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## Environmental Authorisation for the KPSX: South Project

### Heritage Impact Assessment

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**Project Number:**

BHP1591

**Prepared for:**

BHP Billiton Energy Coal South Africa (Pty) Ltd

November 2014

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<b>Project Name:</b>	<b>Environmental Authorisation for the KPSX: South Project</b>
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## EXECUTIVE SUMMARY

Digby Wells Environmental (hereafter Digby Wells) was requested by BHP Billiton Energy Coal South Africa (Pty) Ltd (hereafter BECSA) to serve as the independent Environmental Assessment Practitioner (EAP) for the Klipspruit South (KPSX: South) project, inclusive of an Environmental Impact Assessment, public consultation and specialist studies.

Klipspruit Colliery lies within the Springs-Witbank Coalfield and produces both high and low quality coal. It received authorisation in 2003 in terms of section 39 of the Minerals Act (Act No. 50 of 1991) (Ref: OT6/2/2/495 EM). In 2009, the existing environmental documentation with amendments was consolidated into one EIA and Environmental Management Plan Report (EMP) to meet the requirements of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).

The KPSX: South Project is an extension project focusing on the mining of the KPSX: South pit as part of the overall mining sequencing at BECSA's existing Klipspruit Colliery. Presently, the main pit is supplemented by coal from the neighbouring Smaldeel mini pit, which is due to be mined out. The KPSX: South pit is estimated to produce 40 million tons (Mt) of coal.

The approved EIA, EMP and Integrated Water Use Licence (IWUL) specify the KPSX: South reserve as an underground mining area, however, economic conditions now favour an opencast development for KPSX: South.

A Notification of Intent to Develop (NID) was compiled and submitted to the South African Heritage Resources Agency (SAHRA) (Case ID: 6316) and the Mpumalanga Provincial Heritage Resources Authority (MPHRA) for Statutory Comment as prescribed under Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). Statutory Comment was issued on 9 September 2014.

A total of four heritage resources were identified during the field survey. These, with the significance rating and designation are summarised in the table below.

Resource ID	Resource Period	Type	Description	Cultural Significance	Designation
6316/2629AA/S.34-001	Union of South Africa (1910 CE to 1961 CE)	Site	Location of farmstead. Farmstead is visible on 1954 Aerial Imagery, indicating that at least some elements or structures are older than 60 years. Farmstead has modern labourers' quarters for farm workers.	2	Negligible
6316/2629AA/S.36-002	Republic of South Africa (1961 to 1994)	Burial / grave	Burial ground associated with farm labourers . Approximately 12 graves located at the site. Oldest identifiable grave dates to 1969. High likelihood that some graves may be older than 60 years.	20	Very High
6316/2629AA/S.34-003	Union of South Africa (1910 CE to 1961 CE)	Site	Location of built structure. Built structure visible on 1954 aerial imagery in location of current structure. However, current structure is constructed from prefabricated material and does not appear to be older than 60 years	1	Negligible
6316//2929AA/S.34-004	Union of South Africa (1910 CE to 1961 CE)	Site	Location of built structure foundations. Built structure is visible on the 1954 aerial imagery suggesting that it is older than 60 years	1	Negligible

Identified heritage resources with a negligible cultural significance were not considered during the impact assessment. Burial ground S.36-002 had a very high cultural significance, and potential impacts were identified and considered as part of this report. The findings from the impact assessment are summarised in the following table.

Code	Impact	Pre-mitigation:						Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
V.High SoS	Damage to and/or destruction of burial ground	Permanent	International	Extremely high - negative	Extremely detrimental	Certain	Major - negative	Project Life	National	Very high - negative	Highly detrimental	Highly probable	Moderate - negative
V.High SoS	Degradation of cultural significance due to loss of / restricted access to burial ground	Project Life	Local	Extremely high - negative	Highly detrimental	Likely	Moderate - negative	Project Life	Very limited	Extremely high - positive	Moderately beneficial	Highly probable	Moderate - positive
V.High SoS	Health and safety risk to NoK when accessing / visiting burial ground	Project Life	Local	Extremely high - negative	Highly detrimental	Certain	Moderate - negative	Project Life	Very limited	Extremely high - positive	Moderately beneficial	Highly probable	Moderate - positive

Based on the findings of the NID and this report, Digby Wells recommend the following:

- There is no need for any further palaeontological assessment. If fossil plant material is discovered during mining operations, it is strongly recommended that a professional palaeontologist be called to assess the importance and rescue the fossils if necessary;
- A fossil monitoring programme as outlined below must be included in the EMP:
  - Photographs of fossil plants must be provided to the mine to assist in the identification of potential fossiliferous material in the shales and mudstone;
  - During the operational phase, shale and mudstones must be given a cursory inspection by the mine geologist or designated person before being added to the waste rock pile. Any identified fossiliferous material should be collected and stored in a suitable protected area to ensure mining operations are not disrupted;
  - On a regular basis, to be agreed upon by mine management and the qualified palaeobotanist sub-contractor, the palaeobotanist should visit the mine to inspect the selected material and waste rock dumps where feasible;
  - Fossil plants considered of good quality or scientific interest by the palaeobotanist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. SAHRA permits will be required for this activity;
  - If no good quality fossiliferous material is recovered, site inspection by the palaeobotanist can be reduced to annual events until mine closure.
- Project related mitigation should aim to exclude burial ground S.36-002 from the project area to remove potential direct impacts as far as is feasible. Irrespective of whether the burial ground will be directly or indirectly affected, agreement regarding the future of the site must be reached between BECSA and Next-of-Kin (NoK) through the implementation of a Burial Grounds and Graves Consultation process in accordance with Section 36 of the NHRA and Chapter XI of the Regulations as soon as possible. This process must include agreements in respect of a Conservation Management Plan and possible Grave Relocation Plan if it is required.
- As per the interim comments issued by SAHRA, the assessor was mindful of the general protection of archaeological resources under Section 35 of the NHRA. Unfortunately, no archaeological resources were identified during the field reconnaissance survey. It is, however, recommended that Chance Find Procedures (CFPs) be developed and included within the EMP for the KPSX: South Project. The CFPs must clearly define the reporting structure and action items required in the discovery or accidental exposure of heritage resources during construction and operational activities.



- Identified heritage resources within the KPSX: South Project area are associated with the built environment and burial grounds and graves. An assessment of the significance of the resources indicated that the significance of the built structures was negligible and were therefore excluded from the impact assessment. Nevertheless, a review of the historical aerial imagery presented within the NID indicated that elements of these sites pre-date 1954 and are therefore generally protected under Section 34 of the NHRA. Based on these findings, it is recommended that BECSA apply for a Section 34 Destruction Permit with MPHRA to ensure compliance with the NHRA.

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## 1 Introduction

Digby Wells Environmental (hereafter Digby Wells) was requested by BHP Billiton Energy Coal South Africa (Pty) Ltd (hereafter BECSA) to serve as the independent Environmental Assessment Practitioner (EAP) for the Klipspruit South (KPSX: South) project, inclusive of an Environmental Impact Assessment, public consultation and specialist studies.

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### 1.1 SAHRA Terms of Reference

As per the Statutory Comments (Case ID: 6316) a Heritage Impact Assessment (HIA) to assess the possible impacts on the built environment and burial grounds and graves was required. SAHRA required that the assessor be mindful of potential archaeological resources generally protected under the NHRA.

Further to this, SAHRA required that a Palaeontological field and desktop assessment be undertaken due to the very high palaeontological sensitivity of the project area.

### 1.2 Scope of Work

The Scope of Work (SoW) for the HIA is based on Digby Wells' recommendations contained in the NID and consequently approved by SAHRA. This includes the following:

- A palaeontological desktop assessment to determine the real potential of significant fossils based on available geological and geochemical data. This assessment should provide further recommended mitigation and management measures;
- An assessment of the built environment including a field reconnaissance survey to identify, record, and document all structures that may exist in the project area; and
- An assessment of burial grounds and graves including a field reconnaissance survey to identify, record and document all burials that may exist in the project area.

### 1.3 Expertise of the Specialist

**Justin du Piesanie** obtained his Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. He currently holds the position of Heritage Management Consultant: Archaeologist at Digby Wells. He has over 5 years combined experience in Heritage Resources Management (HRM) in South Africa, gaining further generalist experience since his appointment at Digby Wells in Burkina Faso, the Democratic Republic of Congo, Liberia and Mali.

Justin is a professional member of the Association of Southern African Archaeologists (ASAPA) (*Member No. 270*) and the International Council on Monuments and Sites (ICOMOS) South Africa (*Member No. 14274*).

**Prof. Marion Bamford** obtained her Doctor of Philosophy (PhD) degree in Palaeobotany from the University of the Witwatersrand in 1990. She currently holds the position of Professor and Senior Management Committee Member at the Evolutionary Studies Institute at the School of Geosciences in the University of the Witwatersrand. She has over 15 year's professional experience throughout southern Africa and has completed over 25 Palaeontological Impact Assessments since 2004.

The curricula vitas of the specialists are attached as Appendix A.

## 2 Project Description

Klipspruit Colliery lies within the Springs-Witbank Coalfield and produces both high and low quality coal. It received authorisation in 2003 in terms of section 39 of the Minerals Act (Act No. 50 of 1991) (Ref: OT6/2/2/495 EM). In 2009, the existing environmental documentation with amendments was consolidated into one EIA and Environmental Management Plan Report (EMP) to meet the requirements of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).

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The approved EIA, EMP and Integrated Water Use Licence (IWUL) specify the KPSX: South reserve as an underground mining area, however, economic conditions now favour an opencast development for KPSX: South.

*Additional project details, including relevant contacts, development context, legal framework and description of the cultural landscape were reported on in the NID (Case ID: 6316) available from <http://www.sahra.org.za/heritage-reports/klipspruit-south-nid>*

## 3 HIA Methodology

### 3.1 Field Based Data Collection

Field based data collection was undertaken by Justin du Piesanie, a qualified and accredited archaeologist on 01 October 2014. The project area was assessed through vehicular and pedestrian survey methodologies. Identified heritage resources were recorded using GPS technology, photographs and detailed notes. Information gathered was supplemented through informal consultation with land occupiers.

## 3.2 Evaluation of Significance

The significance rating process is designed to provide a numerical rating of the cultural significance<sup>1</sup> of identified heritage resources. The evaluation was done as objectively as possible through a matrix developed by Digby Wells for this purpose. In addition, the methodology aims to allow ratings to be reproduced independently should it be required, provided that the same information sources are used. This matrix takes into account 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 representivity or uniqueness (i.e. known examples of similar resources to exist). The final significance attributed to a resource furthermore takes into account the physical integrity of the fabric of the resource. The formula used to determine significance can therefore be summarised as:

$$\text{Value} = \text{Importance} \times \text{Integrity}$$

where

$$\text{Importance} = \text{average sum of Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social Significance}$$

The rationale behind the heritage value matrix takes into account the fact that a heritage resource's value is a direct indication of its sensitivity to change (impacts). Value therefore needs to be determined prior to the completion of any assessment of impacts.

This matrix rates the potential, or importance, of an identified resource relative to its contribution to certain values – aesthetic, historical, scientific and social. These values are based on, and summarised from, the criteria for inclusion into the national estate as outlined in subsection 3(3) of the NHRA, listed in Table 3-1.

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

**Table 3-1: NHRA criteria for inclusion of heritage resources into the national estate**

NHRA reference	Description of defining criteria
3(1)(a)	its importance in the community, or pattern of South Africa's history;
3(1)(b)	its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
3(1)(c)	its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
3(1)(d)	its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
3(1)(e)	its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
3(1)(f)	its importance in demonstrating a high degree of creative or technical achievement at a particular period;
3(1)(g)	its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
3(1)(h)	its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
3(1)(i)	sites of significance relating to the history of slavery in South Africa.

The significance of a resource is directly related to the impact on it that could result from project-related activities, as it provides minimum accepted levels of change to the resource. SAHRA has published minimum standards that include minimum required mitigation of heritage resources. These minimum requirements are integrated into the matrix to guide both assessments of impacts and recommendations for mitigation and management of resources.

The weight assigned to the various parameters for significance in the formula, significance ratings and recommended mitigation are presented in Table 3-2 to Table 3-5.

**Table 3-2: Rating options: Importance**

<b>Rating</b>	<b>Description / guideline</b>
0	The resource exhibits attributes that may be considered in a particular dimension, but it is so poorly represented that it cannot or does not contribute to the resource's overall value.
1	Common, well represented throughout diverse cultural landscapes
2	Generally well represented but exhibits superior qualities in comparison to other similar examples
3	The resource exhibits attributes that are rare and uncommon within a region. It is important to specific communities.
4	Rare and uncommon, value of national importance
5	The resource exhibits attributes that are considered singular, unique and/or irreplaceable to the degree that its significance can be universally accepted.
-	Not assessed - dimension and/or attribute not considered in determining value.

**Table 3-3: Rating options: Integrity**

<b>Rating</b>	<b>Description / guideline</b>
0	No information potential, complete loss of meaning, Fabric completely degraded, original setting lost
1	Fabric poorly preserved, limited information, little meaning ascribed, extensive encroachment on setting
2	Fabric is preserved, some information potential (quality questionable) and meaning evident, some encroachment on setting
3	Fabric well preserved, good quality information and meaning evident, limited encroachment
4	Excellent preservation of fabric, high information potential of high quality, meaning is well established, no encroachment on setting

**Table 3-4: Significance ratings**

Score	Description	Rating
0-5	Resource of negligible heritage value	Negligible
6-10	Resource of low heritage value; change to resource not significant	Low
11-12	Resource of medium heritage value: project mitigation must aim to reduce negative change	Medium
13-14	Resource of medium high heritage value: heritage mitigation to reduce negative change	Medium High
15-17	Resource of high heritage value: resource must be partly conserved and heritage mitigation implemented to reduce negative change	High
17-20	Resource of very high heritage value: resource must be preserved/conserved and included in a management plan	Very High

**Table 3-5: Recommended minimum level of required mitigation**

Designation	Recommended mitigation
Negligible	Sufficiently recorded, no mitigation required
Low	Resource must be recorded before destruction, including detailed site mapping, surface sampling may be required
Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
Medium High	Project design should aim to reduce or remove changes; Mitigation of resource to include extensive sampling and recording, e.g. test excavation, analyses, etc.
High	Project design must aim to avoid change to resource; Partly conserved, Conservation Management Plan (CMP)
Very High	Project design must change to avoid all change to resource; Conserved in entirety, CMP

### 3.3 Field Ratings

Although grading of heritage resources remains the responsibility of heritage resources authorities, SAHRA requires in terms of its Minimum Standards that heritage reports include Field Ratings for identified resources to comply with section 38 of the NHRA. The NHRA in terms of section 7 provides for a system of grading of heritage resources that form part of the national estate, distinguishing between three categories.

The field rating process is designed to provide a numerical rating of the recommend grading of identified heritage resources. The evaluation was done as objectively as possible by integrating the field rating into the significance matrix. Field ratings guide decision-making in terms of appropriate minimum required mitigation measures and consequent management responsibilities in accordance with section 8 of the NHRA. The formula used to determine field ratings can be summarised as:

$$\text{Field rating} = \text{average sum of Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social Field Ratings}$$

The weight assigned to the various field rating parameters in the formula and the sum of the average ratings are is presented in Table 3-6 and Table 3-7.

**Table 3-6: Rating options: Field Ratings**

Rating	Grade	Description
7	Grade I	Mainly of national significance
6	Grade II	Mainly of provincial significance
5	Grade III A	Mainly local with very high significance
4	Grade III B	Mainly local with high significance
3	General Protection A	Generally protected resource with Medium to Medium-High significance
2	General Protection B	Generally protected resource with Low significance
1	General Protection C	Generally protected resource with Negligible significance

**Table 3-7: Field ratings**

Score	Description	Rating
6,5 to 7,0	Heritage resources with qualities so exceptional that they are of special national significance	Grade I
5,5 to 6,4	Heritage resources which, although forming part of the national estate, can be considered to have special qualities	Grade II



Score	Description	Rating
	which make them significant within the context of a province or a region	
4,5 to 5,4	Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within a more localised context - very high significance rating	Grade III A
3,5 to 4,4	Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within a more localised context - high significance rating	Grade III B
2,5 to 3,4	Resources under general protection in terms of NHRA sections 34 to 37 with Medium to Medium-Hgh significance	General Protected IV A
1,5 to 2,4	Resources under general protection in terms of NHRA sections 34 to 37 with Low significance	General Protected IV B
1,0 to 1,4	Resources under general protection in terms of NHRA sections 34 to 37 with Negligible significance	General Protected IV C

### 3.4 Assessment of Impacts<sup>2</sup>

The impact rating process is designed to provide a numerical rating of the identified heritage impacts. The significance rating follows an established impact/risk assessment formula, as shown below:

$$\text{Significance} = \text{consequence of an event} \times \text{probability of the event occurring}$$

Where:

$$\text{Consequence} = \text{Type of impact} \times (\text{Intensity} + \text{Spatial Scale} + \text{Duration})$$

And:

$$\text{Probability} = \text{Likelihood of an impact occurring}$$

In the formula for calculating consequence:

$$\text{Type of impact} = +1 \text{ (for positive impacts) or } -1 \text{ (for negative impacts)}$$

<sup>2</sup> The impact assessment methodology has been adapted from the Social Impact Assessment methodology developed by Jan Perold (PhD), Digby Wells Social Department manager.

The weight assigned to the various parameters for positive and negative impacts in the formula is presented in Table 3-2 to Table 3-12 below.

Project-related impacts on heritage resources have taken into account the inherent value of heritage resources, described above, and only applied to resources with values above negligible. As a result, the impact assessment did not consider individual resources, but was applied to diverse resources grouped in terms of similar values.

The magnitude will then be applied to pre- and post-mitigation scenarios with the intention of removing all impacts on heritage resources. Where project related mitigation does not avoid or sufficiently reduce negative changes/impacts on heritage resources with high values, mitigation of these resources may be required. This may include alteration, restoration or demolition of structures under a permit issued by MPHRA and/or SAHRA.

**Table 3-8: Rating options: Intensity**

Rating	Type of impact
+/- 7	Major change to Heritage Resource with High-Very High Value
+/- 6	Moderate change to Heritage Resource with High-Very High Value
+/- 5	Minor change to Heritage Resource with High-Very High Value
+/- 4	Major change to Heritage Resource with Medium-Medium High Value
+/- 3	Moderate change to Heritage Resource with Medium - Medium High Value
+/- 2	Minor change to Heritage Resource with Medium - Medium High Value
+/- 1	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value

**Table 3-9: Rating options: Spatial scale**

Value	Exposure	Description
7	International	The effect will occur across international borders
6	National	Will affect the entire country
5	Region	Heritage resources within region
4	Municipal area	Heritage resources outside project area changed
3	Local	Most or all heritage resources change

Value	Exposure	Description
2	Limited	One or more heritage resource will be changed
1	Very Limited	Isolated aspects of individual heritage resource

**Table 3-10: Rating options: Duration**

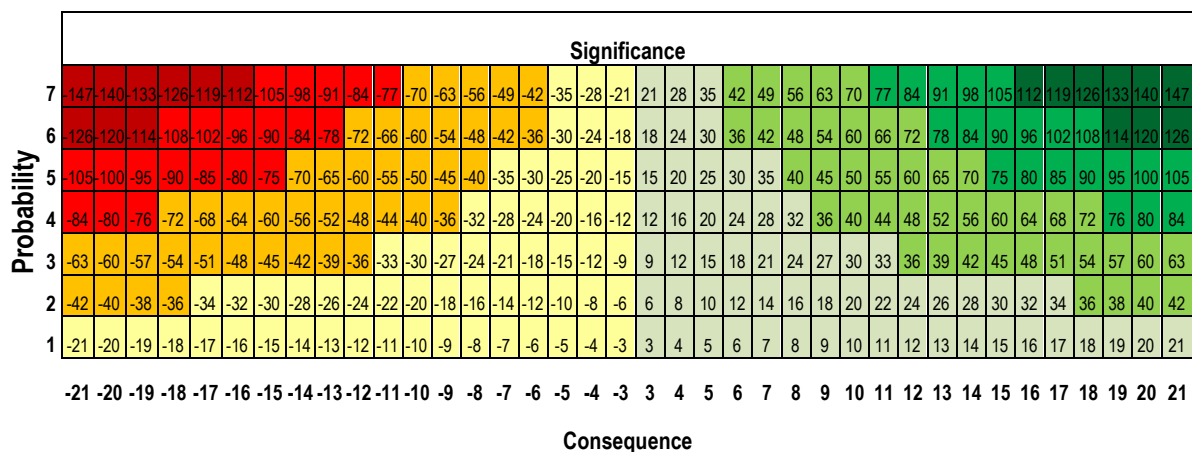
Value	Probability	Description
7	Permanent	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)
6	Beyond Project Life	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)
5	Project Life	The impact will cease after project life.
4	Long Term	Impact will remain for >50% - Project Life
3	Medium Term	Impact will remain for >10% - 50% of Project Life
2	Short Term	Impact will remain for <10% of Project Life
1	Transient	Impact may be sporadic/limited duration and can occur at any time. E.g. Only during specific times of operation, and not affecting heritage value.

**Table 3-11: Rating options: Probability**

Value	Probability	Description
7	Certain/Definite	Happens frequently.
		The impact will occur regardless of the implementation of any preventative or corrective actions.
6	High probability	Happens often.
		It is most likely that the impact will occur.
5	Likely	Could easily happen.
		The impact may occur.

Value	Probability	Description
4	Probable	Could happen.
		Has occurred here or elsewhere.
3	Unlikely / Low probability	Has not happened yet but could happen once in the lifetime of the project.
		There is a possibility that the impact will occur.
2	Rare / Improbable	Conceivable, but only in extreme circumstances.
		Have not happened during lifetime of the project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures
1	Highly Unlikely /None	Expected never to happen.
		Impact will not occur.

Impacts are rated prior to mitigation and again after consideration of the proposed mitigation measures. The impact is then determined and categorised into one of eight categories, as indicated in Table 3-12 and Table 3-13 below. The relationship between the consequence, probability and significance ratings is graphically depicted in Figure 3-1 below.



**Figure 3-1: Relationship between consequence, probability and significance ratings**

**Table 3-12: Impact significance ratings**

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

**Table 3-13: Relationship of significance of negative impacts to specific categories of heritage**

Score	Archaeological attributes	Built heritage or Historic Urban Landscape attributes	Historic landscape attributes	Intangible Cultural Heritage attributes or Associations	Rating
-3 to -35	No change.	No change to fabric or setting.	No change to elements, parcels or components; no visual or audible changes; no changes in amenity or community factors.	No change	Negligible
-36 to -72	Very minor changes to key archaeological materials, or setting.	Slight changes to historic building elements or setting that hardly affect it.	Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.	Very minor changes to area that affect the ICH activities or associations or visual links and cultural appreciation.	Minor
-73 to -108	Changes to key archaeological materials, such that the resource is slightly altered. Slight changes to setting.	Change to key historic building elements, such that the asset is slightly different. Change to setting of an historic building, such that it is noticeably changed.	Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; limited changes to noise levels or sound quality; slight changes to use or access; resulting in limited change to historic landscape character.	Changes to area that affect the ICH activities or associations or visual links and cultural appreciation.	Moderate



-109 to -147	<p>Changes to many key archaeological materials, such that the resource is clearly modified.                  Considerable changes to setting that affect the character of the asset.                  Changes to attributes that convey outstanding value of national estate.                  Most or all key archaeological materials, including those that contribute to outstanding value of national estate such that the resource is totally altered.                  Comprehensive changes to setting</p>	<p>Changes to many key historic building elements, such that the resource is significantly modified.                  Changes to the setting of an historic building, such that it is significantly modified.                  Change to key historic building elements that contribute to outstanding value of national estate, such that the resource is totally altered.                  Comprehensive changes to the setting.</p>	<p>Change to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape;                  noticeable differences in noise or sound quality;                  considerable changes to use or access; resulting in moderate changes to historic landscape character.                  Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit and loss of outstanding value of national estate.</p>	<p>Considerable changes to area that affect the ICH activities or associations or visual links and cultural appreciation.                  Major changes to area that affect the ICH activities or associations or visual links and cultural appreciation.</p>	Major
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### 3.5 Mitigation Measures and Recommendations<sup>3</sup>

The desired outcome of an impact assessment is the removal of negative impacts on heritage resources through the implementation of feasible mitigation measures. The mitigation and management measures recommended in this section comply with the General Principles set out under section 5 of the NHRA. The recommendations further considered the cultural significance of heritage resources and the recommended minimum level of mitigation as published in the SAHRA Minimum Standards. Recommended mitigation is therefore divided into categories: *project related* and *mitigation of heritage resources* defined below.

**Project-related mitigation** requires changes or amendments to project design, planning and siting of infrastructure to avoid or reduce physical impacts on heritage resources. Project-related mitigation measures are always the preferred option, especially where heritage resources with higher cultural significance will be impacted on. Project-related mitigation may include:

- *In situ* preservation (i.e. no-development) of heritage resources for which Conservation Management Plans (CMPs) are required; and
- Conservation of heritage resources through, for example, incorporating the resources into project design and planning, for which CMPs are also required.

**Mitigation of heritage resources** may be necessary where project-related mitigation will not sufficiently conserve or preserve heritage resources, thus resulting in partial or complete changes (including destruction) to a resource. Such resources need to be mitigated to ensure that they are fully recorded, documented and researched before any negative change occurs. This may require mitigation such as:

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

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<sup>3</sup> This section is an adaptation from the Social Impact Assessment methodology developed by Jan Perold (PhD), Digby Wells Social Department manager.



- Where resources have negligible significance the specialist may recommend that no further mitigation is required and the site may be destroyed, for which a destruction permit must be applied for.

Appropriate mitigation measures were identified for each impact, and the procedure discussed above was to assess the possible consequence, probability and significance of each impact post-mitigation.

The post-mitigation rating provided an indication of the significance of residual impacts, while the difference between an impact's pre- and post-mitigation ratings represents the degree to which the recommended mitigation measures are expected to be effective in reducing or ameliorating that impact.

### 3.6 Constraints and Limitations

The following constraints and limitations were experienced as part of this study:

- Due to time and budgetary constraints, systematic controlled survey of the project area was not possible;
- Identified heritage resources are not an exhaustive list of all heritage resources that may occur within the project area;
- Heritage resources commonly occur at sub-surface levels with no visible surface features to assist in their identification. This assessment, while as comprehensive as possible, does acknowledge this constraint and provide appropriate management measures in the event of discovery.

## 4 Statement of Significance

The cultural significance of identified heritage resources located within and near the project area are presented in Table 4-1. The assigned values take into consideration the importance of individual resources in relation to aesthetic, historic, scientific and social criteria, as well as the integrity of the resource.

**Table 4-1: Summary of Statements of Significance for identified heritage resources**

Resource ID	Resource Period	Type	Description	VALUE	Designation
6316/2629AA/S.34-001	Union of South Africa (1910 CE to 1961 CE)	Site	Location of farmstead. Farmstead is visible on 1954 Aerial Imagery, indicating that at least some elements or structures are older than 60 years. Farmstead has modern labourers' quarters for farm workers.	2	Negligible
6316/2629AA/S.36-002	Republic of South Africa (1961 to 1994)	Burial / grave	Burial ground associated with farm labourers . Approximately 12 graves located at the site. Oldest identifiable grave dates to 1969. High likelihood that some graves may be older than 60 years.	20	Very High
6316/2629AA/S.34-003	Union of South Africa (1910 CE to 1961 CE)	Site	Location of built structure. Built structure visible on 1954 aerial imagery in location of current structure. However, current structure is constructed from prefabricated material and does not appear to be older than 60 years	1	Negligible
6316//2929AA/S.34-004	Union of South Africa (1910 CE to 1961 CE)	Site	Location of built structure foundations. Built structure is visible on the 1954 aerial imagery suggesting that it is older than 60 years	1	Negligible



Figure 4-1: House at S.34-001. Modern house within farmstead



Figure 4-3: Burial ground S.36-002. Farmstead in background



Figure 4-2: Labourer accommodation associated with farmstead



Figure 4-4: S.34-003 Modern prefab house

## 5 Impact Assessment and Mitigation

### 5.1 Introduction

In the following sections the discussion of each impact is structured as follows:

1. Narrative description of the impact;
2. Discussion of mitigation measures to avoid and/or ameliorate negative impacts and enhance positive ones; and
3. A table presenting the rating of the impact that summarises the recommended mitigation measures, and repeats the rating exercise after mitigation. The table also explains the motivation for assigning particular ratings to an impact.

The impact assessment considered changes to identified heritage resources with a significance value ranging from low – very high. Heritage resources with a negligible significance were not included in the impact assessment as they have been sufficient recorded and do not require any additional mitigation. However, where structures older than 60 years are granted general protection under section 34 of the NHRA, a destruction permit in conjunction with a 30 day public notice and commenting period is required. The results of the impact assessment are summarised in below.

### 5.2 Summary of Impacts

Impacts associated with the KPSX: South Project are related to the listed activities as described in Table 7-1 in the NID. The highest likelihood of negative impacts on heritage resources to occur is associated with activities that will be undertaken during construction phase of the proposed projects. Here, the potential to negatively impact heritage resources, such as damage or destruction, is the greatest.

For the KPSX: South Project, activities identified as sources of risk during construction include:

- GN R 544 Activity 2 and 12; GN R 545 Activity 5: Construction of facilities and infrastructure will cause damage to or destroy any physical heritage resources that may be present in the footprint areas;
- GN R 545 Activity 15: Physical alteration of land in excess of 20 ha will change the character of the land and possibly destroy *in situ* heritage resources; and
- GN R 544 Activity 22, 39, 47; GN R 545 Activity 18: The construction and/or widening of roads will cause damage to or destroy any physical heritage resources that may be present in the impact footprint

The burial ground S.36-002 is the only identified heritage resources occurring within the impact footprint that has a significance rating high enough to warrant assessment. The conceptually identified impacts on the burial ground (S.36-002) include damage to and/or

destruction of the burial ground during the construction and operational phase, loss of / restricted access to the burial ground which may degrade the cultural significance as a result of limited use, and potential safety risks to visiting Next-of-Kin (NoK).

The impact assessment for the burial ground S.36-002 is summarised in Table 5-1 to Table 5-3:

**Table 5-1: Summary of Impact Assessment in regards to damage to and/or destruction of the burial ground (S.36-002)**

IMPACT DESCRIPTION: Damage to and/or destruction of burial ground				
Predicted for project phase:		Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Permanent (7)	Where mitigations are not implemented, project related activities will result in major changes to the burial ground.	Consequence: Extremely detrimental (-21)	Significance: Major - negative (-147)
Extent	International (7)	The major changes to the burial ground may have international repercussions to the reputation of BECSA		
Intensity x type of impact	Extremely high - negative (-7)	Without appropriate mitigation, a major change to a resource with a high significance will occur.		
Probability	Certain (7)	Without appropriate mitigation, project related activities related activities will result in a major change to the burial ground.		
<b>MITIGATION:</b>				
<p>As far as is feasible, mine infrastructure design and siting should be amended to remove any physical, direct impacts on the burial ground.</p> <p>Irrespective of whether the burial ground will be directly or indirectly affected, agreement regarding the future of the site must be reached between BECSA and NoK through the implementation of a Burial Grounds and Graves Consultation process in accordance with Section 36 of the NHRA and Chapter XI of the Regulations. This process must include agreements in respect of a Conservation Management Plan and possible Grave Relocation Plan.</p>				
<b>POST-MITIGATION</b>				
Duration	Project Life (5)	The potential for change to the burial grounds will be present throughout the project life.	Consequence: Highly detrimental (-17)	Significance: Moderate - negative (-102)
Extent	National (6)	The proper management of the burial grounds and graves will have an impact on the national reputation of BECSA		
Intensity x type of impact	Very high - negative (-6)	Mitigation measures will ensure the retention and management of the tangible remains, although <i>in situ</i> management may still result in change to the intangible aspects of the resource.		
Probability	Highly probable (6)	If mitigation measures are implemented, it is still probable that change on both the tangible and intangible aspects of the burial ground may occur.		

**Table 5-2: Summary of Impact Assessment in regards to loss of / restricted access to the burial ground (S.36-002)**

<b>IMPACT DESCRIPTION: Degradation of cultural significance due to loss of / restricted access to burial ground</b>				
<b>Predicted for project phase:</b>		Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Project Life (5)	Where <i>in situ</i> preservation takes place, loss of or restricted access to the burial ground will occur throughout the project life	Consequence: Highly detrimental (-15)	Significance: Moderate - negative (-75)
Extent	Local (3)	The extent of the impact will primarily be on the local environs.		
Intensity x type of impact	Extremely high - negative (-7)	Loss of access to the burial ground will be highly negative to NoK who may want to visit and attend to the graves, ultimately resulting in the deterioration of the historical fabric of the site. This is considered a major change to a heritage resource with high significance.		
Probability	Likely (5)	<i>Without mitigation, it is likely that the loss of or restricted access to the burial ground will result in the degradation of the historical fabric of the site.</i>		
<b>MITIGATION:</b>				
Consult with bona fide NoK regulated under Chapter XI of the NHRA regulations, and any other applicable legislation Develop an entitlement framework for NoK in which the terms and conditions for access to the burial ground are agreed upon				
<b>POST-MITIGATION</b>				
Duration	Project Life (5)	Where access to burial grounds is encapsulated within an Entitlement Framework, NoK should have a right to access the burial ground.	Consequence: Moderately beneficial (13)	Significance: Moderate - positive (78)
Extent	Very limited (1)	The extent of the impact will be very limited as NoK will be granted access through prior arrangement as agreed upon within an Entitlement Framework		
Intensity x type of impact	Extremely high - positive (7)	Mitigation will result in a positive major change to a heritage resource with high significance has both the tangible and intangible aspects of the burial ground will be managed and maintained.		
Probability	Highly probable (6)	It is highly probable that proposed mitigation measures will result in a positive major change to the tangible and intangible aspects of the burial ground.		

**Table 5-3: Summary of Impact Assessment in regards to health and safety risk to NoK when accessing / visiting the burial ground (S.36-002)**

<b>IMPACT DESCRIPTION: Health and safety risk to NoK when accessing / visiting burial ground</b>				
Predicted for project phase:		Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Project Life (5)	Health and safety risks will be present throughout the project life	Consequence: Highly detrimental (-15)	Significance: Moderate - negative (-105)
Extent	Local (3)	The risks will be limited to the project area in extent		
Intensity x type of impact	Extremely high - negative (-7)	The health and safety risks may result in loss of access to the burial ground which could potentially result in a major change to the historical fabric of the resource.		
Probability	Certain (7)	Without appropriate mitigation, it is certain that a major change to the intangible aspect of the burial ground will occur		
<b>MITIGATION:</b> Consult with bona fide NoK regulated under Chapter XI of the NHRA regulations, and any other applicable legislation Develop an entitlement framework for NoK in which the health and safety risks are identified and remedial preventative measures are agreed upon				
<b>POST-MITIGATION</b>				
Duration	Project Life (5)	As for pre-mitigation	Consequence: Moderately beneficial (13)	Significance: Moderate - positive (78)
Extent	Very limited (1)	The extent of the impact will be very limited as NoK will be granted access through prior arrangement as agreed upon within an Entitlement Framework		
Intensity x type of impact	Extremely high - positive (7)	Management of the health and safety risks will be positive to the burial ground as it will allow for the continued management of the tangible and intangible aspects of the burial ground		
Probability	Highly probable (6)	Through the development of an Entitlement Framework, it is highly probable that health and safety risks will be managed and that the tangible and intangible aspects of the burial ground will be conserved.		

## 6 Recommended Mitigation and Management Plans

Recommended mitigation and management plans are provided for project and heritage related mitigation measures. Project related mitigation measures refer to actions that can be taken at a project level to address potential impacts. An example of a project related mitigation measure is the adjustment of the project boundary to exclude heritage resources

from the impact footprint and preserve them *in situ*. Where these types of mitigation measures are not feasible or possible, heritage related mitigation measures are recommended. An example of a heritage related mitigation measure is a Phase 2 archaeological excavation.

The recommended project and heritage related mitigation measures for the burial ground (S.36-002) is discussed separately below.

## 6.1 Project Mitigation Measures

The burial ground S.36-002 is located on the southern portion of the project area in close proximity to the boundary. It is recommended that the project boundary be adjusted as far as is feasible to exclude the burial ground.

Access to the burial ground from the south should also be established if not available to allow NoK unrestricted access to the site.

## 6.2 Heritage Related Mitigation

Irrespective of whether project related mitigation measures are achievable, agreement regarding the future of the burial ground must be reached between BECSA and NoK. A Burial Grounds and Graves Consultation (BGGC) Process must be undertaken in accordance with Section 36 of the NHRA, Chapter XI of the NHRA Regulations, and other applicable legislation must be undertaken.

The BGGC process must be undertaken to discuss the *in situ* management and possible Grave Relocation Plan (GRP) of the burial ground in conjunction with the identified NoK. The agreement between BECSA and NoK will be encapsulated within an Entitlement Framework. Additionally, a Conservation Management Plan (CMP) must be drafted and presented to the NoK for their consideration.

## 7 Conclusion

The proposed KPSX: South Project is located directly to the west of Ogies in the Mpumalanga Province. The project is a Section 102 Amendment of the approved EMP for the Klipspruit Colliery. An NID completed and submitted to SAHRA and MPHRA in terms of Section 38(8) of the NHRA presented a baseline of the cultural landscape that informed this report. Statutory Comment issued on 9 September required that an HIA and palaeontological desktop and field assessment be undertaken. This was completed and the findings are presented in Appendix B.

A total of four heritage resources (See Table 4-1) were identified within the project boundaries during the field survey, three of which had a negligible significance rating. These were not included in the impact assessment. Burial ground S.36-002 is located on the southern portion of the project area, in close proximity to the boundary. However, during the social consultation completed as part of the Social Impact Assessment, the current



landowner, Ivan Enslin, indicated that older unmarked graves are located within the wetland area, the approximate location indicated on Plan 1 in Appendix C.

An impact assessment was completed for the identified burial ground S.36-002 and discussed under Section 5.2 above. Recommendation to the mitigation and management of this resource was presented and discussed under section 6 above and summarised below. These recommendations are applicable to the unidentified burial ground as well.

Based on the findings of the NID and this report, Digby Wells recommend the following:

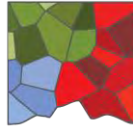
- There is no need for any further palaeontological assessment. If fossil plant material is discovered during mining operations, it is strongly recommended that a professional palaeontologist be called to assess the importance and rescue the fossils if necessary;
- A fossil monitoring programme as outlined below must be included in the EMP:
  - Photographs of fossil plants must be provided to the mine to assist in the identification of potential fossiliferous material in the shales and mudstone;
  - During the operational phase, shale and mudstones must be given a cursory inspection by the mine geologist or designated person before being added to the waste rock pile. Any identified fossiliferous material should be collected and stored in a suitable protected area to ensure mining operations are not disrupted;
  - On a regular basis, to be agreed upon by mine management and the qualified palaeobotanist sub-contractor, the palaeobotanist should visit the mine to inspect the selected material and waste rock dumps where feasible;
  - Fossil plants considered of good quality or scientific interest by the palaeobotanist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. SAHRA permits will be required for this activity;
  - If no good quality fossiliferous material is recovered, site inspection by the palaeobotanist can be reduced to annual events until mine closure.
- Project related mitigation should aim to exclude burial ground S.36-002 from the project area to remove potential direct impacts as far as is feasible. Irrespective of whether the burial ground will be directly or indirectly affected, agreement regarding the future of the site must be reached between BECSA and Next-of-Kin (NoK) through the implementation of a Burial Grounds and Graves Consultation process in accordance with Section 36 of the NHRA and Chapter XI of the Regulations as soon as possible. This process must include agreements in respect of a Conservation Management Plan and possible Grave Relocation Plan if it is required.
- As per the interim comments issued by SAHRA, the assessor was mindful of the general protection of archaeological resources under Section 35 of the NHRA. Unfortunately, no archaeological resources were identified during the field



reconnaissance survey. It is, however, recommended that Chance Find Procedures (CFPs) be developed and included within the EMP for the KPSX: South Project. The CFPs must clearly define the reporting structure and action items required in the discovery or accidental exposure of heritage resources during construction and operational activities.

- Identified heritage resources within the KPSX: South Project area are associated with the built environment and burial grounds and graves. An assessment of the significance of the resources presented in Table 4-1 indicated that the significance of the built structures was negligible and were therefore excluded from the impact assessment. Nevertheless, a review of the historical aerial imagery presented within the NID indicated that elements of these sites pre-date 1954 and are therefore generally protected under Section 34 of the NHRA. Based on these findings, it is recommended that BECSA apply for a Section 34 Destruction Permit with MPHRA to ensure compliance with the NHRA.

## Appendix A: Specialist CV



# DIGBY WELLS

## ENVIRONMENTAL

Mr. Justin du Piesanie  
Heritage Management Consultant: Archaeologist  
Social Sciences Department  
Digby Wells Environmental

### 1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
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
08/2011 to present	Digby Wells Environmental	Heritage Management Consultant: Archaeologist

Digby Wells and Associates (South Africa) (Pty) Ltd (Subsidiary of Digby Wells & Associates (Pty) Ltd). Co. Reg. No. 2010/008577/07. Fern Isle, Section 10, 359 Pretoria Ave Randburg Private Bag X10046, Randburg, 2125, South Africa  
Tel: +27 11 789 9495, Fax: +27 11 789 9498, [info@digbywells.com](mailto:info@digbywells.com), [www.digbywells.com](http://www.digbywells.com)

Directors: A Sing\*, AR Wilke, DJ Otto, GB Beringer, LF Koeslag, AJ Reynolds (Chairman) (British)\*, J Leaver\*, GE Trusler (C.E.O)  
\*Non-Executive

Period	Company	Title/position
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 Professional Affiliations

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

#### 5 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

#### 6 Experience

I have 5 years experiences in the field of heritage resources management (HRM) including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. During my studies I was involved in academic research projects associated with the Stone Age, Iron Age, and Rock Art. These are summarised below:

- Wits Fieldschool - Excavation at Meyersdal, Klipriviersberg Johannesburg (Late Iron Age Settlement).
- Wits Fieldschool - Phase 1 Survey of Prentjiesberg in Ugie / Maclear area, Eastern Cape.
- Wits Fieldschool – Excavation at Kudu Kopje, Mapungubwe National Park Limpopo Province.

- Wits Fieldschool – Excavation of Weipe 508 (2229 AB 508) on farm Weipe, Limpopo Province.
- Survey at Meyerdal, Klipriviersberg Johannesburg.
- Mapping of Rock Art Engravings at Klipbak 1 & 2, Kalahari.
- Survey at Sonop Mines, Windsorton Northern Cape (Vaal Archaeological Research Unit).
- Excavation of Kudu Kopje, Mapungubwe National Park Limpopo Province.
- Excavation of KK (2229 AD 110), VK (2229 AD 109), VK2 (2229 AD 108) & Weipe 508 (2229 AB 508) (Origins of Mapungubwe Project)
- Phase 1 Survey of farms Venetia, Hamilton, Den Staat and Little Muck, Limpopo Province (Origins of Mapungubwe Project)
- Excavation of Canteen Kopje Stone Age site, Barkley West, Northern Cape
- Excavation of Khami Period site AB32 (2229 AB 32), Den Staat Farm, Limpopo Province

Since 2011 I have been actively involved in environmental management throughout Africa, focusing on heritage assessments in compliance with International Finance Corporation (IFC) Performance Standards and other World Bank Standards and Equator Principles. This exposure to environmental, and specifically heritage management has allowed me to work to international best practice standards in accordance with international conservation bodies such as UNESCO and ICOMOS. In addition, I have also been involved in the collection of quantitative data for a Relocation Action Plan (RAP) in Burkina Faso. The exposure to this aspect of environmental management has afforded me the opportunity to understand the significance of integration of various studies in the assessment of heritage resources and recommendations for feasible mitigation measures. I have worked throughout South Africa, as well as Burkina Faso, the Democratic Republic of Congo, Liberia and Mali.

## 7 Project Experience

Please see the following table for relevant project experience:



Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Klipriviersberg Archaeological Survey	Meyersdal, Gauteng, South Africa	2005 2006	Survey of residential development in Meyersdal. This included the recording of identified stone walled settlements through detailed mapping and photographs. Included was the Phase 2 Mitigation of two stone walled settlements	Archaeological Impact Assessments	Researcher, Archaeological Assistant	2 months		Completed survey, excavations and reporting	Archaeological Resource Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Sun City Archaeological Site Mapping	Sun City, Pilanesberg, North West Province, South Africa	2006 2006	Recording of an identified Late Iron Age stonewalled settlement through detailed mapping	Mapping	Archaeological Assistant, Mapper	1 month	Sun City	Completed mapping	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Witbank Dam Archaeological Impact Assessment	Witbank, Mpumalanga, South Africa	2007 2007	Archaeological survey for proposed residential development at the Witbank dam	Archaeological Impact Assessment	Archaeological Assistant	1 week		Completed Archaeological Impact Assessment report	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Archaeological Assessment of Modderfontein AH Holdings	Johannesburg, Gauteng, South Africa	2008 2008	Archaeological survey and basic assessment of Modderfontein Holdings	Archaeological Impact Assessment	Archaeologist	1 month		Completed the assessment of 13 properties	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
Heritage Assessment of Rhino Mines	Thabazimbi, Limpopo Province, South Africa	2008 2008	Heritage Assessment for expansion of mining area at Rhino Mines	Heritage Impact Assessment	Archaeologist	2 weeks	Rhino Mines	Completed the assessment	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Cronimet Project	Thabazimbi, Limpopo Province, South Africa	2008 2008	Archaeological survey of Moddergat 389 KQ, Schilpadnest 385 KQ, and Swartkop 369 KQ,	Archaeological Impact Assessment	Archaeologist	1 weeks	Cronimet	Completed field survey and reporting	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com



Eskom Thohoyadou SEA Project	Limpopo Province, South Africa	2008 2008	Heritage Statement defining the cultural landscape of the Limpopo Province to assist in establishing sensitive receptors for the Eskom Thohoyadou SEA Project	Heritage Statement	Archaeologist	2 months	Eskom	Completed Heritage Statement	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
Wenzelrust Excavations	Shoshanguve, Gauteng, South Africa	2009 2009	Contracted by the Heritage Contracts Unit to help facilitate the Phase 2 excavations of a Late Iron Age / historical site identified in Shoshanguve	Excavation and Mapping	Archaeologist	1 week	Heritage Contracts Unit	Completed excavations	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
University of the Witwatersrand Parys LIA Shelter Project	Parys, Free State, South Africa	2009 2009	Mapping of a Late Iron Age rock shelter being studied by the Archaeology Department of the University of the Witwatersrand	Mapping	Archaeologist	1 day	University of the Witwatersrand	Completed mapping of the shelter	University of the Witwatersrand Karim Sadr karim.sadr@wits.ac.za
Transnet NMPP Line	Kwa-Zulu Natal, South Africa	2010 2010	Heritage Survey of the Anglo-Boer War Vaalkrans Battlefield where the servitude of the NMP pipeline	Heritage Impact Assessment	Archaeologist	1 week	Umlando Consultants	Completed survey	Umlando Consultants Gavin Anderson umlando@gmail.com
Archaeological Impact Assessment – Witpoortjie Project	Johannesburg, Gauteng, South Africa	2010 2010	Heritage survey of Witpoortjie 254 IQ, Mindale Ext 7 and Nooitgedacht 534 IQ for residential development project	Archaeological Impact Assessment	Archaeologist	1 week	ARM	Completed survey for the AIA	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Der Brochen Archaeological Excavations	Steelpoort, Mpumalanga, South Africa	2010 2010	Phase 2 archaeological excavations of Late Iron Age Site	Archaeological Excavation	Archaeologist	2 weeks	Heritage Contracts Unit	Completed excavations	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
De Brochen and Booyensdal Archaeology Project	Steelpoort, Mpumalanga, South Africa	2010 2010	Mapping of archaeological sites 23, 26, 27, 28a & b on the Anglo Platinum Mines De Brochen and Booyensdal	Mapping	Archaeologist	1 week	Heritage Contracts Unit	Completed Mapping	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com





Eskom Thohoyandou Electricity Master Network	Limpopo Province, South Africa	2010 2010	Desktop study to identify heritage sensitivity of the Limpopo Province	Desktop Study	Archaeologist	1 Month	Strategic Environmental Focus	Completed Report	Strategic Environmental Focus (SEF) Vici Napier vici@sefsa.co.za
Bathhako Mine Expansion	North-West Province, South Africa	2010 2010	Mapping of historical sites located within the Bathhako Mine Expansion Area	Mapping	Archaeologist	1 week	Heritage Contracts Unit	Completed Mapping	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
Kibali Gold Project Grave Relocation Plan	Oriental Province, Democratic Republic of Congo	2011 2013	Implementation of the Grave Relocation Project for the Randgold Kibali Gold Project	Grave Relocation	Archaeologist	2 years	Randgold Resources	Successful relocation of approximately 3000 graves	Kibali Gold Mine Cyrille Mutombo Cyrille.c.mutombo@kibaligold.com
Kibali Gold Hydro-Power Project	Oriental Province, Democratic Republic of Congo	2012 2014	Assessment of 7 proposed hydro-power stations along the Kibali River	Heritage Impact Assessment	Heritage Consultant	2 years	Randgold Resources	Completed Heritage Impact Assessment	Randgold Resources Charles Wells Charles.wells@randgoldresources.com
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012 2012	Heritage Impact Assessment on the farm Vygenhoek	Heritage Impact Assessment	Heritage Consultant	6 months	Aquarius Resources	Completed Heritage Impact Assessment	Aquarius Resources
Environmental Authorisation for the Gold One Geluksdal TSF and Pipeline	Gauteng, South Africa	2012 2012	Heritage impact Assessment for the proposed TSF and Pipeline of Geluksdal Mine	Heritage Impact Assessment	Heritage Consultant	4 months	Gold One International	Completed Heritage Impact Assessment	Gold One International
Platreef Burial Grounds and Graves Survey	Mokopane, Limpopo Province, South Africa	2012 2012	Survey for Burial Grounds and Graves	Burial Grounds and Graves Management Plan	Heritage Consultant	4 months	Platreef Resources	Project closed by client due to safety risks	Platreef Resources Gerick Mouton
Resgen Boikarabelo Coal Mine	Limpopo Province, South Africa	2012 2012	Archaeological Excavation of identified sites	Archaeological Excavation	Heritage Consultant	4 months	Resources Generation	Completed excavation and reporting, destruction permits approved	Resources Generation Louise Nicolai
Bokoni Platinum Road Watching Brief	Burgersfort, Limpopo Province, South Africa	2012 2012	Watching brief for construction of new road	Watching Brief	Heritage Consultant	1 week	Bokoni Platinum Mine	Completed watching brief, reviewed report	Bokoni Platinum Mines (Pty) Ltd



SEGA Gold Mining Project	Burkina Faso	2012 2013	Socio Economic and Asset Survey	RAP	Social Consultant	3 months	Cluff Gold PLC	Completed field survey and data collection	Cluff Gold PLC
SEGA Gold Mining Project	Burkina Faso	2013 2013	Specialist Review of Heritage Impact Assessment	Reviewer	Heritage Consultant	1 week	Cluff Gold PLC	Reviewed specialist report and made appropriate recommendations	Cluff Gold PLC
Consbrey and Harwar Collieries Project	Breyton, Mpumalanga, South Africa	2013 2013	Heritage Impact Assessment for the proposed Consbrey and Harwar Collieries	Heritage Impact Assessment	Heritage Consultant	2 months	Msobo	Completed Heritage Impact Assessments	Msobo
New Liberty Gold Project	Liberia	2013 2014	Implementation of the Grave Relocation Project for the New Liberty Gold Project	Grave Relocation	Heritage Consultant	On-going	Aureus Mining	Project is on-going	Aureus Mining
Falea Uranium Mine Environmental Assessment	Falea, Mali	2013 2013	Heritage Scoping for the proposed Falea Uranium Mine	Heritage Scoping	Heritage Consultant	2 months	Rockgate Capital	Completed scoping report and recommended further studies	Rockgate Capital
Putu Iron Ore Mine Project	Petroken, Liberia	2013 2014	Heritage impact Assessment for the proposed Putu Iron Ore Mine, road extension and railway line	Heritage Impact Assessment	Heritage Consultant	6 months	Atkins Limited	Completed Heritage Impact Assessment and provided recommendations for further studies	Atkins Limited Irene Bopp Irene.Bopp@atkinglobal.com
Sasol Twistdraai Project	Secunda, Mpumalanga, South Africa	2013 2014	Notification of intent to Develop and Heritage Statement for the Sasol Twistdraai Expansion	NID	Heritage Consultant	2 months	ERM Southern Africa	Completed NID and Heritage Statement	ERM Southern Africa Alan Cochran Alan.Cochran@erm.com
Daleside Acetylene Gas Production Facility	Gauteng, South Africa	2013 2013	Project Management of the heritage study	NID	Project Manager	3 months	ERM Southern Africa	Project completed	ERM Southern Africa Kasantha Moodley Kasantha.Moodley@erm.com
Exxaro Belfast, Paardeplaats and Eerstelingsfontein GRP	Belfast, Mpumalanga, South Africa	2013 2014	Grave Relocation Plan for the Belfast, Paardeplaats and Eerstelingsfontein Projects	GRP	Project Manager, Heritage Consultant	On-going	Exxaro	Project is on-going	Exxaro Johan van der Bijl Johan.vanderbijl@exxaro.com



Nzoro 2 Hydro Power Project	Oriental Province, Democratic Republic of Congo	2014 2014	Social consultation for the Relocation Action Plan component of the Nzoro 2 Hydro Power Station	RAP	Social Consultant	On-going	Randgold Resources	Completed introductory meetings – project on-going	Kibali Gold Mine Cyrille Mutombo Cyrille.c.mutombo@kibaligold.com
Eastern Basin AMD Project	Springs, Gauteng, South Africa	2014 2014	Heritage Impact Assessment for the proposed new sludge storage facility and pipeline	Heritage Impact Assessment	Heritage Consultant	On-going	AECOM	Project is on-going	AECOM
Soweto Cluster Reclamation Project	Soweto, Gauteng, South Africa	2014 2014	Heritage Impact Assessment for reclamation activities associated with the Soweto Cluster Dumps	Heritage Impact Assessment	Heritage Consultant	On-going	ERGO	Project is on-going	ERGO Greg Ovens Greg.ovens@drdgold.com
Klipspruit South Project	Ogies, Mpumalanga, South Africa	2014 2014	NID and Heritage Statement for the Section 102 Amendment of the Klipspruit Mine EMP	NID	Heritage Consultant	On-going	BHP Billiton	Project is on-going	BHP Billiton
Klipspruit Extension: Weltevreden Project	Ogies, Mpumalanga, South Africa	2014 2014	NID and Heritage Statement for the expansion of the Klipspruit Mine	NID	Heritage Consultant	On-going	BHP Billiton	Project is on-going	BHP Billiton
Ergo Rondebult Pipeline Basic Assessment	Johannesburg, South Africa	2014 2014	NID and Heritage Statement for the construction of the Rondebult Pipeline	NID	Heritage Consultant	1 Week	ERGO	Completed screening assessment and NID	ERGO
Kibali ESIA Update Project	Oriental Province, Democratic Republic of Congo	2014 2014	Update of the Kibali ESIA for the inclusion of new open-cast pit areas	Heritage Impact Assessment	Heritage Consultant	On-going	Randgold Resources	Project is on-going	Randgold Resources Charles Wells Charles.wells@randgoldresources.com
GoldOne EMP Consolidation	Westonaria, Gauteng, South Africa	2014 2014	Gap analysis for the EMP consolidation of operations west of Johannesburg	Gap Analysis	Heritage Consultant	On-going	Gold One International	Project is on-going	Gold One International



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# Marion K Bamford, PhD

May 2014

Personal Professor and Senior Management Committee Member  
Evolutionary Studies Institute (formerly Bernard Price Institute) and NRF-DST Centre of Excellence; School of Geosciences, University of the Witwatersrand  
P Bag 3, WITS 2050, Johannesburg, South Africa  
Tel: +27 11 717 6690, Fax: +27 11 717 6694, e-mail: [marion.bamford@wits.ac.za](mailto:marion.bamford@wits.ac.za)

## Education

1983: BSc University of the Witwatersrand; majors in Botany and Microbiology.  
1984: BSc Honours, University of the Witwatersrand; Botany and Palaeobotany.  
1986: MSc University of the Witwatersrand; Palaeobotany. Graduated with Distinction  
1990: PhD University of the Witwatersrand; Palaeobotany..  
1994 - Service d'Anatomie des Bois, Musée Royal de l'Afrique Centrale, Tervuren, Belgium, by Roger Dechamps – training in wood anatomy  
1997 - Université Pierre et Marie Curie, Paris, France, ditto by Dr Jean-Claude Koeniguer

## Professional experience

1989: Research Officer, Geological Survey, Pretoria  
1991-1992: Research Associate, BPI, University of the Witwatersrand (external funding)  
1993-2000: Research Officer, BPI, University of the Witwatersrand (includes teaching)  
1999: Professeur Invitée, Université Claude Bernard, Lyon, France.  
2001-2006: Senior Research Officer, BPI, University of the Witwatersrand  
2007 – Associate Professor, BPI, University of the Witwatersrand  
2014 – Personal Professor, ESI, University of the Witwatersrand  
Research Rating (South African NRF international and peer review): B3  
Fellow of the Royal Society of South Africa – 2007 onwards

## Field Experience

1982-present: Karoo palaeobotany, P-Tr boundary, Lower Cretaceous deposits; modern ecology in southern Africa  
1986-1989: Kimberlite pipes, Botswana  
1991-present: Tertiary fluvial deposits on west coast, Namibia, Botswana  
1998-present: palaeobotany: eastern Australia, Argentina, Brazil, China, New Zealand  
2000- present: East African hominin sites: Olduvai Gorge, Laetoli, Koobi Fora, Rusinga Island

## Field of expertise

Palaeobotany: wood anatomy, charcoal, leaves, seeds, palynology, phytoliths (Palaeozoic to Cenozoic); Palaeoecology based on plants;  
Palaeontological Impact Assessments 2004-2014: approx 25 projects.

## Publications

Chapters in books: 5; Scientific peer-reviewed Journal articles: 83; Conference presentations: 45

## Other experience/duties/professional societies

Post graduate Student Supervision: Honours completed: 4; Masters completed: 3. Masters current: 0. PhD completed: 3. PhD current: 8. Post docs completed: 3. Post docs current 4.  
Lecturing 2001 to present: Geology II – Palaeontology; Biology III – Palaeontology; Honours – Palaeobotany module, Palynology module, Evolution of Terrestrial ecosystems module.  
Geosciences representative on Graduate Studies Committee: 2008 – present  
Editor – *Palaeontologia africana*: 2002-2013; associate editor: 2014 – present  
SASQUA (Southern African Society for Quaternary Research): Vice president 2013-2015  
PSSA (Palaeontological Society of southern Africa): Vice President 2012-2014  
INQUA ICSU – Chairman South African section: 2014-2016  
PAST (Palaeontological Scientific Trust): Chairman of Scientific Advisory Committee: 2010 +

Heritage Impact Assessment

Environmental Authorisation for the KPSX: South Project

BHP1591



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## Appendix B: Palaeontological Impact Assessment

# **Palaeontological Impact Assessment for the proposed Klipspruit Coal Mine, near Ogies, Mpumalanga**

**Desktop Study**

**For  
Digby Wells Environmental**

**30 October 2014**

**Prof Marion Bamford**  
Evolutionary Studies Institute  
University of the Witwatersrand  
P Bag 3, WITS 2050  
Johannesburg, South Africa  
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# Palaeontological Impact Assessment for the proposed Klipspruit Coal Mine, near Ogies, Mpumalanga

## Background

As requested by Mr Justin du Piesanie of Digby Wells Environmental, on behalf of their client, BECSA, a desktop palaeontological impact assessment has been completed for the proposed extension to the existing mine: Background information from Digby Wells for Klipspruit South (KPSX: South)

Klipspruit Colliery lies within the Springs-Witbank Coalfield and produces both high and low quality coal. It received authorisation in 2003 in terms of section 39 of the Minerals Act (Act No. 50 of 1991) (Ref: OT6/2/2/495 EM). In 2009 the existing environmental documentation with amendments was consolidated into one EIA and Environmental Management Plan Report (EMP) to meet the requirements of the MPRDA. There are two sections under consideration for the PIA.

### Klipspruit South (KPSX: South)

The KPSX: South Project is a brown field's project focusing on the mining of the KPSX: South pit as part of the overall mining sequencing at BECSA's existing Klipspruit Colliery. Presently, the main pit is supplemented by coal from the neighbouring Smaldeel mini pit, which is due to be mined out. The KPSX: South pit is estimated to produce 26 million tons (Mt) of coal.

The approved EIA, EMP and Integrated Water Use Licence (IWUL) specify the KPSX: South reserve as an underground mining area, however, economic conditions now favour an opencast development for KPSX: South.

### Klipspruit Weltevreden (KPSX: Weltevreden)

Currently, BECSA is the owner operator (90%) of the Klipspruit Mine. It lies within the Springs-Witbank Coalfield and produces a nominal 8 million ton per annum (Mtpa) Run of Mine (RoM) of both high and low quality coal. Authorisation for the Klipspruit Mine was received in 2003 in terms of section (s.) 39 of the Minerals Act (Act No. 50 of 1991) (Ref: OT6/2/2/495 EM), with an expected Life of Mine (LoM) to the year 2020.

BECSA is a 50% shareholder with Anglo American Thermal Coal in the Phola Coal Processing Plant (PCPP) Joint Venture (JV) in a take-or-pay agreement until 2028. Here, RoM coal from the Klipspruit Mine is processed and transported along the Richards Bay Coal Terminal (RBCT) railway line for export to international markets.

Currently, the life of asset plan has a sharp decline in export tonnes as the operations at the Klipspruit Mine ramp down. To maintain the current export volume profile and fulfil the take-or-pay agreement at PCPP JV, BECSA intend to implement the KPSX: Weltevreden Project.

BECSA is the holder of three prospecting rights in close proximity to the existing Klipspruit operations, containing coal resources of approximately 500 million ton (Mt). The KPSX: Weltevreden Project is positioned to leverage off the existing export infrastructure, and extend the LoM by 20 years or more.

## Methods and Terms of Reference

The National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998) protect the archaeological and palaeontological heritage of South Africa.



1. In order to determine the likelihood of fossils occurring in the affected area geological maps, literature, palaeontological databases and published and unpublished records must be consulted.
2. If fossils are likely to occur then a site visit must be made by a qualified palaeontologist to locate and assess the fossils and their importance.
3. Unique or rare fossils should either be collected (with the relevant SAHRA permit) and removed to a suitable storage and curation facility, for example a Museum or University palaeontology department or protected on site.
4. Common fossils can be sacrificed if they are of minimal or no scientific importance but a representative collection could be made if deemed necessary.

The published geological and palaeontological literature, unpublished records and databases were consulted to determine if there are any records of fossils from the sites and the likelihood of any fossils occurring there.

### Geology and Palaeontology

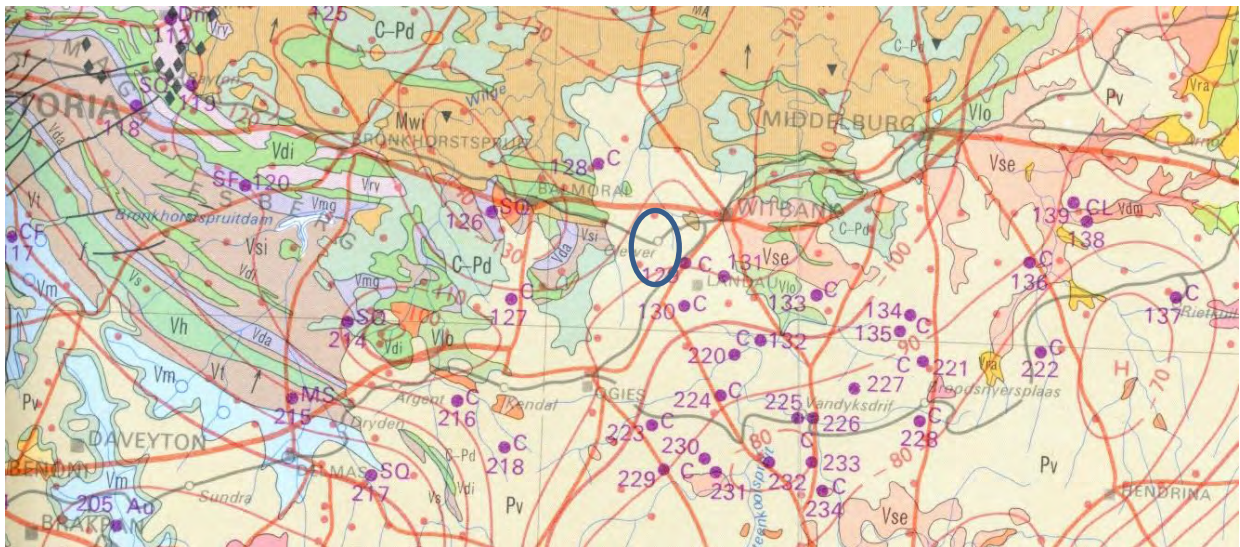


Figure 1. Geological map of the area with the Klipspruit complex falling within the blue outline. Abbreviations of the rock types are explained in Table 1. Map enlarged from the Geological Survey 1: 1 000 000 map 1984.

Symbol	Group/Formation	Lithology	Approximate Age
Pv	Vryheid	Shales, sandstone, coal	Lower Permian, Middle Ecca
C-Pd	Dwyka Fm	Tillite, sandstone, mudstone, shale	Upper Carboniferous-Early Permian
Vdi	Diabase	diabase	
Vsi	Silverton Fm, Pretoria Gr	Shale	Ca 2224 Ma
Vda	Daspoort Fm, Pretoria Gr	quartzite	Ca 2224 Ma

Table 1: Explanation of symbols for the geological map and approximate ages (Johnson et al 2006; Snyman 1998).

Both the southern extension (KPSX: South) and the northern extension (KPSX: Weltevreden) fall in the Vryheid Formation which has coal seams 1-5 of the Middle Ecca Group, the thickness and height of which is influenced by the basal topography of the Karoo Basin. Dykes and sills of dolerite are very common in the region with the most significant one being the Ogies Dyke which is about 15m thick and runs for 100 km. not only do the dykes and sills devolatilize the coals but they destroy the fossil plant material in the associated shales. This means that preservation of fossil plants is very patchy and usually very poor. Any surface exposures weather very rapidly and destroy the fossil material.

Because of the extreme patchiness of any potential fossil occurrence and the very small chance of finding good fossils, a meaningful Palaeontological Impact Assessment or site visit would only be feasible once mining activity has begun and the coal shales are accessible.

### **Recommendation**

Based on the above observations there is no need for any further palaeontological assessment until excavation and mining activities have commenced. It is also highly unlikely that good fossil material will be extracted as such operations crush the coals.

If fossil plant material is discovered during mining operations, then it is strongly recommended that a professional palaeontologist be called to assess the importance and rescue them if necessary (with the relevant SAHRA permit).

If the fossil material is deemed to be of scientific interest then further visits by a professional palaeontologist would be required to collect more material. Given the shortage of such qualified people in South Africa and the stringent safety laws for underground access by the mining companies, any long term monitoring of the fossils is impractical. Nonetheless a monitoring programme is outline below.

As far as the palaeontology is concerned the proposed development can go ahead. Any further palaeontological assessment would only be required AFTER mining has commenced and IF fossils are found by the geologist or environmental personnel.

### **Monitoring Programme for Palaeontology –to commence once the two mine pits are operational.**

1. The following procedure is only required if and when mining commences. The surface activities would not impact on the fossil heritage as the coals and any associated shales with fossil plants would be weathered and unrecognisable.
2. When mining operations commence the shales and mudstones (of no economic value) must be given a cursory inspection by the mine geologist or designated person before being added to the dumps used by the mine. Any fossiliferous material should be put aside in a suitably protected place. This way the mining activities will not be interrupted.
3. Photographs of similar fossil plants must be provided to the mine to assist in recognizing the fossil plants in the shales and mudstones.
4. On a regular basis, to be agreed upon by the mine management and the qualified palaeobotanist sub-contracted for this project, the palaeobotanist should visit the mine to inspect the selected material and check the dumps where feasible. The frequency of

inspections should be monthly. If the geologist/deputy is diligent and extracts the fossil material then inspections can be less frequent.

5. Fossil plants considered to be of good quality or scientific interest by the palaeobotanist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the mine a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA.
6. If any underground inspection is deemed necessary then the normal safety procedures that the mine management endorses, must be followed by the palaeobotanist and associated mine employees.
7. If no good fossil material is recovered then the site inspections by the palaeobotanist can be reduced to annual events until mining operations cease. Annual reports by the palaeobotanist must be sent to SAHRA.

## References

Cadle, A.B., Cairncross, B., Christie, A.D.M., Roberts, D.L., 1993. The Karoo basin of South Africa: the type basin for the coal bearing deposits of southern Africa. *International Journal of Coal Geology* 23, 117-157.

Johnson, M.R., van Vuuren, C.J., Visser, J.N.J., Cole, D.I., Wickens, H.deV., Christie, A.D.M., Roberts, D.L., Brandl, G., 2006. Sedimentary rocks of the Karoo Supergroup. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). *The Geology of South Africa*. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 461 – 499.

Snyman, C.P., 1998. Coal. In: Wilson, M.G.C., and Anhaeusser, C.P., (Eds). *The Mineral Resources of South Africa: Handbook*, Council for Geosciences 16, 136-205.

## Appendix C: Plans and Site Table

# KPSX South Identified Heritage Resources

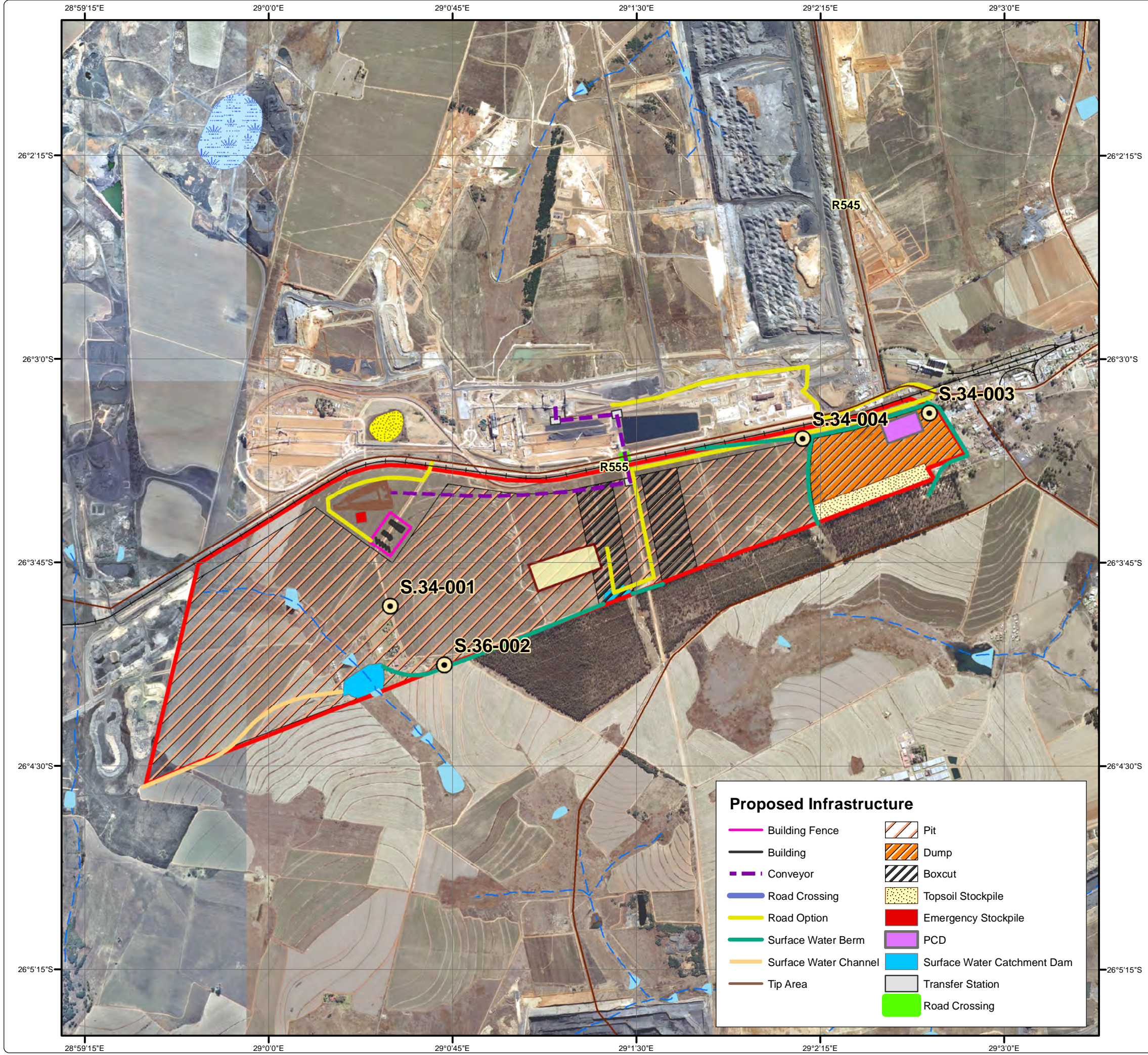
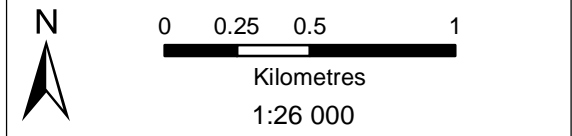
## Legend

- Identified Heritage Resources
- Potential Burial Ground Location
- KPSX South Project Area
- Secondary Town
- Other Town
- Settlement
- Arterial / National Route
- Main Road
- Railway Line
- Non-Perennial River
- Perennial River
- Perennial Pan
- Non-Perennial Pan
- Wetland
- Dam

- ### Proposed Infrastructure
- |                       |                             |
|-----------------------|-----------------------------|
| Building Fence        | Pit                         |
| Building              | Dump                        |
| Conveyor              | Boxcut                      |
| Road Crossing         | Topsoil Stockpile           |
| Road Option           | Emergency Stockpile         |
| Surface Water Berm    | PCD                         |
| Surface Water Channel | Surface Water Catchment Dam |
| Tip Area              | Transfer Station            |
|                       | Road Crossing               |



Projection: Transverse Mercator Ref #: idp.BHP1591.201410.148  
 Datum: WGS 1994 Revision Number: 1  
 Central Meridian: 29°E Date: 20/10/2014



Resource ID	Type	Description	Cultural Significance Value	Designation	Latitude	Longitude
6316/2629AA/S.34-001	Site	Location of farmstead. Farmstead is visible on 1954 Aerial Imagery, indicating that at least some elements or structures are older than 60 years. Farmstead has modern block house for farm labourers associated with the farmstead.	2	Negligible	-26.06518	29.008236
6316/2629AA/S.36-002	Burial / grave	Burial ground associated with the labourers of the farmstead. Approximately 12 graves located at the site. Oldest identifiable grave dates to 1969. High likelihood that graves older than 60 years.	20	Very High	-26.068786	29.011921
6316/2629AA/S.34-003	Site	Location of built structure. Built structure visible on 1954 aerial imagery in location of current structure. However, current structure is constructed from prefabricated material and does not appear to be older than 60 years	1	Negligible	-26.053298	29.044857
6316/2629AA/S.34-004	Site	Location of built structure foundations. Built structure is visible on the 1954 aerial imagery suggesting that it is older than 60 years	1	Negligible	-26.05486986	29.03625331