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## Environmental Authorisation for the Temo Mine proposed Rail, Road and Pipeline Development, Limpopo Province

### Heritage Impact Assessment

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**Project Number:**

NAM5335

**Prepared for:**

Temo Coal Mining (Pty) Ltd

April 2019

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<b>Report Type:</b>	<b>Heritage Impact Assessment</b>
<b>Project Name:</b>	<b>Environmental Authorisation for the Temo Mine proposed Rail, Road and Pipeline Development, Limpopo Province</b>
<b>Project Code:</b>	<b>NAM5335</b>

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## DECLARATION OF INDEPENDENCE

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I, Shannon Hardwick as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Temo Coal Mining (Pty) Ltd, other than fair remuneration for work performed, specifically in connection with the Heritage Resources Management (HRM) Process for the Environmental Authorisation Application for the proposed infrastructure ancillary to the approved Temo Coal Mine near Lephalale in the Limpopo Province. This infrastructure includes a bulk water pipeline, a rail loop and a road diversion within the approved Mining Right Area.



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I, Justin du Piesanie as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Temo Coal Mining (Pty) Ltd, other than fair remuneration for work performed, specifically in connection with the Heritage Resources Management (HRM) Process for the Environmental Authorisation Application for the proposed infrastructure ancillary to the approved Temo Coal Mine near Lephalale in the Limpopo Province. This infrastructure includes a bulk water pipeline, a rail loop and a road diversion within the approved Mining Right Area.



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## EXECUTIVE SUMMARY

Temo Coal Mining (Pty) Ltd (hereinafter Temo) propose to construct ancillary infrastructure associated with their approved coal mining operation, the Temo Coal Mine (“Temo Mine”), near Lephalale in the Limpopo Province (“the Project”). The proposed ancillary infrastructure includes a road diversion, rail loop and water pipeline, which includes three alternative layout designs. Temo appointed Digby Wells to undertake the necessary Environmental Authorisation (EA) applications and Environmental Impact Assessment (EIA) process in compliance with the national South African legislative framework, specifically:

- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The NEMA EIA Regulations, 2017 (Government Notice Regulations [GN R] 982 as amended by GN R 326); and
- The National Water Act, 1998 (Act No. 36 of 1998) (NWA).

Digby Wells undertook a Heritage Resources Management (HRM) process to comply with Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and support the EIA process. This report constitutes the Heritage Impact Assessment (HIA) report.

No heritage resources were identified within 50 m of the Project development footprint, however, palaeontologically-sensitive geological formations underlay the proposed Project area. Digby Wells acknowledges the palaeontological sensitivity of these geological formations but reverts to the recent study completed by Bamford (2018) on adjacent properties that suggest that the exposure of fossils would be an uncommon event. This in conjunction with the results of the pre-disturbance survey that yielded no new heritage resources within the development footprint, suggests that no direct impacts to known heritage resources will occur. On the basis of this assessment, Digby Wells recommends and requests exemption from further heritage studies, including a field-based Palaeontological Impact Assessment (PIA) on condition a Chance Finds Procedure (CFP) and Fossil Finds Procedure (FFP) be developed to mitigate any identified low risks or unplanned events, should these occur. These procedures must be developed prior to the commencement of the construction phase of the Project.

Where these recommendations are implemented, Digby Wells endorses the implementation of the Project from a heritage perspective.

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## 1 Introduction

Temo Coal Mining (Pty) Ltd (hereinafter Temo), a subsidiary of the Namane Group, propose to construct ancillary infrastructure associated with their approved coal mining operation, the Temo Coal Mine (“Temo Mine”), near Lephalale in the Limpopo Province (“the Project”). The proposed ancillary infrastructure includes a road diversion, rail loop and water pipeline.

The proposed Project requires Environmental Authorisation (EA) in terms of the national South African legislative framework. To this effect, Temo appointed Digby Wells Environmental (hereinafter Digby Wells) to undertake an Environmental Impact Assessment (EIA) process in compliance with:

- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The NEMA EIA Regulations, 2017 (Government Notice Regulations [GN R] 982 as amended by GN R 326); and
- The National Water Act, 1998 (Act No. 36 of 1998) (NWA).

Digby Wells undertook a Heritage Resources Management (HRM) process to comply with Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and support the EIA process. This report constitutes the Heritage Impact Assessment (HIA) report for submission to the South African National Heritage Resources Agency (SAHRA) and the Limpopo Heritage Resources Agency (LIHRA).

### 1.1 Project location and background

The Project area is located within Wards 3, 4 and 13 of the Lephalale Local Municipality (LLM). This is located within the Waterberg District Municipality (WDM) of the Limpopo Province. The Project area is approximately 50 km west-northwest of the town of Lephalale and roughly 20 km north of Steenbokpan, although the proposed pipeline transects both these locations. Plan 1 presents an overview of the regional and local setting.

In 2011, Digby Wells undertook the relevant environmental and social assessments in support of the required EA for the establishment and operation of the Temo Mine. Temo proposes to mine using open-pit mining methodologies. Although the Mining Right Area (MRA) is situated across multiple farm portions, the coal pit itself is located exclusively on the farm Verloren Valey 246 LQ<sup>1</sup>.

This project was put on hold and subsequently reinstated. In 2013, the Department of Mineral Resources (DMR) approved Temo’s mining right for the Temo Coal<sup>2</sup>. Digby Wells then submitted the required studies to the competent authorities as required by the national legislative framework. Limpopo Department of Economic Development, Environment and

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<sup>1</sup> Refer to the Notification of Intent (NID) for a full list of the affected properties.

<sup>2</sup> Reference Number LP 30/5/1/2/2/199 MR.

Tourism (LEDET) authorised the Temo Mine in terms of the NEMA and NEMA EIA Regulations of 2010, which have since been repealed<sup>3</sup>.

The EA process in support of the Temo Mine included the submission of an Archaeological Impact Assessment (AIA) report, which was submitted to SAHRA and LIHRA online via the South African Heritage Resources Information System (SAHRIS)<sup>4</sup>. SAHRA issued Interim Comment<sup>5</sup> regarding this application. SAHRA required the following additional studies be undertaken before they can issue Final Comment:

- The burial grounds and graves must be conserved *in situ* if possible. Should this option be exercised, the proponent must develop and implement a Conservation Management Plan (CMP) to conserve and repair (where required) these heritage resources;
- Should it not be possible to conserve the graves *in situ*, the proponent must undertake a Burial Grounds and Graves Consultation (BGGC) process and Grave Relocation Process (GRP) in compliance with Section 36 of the NHRA<sup>6</sup>;
- A Heritage Officer from LIHRA must provide comment regarding any structures afforded general protection under Section 34 of the NHRA (i.e. structures older than 60 years); and
- An in-field Palaeontological Impact Assessment (PIA) process where the proposed mine is underlain by geological strata of very high palaeontological sensitivity.

Subsequently, Namane Generation (Pty) Ltd (hereinafter Namane Generation) undertook an EA process in support of a proposed Independent Power Producer (IPP) power plant and transmission line adjacent to the Temo Mine. This process also included an HRM component which was submitted to the HRAs<sup>7</sup>. SAHRA issued Interim Comment<sup>8</sup> which required the following before Final Comment can be issued:

- An in-field Palaeontological Impact Assessment (PIA) process where the proposed infrastructure is underlain by geological strata of very high palaeontological sensitivity; and
- A walk-down must be conducted of the final transmission line footprint prior to the commencement of the construction phase by a qualified archaeologist. The results of this walk-down must be summarised into a report which is submitted to SAHRIS.

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<sup>3</sup> The Record of Decision is dated 13 July 2015, reference number 12/1/9/2-W55.

<sup>4</sup> Digby Wells Project Numbers RSV689 and COM1723, SAHRIS Case ID 4763, accessible at: <https://sahris.sahra.org.za/cases/temo-coal-project>

<sup>5</sup> Dated 15 May 2014, accessible at: <https://sahris.sahra.org.za/node/162196>

<sup>6</sup> Chapter IX and XI of the NHRA Regulations, 2000 (GN R 548) must also be considered in this process.

<sup>7</sup> Case ID 8728, accessible at: <https://sahris.sahra.org.za/cases/namane-ipp-environmental-authorisation>

<sup>8</sup> Dated 22 June 2016, accessible at: <https://sahris.sahra.org.za/node/364732>

- Of the potential transmission line routing options, SAHRA recommended the option referred to as the Steenbokpan option be chosen, as no heritage resources were identified in proximity to the design footprint;
- Should this option not be feasible, and the proponent implement the alternative (Spitzkop) option, mitigation of a significant heritage resource will be required. The proponent must undertake this mitigation prior to the commencement of the construction phase and will require a permit issued by SAHRA in compliance with Section 35 of the NHRA.

These requirements are still applicable to the relevant project and, it is understood that these have not been met to date. It is, however, beyond of the scope of this HRM process to address these requirements. To date, neither the mine nor the IPP power station has entered their construction phase and no infrastructure has been developed to date.

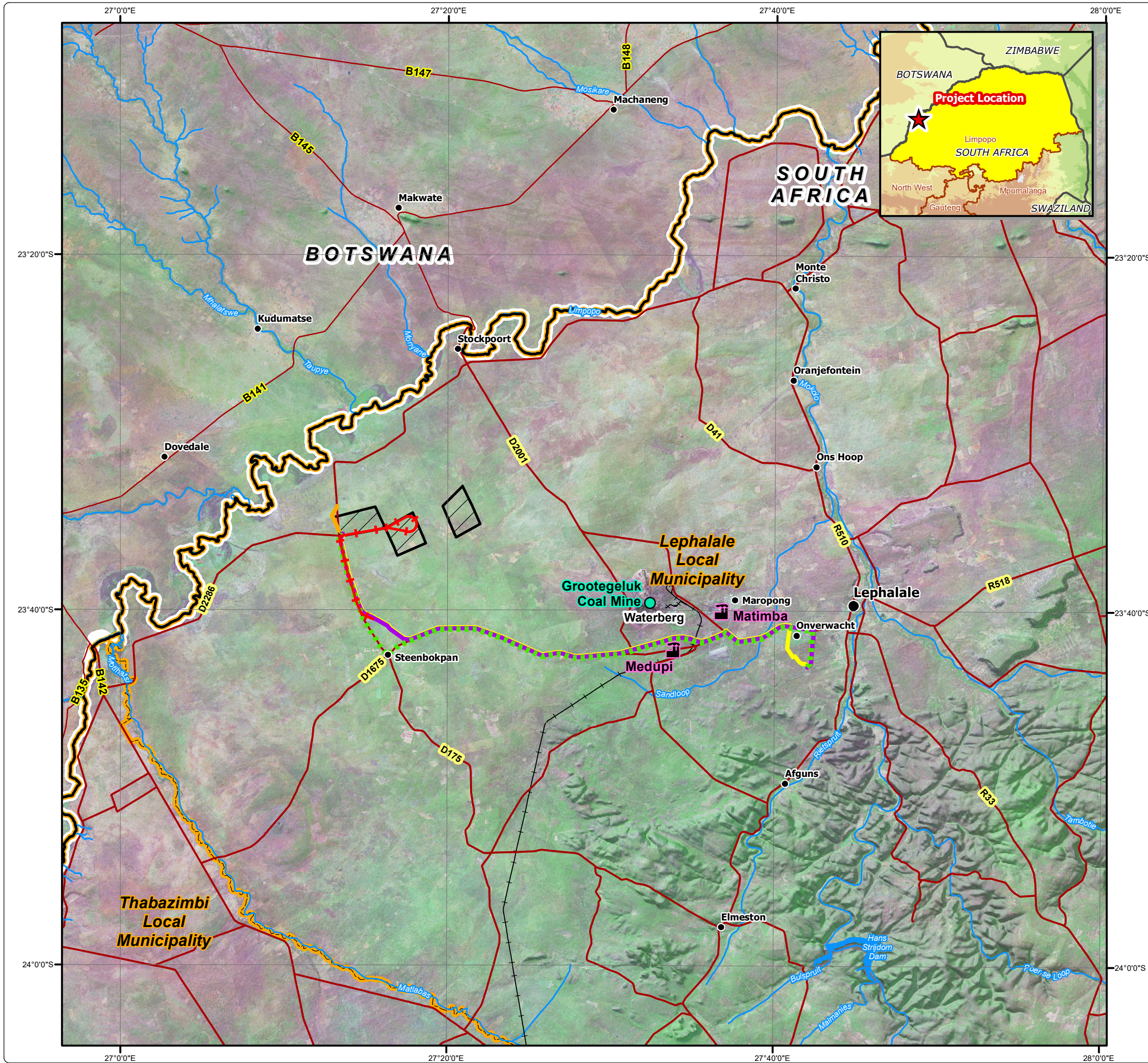
## 1.2 Project description

Currently, Temo Coal have proposed new infrastructure be developed within the MRA. This infrastructure was not assessed during the aforementioned EA processes and is considered crucial to the operation of the mine. The Project includes the following components:

- The diversion of road D175, which is situated above the coal reserves Temo intend to mine out. Temo proposes to move this road to a location where it will not be impacted by the open pit mine;
- A rail loop, which will enable Temo to transport export-grade coal to the Richards Bay Coal Terminal (RBCT); and
- A bulk water pipeline, which will transport water to the mine from the Lephalale Waste Water Treatment Works (WTWW). Temo is presently considering three pipelines, as described in Section 1.3

Plan 2 presents an overview of the proposed infrastructure and alternatives as described in Section 1.3.





# Temo Coal Mining

## Regional and Local Setting

### Legend

- Temo Coal Mining Right
- Power Station
- Grootegeluk Coal Mine
- Major Town
- Settlement
- Main Road
- Railway Line
- Perennial Stream
- Dam
- Waterberg District Municipality
- Local Municipality Boundary
- International Boundary

### Infrastructure

- Pipeline Option 1
- Pipeline Option 2
- Pipeline Option 3
- Rail Loop
- Road Deviation

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Projection: Transverse Mercator	Ref #: kam.NAM5335.201809.055
Datum: WGS 1984	Revision Number: 1
Central Meridian: 27°E	Date: 11/09/2018

1:400 000
















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# Temo Coal Mining

## Infrastructure Layout

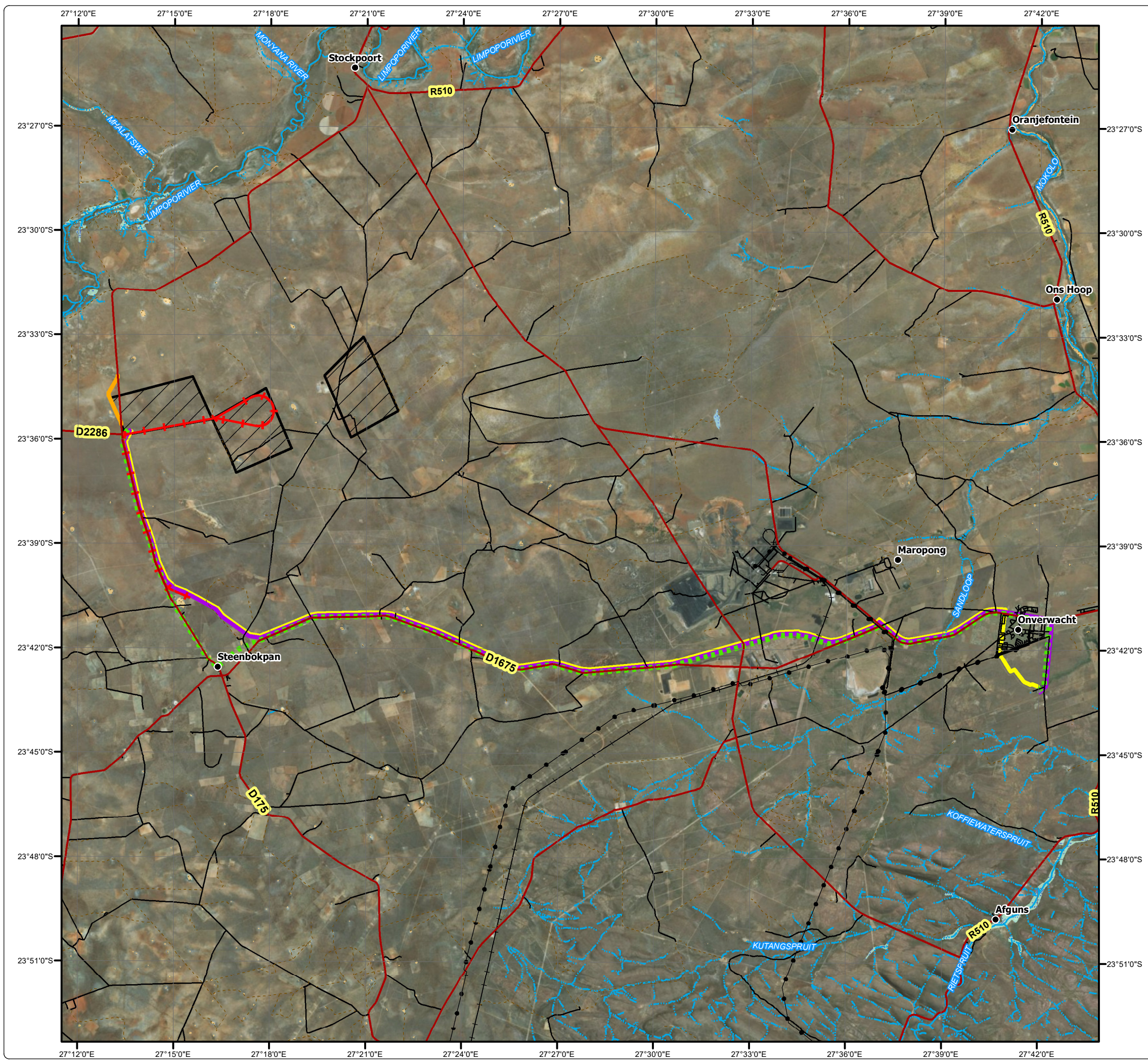
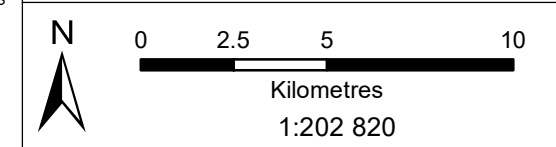
### Legend

-  Temo Coal Mining Right
  -  Settlement
  -  Power Line
  -  Main Road
  -  Minor Road
  -  Track
  -  Railway Line
  -  Non-Perennial Stream
  -  Perennial Stream
  -  Dam Wall
- ### Infrastructure
-  Pipeline Option 1
  -  Pipeline Option 2
  -  Pipeline Option 3
  -  Rail Loop
  -  Road Deviation



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Projection: Transverse Mercator      Ref #: per.NAM5335.201902.503  
 Datum: WGS 1984                              Revision Number: 1  
 Central Meridian: 27°E                        Date: 04/12/2018





### 1.3 Project alternatives

At present, Temo Coal are considering three pipeline routing options. Table 1-1 presents summarised descriptions of these options. These design layouts are focused within the existing servitudes of the established roads within the Project area and Lephalale town.

**Table 1-1: Summary of the three pipeline routing options**

Pipeline	Description	Length
1	The pipeline would run along the western side of the Onverwacht Road reserve towards Nelson Mandela Drive from the WWTP pump station before changing direction at the intersection of Onverwacht Road and Nelson Mandela Drive. From here, the pipeline would run along the southern side of the Nelson Mandela Drive road reserve. At the intersection with the D1675, the pipeline will run along the northern side of the D1675 road reserve towards Steenbokpan. At the intersection of the D1675 and D175, the pipeline will run along the eastern side of the road reserve to the Temo Mine.	64.5 km
2	This pipeline route is similar to Option 1, until the intersection of the D1675 and D175. For option 2, the pipeline would divert before the intersection and will travel along the eastern side of the railway reserve instead. In this option, the water will be pumped for the first 31.8 km and will then gravitate the rest of the way to the mine.	62.4 km
3	This option moves from the WWTP pump station through the farm Paarl to join Palala Drive on the western side. The pipeline will change alignment at the intersection of Palala and Nelson Mandela Drives to run along the southern side of the Nelson Mandela Drive road reserve. This option would then follow the same layout at Option 2 until it reaches the mine.	61.1 km

Another option to be considered is the “no-go” alternative. Should the Project not obtain approval, the potential environmental impacts associated with the construction, installation and utilisation of the proposed infrastructure would not occur. However, the potential benefits associated with the Project would also not occur.

The foreseen impacts will be described in Section 6 and recommendations regarding the various options are presented in Section 9.

### 1.4 Terms of Reference

The Terms of Reference (ToR) for the specialist heritage study were to conduct an HRM process in support of the EA application applicable to this Project. Digby Wells completed the HRM process in accordance with Section 38(8) of the NHRA.

## 1.5 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;
- Undertaking historical layering to identify potential structures older than 60 years that are afforded general protection under Section 34 of the NHRA, or any other tangible heritage resources;
- Assessment of the Cultural Significance (CS) of the identified heritage resources;
- Identification of potential impacts to heritage resources based on the Project description and Project activities;
- An evaluation of the potential impacts to heritage resources relative to the sustainable socio-economic benefits that may result from the Project;
- Recommending feasible management measures and/or mitigation strategies to avoid and/or minimise negative impacts and enhance potential benefits resulting from the Project; and
- Submission of the HIA report to SAHRA and LIHRA for Statutory Comment as required under Section 38(8) of the NHRA.

## 1.6 Expertise of the specialist

Table 1-2 presents a summary of the expertise of the specialists involved in the compilation of this report. The full CVs of these specialists have been included in Appendix A

**Table 1-2: Expertise of the specialists**

Team Member	Bio Sketch
<p><b>Shannon Hardwick</b></p> <p>ASAPA Member: 451</p> <p>Years' Experience: 2</p>	<p>Shannon joined the Digby Wells team in May 2017 as a Heritage Management Intern and has subsequently been appointed as an Assistant 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>

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

## 1.7 Compliance and structure of the report

Table 1-3 presents the structure for the remainder of the report and indicates where each section meets the information requirements encapsulated in the NHRA and Appendix 6 of Government Notice Regulation (GN R) 326 of 07 April 2017.

**Table 1-3: Structure of the report**

Section	Description	App. 6	NHRA
ii and iii	Declaration that the report author(s) is (are) independent.	(b)	-
1.4 1.5	An indication of the scope of, and the purpose for which, the report was prepared.	(c)	-
1.6	Details of the person who prepared the report and their expertise to carry out the specialist study.	(a)	-

Section	Description	App. 6	NHRA
2	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.	(i)	-
0	Describes the methodology employed in the compilation of this HIA.	(e)	-
4.4	An indication of the quality and age of base data used for the specialist report.	(cA)	-
4.5	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment.	(d)	-
5	Provides the baseline cultural landscape.	-	38(3)(a)
6	Motivates for the defined CS of the identified heritage resources and landscape.	-	38(3)(b)
	A description of the potential impacts to heritage resources by project related activities, including: <ul style="list-style-type: none"> <li>- Existing impacts on the site;</li> <li>- Possible risks to heritage resources;</li> <li>- Cumulative impacts of the proposed development;</li> <li>- Acceptable levels of change; and</li> <li>- Heritage-related risks to the project.</li> </ul>	(cB)	38(3)(c)-
	A description of the findings and potential implications of such findings on the impact of the proposed activity or activities.	(j)	38(3)(c)
6 Plan 4	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.	(f)	-
7	Considers the development context to assess the socio-economic benefits of the project in relation to the presented impacts and risks.	-	38(3)(d)
8	A description of any consultation process that was undertaken during the course of preparing the specialist report and the results of such consultation.	(o)	38(3)(e)
	A summary and copies of any comments received during any consultation process and where applicable all responses thereto.	(p)	38(3)(e)

Section	Description	App. 6	NHRA
9	Details the specific recommendations based on the contents of the HIA.	-	38(3)(g)
	An identification of any areas to be avoided, including buffers.	(g)	
	Any mitigation measures for inclusion in the EMPr.	(k)	
	Any conditions for inclusion in the environmental authorisation.	(l)	
	Any monitoring requirements for inclusion in the EMPr or environmental authorisation.	(m)	
9 10	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	(n)	38(3)(g)
10	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)
11	Lists the source material used in the development of the report.	(cA)	-
Plan 4	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	(h)	-
See above	Any other information requested by the competent authority.	(q)	-

## 2 Legislative and policy framework

The HRM process is governed by the national legislative framework. This section provides a summary of the relevant legislation pertaining to the conservation and responsible management of heritage resources.



**Table 2-1: Applicable legislation considered in the HRM process**

Applicable legislation used to compile the report	Reference where applied
<p><b><u>Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</u></b></p> <p>Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that –</p> <ol style="list-style-type: none"> <li>i. Prevent pollution and ecological degradation;</li> <li>ii. Promote conservation; and</li> <li>iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development</li> </ol>	<p>The HRM process is being 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 will be recommended to ensure that any potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution.</p>
<p><b><u>National Environmental Management Act, 1998 (Act No. 107 of 1998)</u></b></p> <p>The NEMA, as amended, was set in place in accordance with section 24 of the Constitution of the Republic of South Africa. Certain environmental principles under NEMA have to be adhered to, to inform decision making on issues affecting the environment. Section 24 (1)(a), (b) and (c) of NEMA state that:</p> <p><i>The potential impact on the environment, socio-economic conditions and cultural heritage of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.</i></p> <p>The Environmental Impact Assessment (EIA) Regulations, Government Notice Regulation (GN) R.982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R.983 (Listing Notice No. 1), GN R.984 (Listing Notice No. 2) and GN R.985 (Listing Notice No. 3) in terms of Sections 24(2) and 24D of the NEMA, as amended.</p>	<p>The application process is being undertaken in accordance with the principles of Section 2 of NEMA as well as with the EIA 2017 Regulations, promulgated in terms of NEMA.</p>

Applicable legislation used to compile the report	Reference where applied
<p><b><u>GN R. 982: Environmental Impact Assessment Regulations, 2014 (as amended by GN R 326 of 7 April 2017)</u></b></p> <p>These three listing notices set out a list of identified activities which may not commence without an Environmental Authorisation from the relevant Competent Authority through one of the following processes:</p> <ul style="list-style-type: none"> <li>▪ Regulation GN R. 983 - Listing Notice 1: This listing notice provides a list of various activities which require environmental authorisation and which must follow a basic assessment process.</li> <li>▪ Regulation GN R. 984 – 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.</li> <li>▪ Regulation GN R. 985 – Listing Notice 3: This notice provides a list of various environmental activities which have been identified by provincial governmental bodies which if undertaken within the stipulated provincial boundaries will require environmental authorisation. The basic assessment process will need to be followed.</li> </ul>	<p>Refer to the Notification of Intent to Develop (NID) report for a full description of the Listed Activities triggered by the proposed Project. Triggered Activities include Activity 9, 12, 24, 27 and 64 of Listing Notice 1.</p> <p>To comply with the regulations, an EIA process must be completed in support of Environmental Authorisation. This HIA was completed to inform the EIA process to comply with Section 24 of the NEMA.</p>
<p><b><u>National Water Act, 1998 (Act No. 36 of 1998) (NWA)</u></b></p> <p>Part 7 of the NWA outlines the requirements for individual applications for licences and Part 8 outlines the requirements in terms of compulsory licences for water use in respect of a specific resource.</p> <p>The responsible authority may request additional information from an applicant in terms of Part 7 or Part 8. Such additional information may include an environmental or other assessment to be undertaken in terms of the NEMA and which is to be considered alongside the application.</p>	<p>An environmental assessment was undertaken in compliance with the NEMA and NEMA EIA Regulations, which also satisfies the requirements of the NWA and may supplement the Water Use Application (WUL).</p> <p>This HIA was completed to inform the environmental assessment and comply with Section 24 of the NEMA</p>

Applicable legislation used to compile the report	Reference where applied
<p><b><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></b></p> <p>The NHRA is the overarching legislation that protects and regulates the management of heritage resources in South Africa, with specific reference to the following Sections:</p> <ul style="list-style-type: none"> <li>▪ 5. General principles for HRM</li> <li>▪ 6. Principles for management of heritage resources</li> <li>▪ 7. Heritage assessment criteria and grading</li> <li>▪ 38. Heritage resources management</li> </ul> <p>The Act requires that Heritage Resources Authorities (HRAs), in this case SAHRA and MPRHA, be notified as early as possible of any developments that may exceed certain minimum thresholds in terms of Section 38(1), or when assessments of impacts on heritage resources are required by other legislation in terms of Section 38(8) of the Act.</p>	<p>The HIA was compiled to comply with Section 5, 38(3), (4) and (8) of the NHRA. This HIA was submitted to the responsible HRAs, which in this instance is SAHRA and LIHRA.</p>

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

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

### 3 Constraints and limitations

Digby Wells encountered constraints and limitations during the compilation of this report. Table 3-1 presents an overview of these limitations and the consequences.

**Table 3-1: 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 5 below is considered accurate, but may not include new data or information which may not have been made available to the public.</p>
<p>Results from previously-completed heritage assessments as sourced from SAHRIS, that may have formed part of the Project area were not verified in-field.</p>	<p>It is assumed the previously recorded heritage resources are accurate and true.</p>

Description	Consequence
<p>Access could not be gained to certain properties at the time of the pre-disturbance survey. These properties include:</p> <ul style="list-style-type: none"> <li>■ Veloren Valey 246;</li> <li>■ Nazarov 685;</li> <li>■ Slangkop 296; and</li> <li>■ Steenbokpan 295</li> </ul>	<p>These properties were not subject to a physical pre-disturbance survey by the heritage specialist.</p> <p>The road diversion takes place over the farms Veloren Valey 246 and Nazarov 685. These properties were surveyed as part of a previous HRM process<sup>9</sup>.</p> <p>Pipeline options 2 and 3 transverse the farms Slangkop 296 and Steenbokpan 295. Should either pipeline option be chosen as the final design layout, previously unidentified heritage resources may be encountered. Should this occur, Temo 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>
<p>Whilst every attempt was made to survey the extent of the site-specific study area<sup>10</sup>, 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, Temo 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>
<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 in themselves limited to surface observations.</p> <p>Subsurface tangible heritage may be exposed during Project activities. Should this occur, Temo 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>

<sup>9</sup> The fieldwork for the above-mentioned process for the proposed IPP power station included these properties. The results were not discussed in the report, but field notes were available to inform this assessment.

<sup>10</sup> Refer to Section 4.1 for a description of the study area.

## 4 Methodology

### 4.1 Defining the study area

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

- *Development footprint area*: the surface area which may potentially be affected by the activities described in Section 1.1. The three pipeline options are considered within the development footprint area. The development footprints constitute linear developments and will include a 200 m buffer on either side of the footprint;
- The *site-specific study area*: the farm portions extent associated with the proposed Project. Refer to the Notification of Intent of Development (NID) for a full list of the affected properties;
- 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. Defined as the area bounded by the local municipality, in this instance the LLM, with particular reference to the immediate surrounding properties and/or farms. The local study area was specifically examined to offer a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provided the local development and planning context that may contribute to cumulative impacts; and
- The *regional study area*: the area bounded by the district municipality, which here is WDM. Where necessary, the regional study area may be extended outside the boundaries of the district municipality to include much wider regional expressions of specific types of heritage resources and historical events. The regional study area also provided the regional development and planning context that may contribute to cumulative impacts.

Plan 1 shows the spatial relationship between the different study areas.

### 4.2 Statement of Cultural Significance

Digby Wells designed the significance rating process to provide a numerical rating of the CS of identified heritage resources. This process considers heritage resources assessment criteria set out in subsection 3(3) of the NHRA, which determines the intrinsic, comparative and contextual significance of identified heritage resources. A resource's importance rating

is based on information obtained through review of available credible sources and representativity or uniqueness (i.e. known examples of similar resources to exist).

The rationale behind the heritage value matrix considers 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.

### 4.3 Definition of heritage impacts

Potential impacts to heritage resources may manifest differently across geographical areas or diverse communities when one considers the simultaneous effect to the tangible resource and social repercussions associated with the intangible aspects. Furthermore, potential impacts may concurrently influence the CS of heritage resources. This assessment therefore considers three broad categories adapted from Winter & Baumann (2005, p. 36). These are described in Table 4-1.

**Table 4-1: 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.



Category	Description
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"> <li>▪ Additive: the simple sum of all the effects, e.g. the reclamation of a historical TSF will minimise the sense of the historic mining landscape.</li> <li>▪ Synergistic: effects interact to produce a total effect greater than the sum of the individual effects, e.g. the removal of all historical TSFs will sterilise the historic mining landscape.</li> <li>▪ Time crowding: frequent, repetitive impacts on a particular resource at the same time, e.g. the effect of regular blasting activities on a nearby rock art site or protected historical building could be high.</li> <li>▪ Neutralizing: where the effects may counteract each other to reduce the overall effect, e.g. the effect of changes from a historic to modern mining landscape could reduce the overall impact on the sense-of-place of the study area.</li> <li>▪ Space crowding: high spatial density of impacts on a heritage resource, e.g. density of new buildings resulting in suburbanisation of a historical rural landscape.</li> </ul>

#### 4.4 Secondary data collection

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

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

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

Section 11 provides a detailed list of all data sources consulted in the compilation of this report, including published literature. Table 4-2 lists the unpublished reports and databases consulted in the literature review. 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 4-2: Secondary data sources consulted in this report**

Secondary Data Sources		
Databases		
Genealogical Society of South Africa (GSSA) database (2011)	University of the Witwatersrand (WITS) Archaeological Database (2010)	
SAHRIS		
SAHRIS Cases		
Case ID: 6249	Case ID: 2123	Case ID: 10767
Case ID: 4763	Case ID: 2512	Case ID: 8728
Case ID: 3118	Case ID: 1647	Case ID: 881
Case ID: 569	Case ID: 5091	

Table 4-3 below lists the sources of historical imagery. Historical layering is a process whereby diverse cartographic sources from various time periods are layered chronologically using Geographic Information Systems (GIS). The rationale behind historical layering is threefold, as it:

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

**Table 4-3: Aerial imagery considered**

Aerial photographs					
Job no.	Flight plan	Photo no.	Area	Date	Ref.
216	Row 011	00430	Ellisras / Pietersburg	1949	216/1949
216	Row 011	00431	Ellisras / Pietersburg	1949	216/1949
216	Row 011	0434	Ellisras / Pietersburg	1949	216/1949
216	Row 012	00467	Ellisras / Pietersburg	1949	216/1949
216	Row 012	00469	Ellisras / Pietersburg	1949	216/1949
216	Row 012	00470	Ellisras / Pietersburg	1949	216/1949
216	Row 012	00471	Ellisras / Pietersburg	1949	216/1949
216	Row 012	00472	Ellisras / Pietersburg	1949	216/1949

Aerial photographs					
Job no.	Flight plan	Photo no.	Area	Date	Ref.
216	Row 012	00473	Ellisras / Pietersburg	1949	216/1949
216	Row 013	00917	Ellisras / Pietersburg	1949	216/1949
216	Row 013	00918	Ellisras / Pietersburg	1949	216/1949
216	Row 014	36625	Ellisras / Pietersburg	1949	216/1949
216	Row 015	01023	Ellisras / Pietersburg	1949	216/1949

#### 4.5 Primary data collection

Shannon Hardwick undertook a pre-disturbance survey of the affected infrastructure footprints on 28 and 29 January 2019. The pre-disturbance survey was undertaken on foot and by vehicle. Where a pedestrian survey was deemed unsafe (i.e. where the pipeline footprints run alongside tarred roads), the survey was done from a vehicle.

The survey was non-intrusive (i.e. no sampling was undertaken) with the aim to:

- Visually record the current state of the cultural landscape;
- Ground-truth certain heritage resources identified in the historical imagery; and
- Record a representative sample of visible tangible heritage resources present within the development footprint, site-specific and local study areas.

Identified heritage resources are recorded as waypoints using handheld GPS and documented through written and photographic records. The GPS data are provided in Plan 4.

#### 4.6 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. 8728/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 4-4 presents a list of the relevant period and feature codes (refer to Section 5 for an explanation of what these terms mean).

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

Feature or Period Code	Feature or Period	Includes
SA	Stone Age	All Section 35 archaeological material relevant to this period.
FC	Farming Community	All Section 35 archaeological material relevant to this period.
HBE	Historical Built Environment	All Section 34 heritage resources.
BGG	Burial Grounds and Graves	All Section 36 heritage resources.

Heritage resources identified through secondary data collection were prefixed by the relevant SAHRIS case or map identification number (*where applicable*) and the original site name as used by the author of that assessment (e.g. 2881/Site 1).

## 5 Cultural heritage baseline description<sup>11</sup>

The cultural heritage baseline description considered the predominant geological context and cultural landscape based on the identified heritage resources within the regional and local study area. Table 5-1 presents a summary of the relevant archaeological periods. Plan 3 presents an overview of these heritage resources and their spatial relation to the Project area.

**Table 5-1: Archaeological periods in South Africa adapted from Esterhuysen & Smith (2007)**

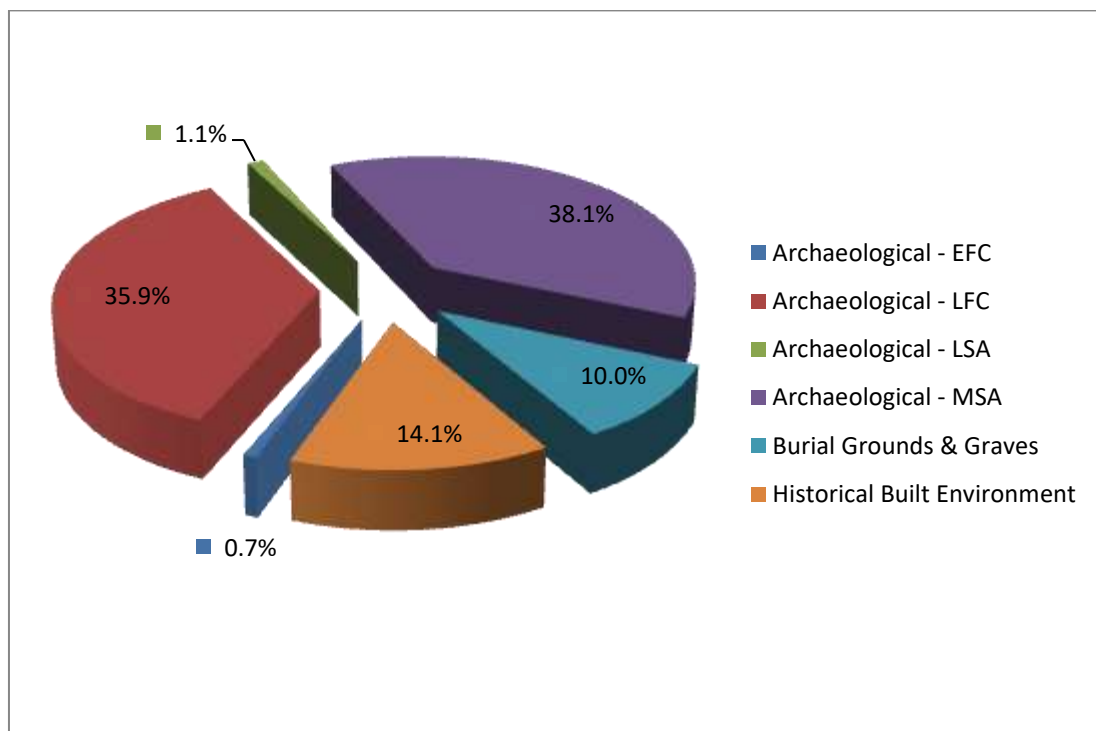
<b>The Stone Age</b>	Early Stone Age (ESA)	2 million years ago (mya) to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era <sup>12</sup> )
<b>Farming Communities</b>	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE

<sup>11</sup> This section was compiled by the heritage consultant, but has been reviewed and accepted by a suitably-qualified palaeontologist.

<sup>12</sup> Common Era (CE) refers to the same period as *Anno Domini* ("In the year of our Lord", referred to as AD): i.e. the time after the accepted year of the birth of Jesus Christ and which forms the basis of the Julian and Gregorian calendars. Years before this time are referred to as 'Before Christ' (BC) or, here, BCE (Before Common Era).

<b>Historical Period</b>	-	1500 CE to 1994 (Behrens & Swanepoel, 2008)
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In total, 270 heritage resources were identified within the regional, local and site-specific study areas. Figure 5-1 illustrates the breakdown of the identified heritage resources. Expressions of resources associated with the palaeontological, MSA, LSA and LFC periods have been recorded within the greater study area. However, the historical period, including the historical built environment and burial grounds and graves, dominate the tangible heritage resources identified within the area under consideration.


















**Figure 5-1: Heritage resources identified within the greater study area**










# Temo Coal Mining

## HRM Matrix

### Legend

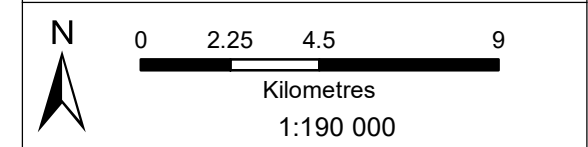
-  Temo Coal Mining Right
  -  Settlement
  -  Power Line
  -  Main Road
  -  Minor Road
  -  Track
  -  Railway Line
  -  Non-Perennial Stream
  -  Perennial Stream
  -  Dam Wall
- ### Infrastructure
-  Pipeline Option 1
  -  Pipeline Option 2
  -  Pipeline Option 3
  -  Rail Loop
  -  Road Deviation

- ### Heritage Points
-  Burial Grounds and Graves
  -  Historic Site
  -  Built Environment
  -  Farming Community
  -  Middle Stone Age & Farming Community
  -  Middle Stone Age
  -  Later Stone Age



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

Projection: Transverse Mercator      Ref #: per.NAM5335.201902.501  
 Datum: WGS 1984                              Revision Number: 1  
 Central Meridian: 27°E                        Date: 14/02/2019





The project area overlies both the Waterberg Basin and the Ellisras Basin and, as such, the regional geology of the Project area and its surrounds is dominated by the various layers of the Karoo Supergroup and the Waterberg Group.

The Waterberg Basin consists of the various layers of the Waterberg Group and the *Glentig Formation* (Johnson, et al., 2006). The Waterberg Group is one of three geological features thought to be deposited in succession between 2 000 and 1 700 mya. This period represents the first time in the Earth's geological past where free oxygen was available in large enough quantities to result in the oxidisation of ferruginous metals. This resulted in the formation of deposits referred to as "red beds".

The Waterberg Group is divided into three subgroups: the Nylstroom, Matlabas and Kransberg Subgroups (Johnson, et al., 2006). Within the Project area, the Kransberg Subgroup represents the Waterberg Group. The Kransberg Subgroup consists of four formations: the *Mogalakwena*, *Sandriversberg*, *Cleremont* and *Vaalwater Formations*. These formations consist of sandstones and conglomerates with minor mudrocks. Within the Project area, the *Mogalakwena Formation* is the most relevant.

The geomorphology of these deposits suggests they were formed within braided stream environments, and may include beach, lacustrine and tidal flat or marine shelf deposits as well as Aeolian deposits (Johnson, et al., 2006; SAHRA, 2013). All four of these formations are considered of low palaeontological sensitivity although they have the potential to include fossilised terrestrial cyanobacterial mats from playa lake deposits (SAHRA, 2013).

The Ellisras Basin consists of deposits representing seven formations of the Karoo Supergroup and of varying palaeo-sensitivity and different depositional environments. These include, from oldest to most recent (Johnson, et al., 2006; SAHRA, 2013; Groenewald & Groenewald, 2014):

- The *Waterkloof Formation*: the basal unit of the Ellisras Formation, these layers lie unconformably on Waterberg and pre-Waterberg rocks. The unit comprises diamictite and conglomerates which appear to have been deposited in a glaciolacustrine environments ahead of retreating glaciers;
- The *Wellington Formation*: a unit developed only in the southern portion of the Ellisras Basin. This unit is characterised by mudstone and siltstone with some sandstone lenses and scattered granule-sized clasts. This unit represents suspension deposits which were formed in a large body of standing water. The scattered granules may represent 'rain out' episodes derived from drifting ice;
- The *Swarttant Formation*: This unit reaches a maximum thickness of 130 m and has been divided into three zones. Collectively, these zones include layers of mudstones, siltstones and sandstones in repetitive layers. The upper zone may represent a depositional crevasse-play environment with deposits also occurring as infills of small channels and isolated swamps. The middle zone appears to have been formed through a glaciolacustrine environment with scattered icebergs. The lower zone appears to have been formed through a delta front which formed through the east;



- The *Goedgedacht Formation*: This unit occurs only in the central and northern parts of the Ellisras Basin. This unit consists of mudstones and includes angular grains of quartz, intraformational clay pellets and impure coal. The depositional environment was most likely a proglacial environment with depositional action undertaken by braided streams on the fan surface;
- The *Grootegeluk Formation*: the most economically important unit in the Ellisras Basin, as it includes several thick coal seams. This unit consists of coal, carbonaceous shale and mudstone and imprints of *Glossopteris*<sup>13</sup> flora are common throughout this formation. These layers were most likely deposited in an environment characterised by poorly-drained swamps which led to the formation of peat. This maximum thickness of this layer is 110 m and, in the central and northern areas, it interdigitates with the *Goedgedacht Formation*;
- The *Eendragtpan Formation*: geological layers composed entirely of variegated mudstones with scattered white reduction spots occurring throughout. This formation signifies a change in environment from the *Grootegeluk Formation* through the complete absence of coal as well as changes in colour. These mudstones are reddish and, towards the top of the feature, more purplish. This suggests that the layers were deposited in oxidising conditions under subaerial conditions. The depositional environment was most likely a low-energy, well-drained environment such as a flood-basin or floodplain;
- The *Greenwich Formation*: this formation comprises mainly of sandstone or granulestone with local, thin conglomerate lenses and thin intercalations of mudstones may also be present. The thickness of this layer ranges from 7 m to 33 m and appear to have been formed as channel deposits from braided streams;
- The *Lisbon Formation*: a succession of (dominantly red) mudstone and siltstone, the latter of which includes many calcareous concentrations. These deposits may have been created through deposition on an extensive floodplain by meandering rivers, although some deposits appear to be Aeolian in nature. The red colour and lack of plant material indicate that these layers were formed in dry and warm (oxidising) conditions; and
- The *Clarens Formation*: predominantly comprised of sandstones, these deposits appear to comprise Aeolian deposits. Some deposits may have been created by small, ephemeral streams.

Table 5-2 provides an overview of the relevant geological sequence and the palaeo-sensitivity of the various formations within the Ellisras Basin.

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<sup>13</sup>Plant species which occur together and are typified by the dominant fossil leaves that belong to the glossopterid group

Table 5-2: Truncated geological sequence and palaeontological sensitivity for the local study area

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

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

The Stone Age in southern Africa comprises three broad phases, defined by the lithic tools and other material culture produced by the various hominid species through time. These phases are: the ESA, the MSA and the LSA (refer to Table 5-1 for the full titles and timeframes of these periods). Archaeological evidence within the Limpopo Province suggests that hominids have inhabited the present-day province since the ESA. No expressions of the ESA have been identified within the regional study area, and so this period is not considered further in this report.

The MSA dates from approximately 300 kya to 20 kya. Early MSA lithic industries are characterised by high proportions of blades, which have been minimally modified and which were created using the Levallois technique (Clark, 1982; Deacon & Deacon, 1999). The use of good quality raw material defines this period, as does the use of bone tools, ochre, beads and pendants. MSA artefacts are usually associated with water sources, for example pans and the Limpopo River. However, these finds are often not found *in situ* and therefore offer limited contextual information.

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

The LSA dates between 40 kya to the historical period. LSA lithics are specialised where specific tools have been created for specific tasks (Mitchell, 2002). Bone points are included in LSA assemblages, which also commonly include diagnostic tools such as scrapers and segments. As with the MSA artefacts, LSA artefacts are usually associated with water sources and are not usually found *in situ*.

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

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

EFC and LFC sites can be identified through secondary tangible surface indicators, such as ceramics and evidence for the domestication of animals (such as faunal remains or dung deposits). Both the EFC and LFC periods are represented by ceramics in the identified cultural heritage landscape, although the EFC accounts for only 0.7% of the records (2 records). The EFC is represented within the regional study area by isolated ceramic sherds (*fragments of pottery*), decorated in styles associated with the Baratani / Happy Rest / Mambo ceramic facies (Karaodia & Higgitt, 2013).

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

Within the identified literature, the LFC is represented by:

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

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

The historical period<sup>14</sup> is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is artificial, as there is a large amount of overlap between the two.

The first Potgietersrus Platinum Mine was established in the 1920s near the town of Potgietersrus (now known as Mokopane) (Environomics CC & NRM Consulting, 2010). The Platreef was mined until the 1930s, when the platinum industry collapsed. This industry only boomed again during the latter half of the 1900s.

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<sup>14</sup> In southern Africa, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented, but is being explored through the 500 Year Initiative (Swanepoel, et al., 2008).

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

The built environment sites include historical farmsteads and farmhouses and churches. The historical sites include surveyor posts and middens.

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

## 5.1 Site-specific heritage baseline description

### 5.1.1 Existing environment

The natural environment within which the Project is situated is classified as Limpopo Sweet Bushveld<sup>15</sup> by Mucina and Rutherford (2010). This vegetation unit is classified as a Central Bushveld type and is characterised by plains transversed by the various tributaries of the Limpopo River Valley. This vegetation unit is predominantly underlain by the Malala Drift Group, Biet Bridge Complex and the Letaba Formation, but is also associated with the Clarens Formation and Matlabas Subgroup.

This vegetation unit comprises short, open woodland and in disturbed areas, nearly-impenetrable sicklebush (*Dichrostachys cinerea*), Blackthorn (*Senegalia mellifera*) and Blue Thorn (*Vachellia erubescens*) thickets occur (Mucina & Rutherford, 2010). This vegetation unit includes one biogeographically important taxon: the succulent herb *Piранthus atosanguineus*. This species is endemic to the Central Bushveld. The species is considered of Least Concern in terms of conservation status. The vegetation unit is considered Least Threatened.

The Limpopo Sweet Bushveld, despite its low rainfall, is a good environment for cattle and game farming as the vegetation has a high capacity for grazing (Mucina & Rutherford, 2010). Cattle and game farming are an important component of the agricultural and tourism industries of the local and district municipalities (LLM, 2018; WDM, 2018).

Within the road diversion and rail-loop infrastructure areas, the natural environment does not appear to be heavily disturbed, with the exception of roads and communication

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<sup>15</sup> Vegetation Unit SVcb 19.

infrastructure. This area is characterised by game and cattle farming on affected and neighbouring farms. The pipeline routing options cross areas heavily disturbed through anthropogenic activity. The pipelines occur within the servitudes of existing roads, where possible. These roads include dirt roads, small tar roads and larger tar roads and exist partially in an urban environment (Lephalale Town). The proposed pipeline routes occur in proximity to the Medupi Power Station, and within the town, shopping malls, residential developments, a tertiary education institution and several businesses. Pipeline Option 3 will potentially run adjacent to the primary school and will need to pass under one or more residential homes to reach the WWTWs.

### **5.1.2 Previously-identified heritage resources**

Plan 3 presents a summary of the heritage resources identified through prior heritage assessments in proximity to the Project area. Identified heritage resources represent the Stone Age, Farming Communities and, to a lesser degree, the historical periods.

No impact to these previously-identified heritage resources is envisaged from the Project. However, should the Project present the risk of impact, Temo must heed the CS of those resources as described by their original assessor and must undertake mitigations that may be recommended in the reports relevant to any such heritage resource.

## **5.2 Results from the pre-disturbance survey**

Shannon Hardwick undertook a non-intrusive vehicular and pedestrian pre-disturbance survey of the affected infrastructure footprints on 28 and 29 January 2019. The GPS data are provided in Plan 4.

No heritage resources or palaeontological surface features (i.e. outcrops of palaeontologically significant formations) were identified within the proposed development footprints or within 50 m of these footprints. As described in Section 5.1.1, the pipeline options are located within areas highly disturbed by human settlement.

Historical layering was undertaken to identify potential structures that may be older than 60 years and would therefore be protected under Section 34 of the NHRA. Some potential structures were identified on the historical map, only one of which was within 100 m of the proposed development footprints. This was ground-truthed on site during the pre-disturbance survey, however, no structure was visible. No Section 34 heritage resources were identified within the Project area.

















**Figure 5-2: Current Environment at the time of the pre-disturbance survey**








# Temo Coal Mining Heritage Pre-disturbance Survey

## Legend

-  Temo Coal Mining Right
-  Heritage Tracks
-  Major Town
-  Settlement
-  Power Line
-  Main Road
-  Minor Road
-  Track
-  Railway Line
-  Non-Perennial Stream
-  Perennial Stream
-  Dam Wall

## Infrastructure

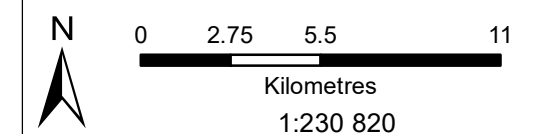
-  Pipeline Option 1
-  Pipeline Option 2
-  Pipeline Option 3
-  Rail Loop
-  Road Deviation



**DIGBY WELLS**  
ENVIRONMENTAL

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

Projection: Transverse Mercator      Ref #: per.NAM5335.201902.500  
Datum: WGS 1984      Revision Number: 1  
Central Meridian: 27°E      Date: 14/02/2019





## 6 Impact assessment

This report considered the potential impacts that may be caused through the construction and operation of the proposed ancillary infrastructure as described in Section 1.2. No heritage resources were identified within the development footprint study area and therefore no direct impact to heritage resources is envisaged. No direct impact to heritage resources is envisaged to heritage resources previously identified through prior assessments.

No surface outcrops of the palaeontologically significant layers described in Section 5 were identified during the pre-disturbance survey, although it must be noted that this survey was not undertaken by a palaeontological specialist. However, the Project is understood to have superficial surface disturbance and is therefore unlikely to impact any palaeontologically-sensitive geological layers.

### 6.1 Cumulative impacts on the cultural landscape

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

This Project in conjunction with other planned developments in line with the strategic development plans for the Limpopo Province requires consideration to identify the possible in-combination effects of various impacts to known heritage resources. The possible cumulative impacts of the Project are presented in Table 6-1.

**Table 6-1: Summary of potential cumulative impacts**

Type	Cumulative Impact	Direction of Impact	Extent of Impact
Additive, Synergistic	<p>The construction of the proposed pipeline will add to the existing body of mining-related and transport infrastructure in the area and will contribute to the degradation of the sense of place of the cultural landscape.</p> <p>Considering the greater development landscape, the effects from the various proposed developments will interact to produce a total greater effect on the cultural landscape and degradation thereof.</p>	Negative	Local

## 6.2 Low risks and unplanned events

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

No heritage resources were identified during the pre-disturbance survey. If heritage resources are subsequently identified, and where Temo knowingly does not take proactive management measures, potential risks to Temo may include litigation in terms of Section 51 of the NHRA and social or reputational repercussions. A summary of the primary risks that may arise for Temo is presented in Table 6-2.

**Table 6-2: Identified heritage risks that may arise for Temo**

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 SAHRA and/or MPRHA in terms of Section 38(8).
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 LIRHA.	Fines Penalties Seizure of Equipment Compulsory Repair / Cease Work Orders Imprisonment

In the event that heritage resources are identified during construction of the pipeline, diverted road and/or the railway loop, potential risks to those heritage resources will need to be assessed. Table 6-3 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 6-3: Identified unplanned events and associated impacts**

Unplanned event	Potential impact	Mitigation / Management / Monitoring
Accidental exposure of fossil bearing material implementation of the Project	Damage or destruction of heritage resources generally protected under Section 35 of the NHRA	Establish Project-specific Chance Find Procedures (CFPs) and Fossil Finds Procedures (FFPs) as a condition of authorisation. Refer to Section 8 for more detailed recommendations.
Accidental exposure of <i>in situ</i> MSA and LSA accumulations during implementation of the Project		

Unplanned event	Potential impact	Mitigation / Management / Monitoring
Accidental exposure of <i>in situ</i> LFC settlement sites 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		

## 7 Identified heritage impacts versus socio-economic benefit

The site-specific Project area falls within Wards 3 and 4 and potentially Ward 13 (depending on the final pipeline routing option) of the LLM within the WRD. This section provides a brief overview<sup>16</sup> of the socio-economic context within which the Project will be situated. This section presents a summary of the information included in the Integrated Development Plans (IDPs)<sup>17</sup> for both these district municipalities.

Information from Wazimap (2017) has been used to supplement the IDP data. These data were used because it realigns the 2011 Census data captured and presented by Statistics South Africa (2011) with new municipal boundaries<sup>18</sup> used in the 2016 Municipal Elections (Open Up, 2017). This data uses the Census 2011 data as the Community Survey (2016) data is not yet available at ward level.

The 2011 Census registered 5 404 868 people in Limpopo, approximately 10.44% of the population of the country, in the Limpopo province (Statistics South Africa, 2011; Wazimap, 2017). Within the province, Vhembe District Municipality is the largest (in terms of population size) and includes 1 294 722 people. WDM is the smallest of the district municipalities by population and includes 679 336 people or 12.57% of the population of Limpopo. Within WDM, Lephalale is the second largest local municipality in terms of population with 118 865 people (17.50% of the WDM population).

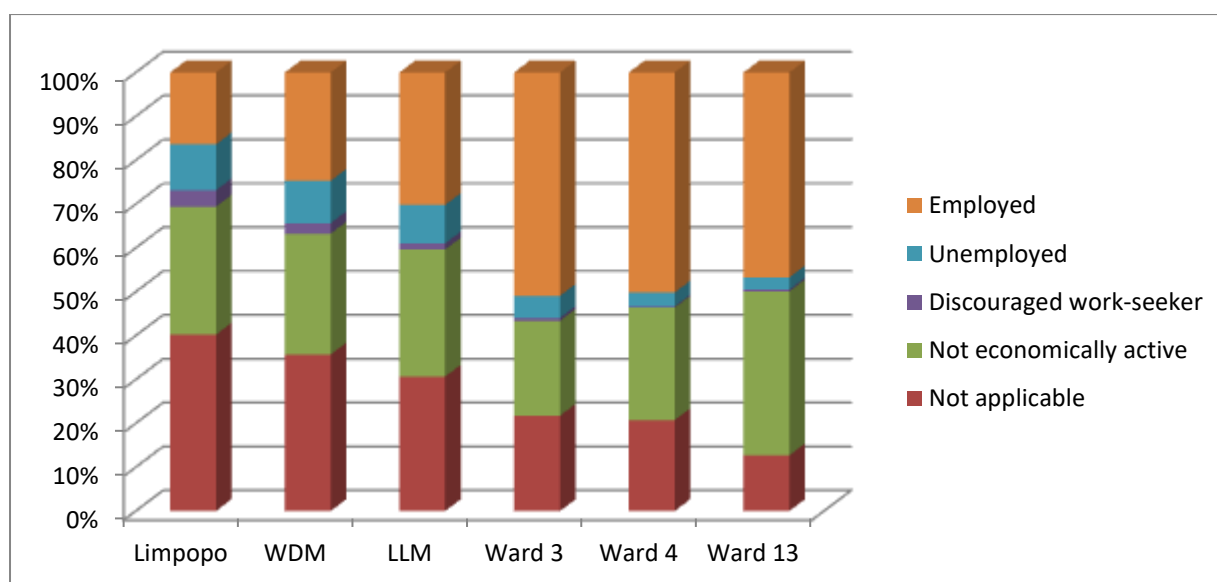
<sup>16</sup> For a full report on the socio-economic setting of the Project, refer to the Social Impact Assessment report.

<sup>17</sup> IDP for the WRD (2018) and LLM (2018). Refer to Section 11 for more detailed references.

<sup>18</sup> The ward boundaries within LLM have regularly changed since 2001. For example, the Project would have been located in Ward 2 if this study was undertaken in 2006 or 2009 and in Ward 1 in 2000. This has implications for the socio-economic data as the shapes, sizes and populations of the wards have changed through this time.

Employment trends are not consistent within the regional study area. Figure 7-1 presents an overview of the employment status of the population within the WDM and within each area of interest. In this figure, 'not applicable' refers to those who are not considered to be of working age (i.e. individuals younger than 18 and older than 65 years of age).

As per the 2011 Census, the employment rate varies from 16.39% in the Limpopo Province to 50.93% in Ward 3 (Wazimap, 2017). Discouraged work-seekers (i.e. individuals who are unemployed but who are not actively seeking work) account for between 3.75% and 0.29% of the population. Unemployment is highest in the Limpopo Province (10.45%) and lowest in Ward 13 (2.79%). All participants in the census specified their employment status.



**Figure 7-1: Employment statistics within the greater study area**

Across all the study areas, the formal sector is the largest provider of employment (Wazimap, 2017). The informal sector is the smallest provider of employment in the LLM, Ward 3 and Ward 4 and the private household is the smallest provider of employment for Limpopo, WDM and Ward 13. Between 0.97% and 1.22% of respondents did not know in which sector they were employed.

In terms of the Employment by Sector section of the 2011 Census, the category "Not applicable" refers to individuals who are not employed (i.e. unemployed, not economically active, not of working age and discouraged work seekers). This category is the largest in each of the areas of interest, but is especially large in the Limpopo Province, accounting for 83.32% of respondents (Wazimap, 2017).

Agriculture, manufacture, mining and tourism are the key sectors contributing to the WDM economy (WDM, 2018). Mining activities centre around Mokopane, Lephalale and the Northam-Thabazimbi area. Minerals mined within the WDM include: chrome, coal, iron nickel, platinum, tin, and tungsten. The Waterberg field contains an estimated 76 billion tons

of coal, which is more than 40% of the national coal reserve. The WDM also produces the most platinum within the Limpopo Province and contributes the most in terms of Gross Domestic Product (GDP) of the national mining sector. Mining contributes 47.4% of the WDM GDP. Agriculture, mining and manufacture are the three most important contributors to the LLM GDP (LLM, 2018)

In terms of economic development, the WDM has identified several potential developments within the more significant economic sectors (WDM, 2018). Within the mining sector, identified potential projects include the development of mining tourism and a platinum corridor.

Within the LLM, identified development goals include the following

- Improving infrastructure;
- Transitioning to a low-carbon economy through using water more sustainably and reducing carbon emissions;
- Creating an inclusive and integrated rural economy by 2030; and
- Realising a green economy (LLM, 2018). Goals for the green economy range from the short term, which includes generating 'green' employment and improving the environmental quality of the municipality, to the long term, which includes a paradigm shift for the local municipality in terms of the relationship between the economy and the environment.

Based on the review of the applicable planning documents and the motivation above, the potential socio-economic benefits that may result from the Project outweigh the identified risks to heritage resources. The following points support this statement:

- No heritage resources were identified during the pre-disturbance survey and therefore no impacts to heritage resources are foreseen;
- The proposed Project would contribute to the mining sector within the WDM and LLM. This sector is already an important component of the economies of these areas. The Project will play a role in allowing the Temo Mine to achieve a significant role as an economic contributor within the local and district municipality, particularly in terms of the exporting of coal; and
- The construction of the proposed infrastructure will contribute to employment through the creation of short-term employment opportunities and the operation of the rail line will contribute in a small way through the creation of more permanent employment opportunities.

The Project in isolation does not present a large benefit in terms of the socio-economic environment. However, this benefit may be considerably larger when it is considered as a necessary component of the larger Temo Coal Mine Project. Should the Project not go ahead, the above-mentioned socio-economic benefits will not be realised. This may also

jeopardise the future realisation of the Temo Mine and the socio-economic benefits associated with this development.

## 8 Consultation

The consultation process affords Interested and Affected Parties (I&APs) opportunities to engage in the EIA process. The objectives of the Stakeholder Engagement Process (SEP) include the following:

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

The Public Participation Process (PPP) has been completed in part, as a process separate to the heritage specialist assessment. No formal consultation was undertaken as part of this assessment. Should any I&AP comments be submitted in relevance to heritage resources during the SEP, these will be considered in the final EIA report.

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

## 9 Recommendations

The construction and installation of the proposed infrastructure included in the Project pose a risk of direct negative impacts (i.e. damage and/or destruction of) to heritage resources within the Project area. No heritage resources were identified within 50 m of proposed Project activities, however the Project has the potential to expose and impact additional heritage resources. To mitigate against these impacts, Digby Wells recommends the following:

- Digby Wells acknowledges the palaeontological significance of the geological features underlying the Project area. Bamford (2018) recently completed a study on adjacent properties and suggests that the exposure of fossils would be an uncommon event. On this basis, and in conjunction with the with the results of the pre-disturbance survey, Digby Wells recommends and requests exemption from further heritage studies, including a field-based PIA; and

- The above recommendation is on the condition that Temo Coal develops and implements Project-specific CFPs and FFPs to the commencement of the construction phase. These documents must be submitted to SAHRA and must be approved before they can be implemented;

Digby Wells further reiterates that, should the proposed Temo Mine and IPP Power Station projects go ahead, Temo and Namane must comply with the HRA requirements relevant to those projects (refer to Section 1.1). Digby Wells suggests that these requirements be undertaken in a single, comprehensive process addressing all stipulated requirements across the three project areas and associated infrastructure.

## 10 Conclusion

This report was compiled to promote compliance with the requirements encapsulated in GN R 983 Appendix 1 Subsections 2(d) and 3(1)(h)(iv) and (vii) as well as Section 38(8) of the NHRA. This HIA considered the baseline cultural environment within a local and regional study area to provide context for tangible heritage resources that may be identified within the site-specific study area and which impacted upon by the construction of the proposed ancillary infrastructure required for the operation of the Temo Mine. The regional and local study areas are predominantly associated with archaeological materials associated with the MSA and LFC periods. Within the development footprint, no heritage resources were identified, therefore no direct impacts to heritage resources are envisaged. Consequently no mitigation or management measures are proposed.

Three pipeline routing alternatives considered in this assessment, as well as the 'No-Go' option. This latter option would result in the current *status quo* remaining intact. No heritage resources were identified in proximity to any of the proposed pipeline routes, where access was granted at the time of the pre-disturbance survey, and so there is no preferred option in terms of the routing alternatives. Digby Wells does, however, recommend that a CFP and FFP be developed and implemented prior to the commencement of the construction phase as a condition of authorisation and requests exemption from any further heritage assessments, including a PIA based on Bamford's (2018) recent findings and recommendations adjacent to the Project area.

Based on the findings of this HIA, Digby Wells is of the opinion that no heritage resources will be impacted and therefore endorses the implementation of the Project from a heritage perspective.



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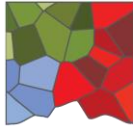
Heritage Impact Assessment

Environmental Authorisation for the Temo Mine proposed Rail, Road and Pipeline  
Development, Limpopo Province

NAM5335



## Appendix A: Specialist CV



# DIGBY WELLS

## ENVIRONMENTAL

Miss Shannon Hardwick  
Assistant Heritage Resources Management Consultant  
Social and Heritage Services Department  
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	Basic	Basic



### 3 Employment

Period	Company	Title/position
2018 to present	Digby Wells Environmental	Assistant Heritage Resources Management Consultant
2017-2018	Digby Wells Environmental	Intern: Heritage Resources Management
2016-2017	Tarsus Academy	Facilitator
2011-2016	University of the Witwatersrand	Teaching Assistant
2011	University of the Witwatersrand	Collections Assistant

### 4 Experience

Shannon joined the Digby Wells team in May 2017 as a Heritage Management Intern, and has subsequently been appointed as an Assistant Heritage Resources Management Consultant. Shannon is an archaeologist who obtained a Master of Science (MSc) degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. She is a published co-author of one paper in *Journal of Ethnobiology*. Since joining Digby Wells, Shannon has gained generalist experience through the compilation of Notification of Intent to Develop (NID) applications as well as Heritage Basic Assessment Reports (HBARs), Heritage Scoping Reports (HSRs) and Heritage Impact Assessment (HIA) reports. 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.

### 5 Project Experience

My project experience is listed in the table below:

Project Title	Project Location	Date:	Description of the Project	Name of Client
Kilbarchan Colliery Environmental Authorisations and Closure Study	Newcastle, KwaZulu-Natal, South Africa	Ongoing	Heritage Impact Assessment	Eskom Holdings SOC Limited



Project Title	Project Location	Date:	Description of the Project	Name of Client
Belfast Implementation Project	Mpumalanga Province, South Africa	Ongoing	Section 34 Permit Application	Exxaro Coal Mpumalanga (Pty) Ltd
The South African Radio Astronomy Observatory Square Kilometre Array Heritage Impact Assessment and Conservation Management Plan Project	Northern Cape Province, South Africa	Ongoing	Heritage Impact Assessment and Conservation Management Plan	The South African Radio Astronomy Observatory (SARAO)
Heritage Resources Management Process for the Exxaro Matla Mine	Mpumalanga Province, South Africa	January 2018	Heritage Impact Assessment	Exxaro Coal Mpumalanga (Pty) Ltd
Newcastle Landfill Project	Newcastle, KwaZulu-Natal, South Africa	March 2018	Heritage Impact Assessment	GCS Water and Environmental Consultants
Tharisa Apollo (UG1) Plant	Marikana, North-West Province, South Africa	Ongoing	Heritage Impact Assessment	GCS Water and Environmental Consultants
National Heritage Resources Act, 1999 (Act No. 25 of 1999) Section 34 Permit Application Process for the Davin and Queens Court Buildings on Erf 173 and 174, West Germiston, Gauteng Province	Johannesburg, Gauteng, South Africa	April 2018	Section 34 Permit Application	IDC Architects
Environmental Impact Assessment for the proposed Future Developments within the Sun City Resort Complex	North West Province, South Africa	Ongoing	Heritage Impact Assessment	Sun International (Pty) Ltd
Basic Assessment and Environmental Management Plan for the Proposed pipeline from the Mbali Colliery to the Tweefontein Water Reclamation Plant, Mpumalanga Province	Mpumalanga Province, South Africa	January 2018	Heritage Basic Assessment Report	HCI Coal (Pty) Ltd (Mbali Colliery)



Project Title	Project Location	Date:	Description of the Project	Name of Client
Environmental Fatal Flaw Analysis for the Mabula Filling Station	Waterberg, Limpopo Province, South Africa	November 2017	Fatal Flaw Analysis	Mr van den Bergh
Zuurfontein NID	Ekurhuleni, Johannesburg, South Africa	July 2017	Notification of Intent to Develop	Shuma Africa Projects
Liwonde Additional Studies	Liwonde, Southern Region, Malawi	Ongoing	Resettlement Action Plan, Community Health, Safety and Security Management Plan	Mota-Engil Africa
National Heritage Resources Act, 1999 (Act No. 25 of 1999) Section 35 Archaeological Investigations, Lanxess Chrome Mine, North-West Province	Rustenburg, North West Province, South Africa	July 2017	Phase 2 Mitigation Assessment	Lanxess Chrome Mines (Pty) Ltd
Environmental and Social Input for the Pre-Feasibility Study	Bougouni, southern Mali	July 2017	Pre-Feasibility Study	Birimium Gold

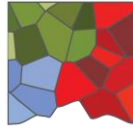
## 6 Professional Registrations

Position	Professional Body	Registration Number
Member	Association for Southern African Professional Archaeologists (ASAPA)	451

## 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.





# DIGBY WELLS

## ENVIRONMENTAL

Mr. Justin du Piesanie  
Manager: Heritage Resources Management  
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
2016 to present	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 unit manager in the Social and Heritage Services Department in 2016. 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, the Democratic Republic of Congo, Liberia and Mali 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. My current focus at Digby Wells is to develop the HRM process as an integrated discipline following international HRM principles and standards. This approach aims to provide clients with comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving strategic objectives.

## 5 Project Experience

Please see the following table for relevant project experience:

Project Title	Project Location	Date:	Description of the Project	Name of Client
Klipriviersberg Archaeological Survey	Meyersdal, Gauteng, South Africa	2005 2006	Archaeological surveys	ARM
Sun City Archaeological Site Mapping	Sun City, Pilanesberg, North West Province, South Africa	2006 2006	Phase 2 Mapping	Sun International
Witbank Dam Archaeological Impact Assessment	Witbank, Mpumalanga, South Africa	2007 2007	Archaeological survey	ARM
Archaeological Assessment of Modderfontein AH Holdings	Johannesburg, Gauteng, South Africa	2008 2008	Heritage Basic Assessment	ARM
Heritage Assessment of Rhino Mines	Thabazimbi, Limpopo Province, South Africa	2008 2008	Heritage Impact Assessment	Rhino Mines
Cronimet Project	Thabazimbi, Limpopo Province, South Africa	2008 2008	Archaeological surveys	Cronimet
Eskom Thohoyandou SEA Project	Limpopo Province, South Africa	2008 2008	Heritage Statement	Eskom
Wenzelrust Excavations	Shoshanguve, Gauteng, South Africa	2009 2009	Phase 2 Excavations	Heritage Contracts Unit
University of the Witwatersrand Parys LIA Shelter Project	Parys, Free State, South Africa	2009 2009	Phase 2 Mapping	University of the Witwatersrand
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 Booyensdal Archaeology Project	Steelpoort, Mpumalanga, South Africa	2010 2010	Phase 2 Mapping	Heritage Contracts Unit
Eskom Thohoyandou Electricity Master Network	Limpopo Province, South Africa	2010 2010	Heritage Statement	Strategic Environmental Focus
Bathako Mine Expansion	North-West Province, South Africa	2010 2010	Phase 2 Mapping	Heritage Contracts Unit
Kibali Gold Project Grave Relocation Plan	Oriental Province, Democratic Republic of Congo	2011 2013	Grave Relocation	Randgold Resources Limited



<b>Project Title</b>	<b>Project Location</b>	<b>Date:</b>		<b>Description of the Project</b>	<b>Name of Client</b>
Kibali Gold Hydro-Power Project	Orientele Province, Democratic Republic of Congo	2012	2014	Heritage Impact Assessment	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
SEGA Gold Mining Project	Burkina Faso	2012	2013	Socio Economic and Asset Survey	Cluff Gold PLC
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012	2015	Heritage Impact Assessment	Aquarius Resources
SEGA Gold Mining Project	Burkina Faso	2013	2013	Technical Reviewer	Cluff Gold PLC
Consbrey and Harwar Collieries Project	Breyton, Mpumalanga, South Africa	2013	2013	Heritage Impact Assessment	Msobo
New Liberty Gold Project	Liberia	2013	2014	Grave Relocation	Aureus Mining
Falea Uranium Mine Environmental Assessment	Falea, Mali	2013	2013	Heritage Scoping	Rockgate Capital
Putu Iron Ore Mine Project	Petroken, Liberia	2013	2014	Heritage Impact Assessment	Atkins Limited
Sasol Twistdraai Project	Secunda, Mpumalanga, South Africa	2013	2014	Notification of Intent to Develop	ERM Southern Africa
Daleside Acetylene Gas Production Facility	Gauteng, South Africa	2013	2013	Heritage Impact Assessment	ERM Southern Africa
Exxaro Belfast GRP	Belfast, Mpumalanga, South Africa	2013	-	Grave Relocation	Exxaro Coal Mpumalanga (Pty) Ltd
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 Impact Assessment	AECOM
Soweto Cluster Reclamation Project	Soweto, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	Ergo (Pty) Ltd





<b>Project Title</b>	<b>Project Location</b>	<b>Date:</b>		<b>Description of the Project</b>	<b>Name of Client</b>
Klipspruit South Project	Ogies, Mpumalanga, South Africa	2014	2014	Heritage Impact Assessment	BHP Billiton
Klipspruit Extension: Weltevreden Project	Ogies, Mpumalanga, South Africa	2014	2014	Heritage Impact Assessment	BHP Billiton
Ergo Rondebult Pipeline Basic Assessment	Johannesburg, South Africa	2014	2014	Heritage Basic Assessment	Ergo (Pty) Ltd
Kibali ESIA Update Project	Oriental Province, Democratic Republic of Congo	2014	2014	Heritage Impact Assessment	Randgold Resources Limited
GoldOne EMP Consolidation	Westonaria, Gauteng, South Africa	2014	2014	Gap analysis	Gold One International
Yzermite PIA	Wakkerstroom, Mpumalanga, South Africa	2014	2014	Palaeontological Assessment	EcoPartners
Sasol Mooikraal Basic Assessment	Sasolburg, Free State, South Africa	2014	2014	Heritage Basic Assessment	Sasol Mining
Oakleaf ESIA Project	Bronkhorstspuit, Gauteng, South Africa	2014	2015	Heritage Impact Assessment	Oakleaf Investment Holdings
Rea Vaya Phase II C Project	Johannesburg, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	ILISO Consulting
Imvula Project	Kriel, Mpumalanga, South Africa	2014	2015	Heritage Impact Assessment	Ixia Coal
Sibanye WRTRP	Gauteng, South Africa	2014	2016	Heritage Impact Assessment	Sibanye
VMIC Vanadium EIA Project	Mokopane, Limpopo, South Africa	2014	2015	Heritage Impact Assessment	VM Investment Company
NLGM Constructed Wetlands Project	Liberia	2015	2015	Heritage Impact Assessment	Aureus Mining
ERPM Section 34 Destruction Permits Applications	Johannesburg, Gauteng, South Africa	2015	2015	Section 34 Destruction Permit Applications	Ergo (Pty) Ltd
JMEP II EIA	Botswana	2015	2015	Heritage Impact Assessment	Jindal
Gino's Building Section 34 Destruction Permit Application	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Impact Assessment and Section 34 Destruction Permit Application	Bigen Africa Services (Pty) Ltd
EDC Block Refurbishment Project	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Impact Assessment and Section 34 Permit Application	Bigen Africa Services (Pty) Ltd
Namane IPP and Transmission Line EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Impact Assessment	Namane Resources (Pty) Ltd
Temo Coal Road Diversion and Rail Loop EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Impact Assessment	Namane Resources (Pty) Ltd
Groningen and Inhambane PRA	Limpopo Province, South Africa	2016	2016	Heritage Basic Assessment	Rustenburg Platinum Mines Limited



<b>Project Title</b>	<b>Project Location</b>	<b>Date:</b>		<b>Description of the Project</b>	<b>Name of Client</b>
NTEM Iron Ore Mine and Pipeline Project	Cameroon	2014	2016	Technical Review	IMIC plc
Palmietkuilen MRA	Springs, Gauteng, South Africa	2016	2016	Heritage Impact Assessment	Canyon Resources (Pty) Ltd
Copper Sunset Sand Mining S.102	Free State, South Africa	2016	2016	Heritage Basic Assessment	Copper Sunset Sand (Pty) Ltd
Grootvlei MRA	Springs, Gauteng, South Africa	2016	2016	Notification of Intent to Develop	Ergo (Pty) Ltd
Lambda EMP	Mpumalanga, South Africa	2016	2016	Palaeontological Impact Assessment	Eskom Holdings SOC Limited
Kilbarchan Basic Assessment and EMP	Newcastle, KwaZulu-Natal, South Africa	2016	2016	Heritage Basic Assessment	Eskom Holdings SOC Limited
Grootegeluk 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
Massawa EIA	Senegal	2016	2017	Technical Reviewer Heritage Impact Assessment	Randgold Resources Limited
Louis Botha Phase 2	Johannesburg, Gauteng, South Africa	2016	2016	Phase 2 Excavations	Royal Haskoning DHV
Beatrix EIA and EMP	Welkom, Free State, South Africa	2016	2017	Heritage Impact Assessment	Sibanye Gold Ltd
Sun City Heritage Mapping	Pilanesberg, North-West Province, South Africa	2016	2016	Phase 2 Mapping	Sun International
Sun City Chair Lift	Pilanesberg, North-West Province, South Africa	2016	2017	Notification of Intent to Develop and Heritage Basic Assessment	Sun International
Hendrina Underground Coal Mine EIA	Hendrina, Mpumalanga, South Africa	2016	2017	Heritage Impact Assessment	Umcebo Mining (Pty) Ltd
Elandsfontein EMP Update	Clewer, Mpumalanga, South Africa	2016	2017	Heritage Impact Assessment	Anker Coal
Eskom Northern KZN Strengthening	KwaZulu-Natal, South Africa	2016	-	Heritage Impact Assessment	ILISO Consulting
Thabametsi GRP	Lephalale, Limpopo Province, South Africa	2017	-	Grave Relocation	Exxaro Resources Ltd
Grootegeluk 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
Ledjadja Coal Borrow Pits	Lephalale, Limpopo Province, South Africa	2017	2017	Heritage Basic Assessment	Ledjadja Coal (Pty) Ltd
Exxaro Belfast Implementation Project PIA	Belfast, Mpumalanga, South Africa	2017	2017	Palaeontological Impact Assessment	Exxaro Coal Mpumalanga (Pty) Ltd

Project Title	Project Location	Date:	Description of the Project	Name of Client
Lanxess Chrome Mine Archaeological Mitigation	Rustenburg, North West Province, South Africa	2017 2017	Phase 2 Excavations	Lanxess Chrome Mine (Pty) Ltd
Goulamina EIA Project	Goulamina, Sikasso Region, Mali	2017 2017	Heritage Impact Assessment	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 -	Grave Relocation	Randgold Resources Limited
Exxaro Matla HRM	Kriel, Mpumalanga	2017 -	Heritage Impact Assessment	Exxaro Coal Mpumalanga (Pty) Ltd

## 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)