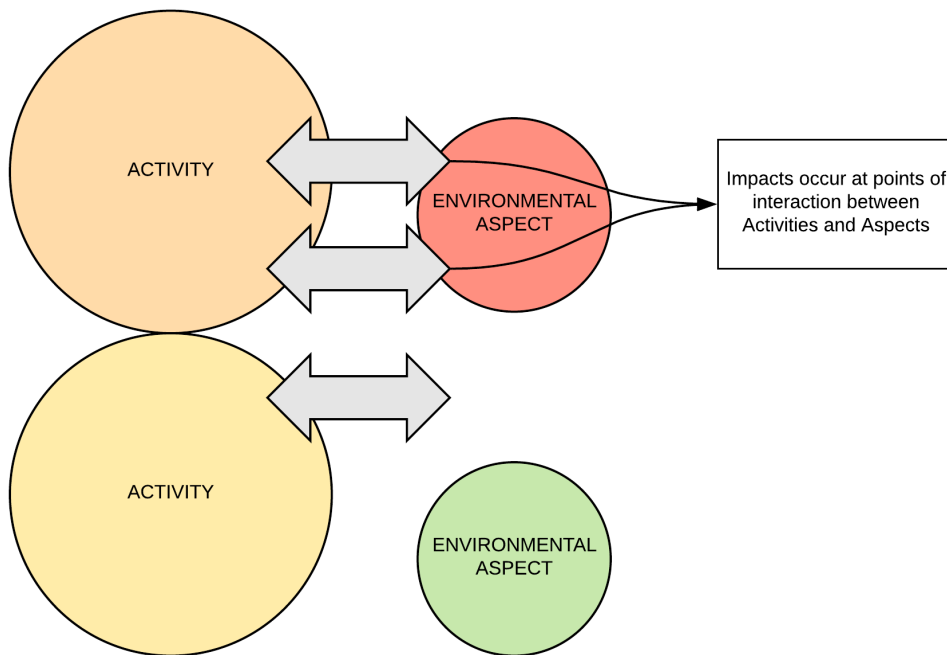


Figure 3-1: Graphical Representation of Impact Assessment Concept

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
		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.