

Appendix I: Archaeological Impact Assessment

**ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR
THE PROPOSED KANGALA COAL MINE
ON PORTIONS 1 AND REMAINING EXTENT OF
PORTION 2 OF WOLVENFONTEIN 244 IR IN THE
DELMAS AREA,
MPUMALANGA PROVINCE**

**UNIVERSAL COAL (PTY) LTD
NOVEMBER 2009**

PREPARED BY



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EXECUTIVE SUMMARY

The Kangala Coal Mine is a venture by Universal Coal Development 1 (Pty) Ltd, which is located in the Witbank coalfield region of the Mpumalanga Province, approximately 80km due east of Johannesburg. As part of the environmental and social studies required for the proposed coal mine development, an Archaeological Impact Assessment (AIA) was conducted in terms of the National Heritage Resource Act (NHRA) (25 of 1999), the National Environmental Management Act (NEMA) (107 of 1998) and the Mineral and Petroleum Resources Development Act (MPRDA) (28 of 2002).

This AIA was conducted in order to identify, document and evaluate any potential archaeological and heritage sites of significance in the proposed project area that may be impacted by proposed mining activities. The first step of the AIA process included information gathering and literature reviews of project information. A physical survey was conducted on foot through the proposed project area by qualified archaeologists between 26 and 28 August 2009 by PGS. During this archaeological survey in the proposed project area, the following archaeological and heritage sites were identified within the mining application area.

SITE	DESCRIPTION
Site 1: Cemetery	A small informal, unfenced cemetery with approximately 150 graves was identified at this location. The graves are situated in a ploughed field within the project boundary.
Site 2: Historical Structures	The dilapidated remains of an old farm house and its outbuildings and other structures were identified at this location.
Site 3: Cemetery	A cluster of three graves was identified located adjacent to the project boundary.
Site 4: Cemetery	Nine graves and building remains (rubble) structures were identified at this site, located adjacent to the project boundary.

According to the current mine plan, the above-mentioned sites will not be disturbed by proposed mining activities; however, the following sites may require mitigation:

Site 1: Cemetery – The cemetery at Site 1 need to be fenced and a buffer zone of 20 meters (m) left around the site and adequate access must be provided for the family to visit the graves in terms of the NHRA (25 of 199). This buffer zone will have to be kept around the cemetery to facilitate the protection of the site during the all phases of mining and operation.

Site 3 and 4: Cemeteries – Site 3 and 4 are located adjacent to the project boundary and does not need to be mitigated; however, if the mine plan changes to include Site 3 and Site 4, the sites will have to be fenced and mitigated accordingly. Although it does not currently fall within the proposed project area, it should be protected from any adverse impacts associated with the mining project.

Site 2: Historical Structures – According to the current mine plan, these structures will be impacted by mining activities. If these structures are older than 60 years, a permit would be required from SAHRA; however, the dates of construction of these structures have not been confirmed. It is recommended that the site be evaluated by a conservation architect before construction commence to provide further recommendations on the mitigation necessary on the site.

General: - If during construction or operational phases, any additional archaeological and heritage finds are made, the operations must be stopped and a qualified archaeologist contacted for an assessment of the find. If the mine plan changes or if it is expected that the cemetery will be directly impacted by mining activities or operations in the regional vicinity of the site, a grave relocation process will be required.

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1 INTRODUCTION

Archaeological and cultural heritage refer to the resources in South Africa having prehistoric, palaeontological, historical, cultural, artistic, and religious values, as well as unique natural environmental features that embody cultural values, such as sacred groves and forests, amongst others (IFC, 2006). Increased development and urbanisation in the southern African region has resulted in more sites being placed at risk during development projects and subsequently, more focused environmental and archaeological impact assessments are needed to avoid losing heritage resources. The Association for South African Professional Archaeologists stipulates that human resource development strategies and sustainability programmes should aim to enhance archaeological conservation and protection (ASAPA, 2009). This archaeological assessment forms an integrated part of the integrated environmental investigations for the proposed Universal Coal Kangala Mine in Mpumalanga.

The Mpumalanga Province encompasses some of the richest geological, archaeological and cultural heritage in the world where fossils of prehistoric animals and plants, such as the famous *Glossopteris* flora, and archaeological artefacts are commonly found and displayed in local museums. The Karoo rocks situated along the route to Witbank and Middelburg, Bethal, Hendrina, Ermelo and Carolina, and beyond the southern border of the Province, contain substantial seams of coal, formed in vast swamps from decomposing forests during a 100 million year period approximately 200 to 300 million years ago.

Coal is a valuable resource in South Africa and the Mpumalanga Province accounts for approximately 83% of South Africa's coal production. Due to increased electricity demands and financial feasibility of coal mining in this area, an opencast mine is proposed on portions 1 and the remaining extent of portion 2 of the farm Wolvenfontein 244 IR in the Delmas area. As a result, these mining activities will lead to surface disturbance and removal of soil, which could impact on potential archaeological or heritage sites. In accordance with applicable legislative requirements, an Archaeological Impact Assessment (AIA) will be compiled for this study. An AIA aims to protect and conserve sites of archaeological and heritage significance by identifying and evaluating the significance of these sites, potential impacts of developments upon such sites, and propose recommendations concerning mitigation and management of these sites. The AIA report will include relevant laws, regulations assessment methodologies, literature reviews, proposed mitigation measures, constructive recommendations, an impacts summary and associated plans, maps, and figures. Once the AIA report has been finalised, it will be submitted to the Provincial and National Heritage Resource Agency (PHRA/SAHRA) for their attention.

2 TERMS OF REFERENCE

Digby Wells & Associates (DWA) was appointed as independent environmental consultants to prepare the required Environmental Impact Assessment (EIA) for the proposed Universal Coal Kangala project. In collaboration with DWA, Professional Graves Solutions (PGS) Heritage Unit was contracted to conduct an archaeological survey of the study area in order to identify, document and evaluate any potential archaeological and heritage sites of significance in the proposed project area that may be impacted by proposed mining activities. The archaeological study will assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

3 LEGISLATIVE REQUIREMENTS

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34 (1) of the NHRA states that “*no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...*”. The National Environmental Management Act (107 of 1998) states that an integrated environmental management plan should (23:2 (b)) “*...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage...*” In compliance with the Mineral and Petroleum Resources Development Act (28 of 2002) (MPRDA), the NHRA and NEMA, this AIA report has been compiled for the proposed Kangala mining project in the Delmas area. In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive legally compatible AIA report is compiled. The AIA criteria are described in more detail in Appendix 2.

4 PROJECT DESCRIPTION

The proposed Kangala Coal Mine is a venture by Universal Coal Development 1 (Pty) Ltd (Universal Coal). The company is 70.5% owned by Universal Coal and Energy (Pty) Ltd and 29.5% by Mountain Rush (Pty) Ltd, a BEE company.

Table 1: Particulars of the applicant

DETAILS OF THE APPLICANT FOR THE KANGALA PROJECT	
Full Name & Contact Person	Universal Coal Development 1(Pty) Ltd. Registration nr: 2007/032600/07 Mike Seeger; Tel: (012) 460 0805, Fax: (012) 460 2417
Physical address:	Universal Coal Head Office, 467 Fehrsen Str, Brooklyn , Pretoria
Postal Address	P O Box 2423, Brooklyn Square, 0075

A prospecting permit has already been granted to Universal Coal for this area in terms of Section 11 of the MPRDA. Kallie-Madel Trust currently owns the surface rights to portion 1 and RE of portion 2 of the farm Wolvenfontein 244 IR. The proposed project area that was surveyed for this mining project is 951 hectares in total. The mineral deposit is bituminous coal from the No. 2 and No. 4 seams of the Witbank Coalfield. The planned life-of-mine is one year for the construction phase, followed by a 10-year operational (production) phase. The exploration drilling programme has been completed and preliminary results show that there is no viable coal in the southern portion of the site.

5 STUDY AREA

The project area is located 80 km due east of the centre of Johannesburg close to the operating coal mine Leeuwan, close to a provincial road and railway infrastructure and within a radius of 30 to 70 km from

four coal-fired power stations. The nearest towns are Delmas, Devon and Leandra. The study area is located on topographical sheet 2628BA and over 90% of the study area consists of ploughed maize fields.

6 AIMS AND OBJECTIVES

The aim of an AIA is to locate, identify, evaluate and document sites, objects and structures of cultural and natural significance found within the boundaries of an area. These sites should be conserved, mitigated and managed according to the recommendations and criteria of the relevant heritage authorities. In essence, the objectives are to:

- Identify, record and document potential archaeological, cultural and historic sites of significance within the proposed development areas;
- Evaluate if proposed mining activities during the construction, operation and decommissioning phases will have any negative impacts on archaeological, cultural, historical and natural heritage resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.

The objectives of the study have been achieved through the archaeological assessment process and evaluation of potential archaeological and heritage sites in the proposed project area.

7 METHODOLOGY

This AIA report has been compiled by DWA and PGS for the proposed Universal Coal Kangala Mine, including applicable maps, tables and figures, as stipulated in the NHRA (25 of 1999), the NEMA (107 of 1998) and the MPRDA (28 of 2002). The AIA process consisted of three steps:

- Step I – Literature Review: This step was aimed at gathering information relating to known archaeological and heritage resources within and surrounding the proposed development area, which included a desktop study and literature reviews of project information.
- Step II – Physical Survey: A physical survey was conducted on foot through the proposed project area by qualified archaeologists (26 – 28 August 2009), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.
- Step III – The final step involved the recording and documentation of relevant archaeological and heritage resources, as well as the assessment of resources in terms of the archaeological impact assessment criteria (Appendix 2) and report writing, as well as mapping and constructive recommendations

8 EXPERTISE OF THE SPECIALIST

A CV and declaration of experience is attached in Appendix 1

9 KNOWLEDGE GAPS

Not subtracting in any way from the comprehensiveness of the fieldwork undertaken, it is important to realise that the archaeological and heritage resources located during the fieldwork do not necessarily represent all the archaeological and heritage resources located in the specific area. This may be due to various reasons, including the subterranean nature of some archaeological sites. Should any additional archaeological and heritage features and/or objects be identified in the proposed mining area that is not included in the present inventory, a specialist must be contacted. These resources may not be disturbed or removed until the specialist has assessed and rated the significance of the site (or material).

10 FINDINGS

During the archaeological survey in the proposed project area, the following archaeological and heritage sites were identified within the mining application area.

Table 2: List of archaeological and heritage sites identified by PGS

SITE	DESCRIPTION
Site 1: Cemetery	A small informal, unfenced cemetery with approximately 150 graves was identified, located within the project boundary. The graves are situated in a ploughed field.
Site 2: Historical Structures	The dilapidated remains of an old farm house and its outbuildings and other structures were identified at this location, located within the project boundary.
Site 3: Cemetery	A cluster of three graves was identified at this location, adjacent to the project boundary.
Site 4: Cemetery	Nine graves and demolished remains (building rubble) structures were identified at this site, located adjacent to the project boundary.

These sites are depicted on the map attached as Appendix 3: Location of Significant Archaeological and Heritage Sites.

11 DISCUSSION

Site 1: Cemetery

This site is of high cultural and heritage significance. Over 150 graves are placed in several lines (6/7) and orientated from east to west. Four of the graves have formal granite dressings, ten graves have rectangular brick and cement outlines as dressings with cement headstones, 15 graves have cement headstones and the rest informal stone packed dressings. During the field survey, the graves were overgrown with grass, but it was evident that they were regularly maintained. The size/extent of the site is estimated at 50 X 50 m.



Figure 11-1: Inscribed headstones (PGS, 2009)

Site 2: Historical Structures

This site is of low cultural and heritage significance. Most of the structures are demolished down to their foundations, but two structures are still partially intact. The one structure could have been a store room or workshop and the other structure could have been a water tower. Building rubble is scattered over the site. The size/extent of the site is estimated at 100 X 100 m.



Figure 11-2: Remains of the old Structures on site (PGS, 2009)

Site 3: Cemetery

This site is of high cultural and heritage significance. The graves were found right on the edge of a ploughed field. One informal grave with a stone packed dressing and one grave with a brick and cement outline as dressing are placed next to each other. The third grave, also with a brick and cement outline as dressing, is situated in front of the two other graves. The two brick and cement graves also have cement headstones. All three graves are orientated from east to west. The size/extent of the site is estimated at 10 X 10 m.



Figure 11-3: Illustration of graves at Site 3 (PGS, 2009)

Site 4: Cemetery

This site is of high cultural and heritage significance. Nine graves were identified at this location. Eight of the graves are placed next to each other in a line and the ninth grave is located behind them. The graves are unfenced and orientated from east to west. One of the graves has a formal granite headstone and dressing and the other graves have packed bricks to form a rectangular outline as dressings. During the field survey, it was found that the graves were overgrown with grass. The demolished remains and associated building rubble were identified approximately 50 m further to the west of the graves. These remains are located amongst a cluster of trees and could be the remains of demolished farm labour quarters. These farm labourers most probably buried their deceased in the above line of graves. The size/extent of the site is estimated at 50x50 m.



Figure 11-4: A headstone on one of the graves at the cemetery at Site 4

12 DESCRIPTION OF IMPACTS

12.1 Construction phase

The construction phase consists of activities performed in preparation of mining such as site clearing, top soil removal, construction of infrastructure, and transportation of construction material and the establishment of an initial boxcut and access ramps. Construction activities will therefore include the total destruction of the land surfaces in these footprint areas. Archaeological and heritage sites located in the directly affected areas will subsequently be impacted. The location of significant archaeological and heritage sites is illustrated on the map (Appendix 3). According to the archaeological field survey, the following sites will be directly affected by the construction phase:

Site one: Cemetery

The cemetery is located within the proposed project boundary, situated to the southeast of the mining application area and is not expected to be impacted on by the proposed mining activities. If at any stage the mining application area is extended and the cemetery is included in the application area, the cemetery needs to be fenced and a buffer zone of 20 m must be left around the site and adequate access must be provided for the family to visit the graves .

Site two: Historical Structures

According to the current mine plan, these structures will be impacted by mining activities. The ages of these structures have not been confirmed; if it is older than 60 years a permit would be required from SAHRA. It is recommended that the site be evaluated by a conservation architect before construction commence to provide further recommendations on the mitigation necessary on the site.

Site three: Cemetery

This cemetery is not expected to be impacted by proposed mining activities, as this site is located outside the boundary of the project area. If at any stage the mining application area is extended and the cemetery is included in the application area, the cemetery needs to be fenced and a buffer zone of 20 m be left around the site and adequate access must be provided for the family to visit the graves. In the event that the mining will impact directly on the graves and the need arise for the relocation of the cemetery a full graves relocation process must be followed.

Site four: Cemetery

This cemetery is not expected to be impacted by proposed mining activities, as this site is located outside the boundary of the project area. If at any stage the mining application area is extended and the cemetery is included in the application area, the cemetery needs to be fenced and a buffer zone of 20 m be left around the site and adequate access must be provided for the family to visit the graves. In the event that the mining will impact directly on the graves and the need arise for the relocation of the cemetery a full graves relocation process must be followed

12.2 Operational phase

The operational phase implies the commencement of mining activities. All related colliery operations, including coal beneficiation, waste generation and disposal, as well as concurrent rehabilitation forms part of this phase. Once the mining project is up and running, the urgency to identify, document and assess archaeological and heritage resources in the opencast area declines, conditional to the effective identification and documentation of significant sites during the previous phase. No additional impacts on sites of archaeological and heritage significance are expected during the operational phase if the mitigation and management measures outlined in the AIA report have been effectively implemented in the pre-development and construction phases.

12.3 Decommissioning and closure phase

During the decommissioning and closure phase of the project, no new surface areas are expected to be disturbed and/or impacted. No additional sites of archaeological and heritage significance are therefore expected to be impacted during decommissioning. The majority of sites of archaeological and heritage significance (cultural and natural) will have been recorded, assessed and mitigated or conserved in preceding phases and should subsequently be protected from any additional impacts from decommissioning and closure activities.

12.4 Cumulative impacts

Archaeological and heritage sites may be affected by the combined impacts of the industrial, agricultural and mining developments in the area, such as pollution (acid mine drainage), vandalism or property damage (influx of workers) and structural damage (blasting or vibrations). It is important to preserve and raise awareness of the importance of archaeological and heritage conservation. Cumulative impacts of industrial developments may also be positive, and capable of adding value through contributions towards archaeological and heritage research and effective documentation and mitigation of relevant heritage sites in the area. Ultimately, the developer should minimise or avoid all anticipated negative impacts and optimise and promote positive impacts.

A summary of the sites that will be potentially be affected by the construction phase are listed in Table 3:

Table 3: Summary of archaeological and heritage sites

<i>SITE NR & SITE CATEGORY</i>	<i>GPS (X/Y) & TOPO-SHEET</i>	<i>SAHRA & ASAPA SITE SIGNIFICANCE</i>	<i>PROBABILITY</i>	<i>SPATIAL SCALE / EXTENT</i>	<i>DURATION</i>	<i>SEVERITY</i>	<i>MITIGATION</i>
Site 1: Cemetery (Recent Historic)	26,20396 S/ 28,67748 E & 2628BA	Generally protected (GP.A) – high significance	2	1	3	2	Yes (Fencing)
Site2: Historical Structures (Recent Historic)	26,19823 S/ 28,66920 E & 2628BA	Generally protected (GP.A) – low significance	4	1	3	1	No
Site 3: Cemetery (Recent Historic)	26,19878 S/ 28,65542 E & 2628BA	Generally protected (GP.A) – high significance	2	2	3	2	Yes (Fencing)
Site 4: Cemetery (Recent Historic)	26,19878 S/ 28,65542 E &	Generally protected (GP.A) – high significance	2	2	3	2	Yes (Fencing)

13 MITIGATION MEASURES AND MANAGEMENT PLAN

13.1 Construction Phase:

Site 1: Cemetery

According to the current mine plan, this site will not be disturbed by mining activities. The cemetery needs to be fenced and a buffer zone of 20 m be left around the site and adequate access must be provided for the family to visit the graves in terms of the NHRA (25 of 1999). This buffer zone will have to be kept around the cemetery to facilitate the protection of the site during all the phases of mining and operations.

Site 2: Historical Structures

According to the current mine plan, these structures will be impacted by mining activities. The ages of these structures have not been confirmed; if it is older than 60 years a permit would be required from SAHRA. It is recommended that the site be evaluated by a conservation architect before construction commence to provide further recommendations on the mitigation necessary on the site.

Site 3: Cemetery

This cemetery is not expected to be impacted by proposed mining activities, as this site is located outside the boundary of the project area. If at any stage the mining application area is extended and the cemetery is included in the application area, the cemetery needs to be fenced and a buffer zone of 20 m be left around the site and adequate access must be provided for the family to visit the graves. In the event that the mining will impact directly on the graves and the need arise for the relocation of the cemetery a full graves relocation process must be followed.

Site 4: Cemetery

According to the current mine plan, this site will not be disturbed by mining activities. If at any stage the mining application area is extended and the cemetery is included in the application area, the cemetery needs to be fenced and a buffer zone of 20 m be left around the site and adequate access must be provided for the family to visit the graves. In the event that the mining will impact directly on the graves and the need arise for the relocation of the cemetery a full graves relocation process must be followed.

General:

If during construction or operational phases any additional archaeological and heritage finds are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find.

If the mine plan changes or if it is expected that the cemetery will be directly impacted by mining activities or operations in the regional vicinity of the site, a grave relocation process will be required. A qualified team of specialists will subsequently need to be contracted for the evaluation, documentation and physical excavation of the graves.

13.2 Operational Phase:

Due to the sub-surface nature of archaeological and heritage finds, archaeological and cultural material may be exposed during operations. A qualified archaeologist must be contacted should any additional finds be made during the operational phase. Developments and processes associated with the operational phase resulting in significant surface disturbance should be monitored and managed to ensure identified sites are protected and new sites are documented.

13.3 Decommissioning and Closure Phase:

During the decommissioning and closure phase, it is recommended that the appointed archaeologist review management procedures and ensure that effective measures were implemented during the preceding phases.

Table 4: Summary of mitigation and management

<i>ACTIVITY</i>	<i>OBJECTIVES</i>	<i>MITIGATION/ MANAGEMENT</i>	<i>FREQUENCY</i>	<i>LAWS/REGS</i>	<i>ACTION PLANS</i>	<i>TIMING OF IMPLEMENTATION</i>	<i>RESPONSIBLE PERSON</i>	<i>AFTER MITIGATION</i>
All development and mining activities during all phases of development	To facilitate the protection of the cemeteries and associated graves at Site 1	Cemetery need to be fenced & buffer of 20 m left around the site & access provided for relatives in terms of the NHRA (25 of 199).	Once off	NHRA (25 of 1999)	Active Management and Monitoring through quarterly check ups to ensure fences are in good state and site is protected from development	Construction, operational and closure	Environmental and/or Mine Manager	Medium-low significance
All development and mining activities during all phases of development	To facilitate the protection of the historical structure at Site 2 before construction commence	This site should be protected from direct impact until a conservation architect has assessed the site before construction	Once off	NHRA (25 of 1999)	Active Management and Monitoring before construction	Pre-construction	Environmental and/or Mine Manager	Low significance



14 MONITORING PROGRAMME

Sites identified in the AIA report must be protected and periodically monitored during the construction, operational and decommissioning phases to ensure sites are not adversely affected by mining activities. The purpose of an effective monitoring and management process is to provide advice to the developer in terms of recommendations for archaeological and heritage components, as part of the integrated environmental management and monitoring plan for the proposed project.

- **Site 1:** Site 1 needs to be conserved by fencing (and 20 meter buffer) and monitoring. If during development it is anticipated that Site 1 may be directly affected, a grave relocation process may be required. This process should be implemented in accordance with the legislative requirements of South Africa such as the NHRA (25 of 1999), Ordinance 7 of 1925 and additional Provincial regulations. Relevant stakeholders and authorities (national/provincial) will be consulted to ensure mitigation measures are implemented according to the applicable legislative requirements. Regular site inspections should be held to determine status of the fencing.
- **Site 2:** Conservation & monitoring: It is recommended that the site be evaluated by a conservation architect before construction.
- **Site 3 and 4:** If the mine plan changes or if it is expected that the cemeteries at Site 3 and Site 4 will be directly impacted by mining activities or operations in the regional vicinity of the site, these sites will also need to be fenced.
- **General:** If any additional archaeological sites or associated heritage resources are identified in the project area that has not been documented in the AIA report, an archaeologist will need to be contacted immediately to identify, assess and document the discovery.

15 RECOMMENDATIONS

The cemetery (Sites 1) need to be fenced and a buffer zone of 20 m left around the site. Adequate access must be provided for the family to visit the graves in terms of the NHRA (25 of 1999). The historical structure (Site 2) should not be disturbed by the development until a conservation architect has assessed the site. If any additional archaeological or heritage finds are made during the construction, operational or decommissioning phases, an accredited archaeologist must be contacted to assess and document the find.

16 CONCLUSION

The Kangala Coal Mine is a venture of Universal Coal Development 1 (Pty) Ltd, which is located in the Witbank coalfield region of the Mpumalanga Province, approximately 80 km due east of Johannesburg. As part of the environmental and social studies required for the proposed coal mine development, an archaeological Impact Assessment (AIA) was conducted in terms of the NHRA (25 of 1999), the NEMA (107 of 1998) and the MPRDA (28 of 2002). This AIA was conducted in order to identify, document and evaluate any potential archaeological and heritage sites of significance in the proposed project area that may be impacted by proposed mining activities.



During the archaeological survey a total of four archaeological and heritage sites were found. According to the current mine plan, one of these will be directly affected by proposed mining activities, Site 2. It is recommended that the cemetery (Site 1) be fenced and a buffer zone of 20 m left around the site and adequate access must be provided for the family to visit the graves in terms of the NHRA (25 of 1999) and the historical structure (Site 2) should not be disturbed by the development until a conservation architect has assessed the site. If any additional archaeological or heritage finds are made during the construction, operational or decommissioning phases, an accredited archaeologist must be contacted to assess and document the find.

If the recommendations and mitigation measures outlined in this report are adhered to, there is no reason from an archaeological or heritage point of view why this development should not proceed.

17 REFERENCES

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APPENDIX 1:
CV and Experience of Relevant Specialists
(Wouter Fourie & Marike Fourie)

PERSONAL INFORMATION:

Name: Wouter Fourie
Profession: Archaeologist
Date of Birth: 1974-04-30
Position in Firm: Director
Years with Firm: 5
Nationality: South African
HDI Status: White Male
Education: BA (Hons) Archaeology

PROFESSIONAL QUALIFICATIONS**Degrees:**

- BA Archaeology (UP), 1996
- BA (Hons) Archaeology (UP), 1997
- MA Archaeology (UNISA), Current

Courses: Radiation Protection Officer

PROFESSIONAL SOCIETY AFFILIATIONS:

- Association of Southern African Professional Archaeologists (ASAPA) - Member
- ASAPA CRM Section - Member
- Field Director – Grave Relocations, Iron Age
- Field Supervisor – Stone Age and Colonial Archaeology

Languages:

First Language – Afrikaans

English – Speak, Read and Write - Excellent

PROPOSED POSITION ON TEAM

Cultural Resources Specialist – Archaeologist

KEY QUALIFICATIONS

- Qualified archaeologist
 - Managed numerous Cultural Heritage Assessments
 - Completed various Archaeological Assessments
 - Assisted and managed archaeological mitigation excavations
 - Managed and completed more than 2000 grave relocation
 - Cultural Resources Management
-
-

RELEVANT EXPERIENCE

1994-2008

Selected work completed (summary of significant projects amongst others)

- iMpunzi Division of Duiker Mining, Witbank, Archaeological Survey. Digby Wells & Associates. Principal Investigator
- iMpunzi Division of Duiker Mining, Witbank, Archaeological Survey. Digby Wells & Associates. Principal Investigator
- iMpunzi Division of Duiker Mining, Witbank, Grave Relocation of 950 graves. Field Director
- Consolidated Modderfontein Mines, Benoni, Cultural Heritage Assessment, Van Ryn Project. Principal Investigator
- V3, Brakfontein, Centurion. Reconnaissance excavation on possible grave in new development area. Field Director
- Tselentis Colliery, Duiker Mining. Relocation of 80 graves. Field Director
- Gardener Ross Golf and Country Estate, DEVCO. Reconnaissance Excavation on possible graves. Field Director
- Eskom - Spencer Venulu 50km Reticulation Line. Heritage Impact Assessment. Wandma Environmental Consulting
- Phase 2 mitigation of archaeological terrain. Bokfontein - Brits, *Field Director*
- Phase 2 mitigation of archaeological terrain. Wesizwe Platinum - Pilanesberg, *Field Director*
- Phase 2 mitigation of archaeological terrain. Nkomati Mine - Badplaas, *Field Director*

SUMMARY OF OTHER EXPERIENCE

1997-1998: Environmental Officer – Department of Minerals and Energy. Johannesburg

1998-2000: Environmental Co-ordinator – Randfontein Estates Limited. Randfontein

2000-2004: CEO– Matakoma Consultants

2003-2004: Director - Professional Grave Solutions (Pty) Ltd

2005-2007: Director – Matakoma Heritage Consultants (Pty) Ltd

Director - Professional Grave Solutions (Pty) Ltd

Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand

2008: Director - Professional Grave Solutions (Pty) Ltd

DECLARATION

I confirm that the above CV is an accurate description of my experience and qualifications and that, at the time of signature, I am available and willing to serve in the position indicated for me in the Proposal for Consulting Services, for the durations and at the locations indicated therein.



SIGNATURE: _____

Name: MARIKE FOURIE
Title: Environmental Consultant
Company: Digby Wells and Associates

EDUCATION

- University of Pretoria (UP) 2000 – 2002: BhcS. Degree *Cum Laude*;
- University of Pretoria (UP) 2003 – BhcS. (Hon) Degree *Cum Laude* Specializing in Cultural and Heritage Tourism Management;
- University of Johannesburg (R.A.U) 2005 – 2006: (M.A.) Degree, specializing in Sustainable Development;
- Wildlife Campus (Ecolife) 2007, Certificate in Wildlife Management;
- University of Johannesburg 2008 – present, (PhD) Degree in Environmental Management

Lifetime Membership: Goldenkey International Honorary Society: Membership attained through academic achievement (Honorary Colours) in the BhcS. Degree.

EMPLOYMENT

- 2005 – Lecturer in Sustainable Tourism Development at the University of Johannesburg (previously known as R.A.U)
- 2005 – Lecturer in Geography at Abbott's College, Northcliff
- 2004 – Researcher for South African Veterinary Association (SAVA): Development of Veterinary Museum at Onderstepoort, Pretoria
- 2004 – Administrative Assistant at Financial Services Compensation Scheme (FHCS), London, U.K
- 2002 – 2003 : Research Assistant at University of Pretoria (UP), Archive Assistant & Part-time Travel Writer for Campus Newspaper

EXPERIENCE

Whilst completing a BhcS. (Hon) and Masters Degree, she has done intensive research, fieldwork and impact assessments in the Blouberg area (Limpopo Province). The Hananwa community formed an integral part of the Masters Degree in Sustainable Development as well as an Ethno-botanical assessment of the region (Bhcs). As a lecturer in Sustainable Tourism Development and Geography, she was responsible for the preparation of formal lectures, presentations, practical guidance (excursions) and student evaluation. Other work experiences such as Research assistant for South African Veterinary Association (SAVA) and University of Pretoria (UP) were primarily focussed on resource analysis, literature reviews, compilation of development proposals, data input and constructive recommendations. Current area of expertise at DWA lies in the formulation and implementation of sustainable development initiatives, archaeological impacts assessments and assisting with scoping reports, Environmental Impact Assessments (EIA), local economic development plans (LED) and Environmental Management Plans (EMP).

Projects recently involved in include:

- Sadiola Deep Sulphides Project (EIA/EMP, Project Manager), AngloGold Ashanti (AGA), Mali, West Africa;
 - Valencia Uranium (EIA/EMP, Assistant Project Manager), Forsys Metals, Namibia, Southern Africa;
 - Tselentis and Spitzkop Mining developments (EIAs/EMPs, Archaeological Management), Xstrata, Mpumalanga, South Africa;
 - Crown Ergo Mining Operation and related reclamation activities (EIAs/EMPS, Air Quality and Archaeological Management), Gauteng;
 - Northern Coal, Weltevreden (EIA/EMP, Archaeological Management), Mpumalanga;
 - Etoile (BFS, Preliminary Archaeological Investigations), IMC, Democratic Republic of Congo (DRC);
 - Khutala Mineral Optimisation Project, EIA/EMPR, Ingwe Colliery, Mpumalanga, South Africa ;
 - Klippoortjie 5 Seam EMPR Addendum, Xstrata Coal, Mpumalanga
 - Cleaner Production (CP) Campaign, Water Research Commission (WRC), South Africa;
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- Op Goeden Hoop Mining Right Application, NuCoal, Mpumalanga
 - Mmamabula Energy Project, CIC, Botswana, including:
 - Mine & Power station EIA/EMPR,
 - Transmission Lines EIA/EMPR,
 - Railway Link and Service Corridor,
 - Kudumatse Groundwater exploration boreholes and
 - Calcrete Mine.
 - ATC Mini Opencast Pits EMPR Addendums, Xstrata Coal, Mpumalanga.
 - Mareesburg Platinum Joint Venture, Eastern Platinum, Mpumalanga.
 - Bankfontein EIA/EMPR, Vaalsands (Pty) Ltd, Free State
 - 3L2 Dump EIA/EMPR, Crown Gold Recoveries, Gauteng
 - Lime-Chem EIA/EMPR, Lime-Chem (Pty) Ltd, Limpopo Province

Courses and seminars recently attended include:

- Medical Health Seminar (October 2006 , Geosciences MSA Medical);
 - Coal Business Seminar (October 2006, Hyatt Hotel, Rosebank);
 - Health and Safety Course (January 2007; Edwilo Risk Consultants);
 - Corporate Social Investment (March 2007 at Randfontein Estate) .
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APPENDIX 2:
Archaeological Impact Assessment Criteria
(PGS, 2009) and (DWA, 2009)

ARCHAEOLOGICAL IMPACT ASSESSMENT CRITERIA

The impact rating process is designed to provide a numerical rating of the various environmental impacts identified by use of the “Input-Output” model. It has to be stressed that the purpose of the EIA process is not to provide an incontrovertible rating of the significance of various aspects, but rather to provide a structured, traceable and defensible methodology of rating the relative significance of impacts in a specific context. The significance rating process follows the established impact/risk assessment formula: “*Significance = Consequence x Probability*”; where: “*Consequence*” = *Severity + Spatial Scale + Duration*”; and “*Probability*” is determined with reference to industry knowledge and instances of impacts happening in similar or same circumstances.

The significance of archaeological sites is generally also based on four main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Uniqueness and
- Potential to answer present research questions.

Management actions and recommended mitigation, which aims to mitigate and reduce the impact on sites, are expressed as follows:

A - No further action necessary;

B - Mapping of the site and controlled sampling required;

C - Preserve site, or extensive data collection and mapping of the site; and

D - Preserve site

1.1 SAHRA AND ASAPA SITE SIGNIFICANCE:

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region is generally used for the purpose of archaeological impact assessment reports. This process has been summarised in the table below:

Site Significance (SAHRA and ASAPA)

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A	-	High / Medium	Mitigation before destruction

(GP.A)		Significance	
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.C)	-	Low Significance	Destruction

In terms of the impact rating process for the Environmental Impact Assessment (EIA) process, the weight assigned to the various parameters for positive and negative impacts in the formula is presented in the tables below:

Severity (Positive and Negative Impacts)

	Severity - Environmental	Severity - Social/Cultural/Heritage
5	Very significant impact/total destruction of a highly valued species, habitat or ecosystem	Irreparable damage to/destruction of highly valued items of great cultural significance or complete breakdown of social order
4	Serious impairment of ecosystem function	Serious social issues/Permanent damage to items of cultural significance
3	Moderate negative alteration of ecosystem functioning or	Moderately important social issues and/or moderately significant damage to items of cultural significance
2	Minor effects not affecting ecosystem functioning or	Minor Impacts on the local population, repairable over time. Temporary impairment of the availability of items of cultural significance
1	Insignificant effects on the biophysical environment or	Insignificant social issues / low-level repairable damage to commonplace structures.

** i.e. Positive impacts over baseline conditions only and not e.g. positive improvements due to rehabilitation.*

Spatial Scale/Extent

5	National/International i.e. Neighbouring countries or abroad
4	Provincial/Regional i.e. Mpumalanga Province
3	Regional (substantially beyond site boundary) i.e. more than 5 km
2	Local (beyond site boundary and affects neighbours) i.e. Up to 5km from site

1	Site (does not extend beyond site boundary)
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Duration

5	Permanent/Irreversible (more than 50 years)
4	Long Term (26 to 50 years or beyond closure)
3	Medium Term (5-25 years)
2	Medium-Short Term (1-5 years)
1	Short term (Less than a year)

Probability

5	Certain/ Normally happens in cases of this nature (81-100% chance of happening)
4	Will more than likely happen (61-80% chance)
3	Could happen and has happened here or elsewhere (41-60% chance)
2	Has not happened yet, but could (21-40% chance)
1	Conceivable, but only in a set of very specific and extreme circumstances (0-20% chance)

Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in the EMP. The significance of an impact is one of four broad categories, as indicated in the table, below:

Significance Threshold Limits (%)		
High	76 %- 100%	
Medium – High	51% – 75%	
Medium – Low	26% – 50%	
Low	0% - 25%	

Management actions will be assigned for all impacts, irrespective of significance, but the scale of significance serves to focus attention and resources on critical environmental impacts.

APPENDIX 3:
Location of Significant Archaeological and Heritage Sites
(DWA, 2009)

Universal Coal Kangala Coal Mine Archaeological Sites



Legend

- | | |
|---------------------------|-----------------------|
| Project Area | Boxcut |
| Farmstead | Coal Opencast |
| Cemetery | Coal Stockpile |
| Arterial / National Route | Discard Dump |
| Main Road | Explosives Magazine |
| Minor Road | Offices |
| Track | Overburden Stockpile |
| Non-Perennial Stream | Pollution Control Dam |
| Perennial Stream | Sub-Station |
| Dam Wall | Topsoil Berm |
| Dam / Lake | Washing Plant |
| Non-Perennial Pan | Weigh Bridge |
| Perennial Pan | Workshop/Stores |
| Wetland | |

Universal Coal Development
1 (Pty) Ltd



Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

Ref #: glo.UNI605.200909.041
Revision Number: 4
Date: 29/10/2009

