



**HERITAGE IMPACT ASSESSMENT FOR
THE CONSBREY COLLIERY PROJECT,
2629BB AND 2629BD, MPUMALANGA
PROVINCE**

MSOBO COAL (PTY) LTD

14 JUNE 2013

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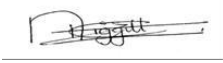


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Report Title: Heritage Impact Assessment for the Consbrey Colliery Project, 2629BB and 2629BD, Mpumalanga Province

Project Number: MSO1805

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EXECUTIVE SUMMARY

Msobo Coal (Pty) Ltd (Msobo Coal) has commissioned Digby Wells Environmental (Digby Wells) to conduct environmental and social studies in support of a Mining Right Application (MRA) in accordance with the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). Msobo Coal proposes to conduct opencast mining on the farms Opgoedehoop 205 IS, De Wittekrans 218 IS, Bosmanskrans 217 IS, Dwarstrek 216 IS, Hartbeesfontein 259 IS, Bankfontein 215 IS and Smutsoog 214 IS in the Magisterial District of Ermelo (hereafter referred to as 'Consbrey'). Msobo Coal also proposes to conduct underground mining on the farm Morgenster 204 IS (hereafter referred to as the 'Consbrey A'). The two mining operations in Consbrey and in Consbrey A are collectively referred to as the 'Consbrey Colliery Project'.

As per the MPRDA, an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) will be compiled and submitted to the Department of Mineral Resources (DMR) for Consbrey and for Consbrey A. This Heritage Impact Assessment (HIA) Report will form a component of the EIA and EMP for Consbrey. A Letter of Recommendation for Exemption from a HIA for Consbrey A has been attached to this HIA Report and will be included in the EIA and EMP for Consbrey A.

From the research conducted on the Study Area, it was evident that significant cultural heritage exists in this area of Mpumalanga. The town of Chrissiesmeer has a long history stemming from the Stone Age to the Iron Age and flourishing in the Historic and Social periods and the town and its surrounding areas have embodied each of these periods of history. Heritage resources that can be found include rock art sites and Bushmen massacre sites, Anglo-Boer battle sites and cemeteries, sandstone, wood and iron, and brick buildings dating to the early 1800s to the 1900s.

During the HIA survey a total of 41 heritage resources ranging from archaeological rock art sites to historical *werwe* were identified and recorded in the proposed Consbrey Colliery Project Area. At least five these sites were located in the proposed Consbrey opencast mining area.

Heritage significance values assigned to the identified resources ranged from negligible to Grade I resources. Only heritage resources with assigned values of Field Rating IV C – low significance and higher were subjected to impact assessments. These included:

- Four Section 34 sites: S.34-001 (inclusive of S.34-002 and S.34-005), S.34-011, S.34-022 and S.34-026 (inclusive of S.34-027);
- Eleven Section 35 sites of which:
 - Five were rock art sites: S.35-015, S.35-016, S.35-019, S.35-021 and S.35-029; and
 - Six were palaeontological sites: S.35-034, S.35-035, S.35-036, S.35-040, S.35-042, S.35-043 and S.35-044.

- Five Section 36 sites: S.36-003, S.36-004, S.36-010, S.36-017 and S.36-028.

Sites that were assessed in terms of direct impacts due to proposed opencast mining activities included S.34-001, S.34-022, S.34-026, S.36-003, S.36-004 and S.36-028. The remainder of assessed sites were located outside opencast mine footprint areas.

General recommendations for the Consbrey Colliery Project included:

- A Comprehensive Phase 2 Built Environment Assessments on Section 34 resources;
- A Comprehensive Phase 2 Archaeological Assessments on Section 35 rock art sites;
- A Comprehensive Phase 2 Palaeontological Assessments on Section 35 palaeontology resources; and
- Where burial grounds and graves may be directly impacted on, Phase 2 Burial grounds and graves relocations may be required.

In addition, Phase 2 assessments should be inclusive of heritage site management plans where relevant for approval by the relevant heritage resources authorities and implementation by Msobo Coal.

Detailed surface infrastructure design plans were not available at the time of the HIA. Detailed HIAs may therefore be required on areas where infrastructure footprints will exceed minimum thresholds described in Section 38 of the NHRA, such as Tailing Storage Facilities (TSFs), stockpiles, pollution control dams and other infrastructure. These HIAs should be undertaken after final designs have been completed and before construction occurs.

Due to a lack of surface infrastructure on Consbrey A, there will be no impacts on surface heritage resources. It is therefore recommended that exemption from all HIA components be granted for Consbrey A. It is further recommended that the Chance Find Procedure and Fossil Find Procedure be implemented during the Operational Phase of Consbrey A.

GLOSSARY OF ABBREVIATIONS AND TERMS

AIA	Archaeological Impact Assessment
BGGS	Burial Grounds and Graves Survey
BP	Before Present
CE	Common Era
DMR	Department of Mineral Resources
EA	Environmental Authorisation
EAP	Environmental Authorisation Policy
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EP	Equator Principle
EPFI	Equator Principles Financial Institutions
ESA	Early Stone Age
HIA	Heritage Impact Assessment
IFC	International Finance Corporation
IWULA	Integrated Water Use License Application
LSA	Later Stone Age
MJS	Major Jackson Series
MRA	Mining Right Application
MPHRA	Mpumalanga Provincial Heritage Resources Agency
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act. No 28 of 2002)
MSA	Middle Stone Age
Mya	Million years ago
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID	Notification of Intent to Develop
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OECD	Organisation of Economic Co-operation and Development
OP	Operational Policies
PIA	Palaeontological Impact Assessment
PPP	Public Participation Process
SAHRA	South African Heritage Resources Agency
SEP	Stakeholder Engagement Plan
SoER	State of Environment Report
SoW	Scope of Work
TSF	Tailing Storage Facility
VIA	Visual Impact Assessment
ZAR	<i>Zuid Afrikaansche Republiek</i>

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1 INTRODUCTION

Msobob Coal (Pty) Ltd (Msobob Coal) has commissioned Digby Wells Environmental (Digby Wells) to conduct environmental and social studies in support of a Mining Right Application (MRA) in accordance with the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). Msobob Coal proposes to conduct opencast mining on the farms Opgoedehoop 205 IS, De Wittekrans 218 IS, Bosmanskrans 217 IS, Dwarstrek 216 IS, Hartbeesfontein 259 IS, Bankfontein 215 IS and Smutsoog 214 IS in the Magisterial District of Ermelo (hereafter referred to as 'Consbrey'). Msobob Coal also proposes to conduct underground mining on the farm Morgenster 204 IS (hereafter referred to as 'Consbrey A'). The two mining operations in Consbrey and in Consbrey A are collectively referred to as the 'Consbrey Colliery Project'.

As per the MPRDA, an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) will be compiled and submitted to the Department of Mineral Resources (DMR) for Consbrey and for Consbrey A. This Heritage Impact Assessment (HIA) Report will form a component of the EIA and EMP for Consbrey. A Letter of Recommendation for Exemption from a HIA and components for Consbrey A has been attached to this HIA Report and will be included in the EIA and EMP for Consbrey A.

2 BACKGROUND INFORMATION OF PROJECT

An application for a MRA was lodged by Xstrata South Africa (Pty) Ltd (Xstrata) with the DMR in November 2012 in respect of the properties Opgoedehoop 205 IS, Morgenster 204 IS, De Wittekrans 218 IS, Bosmanskrans 217 IS, Dwarstrek 216 IS, Hartbeesfontein 259 IS, Bankfontein 215 IS and Smutsoog 214 IS, in the Magisterial District of Ermelo (the Prospecting Rights). The application was accepted by the Regional Manager and the acknowledgement letter (with reference number MP/30/5/1/2/2/10062 MR) was received on 13 March 2013 permitting Xstrata to proceed with the necessary environmental process. Xstrata as the applicant has been directed to lodge an Environmental Management Programme Report (EMPR) as contemplated in Regulations 48, 50, and 51 of the MPRDA Regulations, by 12 September 2013. Although this directive has been addressed to Xstrata, subsequent to the MRA being submitted, the properties previously owned by Xstrata have been transferred and all rights in terms of the MPRDA have been ceded to Msobob Coal. This EMPR has accordingly been prepared under the name of Msobob Coal (Pty) Limited which is the current holder of the prospecting rights, and which will ultimately become the holder of the mining right.

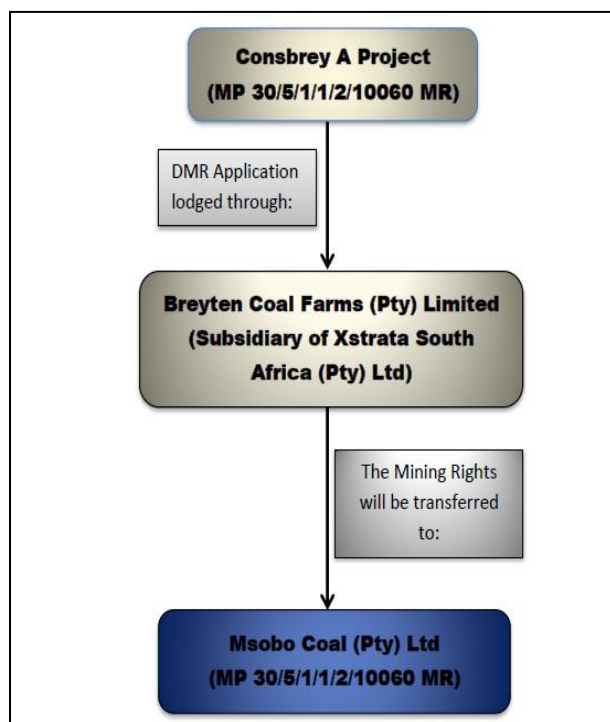


Figure1: Relationship between Xstrata SA and Msobo Coal

2.1 Report Type: NHRA Section 38(8) HIA

Digby Wells was requested by Msobo Coal to conduct an EIA and EMP in support of the MRA in accordance with the MPRDA. This HIA forms part of the EIA and EMP undertaken for Consbrey. A Letter of Recommendation for Exemption from a HIA for Consbrey A has been attached to this HIA Report and will be included in the EIA and EMP for Consbrey A.

2.2 Context of Development

The larger Consbrey Colliery consists of two proposed project areas, namely Consbrey and Consbrey A, which are located within the boundaries of the Albert Luthuli and Msukaligwa Local Municipalities, under the jurisdiction of the Gert Sibande District Municipality, Mpumalanga Province. Consbrey A is a small area within the boundaries of the Consbrey Colliery Project Area, located in the Albert Luthuli Local Municipality. These areas were separated due to different coal seams being mined and different mining techniques being implemented.

The MRA was lodged with the DMR in November 2012 and the acknowledgement letter (with reference number MP 30/5/1/1/2/10060 MR) permitting the applicant to proceed with the necessary environmental process, dated 30 January 2013 was received on 4 February 2013. The applicant was directed to lodge a Scoping Report as contemplated in Regulation 48 and 49 of the MPRDA Regulations, by 28 February 2013.

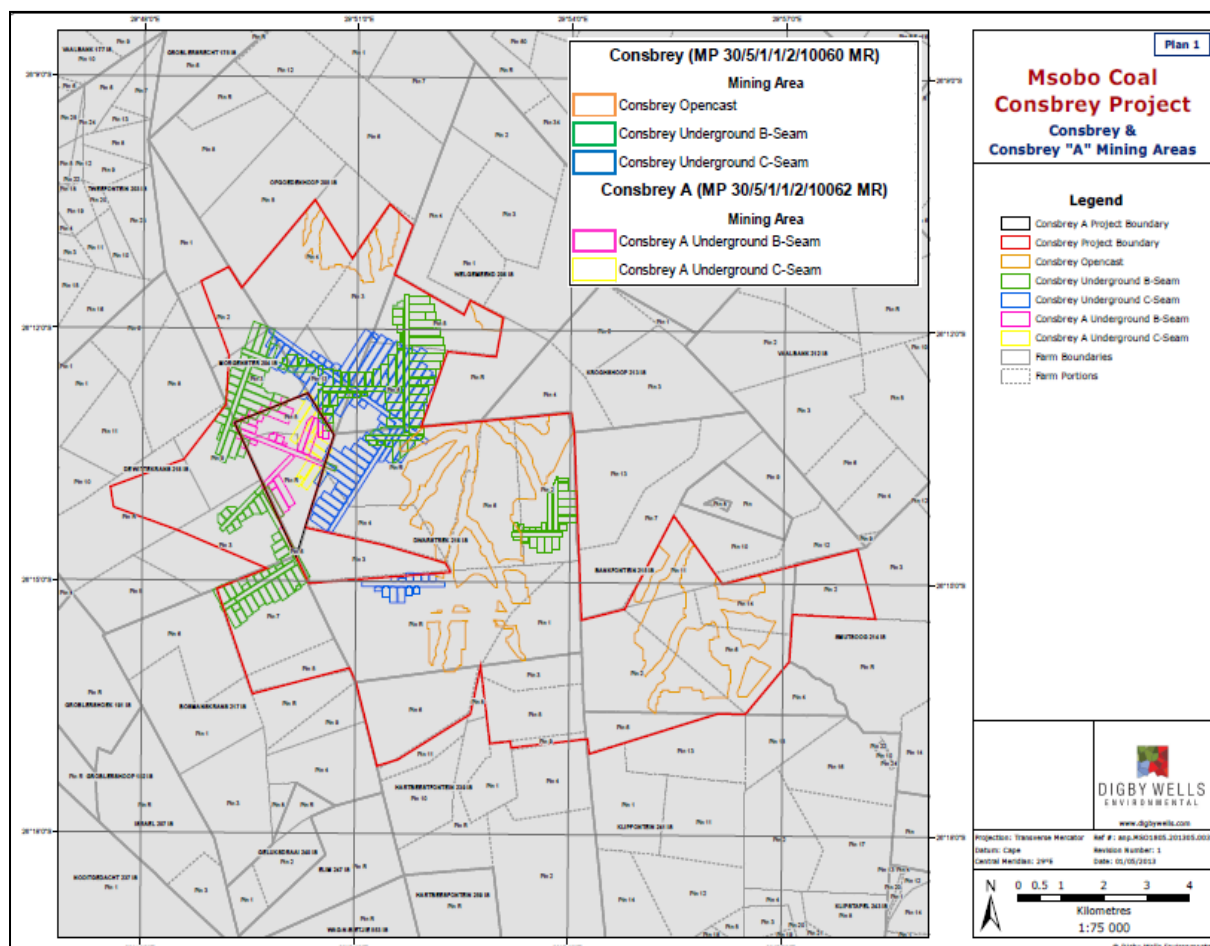


Figure 2-1: Consbrey and Consbrey A.

2.2.1 Mining activities

2.2.1.1 Mineral to be mined

Bituminous coal will be mined covering the Consbrey Colliery Project Area of 9146.7 ha, with Consbrey A covering 420 ha of the total Project Area. The coal will be mined in the Consbrey Colliery Project Area during a 30 year Life of Mine (LoM). The coal depth ranges from 120 m to 180 m below the surface with a total of 292 Million tonnes (Mt) of indicated coal resource.

Coal seams B and C will be mined in the Project Area through the use of open pit, truck and shovel mining methods, and underground mining by use of bord and pillar methods; more specifically, Consbrey A will be mined only through the use of bord and pillar underground mining methods.

During the first year, the open pit mine will produce 6 Million tons per annum (Mtpa), thereafter in the next two year, as the operation stabilises, the mine will be produce 1,2 Mtpa. In the fourth year, when the underground operations commence, the mine will produce 6 Mtpa during the LoM.

2.2.1.2 Mining Method

The coal seams will be mined with the use of the open pit (truck and shovel) and underground (bord and pillar) methods. As the coal resource becomes inaccessible through open pit mining, due to the depths of the coal seam, underground bord and pillar methods, using continuous miners, will be employed. The coal will be accessed via the use of an adit. The continuous miners will feed coal onto shuttle cars which will in turn deliver the coal to the underground conveyor belt system conveying coal to the surface where it will be stockpiled. The mined coal will be transported to the Spitzkop processing plant using trucks and the existing road network and/or a conveyor belt. There will be no coal processing plant on the proposed Consbrey Colliery. Some of the coal will be crushed and screened on site before being loaded to trucks to potentially supply coal the Eskom.

2.2.1.3 Mineral Processing

The coal from the Consbrey Colliery Project area will be transported to the Spitzkop Colliery (an Msobo Coal operation located 17 km from the project area) by truck and/or a conveyor belt system. The coal will be washed at the Spitzkop Colliery's beneficiation facility. The Spitzkop Colliery plant is a dense medium, single-stage wash plant with a feed capacity of 450 tons/ hr.

2.2.1.4 Transportation

An overland conveyor belt system will be erected to convey coal to the Spitzkop Plant. After the beneficiation of the RoM coal at the Spitzkop Colliery Plant, the coal product will be hauled and loaded onto dedicated trains at a railway siding for transport to the Richards Bay Coal Terminal (RBCT) (for export) and by road to regional power stations and other domestic consumers.

2.2.1.5 Coal Markets

Some areas of the B and C lower seams can be beneficiated to supply an export quality steam coal. The C upper seam is of poorer quality and is suited for the domestic power generation market.

2.2.2 Infrastructure

Consbrey Colliery

Roads to the boxcut areas as well as to haul coal will be constructed. The excavation of the boxcut leading to the development of the adit highwall will be constructed. Overland conveyor belt system will also be constructed to convey coal to the Spitzkop Plant. Electricity will be required for the operations of the underground and surface operations (such as conveyor belt, shuttle cars, continuous miners, ventilation shaft, pumps, stores and workshops). Water will be utilised for dust suppression, consumption and processing.

The mining operations will comprise of the following surface infrastructure:

- Administrative buildings, stores and workshops;

- Crusher;
- Services such as power lines, pipelines, conveyors, roads, telephone lines, communication and lighting masts;
- Product stockpiling and loading facilities;
- Services such as power lines, pipelines, conveyors, roads, telephone lines, communication and lighting masts.

Consbrey A Colliery

There will be no surface infrastructure for Consbrey A.

2.2.3 Project activities

Construction Phase

The area is a greenfields site in terms of coal mining and as such, the following activities will take place in order to gain access to prepare the area for operations. During the construction phase, the area will be cleared and vegetation and topsoil will be removed in preparation for the required surface infrastructure.

Operational Phase

The operational phase will entail the removal of soil and overburden during open pit operations, the temporary stockpiling of these, and the filling of open voids of mined out areas as the open pit operations proceed.

The operational phase will include underground mining with the use of continuous miners. Infrastructure requirements for underground mining include ventilation shafts and winder house.

Haul roads will be used to transport coal to Spitzkop Colliery for processing and to domestic markets. A distance of 17 km will be travelled from the Consbrey Colliery Project Area to the Spitzkop Plant.

Decommissioning Phase

The decommissioning phase will include demolition and removal of all infrastructures on site and rehabilitation. Final voids will be filled with overburden and sub-soils before covering with topsoil.

Table 2-1: Activities per phase

Activity No.	Activity
<i>Construction Phase</i>	
1	Site Clearing: Removal of topsoil and vegetation
2	Construction of any surface infrastructure e.g. access roads, pipes, storm water diversion berms, change houses, admin blocks etc. (including transportation of materials and stockpiling)
3	Drilling, blasting and development of infrastructure and adits for mining
4	Temporary storage of hazardous products (fuel, explosives), and waste (e.g. sewage).
5	Monitoring: Environmental monitoring of construction activities' potential impacts
<i>Operational Phase</i>	
6	Use and maintenance of roads and infrastructure
7	Removal of overburden and ore (mining process) and backfilling when possible (including drilling/blasting of hard overburden & stockpiling it)
8	Water use and storage onsite (stormwater, PC Dam, domestic waste water, and abstraction)
9	Storage, handling and treatment of hazardous products (fuel, explosives, oil) and waste (waste, sewage, PC Dam)
10	Concurrent rehabilitation by replacement of overburden, subsoil, topsoil and revegetation as mining progresses
11	Monitoring: Environmental monitoring of operational activities' potential impact
<i>Decommissioning Phase</i>	
12	Demolition and Removal of all infrastructure (incl. transportation off site)
13	Rehabilitation (spreading of soil, re-vegetation & profiling/contouring)
14	Storage, handling and treatment of hazardous products (fuel, explosives, and oil) and waste (waste, sewage, PC Dam).
15	Monitoring: Environmental monitoring of decommissioning activities' potential impact

<i>Post-Closure</i>	
16	Post-closure monitoring and rehabilitation

2.2.4 Rezoning and/or land subdivision

The proposed Consbrey Colliery Project Area currently lies in a brownfields area. Investigation will need to be undertaken to determine the rezoning requirements. This will be conducted in a later phase of the Project.

2.2.5 Integrated Development Plan of Study Area

The Gert Sibande District Municipality Integrated Development Plan (GS-IDP) represented a five-year plan to guide socio-economic development within the district municipality (Gert Sibande District Municipality IDP, 2012). The proposed socio-economic development of the municipality was considered in order to better identify and assess cumulative environmental impacts on heritage resources.

Key economic sectors in the district include manufacturing, mining, energy generation and supply. In addition, agriculture is an important economic sector for the province as a whole. Main land uses in the district include mining, forestry and agriculture (both commercial and subsistence). The Mpumalanga Growth and Development Path (MGDP) – included in the GS-IDP - promotes local economic growth through the following sectors:

- Agriculture and forestry;
- Mining and energy;
- Conservation; and
- Tourism and cultural interests.

Each identified sector above comprises specific types or categories of development that may impact on heritage resources in various manners. The development context in the Study Area must therefore be taken into account. Coal mining is concentrated between Witbank, Standerton, Piet Retief and Carolina, as well as the area immediately west of the MLD, around Ermelo and between Ermelo and Breyten. Forestry contributes a large portion to the area's Gross Geographic Product (GGP) and employs significant numbers of local people. It competes with agriculture for land, but supports other activities such as mining, construction, industry and manufacturing. Forestry plantations are also an ideal backdrop for ecotourism opportunities. Agriculture dominates the central and western parts of the GSDM, and the local Study Area is known for its production of maize, soya beans, dry beans, potatoes, sunflowers, wheat and grazing crops. Subsistence agriculture occurs around towns on communal and state land where many impoverished people compete for the little land available. There are a number of conservation areas and areas of cultural importance in the GSDM, which could also be employed to the benefit of the tourism industry.

2.2.5.1 Agriculture and Forestry

According to the GS-IDP, growth within the agriculture sector will include a massive drive on infrastructure development that may include, among other things:

- Dams;
- Irrigation;
- Farm roads;
- Silos;
- Pack houses;
- Mechanisation;
- Electricity; and
- Infrastructure for agro-processing.

2.2.5.2 Mining and Energy

The key areas that were identified within the mining sector to facilitate economic growth included:

- The upgrading and maintenance of the coal haulage network;
- The expansion of the water network and increased reliance on water transfer schemes;
- The increase of South Africa's energy load and the improvement of alternative energy supply;
- The establishment of a mining supplier park to enhance enterprise development in the province;
- The resolution of land claims to release land for development; and
- The provision of comprehensive support to small-scale mining enterprises.

2.2.5.3 Conservation

A number of conservation areas were identified by the GS-IDP. These included the town of Chrissiesmeer which has an important wetland system. The preservation of Chrissiesmeer and all its components, including heritage, is therefore important for conservation and economic development as identified in the GS-IDP.

2.2.5.4 Tourism and Culture

The GS-IDP also identified key areas to facilitate growth in the tourism and cultural industries. These included broadening and diversifying primarily nature-based tourism product offerings in Mpumalanga into more mainstream market segments such as sports event, business/conference meetings, and theme or amusement parks.

The development context of the Study Area, as discussed above, was considered in order to better identify and assess cumulative environmental impacts on heritage resources in the Study Area.

2.3 Client, Consultant and Land Owner Contact Details

Table 2-2: Client contact details

ITEM	COMPANY CONTACT DETAILS
Company	Msobo Coal (Pty) Ltd
Contact person	Mashudu Gangazhe
Tel no	017 861 8012
Fax no	086 240 1861
Cell no	082 432 1006
Email address	mashudu.gangazhe@msobo.co.za
Postal address	50 Hoy Street, Breyten, 2330

Table 2-3: Consultant contact details

ITEM	COMPANY CONTACT DETAILS
Company	Digby Wells Environmental
Contact person	Marcelle Radyn
Tel no	011 789 9495
Fax no	011 789 9498
Cell no	082 442 1405
E-mail address	Marcelle.radyn@digbywells.com
Postal address	Private Bag X10046, Randburg, 2125

Land owners that have been notified to date are presented in Table 2-4 below. The remaining land owner contact details will be verified during the course of the EIA process.

Table 2-4: Contact details of the land owners

Contact person	Tel/Cell no	Email address	Postal address	Farm Portion
Karel Pieter Landman	013 293 7909	kp.landman@vodamail.co.za	PO Box 400, Hendrina, 1095	Mongenster 204 IS Portion 2
	083 287 6126			De Wittekrans 218 IS Portion 9
Gawie Volschenk	013 293 0280 0842404413	gawie@estancia.co.za	PO Box 289, Middleburg (Mpumalanga, Hendrina, 1095)	Mongenster 204 IS Portion 3
Hannelie Botha	013 293 8068 079 493 5820	hanneliebotha@vodamail.co.za	PO Box 959, Hendrina, 1095	Welgemeend 206 IS Portion 6
Dyndre Prop CC	011 475 4551			Bankfontein 215 IS Portion 1
G Xaba Bheki Nyathikazi	017 819 2076	goxaba@mpg.gov.za nyathikazibw@mpg.gov.za		Smutsoog 214 IS Portion 3
				Bankfontein 215 IS Portion 2
				Dwarstrek 216 IS Portion 2
				Dwarstrek 216 IS Portion 6
Ockert Steyn	0827840461	ockert@sisgroup.co.za		Bankfontein 215 IS Portion 6
Alettha Catharina Roux	017 687 2426	rroux@yebo.co.za	PO Box 1268, Kinross, 2270	Bosmanskrans 217 IS Portion 1
	082 844 5195			Bosmanskrans 217 IS Portion 5
Vincent Schulze	013 293 7800	anvin@lantic.net	PO Box 639, Hendrina, 1095	Dewittekrans 218 IS RE
	083 628 8213			Dewittekrans 218 IS Portion 3

3 TERMS OF REFERENCE

3.1 Client Term of Reference

Msobo Coal has requested Digby Wells to undertake an EIA and EMP with associated studies for the MRA in accordance with the MPRDA. Digby Wells has developed a Heritage Resources Management (HRM) process that is firmly founded on the National Heritage Resources Act, 1999 (Act No 25 of 1999) (NHRA) and is aimed at expediting decisions by relevant Heritage Resources Authorities (HRAs). This process is a phased approach aimed at integrating HRM with the MPRDA and is described in more detail in the Methodology discussion in Section 4 of this HIA Report.

3.2 Heritage Resources Authority (HRA) Terms of Reference

Based on the Heritage Statement, the South African Heritage Resources Authority (SAHRA) stipulated that a HIA must be undertaken for the Consbrey Colliery Project Area. SAHRA required that the HIA must include assessments of:

- Archaeological resources;
- Palaeontological resources;
- Built Environment resources, such as structures older than 60 years;
- Sites of cultural significance associated with oral histories;
- Burial grounds and graves; and
- Cultural landscapes or viewsapes.

Appropriate project-related mitigation and mitigation of heritage resources (Phase 2 heritage assessments) must be recommended as required.

3.3 Scope of Work

As part of the EIA/EMP and Terms of Reference (ToR) received from SAHRA, the Scope of Work (SoW) for the heritage component of the Consbrey Colliery Project that consisted of the compilation of a HIA Report that included the Aims and Objectives discussed below. This report constitutes the specialist HIA component of the Final EIA/EMP Report to be submitted in accordance with the MPRDA for Consbrey. A Letter of Recommendation for Exemption from HIA has also been attached for Consbrey A.

3.4 Aims and Objectives

The aim of this HIA was to assist the client in identifying, documenting and managing heritage resources in the proposed Consbrey Colliery Project Area in a responsible manner. This assessment also aimed to protect, preserve and develop resources within relevant legislative frameworks. In essence, this HIA aimed to:

- Identify, record and document sites of cultural and historic sites, including graves and cemeteries within the proposed Consbrey Colliery Project Area;
- Evaluate whether proposed Project activities will have any negative impacts on these heritage resources during construction, operation and decommissioning phases;
- Recommend project-related mitigation and management measures to avoid or amend any negative impacts on objects or sites of cultural significance. Where project-related mitigation measures cannot remove negative impacts, appropriate mitigation of heritage resources were recommended;
- Promote overall conservation and protection of natural and cultural resources in the proposed Consbrey Colliery Project Area and its surroundings.

3.5 Legislative Requirements

3.5.1 Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)

The MPRDA stipulates under Section 5(4) no person may prospect for or remove, mine, conduct technical co-operation operations, reconnaissance operations, explore for and produce any mineral or petroleum or commence with any work incidental thereto on any area without (a) an approved environmental management programme or approved environmental management plan, as the case may be.

3.5.2 National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)

3.5.2.1 Section 34 – Structures older than 60 years

The proposed activities associated with the Project will include the construction, operation and maintenance of both underground and opencast mining. This may require the removal of existing structures that may be older than 60 years.

Section 34 of the NHRA provides for general protection of structures older than 60 years. Most importantly, Section 34(1) clearly states that no structure or part thereof may be altered or demolished without a permit issued by the relevant Provincial Resources Heritage Authority (PHRA), in this case the Mpumalanga Provincial Heritage Resources Authority (MPHRA). These permits will not be granted without a HIA being completed.

A destruction permit will thus be required before any removal and/or demolition may take place, unless exempted by the MPHRA according to Section 34(2) of the NHRA.

3.5.2.2 Section 35 – Archaeological and palaeontological resources and meteorites

Construction and operation activities associated with the Project – in the immediate receiving environment – are likely to impact on archaeological.

Section 35 of the NHRA provides for the general protection of archaeological and palaeontological resources, and meteorites. In the event that archaeological resources are discovered during the course of development, Section 38(3) specifically requires that the discovery must immediately be reported to the MPHRA, or local authority or museum who must notify the MPHRA. Furthermore, no person may without permits issued by SAHRA destroy, excavate, or make any alterations to archaeological or palaeontological resources encapsulated in Section 38(4).

3.5.2.3 Section 36 – Burial grounds and graves

Construction and operation activities associated with the Project – in the immediate receiving environment – are likely to impact on burial grounds and graves.

Section 36 of the NHRA allows for the general protection of burial grounds and graves. Should burial grounds or graves be found during the course of development, Section 36(6) stipulates that such activities must immediately cease and the discovery reported to the MPHRA and the South African Police Service (SAPS). Furthermore, as specified in Section 38(3) no person may destroy, damage, exhume or alter any burial site without a permit issued by SAHRA.

3.5.2.4 Section 37 – Public monuments and memorials

Section 37 makes provision for the protection of all public monuments and memorials in the same manner as places which are entered in a heritage register referred to in Section 30 of the NHRA.

3.5.2.5 Section 38 – Heritage Resources Management (HRM)

Section 38 (8): The provisions of this section do not apply to a development as described in Section 38 (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No. 50 of 1991), or any other legislation. Section 38(8) ensures cooperative governance between all responsible authorities through ensuring that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of Subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.

3.5.3 International Council on Monuments and Sites (ICOMOS) Charters and Declarations

3.5.3.1 The Venice Charter, 1964

Article 1: The concept of a historic monument embraces not only the single architectural work but also the urban or rural setting in which is found the evidence of a particular civilization, a significant development or a historic event. This applies not only to great works of art but also to more modest works of the past which have acquired cultural significance with the passing of time.

Article 6: The conservation of a monument implies preserving a setting which is not out of scale. Wherever the traditional setting exists, it must be kept. No new construction, demolition or modification which would alter the relations of mass and colour must be allowed.

Article 7: A monument is inseparable from the history to which it bears witness and from the setting in which it occurs. The moving of all or part of a monument cannot be allowed except where the safeguarding of that monument demands it or where it is justified by national or international interest of paramount importance.

3.5.3.2 The Xi'an Declaration, 2005

The declaration talks to the conservation of the setting of heritage structures, sites and areas. The setting of a heritage structure, site or area is defined as the immediate and extended environment that is part of, or contributes to, its significance and distinctive character. This goes beyond the physical and visual aspects and includes the interaction with the natural environment; past or present social or spiritual practices, customs, traditional knowledge, use or activities and other forms of intangible cultural heritage aspects that created and form the space as well as the current and dynamic cultural, social and economic context.

Heritage structures, sites or areas of various scales, including individual buildings or designed spaces, historic cities or urban landscapes, landscapes, seascapes, cultural routes and archaeological sites, derive their significance and distinctive character from their perceived social and spiritual, historic, artistic, aesthetic, natural, scientific, or other cultural values. They also derive their significance and distinctive character from their meaningful relationships with their physical, visual, spiritual and other cultural context and settings. These relationships can be the result of a conscious and planned creative act, spiritual belief, historical events, use or a cumulative and organic process over time through cultural traditions.

3.6 Expertise of Specialists

Justin du Piesanie completed a Master of Science (MSc) degree in Archaeology at the University of the Witwatersrand in 2008. He has been in employ with Digby Wells since 2011 and currently holds the position of Archaeology Consultant.

Johan Nel completed a Bachelor of Arts (BA) in Archaeology and Anthropology and a BA Honours degree in Archaeology at the University of Pretoria. He has been in employ with Digby Wells since 2010 and currently holds the position of HRM: Unit Manager.

Shahzaadee Karodia has completed a BA degree in Archaeology and Anthropology, a Bachelor of Science (BSc) Honours degree in Palaeontology, and an MSc degree in Archaeology at the University of the Witwatersrand. She currently holds the position of Archaeology Consultant at Digby Wells.

Natasha Higgitt has completed a BA Honours degree in Archaeology at the University of Pretoria. She currently holds the position of Archaeology Consultant at Digby Wells.

The curriculum vitae of the specialists are located in Appendix A.

4 METHODOLOGY

4.1 Quantitative Data Collection

A non-intrusive archaeological survey was adopted for the Consbrey Colliery Project where heritage resources were not disturbed and only recorded through photographs, GPS and extensive notes. Due to the size of the Project Area, ground truthing was completed by use of an adaptive extensive survey technique in which specific areas, primarily the proposed opencast areas, were prioritised and surveyed by vehicle and pedestrian methods to identify any heritage sites *in situ*. As a result, only a representative sample of heritage resources for the area is presented in this report.

The aim was to identify and record as many potential sites of heritage significance as possible that were located in areas that would be directly impacted on by the Consbrey Colliery Project, and also those that will be indirectly or cumulatively affected.

Consultation with local community members and land owners was also completed to help identify potential heritage resources and give a comprehensive understanding of the 'Sense of Place' for the individuals that engage with the landscape.

Fieldwork was completed from 20 April 2013 to 26 April 2013.

4.1.1 Site naming

Sites identified during the survey were named using the Digby Wells project number, followed by the map sheet number and the relevant NHRA section suffixed with the site number: **MSO1805/2629BB/S.35-001**

This number is abbreviated in tables and/or on plans or maps using the NHRA reference number suffixed with the site number: **S.35-001**.

4.2 Qualitative Data Collection

Data acquisition was aimed at information gathering relating to known heritage resources within and surrounding the proposed area for development. Project information and data was obtained through intensive research and data gathering, including a variety of primary and secondary sources such as academic journals, textbooks and records, national and provincial websites, archaeological field guides, national guidelines, maps, photographs and plans. Surveys of historical aerial photographs, historical maps, topographical maps and satellite imagery were undertaken to plot potential sites. Some older maps such as the Major Jackson Series (MJS) maps of the early 20th century were also consulted and integrated into the HIA where applicable. These are invaluable resources as they often include features and information not recorded on later maps.

4.2.1 Relevant Databases and Collections

The archival and database survey was conducted by consulting the following resources:

- Chief Surveyor General;
- Genealogical Society of South Africa;
- Geological Society of South Africa;
- National Automated Archival Information Retrieval System (NAAIRS);
- South African Heritage Resources Information Systems (SAHRIS);
- University of the Witwatersrand (WITS) Archaeology Site Database; and
- The South African Rock Art Digital Archive

4.2.2 Desktop cartographic survey

A desktop cartographic survey was conducted in order to determine the potential of sites to exist within the Project Area and the surrounding region, as well as relative age based on the dates of the maps. Historical aerial photographs, historical maps, current topographic maps and satellite imagery were used to this end.

4.2.3 Relevant previous impact assessment reports

The following previous impact assessment reports were consulted:

- Fourie, W., 2007. Nucoal Mining Archaeological Impact Assessment: Proposed coal mining on portions of the farm Op Goedenhoop 205 IS, Hendrina, Mpumalanga Province, Unpublished Report: Digby Wells & Associates.
- Fourie, W., 2012. Heritage Impact Report: Ramp 9 Expansion Project, Lilliput 83 IT, Breyten, Mpumalanga, Unpublished Report by PGS for: Tselentis Colliery - Msobo Coal.
- Huffman, T. N. & Calabrese, J. A., 1997. Archaeological Survey for Project Caroline: A Phase 1 Report, Unpublished Report: Digby Wells & Associates.

- Huffman, T. N. & van der Merwe, H. D. R., 1993. Archaeological survey for Savemore Colliery, Johannesburg: Archaeological Resources Management.
- Murimbika, M., 2007. Phase 1: Archaeological and Heritage Impact Assessment Study for the Proposed Extension of Coal Mining Area on Portion 1 of Goedverwachting 80 IT Farm, Mpumalanga Province, Unpublished Report: Xstrata Coal
- Ouzman, S., 2009. Report on rock and related archaeology, De Wittekrans, Mpumalanga, South Africa, Pretoria, Department of Anthropology and Archaeology: Unpublished specialist report
- Van Schalkwyk, J. A., 2003. Archaeological Survey of a Section of the Secunda-Mozambique Gas Pipeline, Carolina District, Mpumalanga, Unpublished Report: GLMC Joint Venture.
- Van Schalkwyk, J. A., 2003. Archaeological Survey of a Section of the Secunda-Mozambique Gas Pipeline, Ermelo and Bethal Districts, Mpumalanga, Unpublished Report: GLMC Joint Venture.

4.3 Stakeholder Engagement Plan (SEP)

Stakeholder engagement is an essential and legislative requirement for environmental authorisation as per the MPRDA requirements applicable to Consbrey Colliery Project. The principles that demand communication with society at large are best embodied in the principles of the NEMA Chapter 1, South Africa's overarching environmental law. In addition, Section 24 (5), Regulation 54-57 of GNR 543 under the NEMA, guides the public participation process that is required for an EIA process. In addition, the public participation process will be conducted in line with the Equator Principles (EP).

The objectives of the public participation process are to ensure that all stakeholders and Interested and Affected Parties (I&APs) are given accurate and timeous project information, and are given an opportunity to raise comments and concerns.

4.4 Assessment

The assessment of heritage resources includes two distinct but complimentary stages: evaluation of a heritage resource's significance or value and assessment of impacts on the resource. A brief description of the assessment methodology will be presented here. See Appendix D for a full description of the assessment methodology.

4.4.1 Evaluation of Significance/Value

Heritage resources' significance was evaluated in terms of four dimensions - aesthetic, scientific, historic and/or social value – and integrity. Each dimension included certain relevant assessment criteria defined in Section 3 of the NHRA and summarised in Table 4-1. The following formula thus applies:

$$\text{Value} = \text{importance} \times \text{integrity}$$

Where

Importance = average sum of aesthetic + historic + scientific + social significance

The resource was further only evaluated in terms of relevant dimensions, for example burial grounds without any recorded historical significance would only be evaluated on a social level. The significance of a heritage resource in terms of its importance relative to a particular dimension was informed by accessing various credible information sources such as peer reviewed articles that contribute to establishing its authenticity.

A heritage resource's value is a direct indication of its sensitivity to change (impacts) and must therefore be determined before any assessment of impacts can be completed.

Table 4-1: Criteria defined in the NHRA Section 3 that is used to determine value and significance of heritage resources, NHRA Section 3

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.

Field ratings or the proposed grading of heritage resources are required by SAHRA in terms of Section 7(1) of the NHRA. Field ratings prescribe criteria for assessing heritage resources consistent with Section 3(3) of the NHRA. The table below presents the proposed field ratings that are based on the NHRA Section 7(1) and SAHRA Minimum Standards and that describe the value and significance of heritage resources.

Table 4-2: Field ratings

FR/Grade	Significance	Mitigation recommendation
<i>National and Provincial Protection, NHRA 7(1)(a, b)</i>		
I	National SAHRA responsibility High significance	Heritage resource conserved/preserved; No mitigation as part of development recommended
II	Provincial SAHRA responsibility High significance	Heritage resource conserved/preserved; No mitigation as part of development recommended
<i>Local Protection, NHRA 7(1)(c)</i>		
IIIA	Local PHRA responsibility High significance	Retained as heritage register site; Mitigation as part of development not advised
IIIB	Local PRHA responsibility High significance	Could be mitigated and part retained as heritage register site
<i>General Protection, NHRA 7(1)(c)</i>		
IV A	Local PRHA responsibility High/Medium significance	Heritage resource should be mitigated before destruction
IV B	Local PRHA responsibility Medium significance	Heritage resource should be recorded before destruction
IV C	Local PRHA responsibility Low significance	Heritage resource has been sufficiently recorded requiring no further recording before destruction

Assessment of impacts on heritage resources relies on two factors that must be considered when rating impacts:

- The potential physical and/or visual impact on the heritage resource; and
- The impact on the cultural landscape should any heritage resource change or be destroyed.

4.4.2 Impact assessment

The aim is to assess the significance of the potential impacts (threats or sources of risk) on heritage resources in the proposed Consbrey Colliery Project Area. The impact assessment was completed in compliance with the impact assessment criteria implemented for the EIA report as well as the significance ratings and archaeological impact assessment criteria established by the ASAPA and applicable international best practice guidelines.

The impact rating takes into account spatial scale, expected duration and intensity to determine the consequence of impacts on heritage resources. The consequence rating considers the significance value of a resource. Magnitude of impacts on heritage resources are determined by multiplying the consequence rating with the probability of the impact occurring. The following formula thus applies:

$$\text{Magnitude} = \text{consequence} \times \text{probability}$$

Where

$$\text{Consequence} = (\text{spatial} + \text{duration} + \text{intensity}) \times \text{heritage significance value}$$

The impact rating is then applied to pre-mitigation and post-mitigation scenarios with the intention of removing all impacts on heritage resources. More information on the archaeological impact assessment criteria and rating used in this study and details on the weight assigned to the various parameters for positive and negative impacts in the formula are presented in Appendix D.

5 DESCRIPTION OF CONSULTATION WITH STAKEHOLDERS AND INTERESTED AND AFFECTED PARTIES

The Stakeholder Engagement Process (SEP) conducted for Consbrey Colliery Project followed a consultative and inclusive approach. This was achieved by encouraging active engagement from stakeholders so that suggestions and comments can be incorporated into the project design and that concerns and conflicts can be openly addressed in an on-going manner. Through the SEP, adequate and timely information was provided to all I&APs to ensure they are given sufficient opportunity to voice their opinions, concerns and issues. The SEP provided a platform for issues and comments to be raised that will add value to the EIA process, thereby influencing the decision-making process. The following tasks were undertaken:

- Stakeholder identification;
- Development of appropriate documentation;
- Stakeholder notification (through the dissemination of information and meeting invitations);
- The compilation of a Scoping Report in terms of the MPRDA process which was made available to I&AP between 6 March 2013 and 9 April 2013;

- One-on-one meetings were undertaken with directly affected and surrounding landowners, farm occupiers and land claimants; and
- A public meeting was held on 26 March 2013 at the Chrissiesmeer Community Hall.

See Appendix E for a complete list of all registered stakeholders.

5.1 Parties Consulted

Representatives of 16 registered conservation bodies were informed and/or consulted and are presented in Table 5-1 below. No dedicated local heritage conservation bodies were identified.

Table 5-1: Conservation bodies for the Consbrey Project

Registered Conservation Bodies	
South African Heritage Resources Agency (SAHRA)	Yes
Mpumalanga Tourism and Parks Agency (MTPA)	No
Birdlife SA	No
Endangered Wildlife Trust (EWT)	No
Working for Wetlands	No
Water Forum	No
Olifants River Forum	No
Federation for a Sustainable Environment (FSE)	Yes
Upper Vaal Catchment Forum	No
Grass and Wetlands Regional Tourism Organisation	No
Green Trust	No
Chrissiesmeer Urban Conservancy	No
Environmental Monitoring Group (EMG)	No
Ekangala Grasslands Trust	No
Wildlife and Environmental Society of South Africa (WESSA)	No

Registered Conservation Bodies	
World Wildlife Federation – South Africa (WWF-SA)	No

During the fieldwork for the HIA, local farm owners, community members and tourism representatives were consulted with regard to heritage resources. The persons consulted are listed in Table 5-2 below.

Table 5-2: Individuals consulted during the HIA fieldwork

Consulted persons during HIA	
Vincent Schulze	De Wittekrans
Ockert Steyn	Dwarstrek and Bankfontein
Rina Steyn	Dwarstrek
Basaan Mahlangu	Dwarstrek
Andries Roux	Bosmanskrans
Alettha Roux	Bosmanskrans
Athol Stark	Highveld Tourism: Mpumalanga
Ton Sanders	Chrissiesmeer Resident

5.2 Results with regard to heritage resources

The comments pertaining to heritage that were addressed in the Comments and Response Report are presented in Table 5-3.

Table 5-3: Results of the Comments and Response Report

ISSUE OR CONCERN	CONTRIBUTOR	DATE OF CONTRIBUTION	MEANS OF CONTRIBUTION	RESPONSE
Heritage				
<p>The site is situated at the edge of the Highveld Coal Field which forms part of the Karoo Basin. The predominant rocks in the area are sedimentary rocks of the Ecca Group which contain the coal-bearing Vryheid Formation. This formation is known to contain plant fossils and is therefore palaeontologically significant. The landscape is primarily agrarian with significant time depth.</p>	<p>Ms Jenna Lavin Heritage Officer South African Heritage Resources Agency</p>	<p>11 March 2013</p>	<p>Email correspondence</p>	<p>This comment is taken verbatim from the Heritage Statement that was submitted to SAHRA and MPHRA. During the HIA field work, seven palaeontological sites were identified that confirmed the assumption that plant fossil remains may occur in the project area. These and other potential sites are generally protected in terms of Section 35 of the NHRA. Appropriate management and mitigation measures will be included in the final HIA report that will be submitted to SAHRA and MPRHA for Statutory Comment in terms of Section 38(8) of the NHRA.</p>
<p>A number of historical <i>werwe</i> were identified in the study area, as well as several landscape features that have the potential to hold tangible heritage resources. The likelihood of the proposed development impacting on significant heritage resources is therefore high.</p>				<p>Comment taken verbatim from Heritage Statement. Several significant historical built environment resources were identified during the HIA field work. These included at least one example of a <i>hartebeeshuis</i>, possibly the earliest example of European vernacular architecture in the project area. Other significant historical architectural styles were also identified that comprised a significant continuous history of local architecture.</p>



ISSUE OR CONCERN	CONTRIBUTOR	DATE OF CONTRIBUTION	MEANS OF CONTRIBUTION	RESPONSE
				Appropriate management and mitigation measures will be included in the final HIA report.
SAHRA therefore requires that a Heritage Impact Assessment report be completed and submitted to SAHRA for assessment. This report should be inclusive of an assessment of impacts to archaeological resources and an assessment of impacts to paleontological resources by suitably qualified practitioners. This assessment of heritage resources must satisfy Section 38(3) of the NHRA. The requested Archaeological Report must identify all archaeological resources and assess their significance and make recommendations (as indicated in section 38(3) of the NHRA) about what mitigation may be required.				Comment based on Interim Comment received from SAHRA on Heritage Statement and NID that was submitted. Field work was completed from 20-26 April. Findings will be presented in the final HIA report and submitted to SAHRA and MPHRA
A Paleontological study must be undertaken to assess whether or not the development will impact upon significant paleontological resources. Alternatively, a letter of exemption from a Palaeontologist is required to indicate that this is	Ms Jenna Lavin Heritage Officer South African Heritage Resources	11 March 2013	Email correspondence	As above.



ISSUE OR CONCERN	CONTRIBUTOR	DATE OF CONTRIBUTION	MEANS OF CONTRIBUTION	RESPONSE
unnecessary. If the area is deemed sensitive or if significant heritage is identified, a full Paleontological Report may be required.	Agency			
The impacts of the proposed development on any other heritage resources such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and significant cultural landscapes or viewsapes must also be assessed.				As above.

6 STATE OF RECEIVING ENVIRONMENTAL - CULTURAL LANDSCAPE

This section will describe the receiving environment of the Study and Project Areas. The Study Area was considered to include the cultural landscape in an approximately 100 km radius of the Project Area. The Project Area is defined as the boundaries supplied by Msobo Coal for the proposed Consbrey Colliery Project. The Study Area allowed inferences to be made of potential sites that could exist within the Project Area based on certain sources of information such as previously completed relevant heritage studies.

6.1 Details of Area Surveyed

Table 6-1: Location Data

Province	Mpumalanga
Magisterial District / Local Authority	Gert Sibande
Municipality	Albert Luthuli
Property Name and Number	Mongerster 204 IS, Opgoedehoop 205 IS, Welgemeend 206 IS, Smutsoof 214 IS, Bankfontein 215 IS, Dwarstrek 216 IS, Bosmanskrans 217 IS, De Wittekrans 218 IS, Hartebeestfontein 239 IS, Klipfontein 214 IS
1: 50 000 Map Sheet	2629BD Breyten 2629BB Kromkrans
GPS Co-ordinates	Latitude: -26.241763
(relative centre point of study area)	Longitude: 29.866780

6.1.1 Location maps

The regional settings of the Project are depicted in Plan 1, Plan 2, and Plan 3 in Appendix B.

6.1.2 Site maps

The GPS track log and position of sites are depicted in Plan 4 and Plan 5 respectively in Appendix B. The results of historical layering are depicted in Plan 6. The geology of the Project Area is depicted in Plan 7. The surrounding mining areas are shown in Plan 8.

6.2 Description of current environment

The area falls within the central Mpumalanga climatic zone characterised by warm summers with rainfall and warm (during the day) to cold (at night) dry winters with sharp frosts. The average daily maximum temperature in January (the hottest month) is 25.2°C and in July (the coldest month) is 16.7°C. The mean daily minimum in January is 12.4°C and July - 0.3°C but extremes of 4.4°C and - 14.7°C have occurred for the two months respectively.

The gently undulating highland topography is typical of the central Mpumalanga province, with fairly broad to narrowly incised valleys of the headwater drainages. It is characteristic of the post-African erosion surface back-working into the African surface, which remains preserved in places on the higher lying interfluvies (Partridge and Maud, 1987). In the case of the Vaal head-streams, valley side-slopes are generally gentle with gradients ranging from 1 in 20 to 1 in 100 but outcropping, resistant sandstone and dolerite ridges occasionally flank the flat, marshy valley floors which have gentle downstream gradients. Similar conditions apply to the Olifants head-stream valleys although resistant rock ridges are not as conspicuous. In contrast, the Komati head-streams display narrower valleys with steeper flank and channel gradients which indicate a more virile erosional regime. Thus, the Boesmanspruit has cut down through resistant sandstones of the Ecca Group to expose granite of the Basement Complex in the gorge. The proposed Project Area is undulating and includes valleys and hills which act as drainage areas for the local streams.

A significant portion of this landscape consists of soils which, owing to their position in the landscape, are seasonally or permanently wet. They commonly possess pale-coloured, leached, upper horizons which overlie gleyed, mottled or indurated subsoil horizons. The soil pattern is quite complicated due to these soils being formed as a result of alluvial, eluvial or illuvial processes or a combination of these. Where the leached upper horizons overlie mottled subsoil, they belong to the Longlands Form. Occasionally, (e.g. around pan fringes) the leached horizon is very thick (Fernwood Form soils) or absent altogether with the topsoil directly overlying gleyed clay (Katspruit Form).

The Project Area is situated in an endangered ecosystem. This means that the ecosystem has undergone degradation of ecological structure, function or composition as a result of human intervention, although it is not critically endangered. Classification of the vegetation type for the study area has been defined as "Moist Sandy Highveld Grassland" (type no. 38) where "North-eastern Sandy Highveld" (A57) and "Eastern Bankenveld" (A61c) are listed as synonyms. The Nooitgedacht Dam Nature Reserve is the only official conservation area for

this veld type, but the Ermelo Game Park represents a good example of this vegetation type (Low & Rebelo, 1996; Mucina, et al., 2006). Low and Rebelo (1996) recorded that the dominant grasses in this vegetation type are *Eragrostisplana*, *E. curvula*, *Heteropogoncontortus*, *Trachypogonspicatus* and *Themedatriandra*.



Figure 6-1: General conditions on site in uncultivated areas.

Table 6-2: GPS/GIS Data

GPS type and model used	Garmin eTrex Legend HCx	
Datum	WGS 1984	
Average accuracy	~5 m	
Site Names	Site Co-ordinates	
MSO1805/2629BD/S.34-001	-26.253816	29.887331
MSO1805/2629BD/S.34-002	-26.254398	29.887434
MSO1805/2629BD/S.36-003	-26.25148-	29.888087
MSO1805/2629BB/S.36-004	-26.245514	29.885488
MSO1805/2629BD/S.34-005	-26.252993	29.890238
MSO1805/2629BD/S.34-006	-26.263222	29.869034
MSO1805/2629BB/S.34-008	-26.238845	29.871685
MSO1805/2629BD/S.36-010	-26.270301	29.836724
MSO1805/2629BD/S.34-011	-26.269217	29.839061

MSO1805

MSO1805/2629BD/S.34-012	-26.268828	29.835517
MSO1805/2629BD/S.35-013	-26.282716	29.836083
MSO1805/2629BD/S.35-014	-26.283057	29.834343
MSO1805/2629BD/S.35-015	-26.273056	29.834310
MSO1805/2629BD/S.35-016	-26.256778	29.821903
MSO1805/2629BD/S.36-017	-26.256355	29.817046
MSO1805/2629BD/S.35-018	-26.255014	29.815830
MSO1805/2629BD/S.35-019	-26.255245	29.814744
MSO1805/2629BD/S.35-020	-26.253126	29.814073
MSO1805/2629BD/S.35-021	-26.257594	29.825565
MSO1805/2629BD/S.34-022	-26.268146	29.939398
MSO1805/2629BD/S.35-023	-26.264748	29.948059
MSO1805/2629BD/S.35-025	-26.265118	29.949145
MSO1805/2629BD/S.34-026	-26.264466	29.949119
MSO1805/2629BD/S.34-027	-26.257483	29.950884
MSO1805/2629BB/S.36-028	-26.250317	29.93634
MSO1805/2629BD/S.35-029	-26.273691	29.832906
MSO1805/2629BD/S.34-030	-26.271387	29.833757
MSO1805/2629BD/S.35-034	-26.277381	29.832992
MSO1805/2629BD/S.35-035	-26.276266	29.833314
MSO1805/2629BD/S.35-036	-26.273667	29.832995
MSO1805/2629BD/S.35-040	-26.272183	29.833864
MSO1805/2629BD/S.35-042	-26.26908	29.839051
MSO1805/2629BD/S.35-043	-26.268997	29.838686
MSO1805/2629BD/S.35-044	-26.226136	29.860824

6.3 Literature Review

Based on reviews of relevant previous impact assessment reports, academic publications and historical sources, the cultural landscape of the project area can be described as a primarily agrarian landscape with deep time depth. The cultural landscape includes natural and cultural heritage such as archaeological, rock art and historical sites.

6.3.1 Geological and Palaeontological Background

In the Project Area, the underlying stratigraphic unit is the *Madzaringwe Formation* which is roughly equivalent to the basal unit of the Ecca Group in the Karoo Supergroup. The basal Karoo sediments consist of rocks derived mainly from much older underlying strata known as diamictite deposits. The diamictite deposits are overlain by rocks of the *Madzaringwe Formation*. The *Madzaringwe Formation* consists primarily of shales with occasional lenses of red and yellow grit in the lower sequences. Higher up in the sequences the shales alternate with coal seams. The shales and coal are occasionally interrupted by intrusive dolerite dykes of the Jurassic period. The model which best describes the formation of the *Madzaringwe Formation* sequence would be a marsh that was periodically flooded.

If the *Madzaringwe Formation* sequence was formed in a marsh environment that was periodically flooded, there is a strong likelihood of fossil plants occurring in the shales associated with the coals. The plant fossils that may be found here include *Glossopteris* leaves, roots and inflorescences, lycopod and sphenophyte stems, ferns, and insects. Vertebrates that occurred at this time are seldom preserved with the plants (Bamford, 2012).

The dolerite rock is an igneous rock which does not have a palaeontological potential as fossils are not found in this type of rock.

6.3.2 Archaeological Background

6.3.2.1 Stone Age

Tool producing hominids have occupied southern Africa for approximately 2 million years. This is primarily evident in the stone tools that have remained, not only indicating their presence in the landscape, but also attesting to the technological development of our *Homo* genus. Based on the criteria for classification, it is evident that the initial model¹ of Earlier (ESA), Middle (MSA), and Later Stone Age (LSA) (*with variants*) developed by Goodwin and Van Riet Lowe (1929) is appropriate. Evidence of the Stone Age in Mpumalanga is not well documented or researched and is limited to a few well-known sites. Identified stone tool industries within and surrounding the Project Area are primarily affiliated with the MSA and LSA.

The MSA dates between $\pm 250\,000$ years BP to $\pm 20\,000$ years BP. This period can be defined by the occurrence of blades and points produced from good quality raw material.

¹ This model has been reassessed and modified through time.

The LSA is dated to approximately 20 000 years BP and can be characterised by the presence of microlithic technology and strong signs of ritual practises and complex societies, as well as rock art. Microlithics are produced from very fine-grained material such as quartz or chert, and often used as composite tools where they are hafted onto sticks for arrows (Deacon & Deacon, 1999). LSA and rock art sites may occur together as these were typically associated with shelters in sandstone cliffs or outcrops, which are prominent in the Project Area.

6.3.2.2 Rock Art

The economy of the LSA people is associated with Bushmen (hunter-gatherer) or Khoekhoen (pastoralist) societies. A prominent site located approximately 650 m to the west of the Project boundary on the farm De Wittekrans 218 IS is the De Wittekrans Rock Art Complex (See Figure 6-2). Rock art represents a highly significant record of Mpumalanga's past.

Within Mpumalanga, three rock art traditions are represented that are widely dispersed but have been most notably recorded in the northern and eastern regions. Each of these is associated with particular cultural groups:

- The first and oldest tradition is the fine line paintings associated with autochthonous LSA hunter-gatherer groups;
- The second tradition is the finger paintings associated with the later arrival of pastoralists; and
- The last, third tradition is finger paintings associated with much later and possibly historic farming communities.

The co-occurrence of two or more of these traditions, like at De Wittekrans suggests that there were some cultural interactions between these groups.

Bushmen rock art was produced using fine brushes, quills or sticks predominantly done in red, white and black, and more rarely bichrome and polychrome. Realistic and proportionally correct animals such as various antelope species are often found. In addition, human figures and more symbolic beings are also represented (Eastwood, et al., 2002). Common features identified in Mpumalanga include animals such as the giraffe, kudu and elephant, rather than the eland as elsewhere in South Africa, and a line of men / women with their arms raised suggested being depictions of dance associated with rituals. These paintings are explained in terms of their knowledge systems commonly associated with shamanistic beliefs, rituals and experiences. As these images are associated with experiences and symbols of the spirit world they are usually found in complex groupings including superimpositions of many images that show the interdigitating of the spirit realm, believed to be behind the rock surface, with the material world (Smith & Zubieta, 2007). Five previously unrecorded Bushmen rock art sites were identified during the field survey of the Project Area.

In contrast to the hunter-gatherer tradition, pastoralists are typified by predominantly finger-painted geometric images. Initially identified by B. Smith and S. Ouzman, the tradition extends in linear bands following the proposed migration routes of the pastoralists from southern Angola/western Zambia to the southern Cape (Smith & Zubieta, 2007). The geometric designs are composed entirely of circles, finger lines, finger dots, and handprints that are mostly painted in red pigment, sometimes in red and white, and occasionally only in white (Eastwood, et al., 2002; Smith & Zubieta, 2007). In the northern regions of South Africa, this tradition is commonly found among later hunter-gatherer rock art.

In the report completed by Ouzman (2009) he describes De Wittekrans as consisting of at least four individual sites all with archaeological deposit, including stone tools and pottery occurring on a low sandstone outcrop in close proximity to the Klein Olifants River. The rock art within the complex consist of fine-line, brush painted made by hunter-gatherers (Figure 6-3) and finger painted rock paintings associated with herder people (Figure 6-4). This is not surprising as the Lake Chrissies District has been occupied by Bushmen for many generations. According to Potgieter (1955) they lived on reed platforms on the lakes or in rock shelters and there is an existing small group of Bushmen who still calls the lakes their home and act as guides for tourists (Anonymous, 2011).



Figure 6-2: View of the De Wittekrans Site Complex (courtesy Ouzman, 2009).



Figure 6-3: An example of a 'San' rock painting from De Wittekrans (courtesy Ouzman, 2009).



Figure 6-4: An example of a 'Khoekhoen' rock painting from De Wittekrans (courtesy Ouzman, 2009).

The third tradition is associated with Iron Age farmers. In Mpumalanga, the ancestors to the Sotho-Tswana and Nguni created rock art as part of their expressive culture. Research suggests that the Sotho-Tswana almost exclusively created painted art where the Nguni art is almost exclusively engravings. What is for certain is that this tradition is fundamentally different from hunter-gatherer and pastoralist art.

The art of the Sotho-Tswana is finger painted and comprises of anthropomorphic, zoomorphic and geometric designs almost exclusively in white (art also referred to as 'Late White') and occasionally in red. The art is thought to be linked to boys' initiation and is found in remote hill areas suited to lengthy and secretive ceremonies (Smith & Zubieta, 2007). In contrast, Nguni art is almost exclusively engravings. This tradition was first described in 1918 by Cornelius Pijper, with Boomplaats being one of the largest and best examples recorded. The engravings appear to represent settlements, which B. Malan and T. Maggs

identified as Nguni, where the cattle kraal is surrounded by huts with cattle trails connecting the various homestead (Smith & Zubieta, 2007).

6.3.2.3 The Iron Age

The Stone Age is followed by the Iron Age in southern Africa. This period is divided into Early, Middle and Late Iron Age and as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. Archaeologically, one of the identifiers of Iron Age Sites is stonewalled settlements. Stone walled settlements occur over much of southern Africa and are the most visible sign agro-pastoralist. Classification is based on techniques, shapes and internal divisions and within a larger framework that includes the relationships of features (Huffman, 2007, p. 31).

Huffman (2007) states that a variant of Moor Park walling, KwaMaza, dating to between 1700 CE and 1840 CE is located in Mpumalanga and is related to Ndzundza Ndebele. Here there was an emphasis on the back/front where the beehive huts sat at the back of terraced platforms and the cattle kraals and court were built to look the same. Maggs (1976) demonstrates that various settlement types are present within Mpumalanga. Type V consists of the standard core of cattle enclosures surrounded by beehive houses and grain bins (Huffman, 2007), but no surrounding wall is present. Corbelled huts may be present with this type of walling, but they are not a diagnostic feature. Type V settlements are the most common and widely distributed settlement pattern on the southern Highveld from the north-eastern Free State into the south east of Mpumalanga around Bethal and Ermelo. This differs from the settlements found around Carolina through to Lydenburg, where the settlement units have surrounding walls and are linked by trackways with large areas of terracing (Maggs, 1976). Huffman (2007, p. 41) links this walling with the Bakone (Koni) referring to it as Badfontein Type where its distribution extends over an enormous area along the escarpment south of Lydenburg.

Another form of identification is through the remains of material culture, specifically ceramics. Murimbika (2007) states that during this period, the region was predominantly occupied by Ndebele Nguni-speaking groups and the predominant ceramic facies identified are Blackburn (1050 CE - 1500 CE), Moor Park (1350 CE - 1700 CE) and Nqabeni (1700 CE - 1850 CE). Only one site possibly dating to the Late Iron Age was documented in previous studies conducted in the surrounding area. The site comprised remnants of a stonewalled enclosure, but no diagnostic ceramics were noted and thus could not be associated with a specific group (Murimbika, 2007). No diagnostic ceramics were identified during the field survey for this Project.

6.3.3 The Historical Period

The Historical Period is generally accepted to date from approximately the mid-19th century, and is generally associated with the movement and contact with Europeans. It should be noted that some, most notably the Five Hundred Year Initiative, suggest that Historical Period be recognised as occurring earlier, especially in Mpumalanga.

The region was initially inhabited by the nomadic Bushmen groups who would exploit the resources seasonally. In and around the Mpumalanga Lake District on the Highveld, the Bushmen had access to an abundant animal and bird population, edible foods and relative security. Evidence of occupation of the region by these 'first people' can be found throughout the province, where their sites yielded excavated material such as bone and stone tools (Makhura, 2007; Sanders, 2013).

These Bushmen would have come into contact with pastoralists, as suggested by the rock art identified at De Wittekrans (Section 6.3.2.2) and farming communities during the Late Iron Age. These groups moved into the region initially as small bands, and later as larger groups using its grasslands as grazing land for cattle in lieu of the less suitable soil conditions for agriculture (Sanders, 2013). Interaction between groups is evident in the cultural and linguistic changes of the Bushmen community. Two groups that moved into the region of the project area are the Bakone (Koni) and Eastern Sotho.

Huffman (2007, p. 41) refer to the Bakone as 'Sotho-ised' Nguni, where Koni means Nguni in the Sotho-Tswana language. Makhura (2007, p. 99) disagrees with this stating that this misinterpretation is based on:

- The phonological resemblance between the terms Koni and Nguni; and
- Social interactions and cultural borrowings between some dispersed groupings of Bakone.

These points do not prove that the Koni were originally Nguni. Rather, *Bokone* means 'northern region' where *Bakone* means 'people of, or from the north'. This grouping was widely spread over the Limpopo and Mpumalanga Provinces, emphasised over the north and north-east regions. Oral traditions suggest Mabula as their common ancestor and the area occupied by their ancestors as the 'low country'. The main lineage appear to have fallen under the Matlala ruling lineage at the time of fragmentation in the 15th and 16th centuries when some groups ventured onto the Highveld.

Eastern Sotho societies refer to groups from the 17th century onwards that occupied large areas of western and northern Swaziland, the present Carolina, Waterval Boven, and Barberton Districts. Specifically, these groups refer to three societies, namely:

- BaPai;
- MaPulana; and
- BaKutswe.

It is the MaPulana that moved from the southwest under Matsiye northward into the Carolina and Barberton districts during the 18th and 19th centuries establishing stonewalled settlements that they termed Maropeng.

During the 18th and 19th century, the relatively peaceful occupation of the region was disrupted by the events of the *Difaqane* (Sotho) or *Mfecane* (Zulu). Thought to be predominantly associated with the expansion of the Zulu Kingdom, the period is better characterised as the rise of power blocks with a wide range of political centralisation and waves of violent population displacements (Makhura, 2007). For example, the Pedi under King Thulane (1780 CE – 1822 CE) embarked on a process of centralisation. This centralisation allowed subordinate communities to retain their local independence under some tributary obligations. This resulted in the Pedi to emerge as the dominant power in the north-east. In the wake of the defeat of the Pedi in 1822 CE by the Ndebele (Matabele) military leader Mzilikazi, Sotho societies in the region dispersed. The subsequent ‘void’ in the Mpumalanga Highveld was filled by intrusive groups such as the Swazi.

The Swazi, under the reign of Sobhuza (1815 CE – 1836 / 1839 CE) moved into the area as small groups assimilating numerous smaller chiefdoms (Bonner, 1983; Makhura, 2007). During this time, some Bushmen groups converged in the Mpumalanga Lake District for food and sanctuary as the landscape offered relative security from the ensuing conflicts. Sites near pans or watercourses were preferred, although during the winter months or times of danger, the Bushmen groups would find suitable shelter in the many caves in the region. Mswati II (1845 CE – 1868 CE) sought to extend the Swazi Kingdom over areas in which people under his father’s rule had migrated to and settled (Bonner, 1983). During this period of expansion, the Bushmen groups were faced with the loss of land and more dangerous human threat of the encroaching groups. Some Bushmen groups became acculturated with surrounding farming communities. Orpen (1964) reported that at least since 1847 Bushmen groups, along with Zulu and Swazi residents lived together under Zulu King Mpande near the source of the Pongola River.

The Swazi armies regularly traversed the region in search of booty, including children of neighbouring groups who were abducted to become serfs or sold to farmers who needed cheap labour. Bushmen from the southern Highveld were particularly hard hit by the Swazi raids (Bonner, 1983). Oral tradition accounts that literally hundreds of Bushmen were murdered by Swazi armies during raids at sites such as Mushroom Rock (Moordrots) near Breyten (Schoonraad & Schoonraad, 1972).

With the influx of Europeans, Mswati II ceded the southern Transvaal Highveld as part of the colonial system of concessions. In 1867, the *Zuid Afrikaansche Republiek* (ZAR) ceded land surrounding Lake Chrissie was ceded to a Scottish entrepreneur, A. S. McCorkindale, and it became known as New Scotland. This area was intended to economically benefit the ZAR. However, the sudden death of McCorkindale in 1871 resulted in the collapse of the scheme and the area was settled by Boers securing the area for themselves (Bonner, 1983). Ironically, it is with the settlement of the Europeans that some relief came to the Bushmen.

Boer farmers offered to protect the remaining Bushmen from the Swazi in exchange for cheap labour.

Prins (1999) recounts two stories of aid to Bushmen. The first is an incident as told by two Bushmen. A band of Bushmen were besieged and trapped by a Swazi army in a cave known locally among the Bushmen as Magageng. The Bushmen thought that they would all be killed the next day and prepared for the worst. However, early the next morning a Boer commando under the leadership of Bauer Bezuidenhout came to their aid and told the Swazi to leave the Bushmen alone. The second recounts the history of Pastor P. Filter who aided migrating Bushmen, providing them with transport in the early 1880s. Prins (1999, p. 52) states:

Oral tradition among white farmers in Piet Retief has it that pastor Filter helped these migrating Bushmen and provided them with transport on his ox-wagon. The Bushmen, whose leaders were known as Kibit and Adons, told pastor Filter that they had operated as livestock raiders in the Weenen area but that they left Natal during the Anglo-Zulu War (1879) after being pursued by angry Boers.

But, not all accounts of Boer assistance were altruistic. The abduction of Bushmen children to be used as serfs by the Boers is still part of living memory by some present day farmers and Bushman according to Prins (1999). Not all encounters between Boers and Bushmen led to bloodshed. Orpen (1964) suggests that Bushmen parents were sometimes compensated for children, contrasting with the Swazi armies who would have slain those not taken and beaten the others *en route* to Swaziland.

The two Anglo-Boer Wars are arguably the most notable historical events to take place within the region. No major battles occurred within the Project Area, but the most important event relates to the Battle of Lake Chrissie in 1901. The British, under the command of General H.L. Smith-Doriens were encamped around Lake Chrissie on 6 February 1901. The Boers, under the command of General Louis Botha, intended to conduct a surprise attack on the British forces to cripple the advance of the British under Doriens into the Eastern Transvaal. The Boers enlisted the help of the local Bushmen community who were monitoring the British movements in the area. With the Bushmen's knowledge of the terrain, the Boers were able to anticipate where they would establish their camp and launch a surprise attack. The Boer attack killed or wounded 75 British soldiers and caused the loss of 300 horses. However, the Boers suffered a loss of 80 of their own. The battle continued until the 9th of February 1901 when adverse weather caused the Boers to lose their advantage and forced to retreat (Jones, 1999; Prins, 1999; Delius & Cope, 2007; Anonymous, 2013).

Bushmen also offered domestic support during this time of conflict. Most aided Boer families, and with the implementation of the 'scorched-earth' policy of Lord Kitchener in 1901, they assisted the Boer families in hiding their livestock in Swaziland, and hiding and caring for Boer women and children in caves as not to be taken to concentration camps. Prins (1999, p. 58) recounts two such instances, one of which occurred on the farm Bankfontein directly within the Project Area. Here, the Steyn family, who's descendants still

reside and work on the farm, were aided by a Bushmen named Cheese. He acted as a sentry and general assistant to the Boer family, reporting on the movements of the British troops in the vicinity. By the time British troops arrived on the farm, Tienie Steyn and her daughters, Lettie and Nettie, together with Cheese had fled to hide in the series of caves nearby, which already housed many of the Steyn's valuable furniture. During the war, the majority of time was spent in the caves by the Steyn family.

6.3.4 Social History

After the war, the farm Bothasrus was given to Lukas Potgieter as compensation for losing a leg during the first Anglo-Boer War. He later sold the farm to field-cornet, Nicolaas Breytenbach, a well-known farmer and businessman, who founded the town Breyten in 1905. In the same year, the KwaMadala Native Location, situated about 30 km from Ermelo, was established as a freehold township on Portion 7 and Portion 5 of Smutsoog 241 IS in the Project Area. The claimants were some of the Native Location residents and had permission to occupy stands owned by the Town Council of Breyten (Land Claims Commission, 2003).



Figure 6-5: Nicholas Jacobus Breytenbach, the founder of Breyten (Fourie, 2012).

Based on the 1913 Land Act, blacks were segregated which resulted in the majority of the land surrounding the Project Area being owned by whites farmers (Schirmer, 2007).

An agricultural census conducted in 1918 and again in 1993, showed that agriculture was the main form of livelihood across many of the districts in Mpumalanga. The general

20th century landscape may therefore be characterised as a large-scale agricultural landscape. This is confirmed through a review of historical cartographic sources.

Previous studies within the surrounding area (Huffman & Calabrese, 1997; Van Schalkwyk, 2003; Van Schalkwyk, 2003; Fourie, 2007; Murimbika, 2007; Fourie, 2012) primarily identified sites associated with these types of settlements from the early 20th century. Heritage resources mainly include homesteads and burial grounds and graves. Historical layering (i.e. a chronological review of available historical maps) indicated that infrastructure associated with the agricultural economy within the project area was well established and present during the 1950s.

The struggle for land and the poor working conditions under which black farmers were expected to operate led to numerous political struggles in the region during the 1940s to 1990s. Farm worker's associations were formed in towns such as Ermelo, even the youth gathered to discuss political issues (Holden & Mathabatha, 2007). During the apartheid era, many people were forcibly removed from their homes and relocated to other areas to facilitate the national policy of separate development. In 1958, for example, coloured people in Ermelo were forcibly removed from their homes and relocated to an area 'zoned' as a coloured township (Christopher, 1991). In 1968, claimants from the KwaMadala location were removed to the KwaZanele Township, about 10 km from Breyten. Four-roomed houses were allocated to the claimants, for which rent was levied. On 6 February 2003, 245 households from the KwaZanele Township received financial compensation which will be used to improve their present housing and infrastructure (Land Claims Commission, 2003).

6.4 Visual Assessment

The Consbrey Project Area is characterised by grasslands on undulating hills and agricultural activities, interlaced by rivers, wetlands, perennial and non-perennial pans, marshy areas or *vleis*. The industrial landscape in the region is marked by mining activities at Spitzkop and Tselentis, owned by Msobo Coal located roughly 5 km east from the project boundary.

The sense of place is typical of a Highveld maize farming region with small towns serving the farming community. Consultation with local farmers described their 'sense of place' for the project area as tranquil and pure, deep sense of space, history, and sentimentality.

In terms of access to the area, the nearest arterial routes are the N11 on the southwest and the R38 on the north. The N11 national route traverses the south-eastern project boundary, the R36 briefly passes the far eastern boundary, and the R38 between Hendrina and Carolina is located 4 km to the north. Furthermore, there are a number of main and other access roads which pass through the project area. There are also a number of houses that occur within and adjacent to the project area, some of which are discussed in Section 8.

At the time of writing this report, no infrastructure designs were available. The visual assessment suggests that depending on dump and infrastructure heights, it is possible that the proposed Project will be visible from the town of Breyten and surrounding farm complexes. In terms of the access routes, the proposed project is likely to be seen by

motorists travelling along the N11, R36 and main and secondary roads within the Project Area.

Potential impacts to the sense of place and visual aspects during the construction phase will be negative due to the disturbance of the surface area and increase of dust that will likely be visible from the access routes. Overburden stockpiles associated with the opencast mining during the operational phase are likely to be visible by local farm inhabitants and people passing on access routes where the underground mining operations are likely to have a minimal impact on the visual environment.

7 RESTRICTIONS, LIMITATIONS, AND KNOWLEDGE GAPS

A detailed mine plan indicating the location of the proposed infrastructure, in addition to the opencast and underground mining areas of the Consbrey Colliery Project was not available at the time of compiling this report. As a result, detailed information required for additional studies, such as the visual impact assessment, was not available and has not been adequately assessed. Additionally, a blasting and vibration study was not completed to date and information required to adequately assess these types of impacts on heritage resources was not available.

Due the extent of the Project Area – in excess of 10 000 ha - field surveys were prioritised to farms where direct impacts due to proposed opencast pit areas would occur. These locations were determined to have the greatest impact on possible heritage resources, and as such not all farms within the project boundaries were surveyed. As a result of the extensive survey technique adopted, there is a high potential for additional heritage resources to exist in the Project Area.

In addition, certain landowners did not grant specialists' access, specifically with regard to Opgoedenhooop 205 IS Portion 3 and 4. However, property was visually surveyed from public roads on its boundary and a desktop survey on Google Earth™. It was noted that the majority of the impacted area was currently being used for agricultural purposes and was heavily disturbed.

Large portions of the surveyed farms comprised established agricultural fields either lying fallow or were under cultivation. This indicated extensive surface disturbance that would significantly have disturbed heritage resources that may have occurred in that area.

Information concerning cumulative impacts of mining activities did not comprehensively consider current activities associated with mines adjacent to the Project Area boundaries. Due to the limited timeframes, data gathering for these proposed developments was not possible or feasible. As a result, ratings associated with cumulative impacts may be undervalued. In addition detailed surface infrastructure design plans were not available at the time of the HIA and as a result more detailed HIAs may be required should the finalised infrastructure footprints exceed minimum thresholds described in Section 38.



Figure 7-1: Example of maize fields within the Project Area.



Figure 7-2: Example of the extent of agricultural fields as viewed from the road.

8 DESCRIPTION OF BUILT ENVIRONMENT RESOURCES

Identified heritage resources related to the built environment were individually assessed to obtain a significance value. Where individual structures formed part the space surrounding a homestead in which outbuildings, gardens, orchards, small livestock pens or coops and a family cemetery or *kerkhof* may be present, they were assessed holistically as part of a single *werf*.

Built environs with a negligible heritage value were not assessed further. Based on their lack of context identifiable - characteristics, clear associations with particular groups or people, assessment against aesthetic, technical, historic, scientific or social criteria produced a low value rating. The rating was informed by credible information sources including peer reviewed scientific publications and relevant previous impact assessments.

These types of built environs are not rare and have low information potential due to absence of context, deposit or associated material. These resources were assigned Grade IV C field ratings described in Section 7 of the NHRA. Based on SAHRA minimum standards, Grade IV C resources require no further mitigation. As a result, these sites were excluded from this impact assessment. Three sites were excluded (S.34-006, S.34-008, and S.34-030) but full descriptions are provided in the site table list in Appendix C. The assessment of site value and impacts on sites are presented in the impact assessment matrix in Appendix D.

8.1 MSO1805/2629BD/S.34-022

S.34-022 is located on Bankfontein 215 IS and comprises a six-arched sandstone bridge that crosses over the Vaalwaterspruit (Figure 8-1). No date was visible on the bridge, and no archive records found during the archive search. However, the bridge is probably associated with the Breyten Colliery that was in operation during the earlier part of the 20th century, circa 1911. The bridge is still in good condition but is no longer maintained.



Figure 8-1: S.34-022 - Historic bridge on Bankfontein 215 IS.

Table 8-1: Summary of the S. 34-022, Bankfontein six-arch sandstone bridge

Site Type	Bridge
Site category	Industrial
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.2681458</p> <p>Longitude: 29.9393975</p> <p>The site is located in Consbrey, just outside of the opencast footprint.</p>
Context	Primary
Age	Thought to be associated with the Breyten Colliery. Suggests possible date of over 100 years.
Significant features	The bridge is constructed from sandstone, including six arches.
Threats or sources of risk	
The bridge is situated adjacent to proposed opencast mining area. It will be negatively impacted on by mining activities and possibly destroyed.	
Condition of site	
The bridge is in excellent condition.	
Statement of Value	Field Rating: Grade IV A

8.1.1 Statement of value

The sandstone bridge has a medium-high heritage value on its historical association with the Breyten Colliery. The rating of the structure based on its association with the Breyten Colliery was informed by credible information sources, such as peer reviewed articles, and official records.

Based on its assumed association with the mine, the bridge is attributed to changes in the pattern of the country's history. This is seen through the development of the coal mining industry as a source of inexpensive fuel required for the gold mining activities on the Witwatersrand.

The bridge was identified, recorded and assessed by generalist heritage practitioners. As a result, the ascribed significance value was only evaluated on two dimensions – historical and social. A Phase 2 Built Environment Assessment will be required and this may affect the resource's value presented in this HIA report.

8.1.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Municipal	The bridge is associated with mining in the municipal area and negative effects to the structure will detract from that specific history.
Duration	Permanent	The bridge will be destroyed by mining of the opencast pit
Severity	Irreparable damage	The bridge will be destroyed and litigation to the company may result in withdrawal of permits
Probability	Certain	The bridge will be destroyed by opencast mining
Magnitude		Moderate
Value of the heritage resource		Grade IV A

8.1.3 Rating of impact (post-mitigation)

Type of Impact		Negative change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	Impacts will be limited to the bridge as it would have been recorded.
Duration	Permanent	The bridge will be destroyed but the impact would have been mitigated through the recording of the structure
Severity	Low level	The impacts will be limited to low level legal issues
Probability	Unlikely	If the correct procedure is followed and the bridge is assessed through a Phase 2 Built Environment Assessment, it is unlikely that the negative impacts identified in the pre-mitigation will occur.
Magnitude		Minor

8.1.4 Recommendations

The site should be subject to a Phase 2 Built Environment Assessment by a suitably qualified specialist. The Phase 2 assessment should at least:

- Record and document the site using appropriate methods;
- Establish the site's actual age and association with the surrounding cultural landscape; and
- Provide appropriate site management plans OR complete an application for destruction if relevant.

8.2 MSO1805/2629BD/S.34-001, S.34-002, S.34-005 – Boomplaats Werf (Dwarstrek 216 IS Ptn 1)

This werf forms the main household area of Portion 1 of the farm Dwarstrek 216 IS. The current owners (Mr Ockert Steyn) are fourth generation descendants of the original landowner (P. J. Steyn). The farm was officially proclaimed Boomplaats in 1894 (Figure 8-2; Figure 8-3).

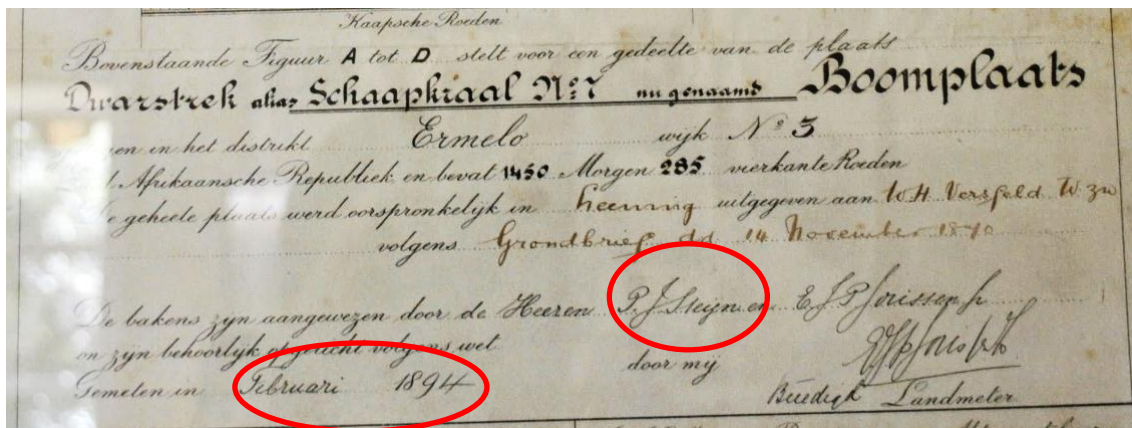


Figure 8-2: Name and date on original title deed for Boomplaats on Dwarstrek 216 IS.

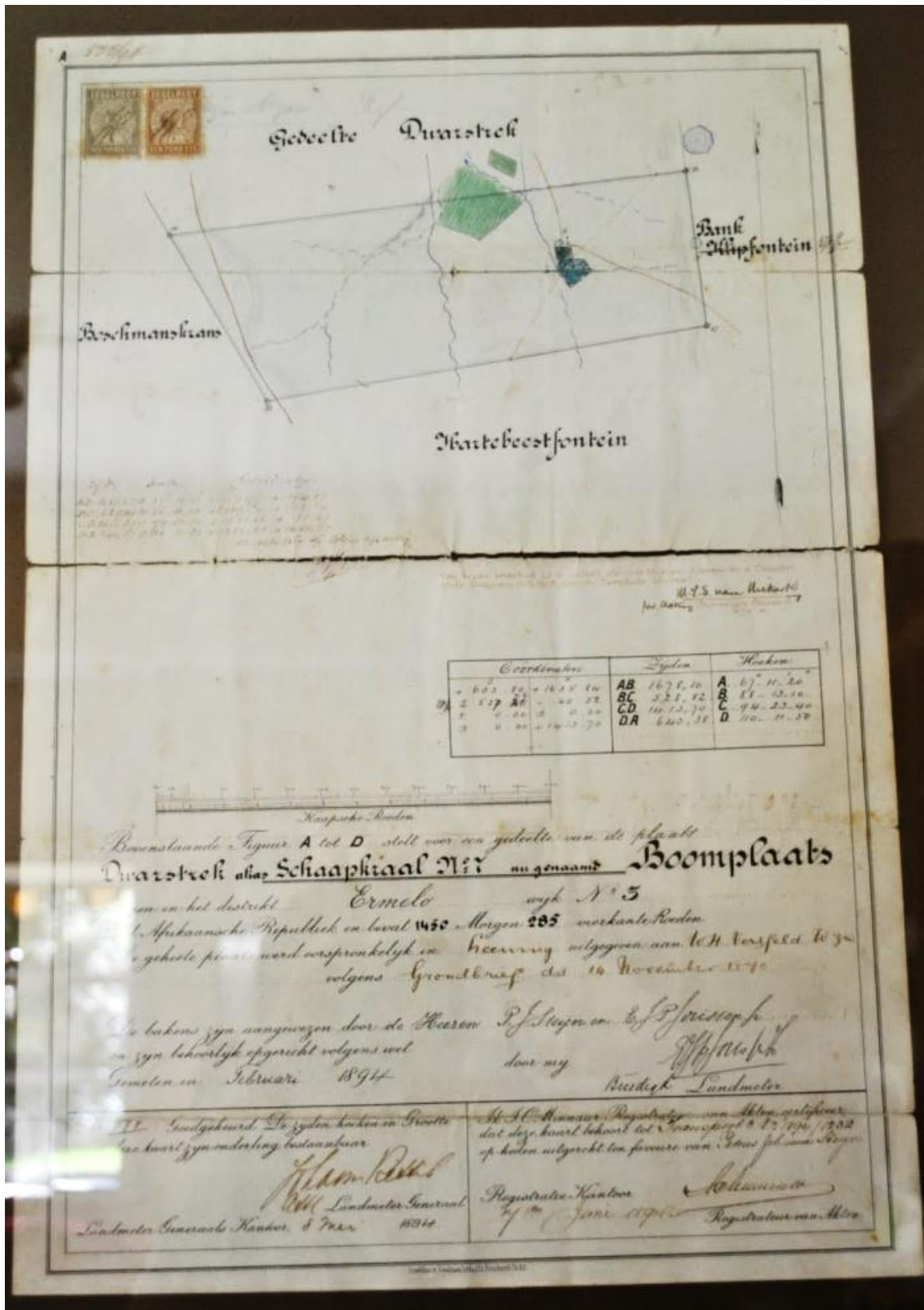


Figure 8-3: Original title deed for Boomplaats on Dwarstrek 216 IS dating to 1894 in the name of P.J. Steyn.

The *werf* is discussed holistically and assessed as such, although individual elements were evaluated independently. The Boomplaats *werf* was located on Dwarstrek 216 IS and consisted of several individual buildings, some of which are older than 60 years, and one cemetery (S.36-003), which is described under Section 11 below. Historic structures present on the *werf* include that least three historical structures. These are discussed in more detail below. In addition, the *werf* also included more recent structures such as a converted shed occupied by Mr Steyn and his family, several outbuildings and workshops, a primary school, and labourers' homesteads.

The original farmhouse, old milk-shed dated to 1892 by keystone, and the original Breyten Collieries Managers Residence dating to 1911 was relocated from Bankfontein 215 IS during the 1930s. The remaining buildings on the *werf* are primarily used for farming purposes, are more contemporary and form part of the assessment of the *werf*.

The original farmhouse (S.34-002; Figure 8-5) dates, according to both Mr Steyn and his mother, Mrs Rina Steyn, to circa 1872. This was the first residential building built. The Steyns describe it as a *hartebeeshuis*, although it does not conform to a typical example of such a structure.

The building was constructed using *ouklip* (ferricrete) blocks. It is a single roomed structure with a tin roof, and a possible later sub dried mud brick section that created a second room or possible kitchen. The building has been neglected and is in a state of decay.

The second historical built structure on the *werf* is an old milk-shed (S.34-001; Figure 8-6). This shed was constructed in 1892 as indicated by the keystone (Figure 8-7). The construction material was primarily sandstone, though a later addition of ferricrete was noted on the western portion of the structure. The roof was constructed using tin. Some contemporary alterations were noted, but these are limited to the bricking up of windows and entrances. This building was, according to Mr Steyn, the primary family residence occupied after the earlier so-called *hartebeeshuis*.

The current main residence was the Breyten Collieries Manager's Residence that was relocated from Bankfontein to Dwarstrek during the 1920s. This house was originally constructed in 1911, as indicated on the architectural plans (Figure 8-10). After the miners' strike of 1922 which saw the closing of Breyten Collieries, the building was purchased by the Steyns and meticulously broken down, catalogued and reconstructed in its current location (Figure 8-9). All the original building materials were used when rebuilt on the *werf*. The building is constructed with large sandstone blocks. Internal features, such as the flooring, fireplaces and moulded ceilings are all still original features. Two fireplace surrounds were said to be Art Deco and includes tiles typical of this style. Minor alteration and additions have been done over the years. The entrance and outside patio of the residence is on the northern side of the structure. Internally from the entrance off the hallway, on the western portion are a lounge and dining area, and the eastern are two rooms.

On the southern end of the residence is the bathroom and kitchen, which have been modified over the years in keeping with the original materials used. Addition to the property includes the building of a double garage constructed from sandstone.

Table 8-2: Summary of the Boomplaats *Werf*

Site Type	<i>Werf</i>
Site category	Residential
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.2529932</p> <p>Longitude: 29.890238</p> <p>The site is located in proposed Consbrey opencast footprint area.</p>
Context	Primary/Secondary
Age	From late 19 th century. First building circa 1872, second building 1892, first title deed 1894.
Significant features	The original farmhouse and milk-shed are still present. The new farmhouse (Breyten Collieries Managers Residence) is older than 60 years. Architecturally, the <i>werf</i> contains examples early European architecture Voortrekker to ArtDeco and more contemporary styles. The <i>werf</i> is also associated with a specific social history not found or recorded in other regions as extensively.
Threats or sources of risk	
The <i>werf</i> is situated within the proposed opencast area and will be destroyed if mining commences.	
Description of structures present	
<p>The <i>werf</i> consists of many structures, many being contemporary. Of the historic structure, the most notable are:</p> <p>The original farmhouse;</p> <p>The old milk-shed; and</p> <p>The farmhouse (Breyten Collieries Managers Residence).</p>	
Description of features present	
<p>The original farmhouse is constructed using ferricrete and has a corrugated iron roof.</p> <p>The milk-shed is constructed using sandstone and has a keystone dated to 1892. Additions to the milk-house were made from sandstone and ferricrete. The roof is constructed using corrugated iron.</p> <p>The farmhouse is constructed using sandstone. All original features are still present, including internal fixtures. Minor alteration were made and some additions to the structure.</p>	

Condition of site	
Condition of the <i>werf</i> is excellent. Still occupied and used.	
Statement of Value	Field Rating: Grade III B



Figure 8-4: Aerial view of the Steyn Werf on Dwarstrek 216 IS Ptn 1 in the landscape as seen on Google Earth. Shaded area indicates proposed opencast mining area.



Figure 8-5: S.34-002 – Original farmhouse. Note later addition as indicated by sunbaked bricks.



Figure 8-6: S.34-001 – Old milk-shed dated to 1892. South facing section.



Figure 8-7: Detail of keystone of S.34-001 dating the building to 1892.

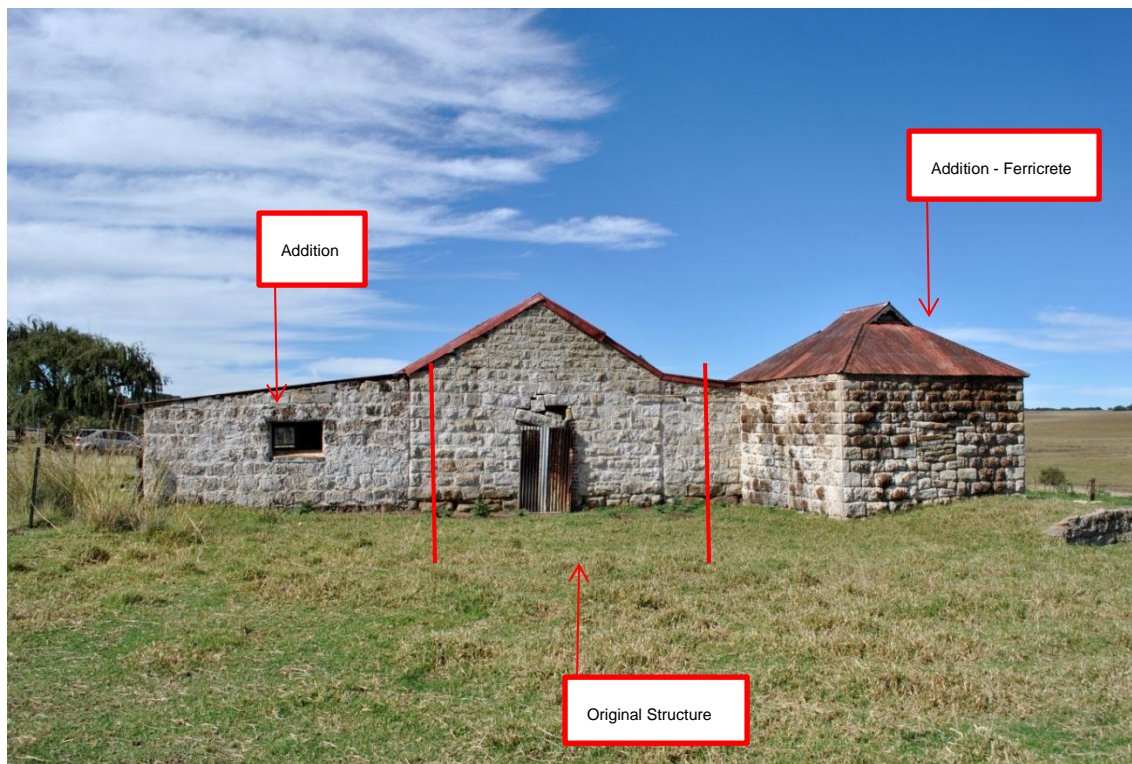


Figure 8-8: North facing section of S.34-001 indicating later additions to original structure.



Figure 8-9: S.34-005 - Breyten Collieries Manager's Residence now on Boomplaats.

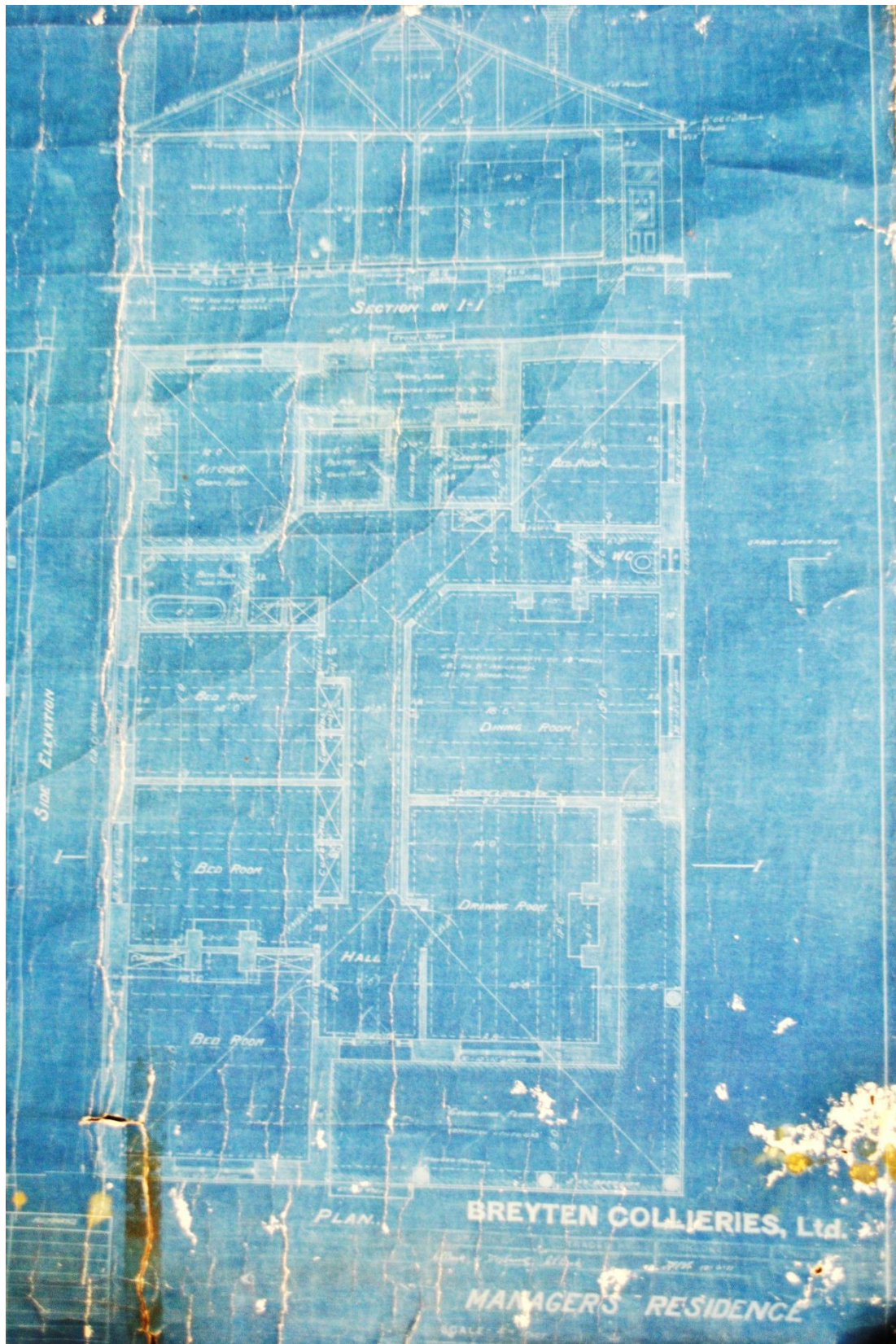


Figure 8-10: Architectural plans for the Breyten Collieries Managers Residence on Bankfontein 215 IS before relocation to Boomplaats Werf.

8.2.1 Statement of value

The Boomplaats *werf* has a medium-high heritage value in aesthetic and technical characteristics, scientific information potential, and historic and social association. Architecturally, the individual structures will require re-assessment by a qualified historical architect. As we were not qualified to assess the technical aspects of the structures, these were excluded from our assessment. The rating of the *werf* was informed by credible information sources, such as peer reviewed articles, official records and consultation with the Steyn family residing on the *werf*.

The *werf* can be verified to date to at least 1892, and the keystone suggests the milk-house to be 121 years. The official title deed also indicated that the same family has occupied the *werf* for four generations, their children being the fifth generation. Aesthetically, the *werf* exhibits attributes that are intrinsically significant to the farming, mining, and architecture community due to the presence of the historic structures. Additionally, the relocation and reconstruction of the Breyten Collieries Managers house on the *werf* exhibits a degree of technical skill that is difficult to reproduce.

Historically, the *werf* is associated with the Bushmen and their role in the Anglo-Boer War, as well as the Steyn family. As documented in Prins (1999, p. 58) and relayed by Rina Steyn, their ancestral family, Tienie, and daughters Lettie and Nettie, residing on the *werf* were assisted by a Bushmen named Cheese during the war. Scouting the movements of the British, in times of danger, Cheese would guide the family to safety in the caves locally known as wonderbanke. This history is singular and unique and provides the *werf* with a significant historical association that is irreplaceable. Additionally, through the consultation with the Steyn and Mahlangu residing on the *werf*, it was communicated that through decree of ZAR President Paul Kruger, the Steyns were given permission to bring the Mahlangu family to Boomplaats. These historical connections also talk to the social significance of this *werf* to the people, and their family, residing on the *werf*.

8.2.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	National	Due to the historical and social aspects of the <i>werf</i> , impacts will effect the nation as documented and specific history of the Bushmen and their role in the Anglo-Boer War will be altered or destroyed.
Duration	Permanent	The <i>werf</i> will be destroyed by mining of the opencast pit
Severity	Irreparable damage	The <i>werf</i> will be destroyed and litigation to the company may result in withdrawal of permits
Probability	Cerertain	The <i>werf</i> will be destroyed by opencast mining
Magnitude		Major
Value of the heritage resource		Grade III B

8.2.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	If the opencast area is adjusted, impacts on the <i>werf</i> will be limited.
Duration	Project life	Impacts on the <i>werf</i> will cease once the project life is complete
Severity	Minor medium term	Impacts will be minor on local populations and those to the structures will mostly repairable.
Probability	Highly unlikely	If the opencast pit area is adjusted, it is highly unlikely that the negative impacts described in the pre-mitigation will occur.
Magnitude		No Change

8.2.4 Recommendations

It is recommended that the *werf* be conserved in situ and the proposed opencast pit area adjusted relocated.

The *werf* should in addition be subject to a Phase 2 Built Environment assessment to comprehensively record and document the *werf* and provide a site management plan to assist conservation and management of the site.

8.3 MSO1805/2629BD/S.34-011 and MSO1805/2629BD/S.34-012 – Bosmanskrans *Werf* (Bosmanskrans 217 IS Ptn 9)

The *werf* consisted of a homestead including associated outbuildings, stock enclosures and family cemetery (S.36-010, which is discussed separately under Section 11). Discussion and assessment focussed on the *werf*. One of the old outbuildings, presumably the original milk-shed, was salvaged for materials by the owners of the property when additions were made to the old farmhouse. Due to this, only small portions of the structures walls and foundations remained, and were therefore not included in the individual assessment of structures as the integrity of this structure was completely destroyed.

The farmhouse (S.34-012) was built in 1893, identified by the keystone (Figure 8-12). The farm was originally occupied by the Janse van Vuuren and Hendrikse family, as indicated by the family cemetery (S.36-010). During consultation with the current owner, Mrs Alettha Roux indicated that the farmhouse is one of the few structures in the area that was not affected by Kitchener's 'Scorched Earth' policy of 1901. The building was constructed from sandstone and has a tin roof. Early additions to the original structure were believed to have been completed by Second World War (1935-1948) Italian prisoners of war. This has been suggested by several sources for construction of buildings in the area, but no documented verification could be identified. Addition to the farmhouse was completed on the western portion of the structure using material salvaged from the old milk-shed. The original structure was not altered and only minor improvements were completed. The addition consisted of one large room attached to the original farmhouse.

A stonewalled sheep dip was associated with the homestead that incorporated natural features of the sandstone outcrop on which it was built. The stone walled structure consisted of two enclosures, and a dip carved into the sandstone (Figure 8-13).

Table 8-3: Summary of the Bosmanskrans *Werf*

Site Type	<i>Werf</i>
Site category	Residential
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.268828</p> <p>Longitude: 29.8355174</p> <p>The site is located outside of the Consbrey Colliery Project Area.</p>
Context	Primary
Age	Farmhouse dated to 1893, no title deed has been identified. <i>Werf</i> is at least 120 years old based on the age of the keystone.
Significant features	The original farmhouse is still present with only minor alterations.
Threats or sources of risk	
The <i>werf</i> is situated within the proposed project boundary and will be affected by cumulative effects of both opencast and underground mining activity.	
Description of structure present	
<p>The <i>werf</i> consisted of:</p> <ul style="list-style-type: none"> Original farmhouse Old milk-shed destroyed Stonewalled dip Contemporary outbuildings 	
Description of features present	
The original farmhouse was constructed using sandstone with a corrugated iron roof and a keystone dated to 1893. The milk-shed was constructed using sandstone. The structure was salvaged for materials by the current owners. The stonewalled sheep dip consisted of two enclosures and a dip that was carved out of the sandstone outcrop on which it has been built.	
Condition of site	
Condition of the <i>werf</i> is good. Still occupied and used.	

Statement of Value

Field Rating: Grade IV B

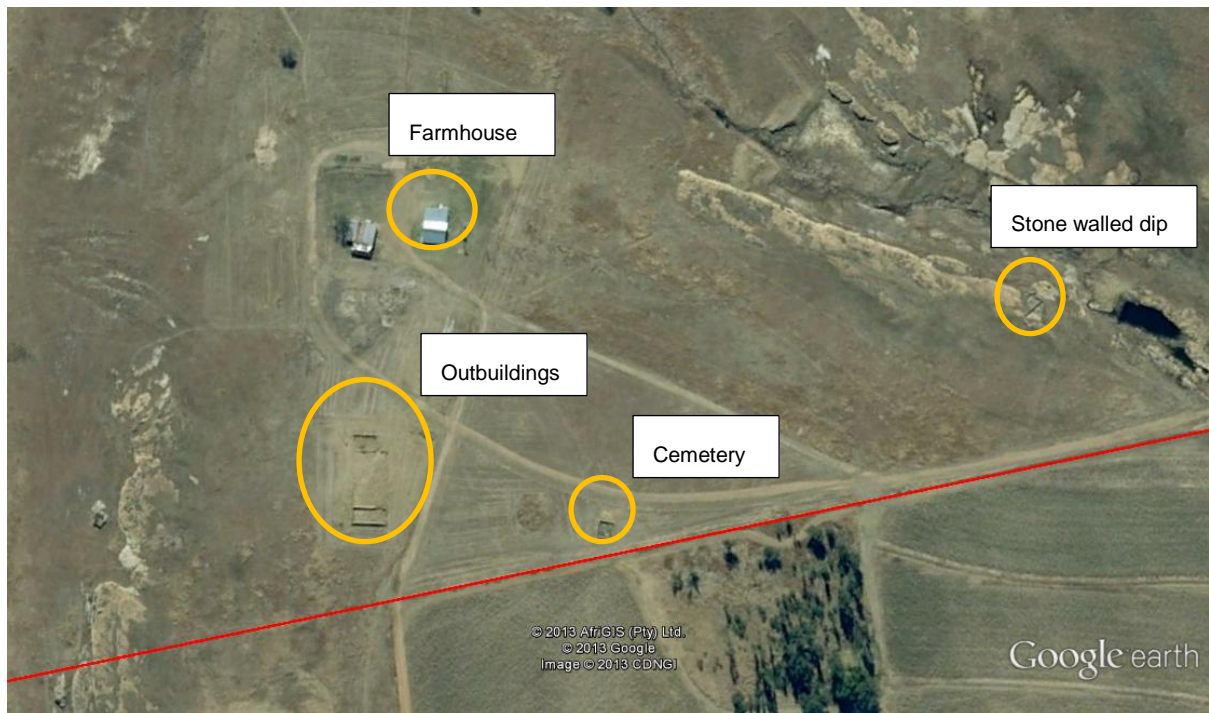


Figure 8-11: Aerial view of the Bosmanskrans werf. Red line indicates the Project boundary.



Figure 8-12: Keystone on the original farmhouse of the Bosmanskrans werf.



Figure 8-13: Stonewalled dip on sandstone outcrop included in the Bosmanskrans *werf*.

8.3.1 Statement of value

The Bosmanskrans *werf* has a medium heritage value in historic and social association. The rating was informed by credible information sources, such as literature on the history of the area and consultation with the Roux family residing on the *werf*. The *werf* was not assessed aesthetics or scientific criteria. To determine appropriate ratings for these criteria, a qualified historical architect is required to conduct a Phase 2 Built Environment Assessment.

Historically, the *werf* is thought to date to at least 1893 by keystone, suggesting the farmhouse to be 120 years. Discussions with the Roux family indicated that the farmhouse specifically survived the 'scorched earth' policy. It was suggested that this was due to the previous occupants of the *werf*. Mr Hendrikse was an immigrant from the Netherlands who came into the area. He was a teacher who taught English at the school, and it was said that this is what spared him during the Anglo-Boer War.

8.3.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Local	The impacts on the <i>werf</i> will be local, only extending as far as the development area.
Duration	Project life	The <i>werf</i> lies outside of the proposed opencast pit area. Impacts on the <i>werf</i> will only occur during the project life.
Severity	Minor medium term	The <i>werf</i> lies outside the opencast pit area. Impacts will primarily be cumulative.
Probability	Likely	It is likely that cumulative impacts will have a negative effect on the <i>werf</i> .
Magnitude		Moderate
Value of the heritage resource		Grade III B

8.3.3 Rating of impact (post-mitigation)

Type of Impact		Negative change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Very limited	If the monitoring plan is implemented, impacts on the <i>werf</i> will be limited to specific isolated parts of the <i>werf</i> .
Duration	Project life	Impacts on the <i>werf</i> will cease once the project life is complete
Severity	Low level	Impacts on the <i>werf</i> will be repairable.
Probability	Probable	Even with a monitoring plan, it is probable that cumulative impacts will still have an effect on the <i>werf</i> .
Magnitude		Minor

8.3.4 Recommendations

It is recommended that a monitoring plan be implemented to assess the cumulative effect from mining operations, including blasting and vibration. Additionally, the *werf* should undergo a Phase 2 Built Environment Assessment to determine individual structures' significance on all criteria.

8.4 MSO1805/2629BD/S.34-026 and MSO1805/2629BD/S.34-027 – Bankfontein *Werf* (Bankfontein 215 IS Ptn 14)

The Bankfontein *werf* consisted of one farmhouse, a stonewalled dip on a nearby sandstone outcrop, and several dilapidated outbuildings.

The farmhouse (S.34-027) was consistent with the architectural style of the 1920s and 1930's. The architectural style was art deco, a classic feature being bay windows with spear and pillared outside porch area with its geometric shaped ornamentation. The building was constructed with brick and plaster, and differed from the surrounding sandstone buildings. The roof was constructed from corrugated iron (Figure 8-15). A foundation stone dated the building to 1929.

Outbuildings associated with the Bankfontein *werf* were destroyed and materials seemingly removed, leaving only remnants of the walls and foundations.

The only structure that was still intact was a stonewalled dip located some distance to the south on a sandstone outcrop. The stonewalled dip consisted of two enclosures and some rusted historic metal was found in association with these enclosures.

Table 8-4: Summary of the Bankfontein *Werf*

Site Type	<i>Werf</i>
Site category	Residential
Site location	<p>Site co-ordinates</p> <p>South:-26.2574826</p> <p>East: 29.9508838</p> <p>The sites are located in Consbrey but outside of the opencast footprint.</p>
Context	Primary
Age	Farmhouse dated to 1929, no title deed has been identified. <i>Werf</i> is at least 84 years old based on the age of the keystone.
Significant features	The original farmhouse is still present. No alterations were visible.

Threats or sources of risk	
The <i>werf</i> is situated within the proposed project boundary adjacent to an opencast area and will be directly impacted mining activity.	
Description of structure present	
The <i>werf</i> consists of: The original farmhouse The stone walled dip Dilapidated outbuildings	
Description of features present	
The original farmhouse is constructed using bricks and plaster and has a corrugated iron roof. The building is dated to 1929 by keystone. The stone walled dip consists of two enclosures and a dip on a sandstone outcrop.	
Condition of site	
Condition of the <i>werf</i> is fair. There is some decay present and restoration will be required. Still occupied and used.	
Statement of Value	Field Rating: Grade IV B

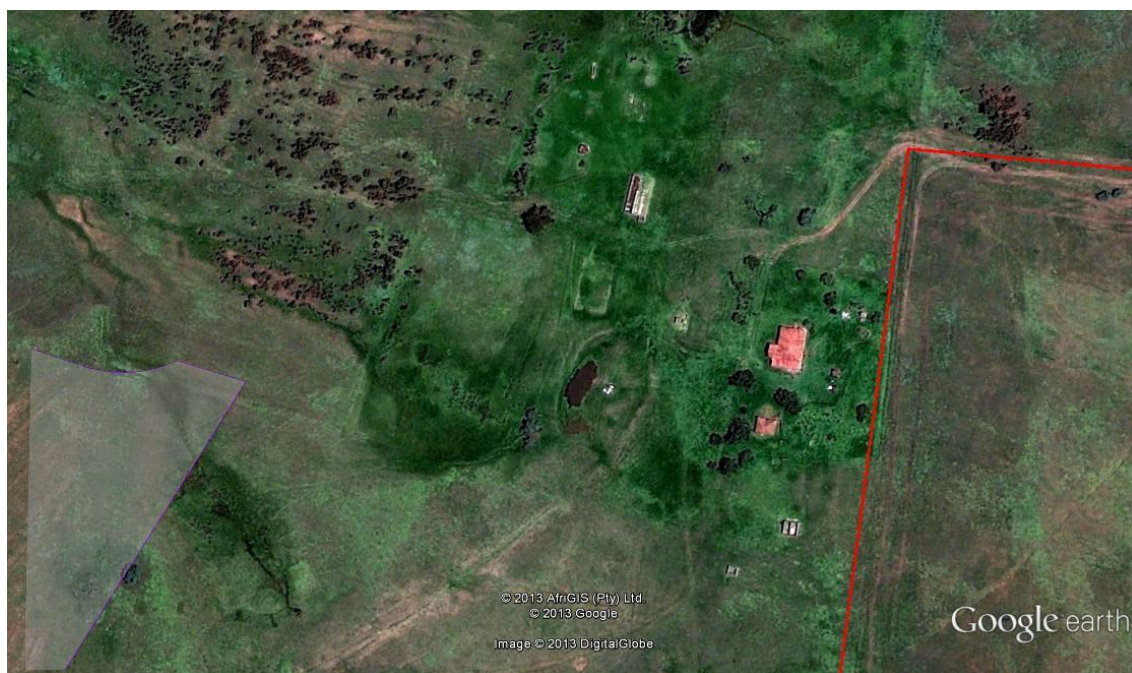


Figure 8-14: Aerial view of the Bankfontein *werf*. The red line indicates the project boundary and the shaded area the opencast pit area.



Figure 8-15: The farmhouse of the Bankfontein werf, dated to 1929 by foundation stone.



Figure 8-16: Stone walled dip associated with the Bankfontein werf.

8.4.1 Statement of value

The Bankfontein *werf* has a medium heritage value in historic association. The rating was informed by credible information sources, such as literature on the history of the area. The *werf* was not assessed aesthetics, scientific or social criteria. To determine appropriate ratings for aesthetic and scientific criteria, a qualified historical architect is required to conduct a Phase 2 Built Environment Assessment. Socially, no information was available regarding the previous occupants of the residence. The *werf* has been abandoned for some time and the current occupant could not produce any pertinent information.

Historically, the *werf* is thought to date to at least 1929 by keystone, suggesting the farmhouse to date to the period when the Consolidated Mines began its operations. It would be feasible that this house directly relates to the mining operations that were conducted on

Bankfontein during this period. This type of resource may be rare in the region, but it is not unique.

8.4.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Local	The impacts on the <i>werf</i> will be local, only extending as far as the development area.
Duration	Permanent	The <i>werf</i> lies adjacent to the proposed opencast pit area.
Severity	Irreparable damage	The <i>werf</i> will be destroyed by activities associated with the opencast pit mining.
Probability	Certain	The <i>werf</i> will be destroyed
Magnitude		Minor
Value of the heritage resource		Grade IV B

8.4.3 Rating of impact (post-mitigation)

Type of Impact		Negative change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	Destruction will be limited to the site.
Duration	Permanent	The <i>werf</i> will be destroyed, but the impact will have been mitigated by the recording of the site
Severity	Low level	There will be irreparable damage to the <i>werf</i> but due it having been recorded, there will be the possibility of low level legal issues
Probability	Unlikely	It is unlike that the negative impacts identified for pre-mitigation will occur if the recommendations are followed
Magnitude		Minor

8.4.4 Recommendations

It is recommended that the *werf* should undergo a Phase 2 Built Environment Assessment to determine individual structures significance on all criteria and adequately record all architectural features.

9 DESCRIPTION OF ARCHAEOLOGICAL RESOURCES

The section aims to describe the identified and recorded heritage resources, discuss the values ascribed to the heritage resources, as well as to assess the impacts on the identified heritage resources. The heritage resources that have a negligible to low heritage value are not discussed. These include sites S.35-013, S.35-014, S.35-018, S.35-020, S.35-023, and S.35-025. The full descriptions are provided in the site table list in Appendix C. Impacts were only discussed for sites with low to high heritage value. For descriptions of the significance and the field rating system, see Table 4-1 and Table 4-2 in Section 4.4.

Based on their lack of context, un-diagnostic characteristics and the inability to associate these finds with a particular group of people, assessment against aesthetic, technical, historic, scientific or social criteria produced a low value rating. The rating was informed by credible information sources including previous impact assessments. Find spots such as these are not rare and have a low information potential especially when considered outside of any site context. Based on this, these heritage resources have a field rating of Grave IV C as defined in the NHRA Section 7 requiring no further mitigation and were excluded from this impact assessment.

9.1 MSO1805/2629BD/S.35-015 – Rock Art

Table 9-1: Summary of Site S.35-015

Site type	Rock Art
Site category	Bushmen
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.2730562</p> <p>Longitude: 29.8343102</p> <p>The site is situated to the south of the Consbrey Colliery Project boundary.</p>
Context	Primary
Cultural affinities	Bushmen
Age	Unknown
Significant features	Two large antelope figures were visible. Other images were

	degraded and unclear. Approximately five images occur in association with this panel.
Site extent and orientation	Rock surface faces to the west.
Threats or sources of risk	
This site lies outside of the project boundary and will not be directly impacted on. Indirect, induced and cumulative impacts may pose risks to the art.	
Features	
The art is located in an exposed sandstone shelter along the Klein Olifants River on Bosmanskrans 215 IS. The surface of the shelter is fairly degraded and subject to severe weathering in the form of exfoliation placing the art at risk.	
Statement of Value	Field Rating: Grade IV A



Figure 9-1: Two distinct antelope figures identified at S.35-015. Note the exfoliation of the rock surface.



Figure 9-2: A faded antelope type figure to the north of the primary panel. Figure is indicated by the red circle. Also, note the crack in the rock surface, indicating the potential for collapse due to the exfoliation process.

9.1.1 Statement of value

The rock art has a significance rating of medium. The significance of the rock art is based on aesthetic, historic, scientific and social criteria. Rock art is deemed as a heritage resource that by its very nature has aesthetic qualities that require a certain level of technical skill to produce. Rock art is relatively rare and each site is unique and irreplaceable. Production of rock art is also intrinsically linked to the specific groups or communities for various social, cultural and spiritual reasons acting as a tangible resource in identifying groups and patterns in the country's history. Based on these criteria, the rock art has a field rating of Grade IV A.

9.1.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Province / Region	Impacts on the rock art will have implications to the province as identified rock art sites in that area are rare. It will also detract from the tangible history of the area.
Duration	Permanent	Impacts will have a permanent effect on the rock art as these sites cannot be restored.
Severity	Irreparable	Damaged to rock art is irreparable and irreplaceable
Probability	Likely	It is likely that mining activities will have an impact on the rock art
Magnitude		Moderate
Value of the heritage resource		Grade IV A

9.1.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	The scale will be limited to the rock art site and its immediate surrounds
Duration	Project life	With monitoring of the sites, impacts will be limited to the duration of the project
Severity	Significant damage	With recording and monitoring, the potential impacts may still occur and cause serious damage to the rock art.
Probability	Unlikely	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed
Magnitude		Minor

9.1.4 Recommendations

It is recommended that a Phase 2 Rock Art Assessment be undertaken to intensively survey and record all rock art sites within and surrounding the project area to guide appropriate mitigation measures. Additionally, identified rock art sites should be included into a monitoring programme to assess the cumulative impacts of dust and vibrations caused by mining activities.

9.2 MSO1805/2629BD/S.35-016 – Rock Art

Table 9-2: Summary of S.35-016

Site type	Rock Art
Site category	Bushmen
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.2567781</p> <p>Longitude: 29.8219027</p> <p>The site is situated within the Consbrey Colliery Project boundary on Bosmanskrans 215 IS directly above proposed underground mining activity in Consbrey A.</p>
Context	Primary
Cultural affinities	Bushmen
Age	Unknown
Significant features	Single panel with approximately six painted images. Images are significantly faded and some have been vandalised.
Site extent and orientation	Rock surface faces to the east.
Threats or sources of risk	
This site lies directly above proposed underground mining areas and will not be directly impacted on. Cumulative effects may have an impact on the art.	
Features	
The art is located in an exposed sandstone shelter along the Klein Olifants River on Bosmanskrans 215 IS. The surface of the shelter is fairly degraded and subject to severe weathering placing the art at risk.	
Statement of Value	Field Rating: Grade IV A

9.2.1 Statement of value

The rock art has a significance rating of medium. The significance of the rock art is based on aesthetic, historic, scientific and social criteria. Rock art is deemed as a heritage resource that by its very nature has aesthetic qualities that require a certain level of technical skill to produce. Rock art is relatively rare and each site is unique and irreplaceable. Production of rock art is also intrinsically linked to the specific groups or communities for various social, cultural and spiritual reasons acting as a tangible resource in identifying groups and patterns in the country's history. Based on these criteria, the rock art has a field rating of Grade IV A.

9.2.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Province / Region	Impacts on the rock art will have implications to the province as identified rock art sites in that area are rare. It will also detract from the tangible history of the area.
Duration	Permanent	Impacts will have a permanent effect on the rock art as these sites cannot be restored.
Severity	Irreparable	Damage to rock art is irreparable and irreplaceable
Probability	Likely	It is likely that mining activities will have an impact on the rock art
Magnitude		Moderate
Value of the heritage resource		Grade IV A

9.2.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	The scale will be limited to the rock art site and its immediate surrounds
Duration	Project life	With monitoring of the sites, impacts will be limited to the duration of the project

Severity	Significant damage	With recording and monitoring, the potential impacts may still occur and cause serious damage to the rock art.
Probability	Unlikely	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed
Magnitude		Minor

9.2.4 Recommendations

It is recommended that a Phase 2 Rock Art Assessment be undertaken to intensively survey and record all rock art sites within and surrounding the Project Area to guide on appropriate mitigation measures. Additionally, identified rock art sites should be included into a monitoring programme to assess the cumulative impacts of dust and vibrations caused by mining activities.



Figure 9-3: Outcrop on which S.35-016 rock art occurs. Red circle indicates the panel.



Figure 9-4: Antelope figure found on panel with head and horns clearly visible.



Figure 9-5: Image that has been scratched. Image is no longer clearly visible.

9.3 MSO1805/2629BD/S.35-019 – Rock Art

Table 9-3: Summary of S.35-019

Site type	Rock Art.
Site category	Unknown
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.2552449</p> <p>Longitude: 29.8147442</p> <p>The site is situated outside the project boundary on Bosmanskrans 215 IS directly adjacent proposed underground mining activity in Consbrey A.</p>
Context	Primary
Cultural affinities	Unknown
Age	Unknown
Significant features	Single panel with several finger-painted monochrome single lined shaped figures.
Site extent and orientation	Rock surface faces to the south.
Threats or sources of risk	
This site lies adjacent to the proposed underground mining areas and will not be directly impacted on. Cumulative effects may have an impact on the art.	
Features	
The art is located in an exposed sandstone shelter along the Klein Olifants River on Bosmanskrans 215 IS. The surface of the shelter is fairly degraded and subject to severe weathering placing the art at risk.	
Statement of Value	Field Rating: Grade IV A

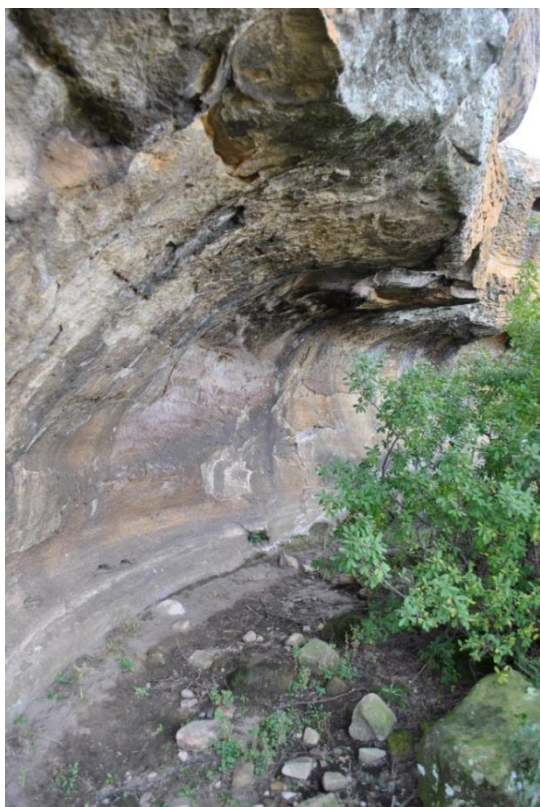


Figure 9-6: Shelter in which S.35-019 occurs.



Figure 9-7: Six individual finger painted lines on the panel of S.35-019.

9.3.1 Statement of value

The rock art has a significance rating of medium. The significance of the rock art is based on aesthetic, historic, scientific and social criteria. Rock art is deemed as a heritage resource that by its very nature has aesthetic qualities that require a certain level of technical skill to produce. Rock art is relatively rare and each site is unique and irreplaceable. Production of rock art is also intrinsically linked to the specific groups or communities for various social, cultural and spiritual reasons acting as a tangible resource in identifying groups and patterns in the country's history. Based on these criteria, the rock art has a field rating of Grade IV A.

9.3.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Province / Region	Impacts on the rock art will have implications to the province as identified rock art sites in that area are rare. It will also detract from the tangible history of the area.
Duration	Permanent	Impacts will have a permanent effect on the rock art as these sites cannot be restored.
Severity	Irreparable	Damaged to rock art is irreparable and irreplaceable
Probability	Likely	It is likely that mining activities will have an impact on the rock art
Magnitude		Moderate
Value of the heritage resource		Grade IV A

9.3.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	The scale will be limited to the rock art site and its immediate surrounds
Duration	Project life	With monitoring of the sites, impacts will be limited to the duration of the project
Severity	Significant damage	With recording and monitoring, the potential impacts may still occur and cause serious damage to the rock art.
Probability	Unlikely	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed
Magnitude		Minor

9.3.4 Recommendations

It is recommended that a Phase 2 Rock Art Assessment be undertaken to intensively survey and record all rock art sites within and surrounding the project area to guide on appropriate mitigation measures. Additionally, identified rock art sites should be included into a monitoring programme to assess the cumulative impacts of dust and vibrations caused by mining activities.

9.4 MSO1805/2629BD/S.35-021 – Rock Art

Table 9-4: Summary of S.35-021

Site type	Rock Art.
Site category	
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.2575935</p> <p>Longitude: 29.8255654</p> <p>The site is situated within the project boundary on Bosmanskrans 215 IS directly above the proposed underground mining activity in Consbrey A.</p>
Context	Primary
Cultural affinities	Unknown
Age	Unknown
Significant features	Two separate panels with several finger-painted monochrome cross shaped figures. Above the shelter is a historic cattle or sheep dip carved into the natural rock surface and with a sandstone wall.
Site extent and orientation	Rock surface faces to the south.
Threats or sources of risk	
This site lies above the proposed underground mining areas and will not be directly impacted on. Cumulative effects may have an impact on the art.	
Description of Artefacts, Faunal, Botanical or Other Finds and Features	
Features	
The art is located in an exposed sandstone shelter along the Klein Olifants River on Bosmanskrans 215 IS. The surface of the shelter is fairly degraded and subject to severe weathering placing the art at risk.	
Statement of Value	Field Rating: Grade IV A

9.4.1 Statement of value

The rock art has a significance rating of medium. The significance of the rock art is based on aesthetic, historic, scientific and social criteria. Rock art is deemed as a heritage resource that by its very nature has aesthetic qualities that require a certain level of technical skill to produce. Rock art is relatively rare and each site is unique and irreplaceable. Production of rock art is also intrinsically linked to the specific groups or communities for various social, cultural and spiritual reasons acting as a tangible resource in identifying groups and patterns in the country's history. Based on these criteria, the rock art has a field rating of Grade IV A.

9.4.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Province / Region	Impacts on the rock art will have implications to the province as identified rock art sites in that area are rare. It will also detract from the tangible history of the area.
Duration	Permanent	Impacts will have a permanent effect on the rock art as these sites cannot be restored.
Severity	Irreparable	Damaged to rock art is irreparable and irreplaceable
Probability	Likely	It is likely that mining activities will have an impact on the rock art
Magnitude		Moderate
Value of the heritage resource		Grade IV A

9.4.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	The scale will be limited to the rock art site and its immediate surrounds
Duration	Project life	With monitoring of the sites, impacts will be limited to the duration of the project
Severity	Significant damage	With recording and monitoring, the potential impacts may still occur and cause serious damage to the rock art.
Probability	Unlikely	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed
Magnitude		Minor

9.4.4 Recommendations

It is recommended that a Phase 2 Rock Art Assessment be undertaken to intensively survey and record all rock art sites within and surrounding the project area to guide on appropriate mitigation measures. Additionally, identified rock art sites should be included into a monitoring programme to assess the cumulative impacts of dust and vibrations caused by mining activities.



Figure 9-8: Finger painted cross figures in red at S.35-021.



Figure 9-9: Historic cattle/sheep dip located above the shelter of S.35-021.

9.5 MSO1805/2629BD/S.35-029 – Rock Art

Table 9-5: Summary of S.35-029

Site type	Rock Art.
Site category	Bushmen
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.273691</p> <p>Longitude: 29.832906</p> <p>The site is situated outside the project boundary on the Bosmanskrans 215 IS along the Klein Olifants River.</p>
Context	Primary
Cultural affinities	Bushmen
Age	Unknown
Significant features	A single panel with one fine lined antelope figure.
Site extent and orientation	Rock surface faces to the east.
Threats or sources of risk	
This site lies outside the project boundary and will not be directly impacted on. Cumulative effects may have an impact on the art.	
Description of Artefacts, Faunal, Botanical or Other Finds and Features	

Features	
The art is located in an exposed sandstone shelter along the Klein Olifants River on Bosmanskrans 215 IS. The surface of the shelter is fairly degraded and subject to severe weathering placing the art at risk.	
Statement of Value	Field Rating: Grade IV A



Figure 9-10: S.35-029 rock art on Bosmanskrans 217 IS. The red line indicates the shape on the upper part of the image.

9.5.1 Statement of value

The rock art has a significance rating of medium. The significance of the rock art is based on aesthetic, historic, scientific and social criteria. Rock art is deemed as a heritage resource that by its very nature has aesthetic qualities that require a certain level of technical skill to produce. Rock art is relatively rare and each site is unique and irreplaceable. Production of rock art is also intrinsically linked to the specific groups or communities for various social, cultural and spiritual reasons acting as a tangible resource in identifying groups and patterns in the country's history. Based on these criteria, the rock art has a field rating of Grade IV A.

9.5.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Province / Region	Impacts on the rock art will have implications to the province as identified rock art sites in that area are rare. It will also detract from the tangible history of the area.
Duration	Permanent	Impacts will have a permanent effect on the rock art as these sites cannot be restored.
Severity	Irreparable	Damagto rock art is irrpable and irreplaceable
Probability	Likely	It is likely that mining activities will have an impact on the rock art
Magnitude		Moderate
Value of the heritage resource		Grade IV A

9.5.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	The scale will be limited to the rock art site and its immediate surrounds
Duration	Project life	With monitoring of the sites, impacts will be limited to the duration of the project
Severity	Significant damage	With recording and monitoring, the potential impacts may still occur and cause serious damage to the rock art.
Probability	Unlikely	It is unlike that the negative impacts identified for pre-mitigation will occur if the recommendations are followed
Magnitude		Minor

9.5.4 Recommendations

It is recommended that a Phase 2 Rock Art Assessment be undertaken to intensively survey and record all rock art sites within and surrounding the project area to guide on appropriate mitigation measures. Additionally, identified rock art sites should be included into a monitoring programme to assess the cumulative impacts of dust and vibrations caused by mining activities.

10 DESCRIPTION OF PALAEOLOGICAL RESOURCES

10.1 MSO1805/2630AA/S.35-034 (Fossilised plant)

Site S.35-034 represents a single, isolated find of a fossilised plant belonging to the genus *Breytenia*. The fossil was identified on a sandstone ridge. The site is located approximately 720 m south of the Project Area.

Table 10-1: Summary of Site S.35-034

Context	Primary
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.277381</p> <p>Longitude: 29.832992</p> <p>The site is 720 m outside of the Consbrey Colliery Project Area.</p>
Type	Fossil <i>Breytenia</i>
Age estimate	Early Permian
Site extent and orientation	A single, isolated find on a sandstone ridge
Threats or sources of risk	
Activities that could impact on potential fossil heritage include blasting which would result in vibrations that could result in damage to rock surfaces with palaeontological potential. Mine dewatering may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage.	
Statement of Value	Field Rating: Grade I

10.1.1 Statement of Value

The heritage resource was considered to have a high value in terms of its scientific potential. This rating was informed by credible information sources such as peer-reviewed publications. To date, there is only one specimen of the fossil *Breytenia* available for research and as a result, the description and classification of this fossil is not well known. Therefore this fossil is highly valued in terms of its scientific potential. The resource is in an excellent condition and has good information potential.

Project-related mitigation measures such as changes to design or mine plan were not considered as the site is located 720 m away from the opencast mining area and will be impacted on vibrations caused by blasting. It is therefore recommended that the heritage resource be mitigated and partly conserved.



Figure 10-1: A fossil plant of the genus *Breytenia* at Site S.35-034.

10.1.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	International	The impact will affect the international scientific community.
Duration	Permanent/no mitigation	No mitigation measures of natural process will reduce the impact after implementation.
Severity	Medium	Significant damage to structures and items of cultural significance.
Probability	Likely	The impact on the palaeontological resource could occur.
Magnitude		Moderate
Value of the heritage resource		High
The heritage resource is of a medium heritage value. Phase 2 mitigation is required for this site.		

10.1.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	If the impact occurs, it will be limited to specific isolated parts of the site.
Duration	Project life	If the impact occurs, it will cease after the lifespan of the Project.
Severity	Low to Medium	If the impact occurs, it will cause damage to palaeontological resources.
Probability	Highly unlikely/none	If Phase 2 mitigation measures are implemented, the impact will not occur.
Magnitude		Low

10.1.4 Recommendations

Potential impacts could result from vibrations caused by blasting. Vibrations may result in damage to rock surfaces with palaeontological potential. In addition, may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage. Based on these impacts, it is recommended that Phase 2 mitigation measures be conducted for the proposed opencast mine development of the Project

10.2 MSO1805/2630AA/S.35-035 (Fossil leaf)

Site S.35-035 represents a single, isolated find of a fossil plant on a sandstone ridge. The site is located approximately 600 m south of the Project Area.

Table 10-2: Summary of Site S.35-035

Context	Primary
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.276267</p> <p>Longitude: 29.833314</p> <p>The site is 600 m outside of the Consbrey Colliery Project Area.</p>
Type	Fossil leaf
Age estimate	Permian
Site extent and orientation	A single, isolated find on a sandstone ridge
Threats or sources of risk	
Activities that could impact on potential fossil heritage include blasting and vibrations which could result in damage to rock surfaces with palaeontological potential. Mine dewatering may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage.	
Statement of Value	Field Rating: Grade I

10.2.1 Statement of Value

The heritage resource was considered to have a high value in terms of its scientific potential. This rating was informed by credible information sources such as peer-reviewed publications which indicate that fossil *Glossopteris* leaves can be found in the area. The resource is in an excellent condition and has a good information potential.

Project-related mitigation measures such as changes to design or mine plan were not considered as the site is located 600 m away from the opencast mining area and will be impacted on vibrations caused by blasting. It is therefore recommended that the heritage resource be mitigated and partly conserved.



Figure 10-2: A fossil leaf identified at Site S.35-035.

10.2.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Municiple area	The impact will affect the whole municiple area.
Duration	Permanent/no mitigation	No mitigation measures of natural process will reduce the impact after implementation.
Severity	Medium	Significant damage to structures and items of cultural significance.
Probability	Likely	The impact on the palaeontological resource could occur.
Magnitude		Moderate
Value of the heritage resource		High
The heritage resource is of a medium heritage value. Phase 2 mitigation is required for this site.		

10.2.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	If the impact occurs, it will be limited to specific isolated parts of the site.
Duration	Project life	If the impact occur, it will cease after the lifespan of the Project.
Severity	Low to Medium	If the impact occurs, it will cause damage to palaeontological resources.
Probability	Highly unlikely/none	If Phase 2 mitigation measures are implemented, the impact will not occur.
Magnitude		Low

10.2.4 Recommendations

Potential impacts could result from vibrations caused by blasting. Vibrations may result in damage to rock surfaces with palaeontological potential. In addition, may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage. Based on these impacts, it is recommended that Phase 2 mitigation measures be conducted for the proposed opencast mine development of the Project.

10.3 MSO1805/2630AA/S.35-036 (Fossil plant)

Site S.35-036 represents a single, isolated find of a fossilised plant belonging to the genus *Breytenia*. The fossil was identified on a sandstone ridge. The site is located approximately 310 m south of the Project Area.

Table 10-3: Summary of Site S.35-036

Context	Primary
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.273667</p> <p>Longitude: 29.832994</p> <p>The site is 310 m outside of the Consbrey Colliery Project Area.</p>
Type	Fossil <i>Breytenia</i>
Age estimate	Early Permian
Site extent and orientation	A single, isolated find on a sandstone ridge
Threats or sources of risk	
Activities that could impact on potential fossil heritage include blasting and vibrations which could result in damage to rock surfaces with palaeontological potential. Mine dewatering may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage.	
Statement of Value	Field Rating: Grade I

10.3.1 Statement of Value

The heritage resource was considered to have a high value in terms of its scientific potential. This rating was informed by credible information sources such as peer-reviewed publications. To date, there is only one specimen of the fossil *Breytenia* available for research and as a result, the description and classification of this fossil is not well known. Therefore this fossil is highly valued in terms of its scientific potential. The resource is in an excellent condition and has a good information potential.

Project-related mitigation measures such as changes to design or mine plan were not considered as the site is located 310 m away from the opencast mining area and will be impacted on vibrations caused by blasting. It is therefore recommended that the heritage resource be mitigated and partly conserved.



Figure 10-3: Fossil *Breytenia* identified at Site S.35-036.

10.3.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	International	The impact will affect the international scientific community.
Duration	Permanent/no mitigation	No mitigation measures of natural process will reduce the impact after implementation.
Severity	Medium	Significant damage to structures and items of cultural significance.
Probability	Likely	The impact on the palaeontological resource could occur.
Magnitude		Moderate
Value of the heritage resource		High
The heritage resource is of a medium heritage value. Phase 2 mitigation is required for this site.		

10.3.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	If the impact occurs, it will be limited to specific isolated parts of the site.
Duration	Project life	If the impact occur, it will cease after the lifespan of the Project.
Severity	Low to Medium	If the impact occurs, it will cause damage to palaeontological resources.
Probability	Highly unlikely/none	If Phase 2 mitigation measures are implemented, the impact will not occur.
Magnitude		Low

10.3.4 Recommendations

Potential impacts could result from vibrations caused by blasting. Vibrations may result in damage to rock surfaces with palaeontological potential. In addition, may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage. Based on these impacts, it is recommended that Phase 2 mitigation measures be conducted for the proposed opencast mine development of the Project.

10.4 MSO1805/2630AA/S.35-040 (Fossil leaf)

Site S.35-040 represents a single, isolated find of a fossil plant on a sandstone ridge. The site is located approximately 165 m south of the Project Area.

Table 10-4: Summary of Site S.35-040

Context	Primary
Site location	<p>Site co-ordinates</p> <p>South: -26.272183</p> <p>East: 29.833864</p> <p>The site is 165 m outside of the Consbrey Colliery Project Area.</p>
Type	Fossil leaf
Age estimate	Permian
Site extent and orientation	A single, isolated find on a sandstone ridge
Threats or sources of risk	
Activities that could impact on potential fossil heritage include blasting and vibrations which could result in damage to rock surfaces with palaeontological potential. Mine dewatering may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage.	
Statement of Value	Field Rating: Grade I

10.4.1 Statement of Value

The heritage resource was considered to have a high value in terms of its scientific potential. This rating was informed by credible information sources such as peer-reviewed publications which indicate that fossil *Glossopteris* leaves can be found in the area. The resource is in an excellent condition and has a good information potential.

Project-related mitigation measures such as changes to design or mine plan were not considered as the site is located 165 m away from the opencast mining area and will be impacted on vibrations caused by blasting. It is therefore recommended that the heritage resource be mitigated and partly conserved.



Figure 10-4: A fossil leaf identified at Site S.35-040.

10.4.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Municiple area	The impact will affect the whole municiple area.
Duration	Permanent/no mitigation	No mitigation measures of natural process will reduce the impact after implementation.
Severity	Medium	Significant damage to structures and items of cultural significance.
Probability	Likely	The impact on the palaeontological resource could occur.
Magnitude		Moderate
Value of the heritage resource		High
The heritage resource is of a medium heritage value. Phase 2 mitigation is required for this site.		

10.4.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	If the impact occurs, it will be limited to specific isolated parts of the site.
Duration	Project life	If the impact occur, it will cease after the lifespan of the Project.
Severity	Low to Medium	If the impact occurs, it will cause damage to palaeontological resources.
Probability	Highly unlikely/none	If Phase 2 mitigation measures are implemented, the impact will not occur.
Magnitude		Low

10.4.4 Recommendation

Potential impacts could result from vibrations caused by blasting. Vibrations may result in damage to rock surfaces with palaeontological potential. In addition, may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage. Based on these impacts, it is recommended that Phase 2 mitigation measures be conducted for the proposed opencast mine development of the Project.

10.5 MSO1805/2630AA/S.35-042 (Fossil plant)

Site S.35-042 represents a single, isolated find of a fossilised plant belonging to the genus *Breytenia*. The fossil was identified on a sandstone ridge. The site is located in the Project Area.

Table 10-5: Summary of Site S.35-042

Context	Primary
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.269081</p> <p>Longitude: 29.839050</p> <p>The site is located in the Consbrey Colliery Project Area.</p>
Type	Fossil <i>Breytenia</i>
Age estimate	Early Permian
Site extent and orientation	A single, isolated find on a sandstone ridge
Threats or sources of risk	
Activities that could impact on potential fossil heritage include blasting and vibrations which could result in damage to rock surfaces with palaeontological potential. Mine dewatering may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage.	
Statement of Value	Field Rating: Grade I

10.5.1 Statement of Value

The heritage resource was considered to have a high value in terms of its scientific potential. This rating was informed by credible information sources such as peer-reviewed publications. To date, there is only one specimen of the fossil *Breytenia* available for research and as a result, the description and classification of this fossil is not well known. Therefore this fossil is highly valued in terms of its scientific potential. The resource is in an excellent condition and has a good information potential.

Project-related mitigation measures such as changes to design or mine plan were not considered as the site is in the Project Area and will be impacted on vibrations caused by blasting. It is therefore recommended that the heritage resource be mitigated and partly conserved.



Figure 10-5: A fossil *Breytenia* identified in the Project Area at Site S.35-042.

10.5.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	International	The impact will affect the international scientific community.
Duration	Permanent/no mitigation	No mitigation measures of natural process will reduce the impact after implementation.
Severity	Certain/Definite	The impact will occur as the fossil is located in the opencast mine footprint.
Probability	Likely	The impact on the palaeontological resource could occur.
Magnitude		Moderate
Value of the heritage resource		High

The heritage resource is of a medium heritage value. Phase 2 mitigation is required for this site.

10.5.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	If the impact occurs, it will be limited to specific isolated parts of the site.
Duration	Project life	If the impact occur, it will cease after the lifespan of the Project.
Severity	Low to Medium	If the impact occurs, it will cause damage to palaeontological resources.
Probability	Highly unlikely/none	If Phase 2 mitigation measures are implemented, the impact will not occur.
Magnitude		Low

10.5.4 Recommendation

Potential impacts could result from vibrations caused by blasting. Vibrations may result in damage to rock surfaces with palaeontological potential. In addition, may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage. Based on these impacts, it is recommended that Phase 2 mitigation measures be conducted for the proposed opencast mine development of the Project.

10.6 MSO1805/2630AA/S.35-043 (Fossil bone)

Site S.35-043 represents a single, isolated find of a fossilised bone. The fossil was identified on a sandstone ridge. The site is located in the Project Area.

Table 10-6: Summary of Site S.35-043

Context	Primary
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.268997</p> <p>Longitude: 29.838686</p> <p>The site is located in the Consbrey Colliery Project Area.</p>
Type	Fossil bone
Age estimate	Permian
Site extent and orientation	A single, isolated find on a sandstone ridge
Threats or sources of risk	
Activities that could impact on potential fossil heritage include blasting and vibrations which could result in damage to rock surfaces with palaeontological potential. Mine dewatering may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage.	
Statement of Value	Field Rating: Grade I

10.6.1 Statement of Value

Field rating: Grade IV B – Record before destruction

The heritage resource was considered to have a high value in terms of its scientific potential. This rating was informed by credible information sources such as peer-reviewed publications. To date, there are very few specimens of the vertebrate fossils from the Mpumalanga coal fields available for research. As a result, the description and classification of this fossil is not well known. This fossil is highly valued in terms of its scientific potential. The resource is in a fair to good condition and has a good information potential.

Project-related mitigation measures such as changes to design or mine plan were not considered as the site is located in the Project Area and will be impacted on vibrations caused by blasting. It is therefore recommended that the heritage resource be mitigated and partly conserved.



Figure 10-6: A fossil bone identified in the Project Area at Site S.35-043.

10.6.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Municiple area	The impact will affect the whole municiple area.
Duration	Permanent/no mitigation	No mitigation measures of natural process will reduce the impact after implementation.
Severity	Certain/Definite	The impact will occur as the fossil is located in the opencast mine footprint.
Probability	Likely	The impact on the palaeontological resource could occur.
Magnitude		Moderate
Value of the heritage resource		High

The heritage resource is of a medium heritage value. Phase 2 mitigation is required for this site.

10.6.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	If the impact occurs, it will be limited to specific isolated parts of the site.
Duration	Project life	If the impact occur, it will cease after the lifespan of the Project.
Severity	Low to Medium	If the impact occurs, it will cause damage to palaeontological resources.
Probability	Highly unlikely/none	If Phase 2 mitigation measures are implemented, the impact will not occur.
Magnitude		Low

10.6.4 Recommendations

Potential impacts could result from vibrations caused by blasting. Vibrations may result in damage to rock surfaces with palaeontological potential. In addition, may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage. Based on these impacts, it is recommended that Phase 2 mitigation measures be conducted for the proposed opencast mine development of the Project.

10.7 MSO1805/2630AA/S.35-044 (Fossilised plant)

Site S.35-044 represents a single, isolated find of a fossilised plant belonging to the genus *Breytenia*. The fossil was identified on a sandstone ridge. The site is located in the Project Area.

Table 10-7: Summary of Site S.35-044

Context	Primary
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.226136</p> <p>Longitude: 29.860825</p> <p>The site is in the Consbrey Colliery Project Area.</p>
Type	Fossil <i>Breytenia</i>
Age estimate	Early Permian
Site extent and orientation	A single, isolated find on a sandstone ridge
Threats or sources of risk	
Activities that could impact on potential fossil heritage include blasting which would result in vibrations that could result in damage to rock surfaces with palaeontological potential. Mine dewatering may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage.	
Statement of Value	Field Rating: Grade I

10.7.1 Statement of Value

The heritage resource was considered to have a high value in terms of its scientific potential. This rating was informed by credible information sources such as peer-reviewed publications. To date, there is only one specimen of the fossil *Breytenia* available for research and as a result, the description and classification of this fossil is not well known. Therefore this fossil is highly valued in terms of its scientific potential. The resource is in an excellent condition and has a good information potential.

Project-related mitigation measures such as changes to design or mine plan were not considered as the site is located 720 m away from the opencast mining area and will be impacted on vibrations caused by blasting. It is therefore recommended that the heritage resource be mitigated and partly conserved.



Figure 10-7: Fossil *Breytenia* identified in the Project Area at Site S.35-044.

10.7.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Internation	The impact will affect the international scientific community.
Duration	Permanent/no mitigation	No mitigation measures of natural process will reduce the impact after implementation.
Severity	Certain/Definite	The impact will occur as the fossil is located in the opencast mine footprint.
Probability	Likely	The impact on the palaeontological resource could occur.
Magnitude		Moderate
Value of the heritage resource		High

The heritage resource is of a medium heritage value. Phase 2 mitigation is required for this site.

10.7.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	If the impact occurs, it will be limited to specific isolated parts of the site.
Duration	Project life	If the impact occur, it will cease after the lifespan of the Project.
Severity	Low to Medium	If the impact occurs, it will cause damage to palaeontological resources.
Probability	Highly unlikely/none	If Phase 2 mitigation measures are implemented, the impact will not occur.
Magnitude		Low

10.7.4 Recommendations

Potential impacts could result from vibrations caused by blasting. Vibrations may result in damage to rock surfaces with palaeontological potential. In addition, may adversely effect rock surfaces by causing exfoliation. This would result in damage to potential fossil heritage. Based on these impacts, it is recommended that Phase 2 mitigation measures be conducted for the proposed opencast mine development of the Project.

11 DESCRIPTION OF BURIAL GROUNDS AND GRAVES

The section aims to describe the identified and recorded burial grounds within and surrounding the project area and discuss the values ascribed to these heritage resources. The impacts on the burial grounds are also assessed and described in this section. The full descriptions are provided in the site table list. For descriptions of the significance and the field rating system, see Table 4-1 and Table 4-2.

11.1 MSO1805/2629BD/S.36-003 – Steyn Family Cemetery

The cemetery is located on Dwarstrek 216 IS Portion 1 and forms part of the Dwarstrek *werf*. The cemetery contains four burials, all of which have formal surface dressing with headstones. The burials area associated with the Steyn family who have occupied the farm Boomplaats since the later 19th century.

Table 11-1: Summary of Site S.36-003

Context	Informal
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.2514798</p> <p>Longitude: 29.8880871</p>
Physical Description	4 graves present, approximately 5 m x 3 m in extent
Condition	Maintained
Age	Dating from 1919, to 1988
Possible Affinity	Farm owners – Steyn Family.
Persons consulted	Rina Steyn
Threats or sources of risk and legal implications	
<ul style="list-style-type: none"> ■ Immediate threats include destruction from site clearing and opencast mining for the proposed development. ■ Potential risks include vandalism and accidental destruction or alteration of the burial site by construction workers. ■ Legal implications based on NHRA Section 36 and Regulations Chapter XI (Sections 38-40) consultation with affected families and permit application for possible grave relocation. 	
Statement of Value	Field Rating: Grade III B



Figure 11-1: General view of Site S.36-003 in landscape.

11.1.1 Statement of value

The heritage resource has a high heritage value in historic and social association. The burial ground has a strong association to the Steyn family (farmers) for social, cultural and spiritual reasons. Its importance is also based on highly credible information sources. It is in an excellent condition. There is some decay present but it can easily be restored.

11.1.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	National	The destruction of the cemetery will have national impacts as the next-of-kin are spread throughout the country.
Duration	Permanent	Mining activity will destroy the graves as they are located in the opencast pit area.
Severity	Irreparable damage	Mining activity will destroy the graves as they are located in the opencast pit area.
Probability	Certain/definite	The impact will occur as the burials are located in the opencast mine footprint.
Magnitude		Major
Value of the heritage resource		High

11.1.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Municipal	If the graves are relocated, it will have a municipal impact as they will have to be relocated to a designated burial ground.
Duration	Permanent	The relocation of graves will be permanent.
Severity	Minor medium term	The severity of the relocation will be minor and medium term involving minor legal issues.

Probability	Unlikely/low probability	It is unlikely that the impacts described for pre-mitigation are to occur if the recommendations are followed
Magnitude		Minor

11.1.4 Recommendations

It is recommended that the burial ground be preserved in situ as part of the Boomplaats *werf*. This would require that there be readjustment of the proposed location of the opencast pit area. Where this is not feasible, it is recommended that the burial ground be relocated.

11.2 MSO1805/2629BD/S.36-004 – Informal Cemetery

The cemetery is located on Dwarstrek 216 IS Portion 6. The cemetery contains one burial, which has concrete surface dressing with no headstones. The burial is associated with the Tjhengwa family.

Table 11-2: Summary of Site S.36-004

Context	Informal
Site location	Site co-ordinates Latitude: -26.2455143 Longitude: 29.8854878
Physical Description	1 grave present, approximately 1 m x 2 m in extent
Condition	Overgrown
Age	Dating to 1970
Possible Affinity	Farm labourers.
Persons consulted	Basaan Mahlangu
Threats or sources of risk and legal implications	
<ul style="list-style-type: none"> ■ Immediate threats include destruction from site clearing and opencast mining for the proposed development. ■ Potential risks include vandalism and accidental destruction or alteration of the burial site by construction workers. ■ Legal implications based on NHRA Section 36 and Regulations Chapter XI (Sections 38-40) consultation with affected families and permit application for possible grave relocation. 	
Statement of Value	Field Rating: Grade IV A



Figure 11-2: General view of Site S.36-004.

11.2.1 Statement of value

The heritage resource has a medium heritage value in social association. The burial ground has an association to the farm labourers for social, cultural and spiritual reasons. It is in a fair condition but is overgrown. There is some decay present but it can easily be restored.

11.2.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	International	The destruction of this grave may have international implications as the location of the next-of-kin is not known.
Duration	Permanent	The grave lies within the proposed opencast pit area and will be destroyed by mining activities.
Severity	Irreparable	The grave lies within the proposed opencast pit area and will be destroyed by mining activities.
Probability	Certain/definite	The impact will occur as the burials are located in the opencast mine footprint.
Magnitude		Moderate

Value of the heritage resource	Medium
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11.2.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Municipal	If the graves are relocated, it will have a municipal impact as they will have to be relocated to a designated burial ground.
Duration	Permanent	The relocation of graves will be permanent.
Severity	Minor medium term	The severity of the relocation will be minor and medium term involving minor legal issues.
Probability	Unlikely/low probability	It is unlikely that the impacts described for pre-mitigation are to occur if the recommendations are followed
Magnitude		Minor

11.2.4 Recommendations

It is recommended that the burial ground be preserved in situ. This would require that there be readjustment of the proposed location of the opencast pit area. Where this is not feasible, it is recommended that the burial ground be relocated.

11.3 MSO1805/2629BD/S.36-010 – Janse van Vuuren Cemetery

The cemetery is located on Bosmanskrans 217 IS Portion 5. The cemetery contains five burials, which has formal surface dressing with headstones. The burials are associated with the Janse van Vuuren, Burger and Hendrikse families.

Table 11-3: Summary of Site S.36-010

Context	Informal
Site location	Site co-ordinates Latitude: -26.2703012 Longitude: 29.8367239
Physical Description	5 grave present, approximately 3 m x 5 m in extent
Condition	Maintained

Age	Dating from 1900 to 1932
Possible Affinity	Janse van Vuuren and Hendrikse families.
Persons consulted	Alettha Roux
Threats or sources of risk and legal implications	
<ul style="list-style-type: none"> ■ Immediate threats include possible damage from blasting and vibrations, and subsidence. ■ Potential risks include vandalism and accidental destruction or alteration of the burial site by construction workers. ■ Legal implications based on NHRA Section 36 and Regulations Chapter XI (Sections 38-40) consultation with affected families and permit application for possible grave relocation. 	
Statement of Value	Field Rating: Grade IV A

11.3.1 Statement of value

The heritage resource has a low to medium heritage value in social association and integrity. The burial ground has an association to the Janse van Vuuren and Hendrikse families for social, cultural and spiritual reasons. Its importance is also based on highly credible information sources. It is in a good condition. There is some decay present but it can easily be restored. Based on these attributes, the burial ground was given a low to medium heritage value.

11.3.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	International	Any damage to the graves may have international effects as the next-of-kin's location is unknown.
Duration	Permanent	Impacts that damage the graves will be permanent.
Severity	Irreparable	Impacts from blasting may cause damage that will not be repaired.
Probability	Certain/definite	Indirect and cumulative impacts will cause damage to the graves which are highly valued items of cultural significance.
Magnitude		Moderate
Value of the heritage resource		Medium

11.3.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	Impacts will be limited to the burial ground.
Duration	Project life	Potential impacts on the burial ground will cease after the operational phase of the mine.
Severity	Minor medium term	With the implementation of a monitoring program, potential impacts on the graves will be mitigated and damage to the graves could be mitigated
Probability	Unlikely/low probability	It is unlikely that the impacts described for pre-mitigation are to occur if the recommendations are followed.
Magnitude		Minor

11.3.4 Recommendations

The burial ground is located within the Project Area but is unlikely to be directly impacted on by mining activities. There is the potential that indirect and cumulative impacts may have a negative effect on the graves. It is recommended that a monitoring program be implemented to assess the effects of blasting on the graves.



Figure 11-3: General view of graves S.36-010/001 and S.36-010/002



Figure 11-4: General view of S.36-010/003 and S.36-010/004.

11.4 MSO1805/2629BD/S.36-017 – Informal Cemetery

The cemetery is located on Bosmanskrans 217 IS Portion 7. The cemetery contains 22 burials, one of which has formal surface dressing with headstones. The burials are informal and are stone packed with the exception of one which is associated with the Mpila family.

Table 11-4: Summary of Site S.36-017

Context	Informal
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.2563554</p> <p>Longitude: 29.8170457</p>
Physical Description	22 graves were counted
Condition	Overgrown
Age	Dating from at least 1973
Possible Affinity	Mpila family.
Threats or sources of risk and legal implications	
<ul style="list-style-type: none"> ■ Immediate threats include possible damage from blasting and vibrations, and subsidence. ■ Potential risks include vandalism and accidental destruction or alteration of the burial site by 	

construction workers.

- Legal implications based on NHRA Section 36 and Regulations Chapter XI (Sections 38-40) consultation with affected families and permit application for possible grave relocation.

Statement of Value

Field Rating: Grade IV A



Figure 11-5: General view of S.36-017 in the landscape.



Figure 11-6: View of grave belonging to Bhesy Johanna Mpila who passed away in 1973. This is the only grave that has formal dressing and headstone.

11.4.1 Statement of value

The heritage resource has a low to medium heritage value in social association. The burial ground has an association to the Mpila family for social, cultural and spiritual reasons. It is in a fair condition, but has not been maintained and is overgrown. There is some decay present but it can easily be restored.

11.4.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	International	Any damage to the graves may have international effects as the next-of-kin's location is unknown.
Duration	Permanent	Impacts that damage the graves will be permanent.
Severity	Irreparable	Impacts from blasting may cause damage that will not be repaired.
Probability	Certain/definite	Indirect and cumulative impacts will cause damage to the graves which are highly valued items of cultural significance.
Magnitude		Moderate
Value of the heritage resource		Medium

11.4.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Municipal	If the graves are relocated, it will have a municipal impact as they will have to be relocated to a designated burial ground.
Duration	Permanent	The relocation of graves are permanent.
Severity	Minor medium term	The severity of the relocation will be minor and medium term involving minor legal issues.
Probability	Unlikely/low probability	It is unlikely that the impacts described for pre-mitigation are to occur if the recommendations are followed.

Magnitude	Minor
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11.4.4 Recommendations

The burial ground lies in close proximity to the proposed underground mining activity for the Consbrey Project. Potential impacts on the graves could include vibrations from blasting, vandalism from increased human activity in the area, and subsidence. It is recommended that a monitoring program be implemented to assess the impacts on the grave. If it is deemed that the graves are negatively affected by the cumulative impacts of the mining activity, it is recommended that the graves are relocated.

11.5 MSO1805/2629BD/S.36-028 – Informal Cemetery

The cemetery is located on Bankfontein 215 IS Portion 10. The cemetery contains 27 burials, one of which has formal surface dressing with headstones. The burials are informal and are stone packed with the exception of one which is associated with the Mahlangu family.

Table 11-5: Summary of Site S.36-028

Context	Informal
Site location	<p>Site co-ordinates</p> <p>Latitude: -26.2503167</p> <p>Longitude: 29.9363396</p>
Physical Description	27 graves were counted
Condition	Overgrown, with section maintained.
Age	Dating from at least 1953
Possible Affinity	Mahlangu family.
Threats or sources of risk and legal implications	
<ul style="list-style-type: none"> ■ Immediate threats include destruction from site clearing and opencast mining activity. ■ Potential risks include vandalism and accidental destruction or alteration of the burial site by construction workers. ■ Legal implications based on NHRA Section 36 and Regulations Chapter XI (Sections 38-40) consultation with affected families and permit application for possible grave relocation. 	
Statement of Value	Field Rating: Grade IV A



Figure 11-7: Grave of Solomon Mahlangu born in 1908 and died in 1953. This is the only grave that has formal dressing the remainder have stone dressing with no headstone.

11.5.1 Statement of value

The heritage resource has a medium heritage value in social association. The burial ground has an association to the Mahlangu family for social, cultural and spiritual reasons. It is in a fair condition, but has not been maintained and is overgrown. There is some decay present but it can easily be restored.

11.5.2 Rating of impact (pre-mitigation)

Type of Impact		Negative impact
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	International	The destruction of this grave may have international implications as the location of the next-of-kin is not known.
Duration	Permanent	The grave lies within the proposed opencast pit area and will be destroyed by mining activities.
Severity	Irreparable	The grave lies within the proposed opencast pit area and will be destroyed by mining activities.

Probability	Certain/definite	The impact will occur as the burials are located in the opencast mine footprint.
Magnitude		Moderate
Value of the heritage resource		Medium

11.5.3 Rating of impact (post-mitigation)

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Municipal	If the graves are relocated, it will have a municipal impact as they will have to be relocated to a designated burial ground.
Duration	Permanent	The relocation of graves will be permanent.
Severity	Minor medium term	The severity of the relocation will be minor and medium term involving minor legal issues.
Probability	Unlikely/low probability	It is unlikely that the impacts described for pre-mitigation are to occur if the recommendations are followed
Magnitude		Minor

11.5.4 Recommendations

It is recommended that the burial ground be preserved in situ. This would require that there be readjustment of the proposed location of the opencast pit area. Where this is not feasible, it is recommended that the burial ground be relocated.

12 DISCUSSION OF RESULTS AND FINDINGS

The GS-IDP was reviewed to gain a more detailed understanding of the development context within which the Consbrey Colliery Project Area is situated. The mining sector has been identified as a key area for growth and development in Mpumalanga, but it has also identified agriculture, conservation and tourism as other areas of developments. The proposed development of the Consbrey Colliery Project Area must be weighed against the potential impact on heritage resources versus other key growth and development areas.

It is evident from the research conducted that the Mpumalanga Province is rich in cultural and natural heritage. The project area is located in a region that has a deep time depth as is evident in the palaeontological resources identified. Stratigraphically, the Karoo diamictite deposits are overlain with siliciclastic rocks of the *Madzaringwe Formation*. It is in the upper sequences of the *Madzaringwe Formation* that the coal seams are located. The desktop research done indicates that there may be fossils in the Study Area which could be encountered when construction and mining commences. During the field survey, seven fossils were identified on the sandstone ridges and outcrops within and around the Project Area. These fossils include the rare *Breyenia* plant fossil, Glosspteris fossil leaves and a fossil bone. Based on their scientific potential and integrity, these fossils were given a high heritage value.

Archaeologically, heritage resources associated with the Bushmen were identified. These were primarily in the form of rock art on the rock surface of shelters in and surrounding the Project Area. The most prominent site discussed in Section 6.3.2.2 is the De Wittekrans Rock Art Complex. Five additional rock art sites were identified on the farm Bosmanskrans 217 IS.

Consideration must be given to the prevailing winds as identified in the dust study compiled by Digby Wells for the Consbrey Colliery Project, and the possible cumulative impacts this may have on the rock art in the area. Dominant wind direction for the Project Area is North-East (NE) and West-North-West (WNW) (Figure 12-1). When one takes into account the activities during construction, and the operation of the mine, a large amount of dust will be created and transported by these prevailing winds. Based on the location of the opencast areas, including factors such as windspeed and rainfall, studies would suggest that the south-eastern portion of the Project Area will be primarily affected by the dust. It is within this section of the Project that the majority of the rock art sites, including the De Wittekrans Complex have been identified.

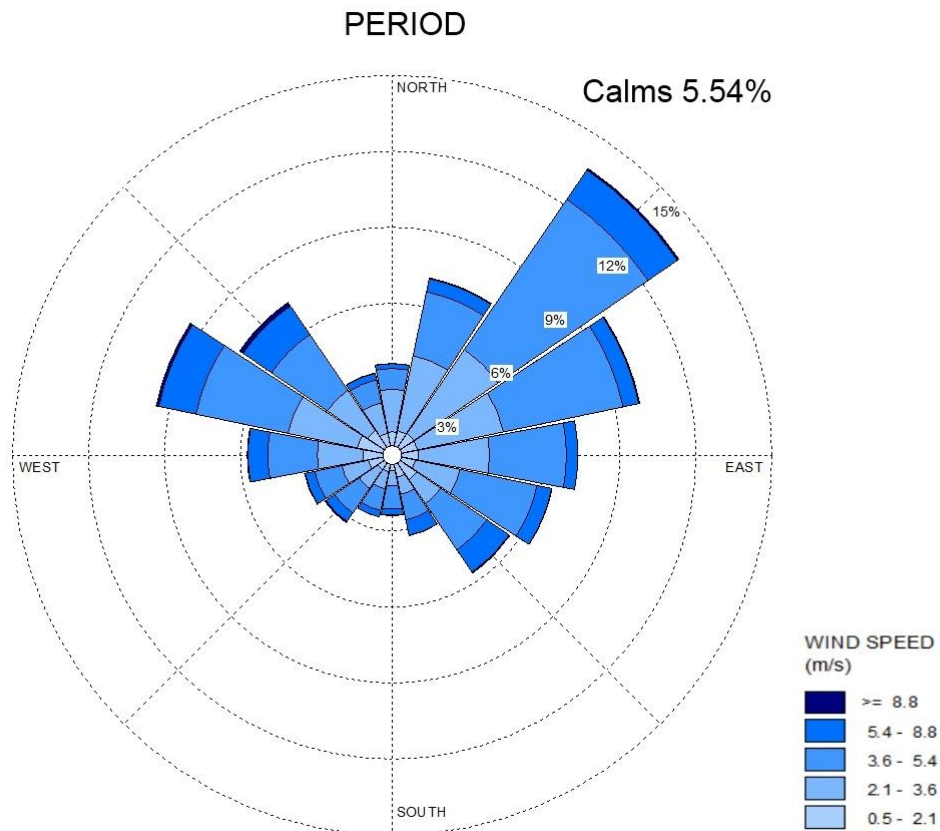


Figure 12-1: Predominant wind direction for the Consbrey Project Area.

Historical accounts of the Bushmen of this region, as summarised in Section 6.3.3, are complimented by these rock art sites. To re-iterate, these groups utilised the grasslands of the region, hunting the abundant game and utilising the water resources of the rivers and pans for millenia before the arrival of migrating pastoralist and farmers into the region. Evidence of pastoralist occupation is evident in the rock art depicted at De Wittekrans (Figure 6-4). Relatively peaceful co-habitation of the region was had until periods of conflict, beginning with the Difiqane/Mfecane, started to impact on the Bushmen way of life where some groups became acculturated and others were sought by the Swazi where the men were slaughtered and the women and children were taken as serfs or sold. One notable event that took place adjacent to the Project Area is the systematic slaughter of Bushmen at Murder/Mushroom Rock outside of Breyten. These types of sites are symbolic of the oppression the Bushmen had undergone since the arrival of migrating Iron Age farmers through to the formation of the apartheid state.

In terms of the NHRA Section 3(2)(d), 3(2)(h), 3(3)(a), 3(3)(g) and 3(3)(i), this region may be classified as a 'relic landscape' in which the history of the Bushmen, their way of life, and events relating to their massacre and enslavement have been recorded.

Paradoxically, the Bushmen were assisted by the Boers (Voortrekkers) who were migrating north and settling in region at this time. The land in and surrounding the Project Area was

ceded by Mswati II to the Boers who began to establish farms, recruiting Bushmen as labourers and protecting them from the Swazi. Tangible evidence for the migration of the Voortrekkers moving into the area can still be found in the built environment. These finds are discussed in detail in Section 8, but for example, a farmhouse (S.34-002) and Milk-shed dating to 1892 have been recorded on Dwarstrek 216 IS Portion 1. These structures are significant as they relate directly to the Steyn family, who are currently the fifth generation who occupy the farm, and are examples of architecture that are rare as most were destroyed during Kitchners 'scorched earth' policy of the Anglo-Boer War. In addition to the tangible remains from this period, oral histories paint a picture of the war and how the Boers were assisted by the Bushmen in their fight against the colonial forces. No battle fields were identified within or surrounding the Project Area, the most notable in the region being the Battle of Lake Chrissie some 30 km away. What was worth noting is the assistance received by the Steyn family from a Bushmen named Cheese who would report on the movement of the British and hide the family in nearby caves when they were under threat (See Section 6.3.3).

After the war, farmers resumed their way of life until the partial industrialisation of the area through the introduction of mining. Within the project boundary, the Breyten Collieries (Ltd) mine was started on Bankfontein 215 IS in the early 20th century. A search of the National Archives of South Africa (NASA) revealed that the application of the mine was opposed by a Mr Dennill in 1912 (Source: TPD 8/65 876/1912). In conjunction with the architectural plans for the managers residence, the Breyten Collieries can be dated to 1911/1912. This mine continued until the miners strike of 1922, when all mining operation on Bankfontein ceased (Loubser, et al., 1991). After some time, mining operations were taken over by Consolidated Collieries, closing in the 1970's (Steyn pers. comm.). Remnants of the mining complex is still visible to this day in the form of rehabilitated mine dumps adjacent to the Bankappels orchards and in the one of the proposed opencast areas of Consbrey (Figure 12-2).



Figure 12-2: Aerial view of the previous mine dumps on Bankfontein 215 IS.

The immediate receiving environment which includes opencast mining is primarily consisting of agricultural fields. Heritage resources relating to archaeology and palaeontology have been identified within and surrounding the project boundaries and will be impacted on by opencast mining activity. Heritage resources pertaining to the built environment and burial grounds that fall within defined legal parameters were identified and recorded in opencast areas and will potentially be destroyed by mining operations if not mitigated.

There will be no surface infrastructure on Consbrey A and as a result there will be no impacts on heritage resources in the immediate and surrounding areas. It is therefore recommended that exemption from all HIA components be granted for Consbrey A. It is further recommended that the Chance Find Procedure and Fossil Find Procedure be implemented during the Operational Phase of Consbrey A. See Appendix F for the Chance Find Procedures, the Fossil Find Procedures and Fossil Monitoring.

The results of the HIA indicated that the Project Area is located in a culturally sensitive landscape in which tangible and intangible remnants of the past are still present. The most prominent heritage features identified are palaeontological fossils, rock art sites and historical *werfs* with documented links to Bushmen and the Anglo-Boer War. Additional fossils may also exist beneath the surface but their existence can only be verified through monitoring excavations. In this sense, the impact of construction activities such as excavations is positive for palaeontology, provided that efforts are made to monitor and rescue the fossils.

Rock art sites here occur in shelters associated with sandstone outcrops commonly found along river gullies. Due to the extensive size of the Project Area and the limited timeframes

within which this project was conducted, an intensive survey was not possible. As a result, there is a great potential that more rock art sites associated with the Bushmen who were prevalent in the area may still be identified. Additionally, impacts on the rock art through vibrations from blasting have not been taken into consideration during this study as relevant information from the blasting and vibration specialist study was not available at the time of compilation.

Finally, identified *werfs*, typically consisting of a house, barn, and stable constructed from sandstone, and associated burial grounds add context to the complex history of the region. These sites date back to the arrival of the Voortrekkers, tell of the history of the Anglo-Boer War in the region, and significantly, are tangible features that relate to the role of Bushmen in the war and generations of Boer families residing in them.

When considering the potential impacts of mining activity on these heritage resources, the context of the region must be reviewed to more accurately assess the cumulative impacts. To date, six other mining ventures have been proposed for areas surrounding the Consbrey Colliery Project Area, including either prospecting or mining by Tselentis, Spitzkop, New Coal, Bennicon, Northern Coal, Mashala, Ecoti and Xstrata. Impacts on the identified heritage resources and cultural landscape by mining activities within this HIA only take into consideration the impacts posed by the Consbrey Project. At this point it is not feasible to assess impacts from adjacent mining projects as there is no sufficient data. Nevertheless, one must be cognoscente of these developments and take into consideration that the impact assessment may be undervalued.

13 CONCLUSION

Evidence from the assessment conducted for this HIA indicates that several tangible heritage resources occur within the Project Area. These resources give context to the intangible heritage of this cultural landscape. The past here is not merely something that happened previously that is un-relatable to society. Rather, past events and groups are still visible in the heritage resources found within it, providing a sense-of-place grounded in its history. The events related to the Bushmen within this landscape make this region unique, singular and irreplaceable to the degree that its significance can be universally significant. Events relating to the massacre of the Bushmen have been documented in the region, and their role within the Anglo-Boer War can be directly linked to the Boomplaats *werf* situated in the Project Area.

Due to the time constraints of the timeframes for the Project, sufficient coverage of the area was not completed. It is recommended that an intensive Phase 2 Rock Art Survey and Assessment be conducted for the Consbrey Project.

In addition, detailed surface infrastructure design plans were not available at the time of the HIA. Detailed HIAs may therefore be required on areas where infrastructure footprints will exceed minimum thresholds described in Section 38 of the NHRA, such as Tailing Storage Facilities (TSFs), stockpiles, pollution control dams and other infrastructure. These HIAs

should be undertaken after final designs have been completed and before construction occurs.

Architecturally, adequate assessment of the built environment is required to accurately identify structure of historical significance and assess the potential impacts of the proposed mining. As such, a Phase 2 Built Environment Impact Assessment is recommended for the Consbrey Project.

Due to a lack of surface infrastructure on Consbrey A, there will be no impacts on surface heritage resources. It is therefore recommended that exemption from all HIA components be granted for Consbrey A. It is further recommended that the Chance Find Procedure and Fossil Find Procedure be implemented during the Operational Phase of Consbrey A.

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Appendix A: Curriculum Vitae of Specialist



DIGBY WELLS
ENVIRONMENTAL

JUSTIN DU PIESANIE

Mr. Justin du Piesanie
Archaeology Consultant
Social Sciences Department
Digby Wells Environmental

1 EDUCATION

University of the Witwatersrand

- BA Degree (2004)
- BA Honours Degree (2005) - Archaeology
 - Title of Dissertation - Seal Skeletal Distribution of Herder and Forager Sites at Kasteelberg, Western Cape Province of South Africa.
- Master of Science (MSc) Degree (2008) – Archaeology
 - Title of Dissertation – Understanding the Socio-Political Complexity of Leokwe Society during the Middle Iron Age in the Shashe-Limpopo Basin through a Landscape Approach

2 LANGUAGE SKILLS

English First Language
Afrikaans Second Language

3 EMPLOYMENT

2011 to Present:	Archaeology Consultant at Digby Wells Environmental
2009 to 2011:	Archaeology Collections Manager at the University of the Witwatersrand.
2009 to 2011:	Freelance Archaeologist for Archaeology Resource Management (ARM), Matakoma Heritage Consultants, Wits Heritage Contracts Unit & Umlando Heritage Consultants.
2006 to 2007:	Tour Guide at Sterkfontein Caves World Heritage Site.

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*Non-Executive



4 EXPERIENCE

- 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 Meyersdal, 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

5 PROJECT EXPERIENCE

- Phase 2 Mitigation at Meyersdal, Klipriviersberg Johannesburg (ARM)
- Phase 1 Mitigation – Mapping of Late Iron Age Site in Pilansberg, Sun City (ARM)
- Phase 1 Mitigation – Survey of Witbank dam development (ARM)
- Phase 1 Mitigation – Survey of Glen Austin AH, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 34, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 38, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 44, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 46, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 47, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 48, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 49, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 50, Johannesburg (Matakoma)



- Phase 1 Mitigation – Survey of Modderfontein AH Holding 61, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 62, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 71, Johannesburg (Matakoma).
- Phase 1 Mitigation – Survey of Modderfontein AH Holding 72, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Modderfontein 35IR Portion 40, Johannesburg (Matakoma)
- Phase 1 Mitigation – Survey of Rhino Mines, Thabazimbi Limpopo Province (ARM)
- Phase 1 Mitigation – Survey of Moddergat 389KQ, Schilpadnest 385KQ, Swartkop 369KQ, Cronimet Project, Thabazimbi Limpopo Province (Matakoma)
- Desktop Study – Desktop study for the Eskom Thohoyandou SEA Project, Limpopo Province (Matakoma)
- Phase 2 Mitigation – Excavation of Iron Age site on Wenzelrust, Shoshanguve Gauteng (Heritage Contracts Unit)
- Phase 1 Mitigation – Mapping of Late Stone Age shelter, Parys, Free State
- Phase 1 Mitigation – Survey of Vaalkrans Battlefield for the Transnet NMPP Line (Umlando)
- Phase 1 Mitigation – Survey of Portion 222 of Mindale Ext 7 Witpoortjie 254 IQ & Portion 14 of Nooitgedacht 534 IQ, Johannesburg (ARM)
- Phase 2 Mitigation – Excavation of Site 19 for the Anglo Platinum Mines Der Brochen & Booyensdal, Steelpoort, Mpumalanga (Heritage Contracts Unit)
- Phase 1 Mitigation – Mapping of sites 23, 26, 27, 28a & b for the Anglo Platinum Mines Der Brochen & Booyensdal, Steelpoort, Mpumalanga (Heritage Contracts Unit)
- Desktop Study - Desktop study for the inclusion into the Thohoyandou Electricity Master Network for Eskom, Limpopo Province (Strategic Environmental Focus)
- Phase 1 Mitigation – Mapping of historical sites as part of the mitigation for the expansion of the Bathlako Mine's impact area (Heritage Contracts Unit).
- Phase 2 Mitigation – Kibali Grave Relocation Project (KGRP) for the Kibali Gold Project, Democratic Republic of Congo (Digby Wells)
- Phase 1 Mitigation – Heritage Assessment and Survey for the proposed Kibali Hydro Power Stations, Democratic Republic of Congo (Digby Wells)
- Phase 1 Mitigation – Heritage Impact Assessment & Survey of the farm Vygenhoek for Aquarius Resources Everest North Mining Project, Steelpoort, Mpumalanga (Digby Wells)
- Phase 1 Mitigation – Heritage Impact Assessment for the Gold One International Ltd Proposed Geluksdal Tailings Storage Facility and Pipeline Infrastructure, Johannesburg, Gauteng Province (Digby Wells)
- Phase 1 Mitigation – Burial Grounds and Graves Survey (BGGS) for Platreef Resources, Mokopane, Limpopo Province (Digby Wells)
- Phase 2 Mitigation – Archaeological Impact Assessment of sites for Resource Generation Boikarabelo Mine, Steenbokpan, Limpopo Province (Digby Wells)

- Phase 1 Mitigation – Watching Brief for Bokoni Platinum Mines (Pty) Ltd, Burgersfort, Limpopo Province (Digby Wells)
- Heritage Statement for Rhodium Reefs Limited Platinum Operations on the Farm Kennedy's Vale 361 KT, Steelpoort, Mpumalanga Province (Digby Wells).
- Socio-Economic and Asset Survey, SEGA Gold Mining Project, Cluff Gold PLC, Burkina Faso (Digby Wells)

6 PROFESSIONAL AFFILIATIONS

Society for Africanist Archaeologists (SAfA) Member

7 PROFESSIONAL REGISTRATION

Association of Southern African Professional Archaeologists (ASAPA): Professional & CRM Member

8 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



JOHAN NEL

Mr Johan Nel

Unit manager: Heritage Resources Management

Social Sciences

Digby Wells Environmental

1 EDUCATION

2002 BA Honours - Archaeology

2001 BA Anthropology & Archaeology

1997 Matriculated Brandwag Hoërskool

2 LANGUAGE SKILLS

Fluent in English and Afrikaans

3 EMPLOYMENT

2011 to present Unit manager: Heritage Resources Management, Digby Wells Environmental

2010-2011 Archaeologist, Digby Wells Environmental

2005-2010 Manager and co-owner, Archaic Heritage Project Management

2003-2005 Freelance archaeologist

Resident archaeologist, Rock Art Mapping Project, Ndidima, Ukhahlamba-Drakensberg World Heritage Site

2002-2003 Special Assistant: Anthropology, Department of Anatomy, University of Pretoria

2001-2002 Technical Assistant: Department of Anatomy, University of Pretoria

1999-2001 Assistant: Mapungubwe Project, National Cultural History Museum & Department of Anthropology and Archaeology, UP

4 EXPERIENCE

I have 13 years of combined experience in the field of cultural heritage resources management (HRM) including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. I have gained experience both within urban settings and remote rural landscapes. Since 2010 I have been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources management into environmental impact assessments (EIA). Many of the projects since have

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Directors: A Sing*, AR Wilke, LF Koeslag, PD Tanner (British)*, AJ Reynolds (Chairman) (British)*, J Leaver*, GE Trusler (C.E.O)

*Non-Executive

required compliance with International Finance Corporation (IFC) requirements and other World Bank standards. This exposure has allowed me to develop and implement a HRM approach that is founded on international best practice and leading international conservation bodies such as UNESCO and ICOMOS. I have worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo and Sierra Leone. I am fluent in English and Afrikaans, with excellent writing and research skills.

5 PROJECT EXPERIENCE

PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENTS:

- Above Ground Storage Tanks survey, SASOL Oil (Pty) Ltd, Free State Province, South Africa
- Access road establishment , AGES-SA, Tzaneen, South Africa
- Boikarabelo Railway Link, Resgen South Africa, Steenbokpan, South Africa
- Conversion of prospecting rights to mining rights, Georock Environmental, Musina, South Africa
- Galaxy Gold Agnes Mine, Barberton, South Africa
- HCI Khusela Palesa Extension, Bronkhorstspuit, South Africa
- Kennedy's Vale township establishment, AGES-SA, Steelpoort, South Africa
- Koidu Diamond Mine, Koidu Holdings, Koidu, Sierra Leone
- Lonmin Platinum Mine water pipeline survey, AGES-SA, Lebowakgomo, South Africa
- Mining right application, DERA Environmental, Hekpoort, South Africa
- Mogalakwena water pipeline survey, AGES-SA, Limpopo Province, South Africa
- Nzoro Hydropower Station, Environmental and Social Impact Assessment, DRC
- Randgold Kibali Gold Project, Environmental and Social Impact Assessment, Kibali, Democratic Republic of the Congo
- Randwater Vlaktefontein-Mamelodi water pipeline survey, Archaeology Africa cc, Gauteng, South Africa
- Residential and commercial development, GO Enviroscience, Schoemanskloof, South Africa
- Temo Coal, Limpopo, South Africa
- Transnet Freight Line survey, Eastern Cape and Northern Cape, ERM, South Africa
- Van Reenen Eco-Agri Development Project, GO Enviroscience, South Africa
- Platreef Platinum Mine, Ivanhoe Nickel & Platinum, Mokopane, South Africa

MITIGATION PROJECTS:

- Mitigation of Iron Age archaeological sites: Kibali Gold Project, DRC

- Mitigation of Iron Age metalworking site: Koidu Diamond Mine, Sierra Leone
- Mitigation of Iron Age sites: Boikarabelo Coal Mine, South Africa
- Exploratory test excavations of alleged mass burial site: Rustenburg, Bigen Africa Consulting Engineers, South Africa
- Mitigation of Old Johannesburg Fort: Johannesburg Development Agency (JDA), South Africa
- Site monitoring and watching brief: Department of Foreign Affairs Head Office, Imbumba-Aganang Design & Construction Joint Venture, South Africa

GRAVE RELOCATION

- Du Preezhoek-Gautrain Construction, Bombela JV, Pretoria, South Africa
- Elawini Lifestyle Estate social consultation, PGS (Pty) Ltd, Nelspruit, South Africa;
- Motaganeng social consultation, PGS (Pty) Ltd Burgersfort, South Africa
- Randgold Kibali Mine, Relocation Action Plan, Kibali, DRC
- Repatriation of Mapungubwe National Park and World Heritage Site, DEAT, South Africa
- Smoky Hills Platinum Mine social consultation, PGS (Pty) Ltd Maandagshoek South Africa
- Southstock Colliery, Doves Funerals, Witbank, South Africa
- Tygervallei. D Georgiades East Farm (Pty) Ltd, Pretoria, South Africa
- Willowbrook Ext. 22, Ruimsig Manor cc, Ruimsig, South Africa
- Zondagskraal social consultation, PGS (Pty) Ltd, Ogies, South Africa
- Zonkezizwe Gautrain, PGS, (Pty) Ltd, Midrand, South Africa

OTHER HERITAGE ASSESSMENTS AND REVIEWS:

- Heritage Scoping Report on historical landscape and buildings in Port Elizabeth: ERM South Africa
- Heritage Statement and Cultural Resources Pre-assessment scoping report on Platreef Platinum Mine, Mokopane: Platreef Ltd
- Heritage Statement and Scoping Report on five proposed Photo Voltaic Solar Power farms, Northern Cape and Western Cape: Orlight SA
- Land claim research Badenhorst family vs Makokwe family regarding Makokskraal, Van Staden, Vorster & Nysschen Attorneys, Ventersdorp South Africa
- Research report on Cultural Symbols, Ministry for Intelligence Services, Pretoria, South Africa
- Research report on the location of the remains of kings Mampuru I and Nyabela, National Department of Arts and Culture, Pretoria, South Africa
- Review of Archaeological Assessment: Resources Generation, Coal Mine Project in the Waterberg area, Limpopo Province

- Review of CRM study and compilation of Impact Assessment report, Zod Gold Mine, Armenia

6 PROFESSIONAL AFFILIATIONS

Society for Africanist Archaeologists (SAfA)

7 PROFESSIONAL REGISTRATION

Association for Southern African Professional Archaeologists (ASAPA)

Accredited by ASAPA Cultural Resources Management section

International Association of Impact Assessors (IAIA)

8 PUBLICATIONS

Nel, J. 2001. Cycles of Initiation in Traditional South African Cultures. *South African Encyclopaedia* (MWEB).

Nel, J. 2001. *Social Consultation: Networking Human Remains and a Social Consultation Case Study*. Research poster presentations at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: National Museum, Cape Town.

Nel, J. 2002. *Collections policy for the WG de Haas Anatomy museum and associated Collections*. Unpublished. Department of Anatomy, School of Medicine: University of Pretoria.

Nel, J. 2004. Research and design of exhibition for Eloff Belting and Equipment CC for the Institute of Quarrying 35th Conference and Exhibition on 24 – 27 March 2004.

Nel, J. 2004. *Ritual and Symbolism in Archaeology, Does it exist?* Research paper presented at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: Kimberley

Nel, J & Tiley, S. 2004. The Archaeology of Mapungubwe: a World Heritage Site in the Central Limpopo Valley, Republic of South Africa. *Archaeology World Report*, (1) United Kingdom p.14-22.

Nel, J. 2007. *The Railway Code: Gautrain, NZASM and Heritage*. Public lecture for the South African Archaeological Society, Transvaal Branch: Roede School, Parktown.

Nel, J. 2009. *Un-archaeologically speaking: the use, abuse and misuse of archaeology in popular culture*. *The Digging Stick*. April 2009. 26(1): 11-13: Johannesburg: The South African Archaeological Society.

Nel, J. 2011. 'Gods, Graves and Scholars' returning Mapungubwe human remains to their resting place.' In: *Mapungubwe Remembered*. University of Pretoria commemorative publication: Johannesburg: Chris van Rensburg Publishers.

Nel, J. 2012. *HIAs for EAPs*. Paper presented at IAIA annual conference: Somerset West.



DIGBY WELLS
ENVIRONMENTAL

SHAHZAADEE KARODIA

Ms Shahzaadee Karodia
Archaeology Consultant
Social Science Department
Digby Wells Environmental

1 EDUCATION

- 2006 BA Anthropology & Archaeology, University of the Witwatersrand
- 2007 BSc Honours. Palaeontology, University of the Witwatersrand
 - Courses included: comparative vertebrate anatomy; cladistics analysis; primate and human evolution; Karoo biostratigraphy; dinosaurs and the origins of birds; Cenozoic mammals; taphonomy; and palaeoecology
 - Honours Thesis: "Encephalization and its relationship to orbit size in modern humans and a small bodied population from Palau, Micronesia".
- 2012 MSc Archaeology, University of the Witwatersrand
 - MSc Thesis: "Naturally mummified human remains from Historic Cave, Limpopo, South Africa".
 - Skills obtained during MSc included: stereo microscopy; light microscopy; scanning electron microscopy; and histology

2 LANGUAGE SKILLS

English (read, write, speak)

Currently completing French training for beginners

3 EMPLOYMENT

2012:	Archaeology consultant, Digby Wells Environmental
April 2012 – June 2012:	External archaeology research consultant, EcoAfrica
April 2011 – November 2011:	Archaeology intern, University of Pretoria



- 2007 – 2008: Palaeontology collections assistant, BPI
University of the Witwatersrand
- 2006 – 2007: Tour guide, Sterkfontein Caves

4 EXPERIENCE

- Archaeology Field School in Klipriviersberg with Dr Karim Sadr, University of the Witwatersrand
- Archaeology Field School in Swartkrans and Maropeng with Dr Kathy Kuman, University of the Witwatersrand
- Archaeology Field School in Ottosdaal with Dr Thembi Russell, University of the Witwatersrand
- Palaeontology Field School in the Karoo with Professor Bruce Rubidge, University of the Witwatersrand
- Palaeontology Field School in Gladysvale with Professor Lee Berger, University of the Witwatersrand
- Palaeontology Field School in Wonderkrater with Dr Lucinda Backwell, University of the Witwatersrand

5 PROJECT EXPERIENCE

- Heritage Statement and Letter of Recommendation from Exemption for the Central Basin, Witwatersrand Acid Mine Drainage Project
- Heritage Impact Assessment for the Witwatersrand Gold Fields Acid Mine Drainage Project (Western Basin)
- Archaeological Watching Brief on Access Road for Bokoni Platinum Ltd
- Heritage Statement and Notification of Intent to Develop for Eskom Transmission Division – Roodepoort Strengthening Project;
- Heritage Statement and Notification of Intent to Develop for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IR and Bosmans Spruit 364 IS, Standerton, Mpumalanga
- Heritage Statement and Notification of Intent to Develop for Rhodium Reef Limited Platinum Operation, 2430 CA & CC, De Goedverwachting 332 KT, Boschloof 331 KT and Belvedere 362 KT
- Heritage Statement and Notification of Intent to Develop for the Thabametsi Project, 2327CB, Vaalpensloop 313 LQ, Lephallale, Limpopo Province
- Heritage Impact Assessment for the Proposed Thabametsi Project, Lephallale, Limpopo Province



6 PROFESSIONAL AFFILIATIONS

- Association of Southern African Professional Archaeologists (ASAPA)
- The South African Archaeology Society (SAAS)
- Society of Africanist Archaeologists (SAfA)
- The Geological Survey of South Africa (GSSA)
- The Palaeontological Society of Southern Africa (PSSA)
- The South African Society for Amateur Palaeontologists (SASAP)



DIGBY WELLS
ENVIRONMENTAL

NATASHA HIGGITT

Ms Natasha Higgitt
Archaeology Consultant
Social Department
Digby Wells Environmental

1 EDUCATION

- University of Pretoria
- BA Degree (2008)
- Archaeology Honours (2009)
- Title of Dissertation- Pass the Salt: An Archaeological analysis of lithics and ceramics from Salt Pan Ledge, Soutpansberg, for evidence of salt working and interaction.

2 LANGUAGE SKILLS

- English - Excellent (read, write and speak)
- Afrikaans - Fair (read, write and speak)
- Italian – Poor (Speaking only)

3 EMPLOYMENT

- July 2011 to Present: Archaeology Consultant at Digby Wells Environmental
- April 2011 to June 2011: Lab assistant at the Albany Museum Archaeology Department, Grahamstown, Eastern Cape
- April 2010 to March 2011: Intern at the Archaeology Department, Albany Museum, Grahamstown, Eastern Cape under the Department of Sports, Recreation, Arts and Culture, Eastern Cape Government, South Africa (DSRAC)

4 EXPERIENCE

- Human remains rescue excavation at St Francis Bay, Eastern Cape
- Human remains rescue excavation at Wolwefontein, Eastern Cape

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*Non-Executive

- Recorded two rock art sites at Blaauwbosch Private Game Reserve, Eastern Cape
- Attended a 2 week excavation/study tour in the Friuli Region in Italy, organised by the *Società Friulana di Archeologia*, sponsored by *Ente Friuli nel Mondo*, and excavated a 12th century medieval castle
- Attended a 2 week excavation in Limpopo, Waterpoort Archaeological Project organised by Xander Antonites (Yale PhD Candidate)
- A total of 5 University of Pretoria Archaeology field schools in Limpopo and Gauteng spanning over 4 years

5 PROJECT EXPERIENCE

- Phase 1 Heritage Impact Assessment for the Thabametsi Coal Mine, Lephalale, Limpopo for Exxaro Coal (Digby Wells Environmental)
- Heritage Statement for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IR and Bosmans Spruit 364 IS, Standerton, Mpumalanga for Xtrata Coal South Africa (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Brakfontein Thermal Coal Mine, Mpumalanga for Universal Coal (Digby Wells Environmental)
- Development of a RAP for Aureus Mining for the New Liberty Gold Mine Project, Liberia (Digby Wells Environmental)
- Phase 1 Archaeological Impact Assessment for the MBET Pipeline, Steenbokpan, Limpopo (Digby Wells Environmental)
- Notice of Intent to Develop and Cultural Resources Pre-Assessment for Orlight SA (PTY) Ltd Solar PV Project. 2012. (Digby Wells Environmental)
- Agricultural Survey for Platreef ESIA, Mokopane, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for the Proposed Sylvania Everest North Mining Development in Mpumalanga, near Lydenburg. 2011. (Digby Wells Environmental)
- Phase 2 Mitigation of Archaeological sites at Boikarabelo Coal Mine, Steenbokpan, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for Proposed Platinum Mine Prospecting in Mpumalanga, near Bethal for Anglo Platinum. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for proposed Platinum Mine at Mokopane, Limpopo for Ivanhoe Platinum. 2011. (Digby Wells Environmental)
- Phase 1 AIA Mixed-use housing Development, Kwanobuhle, Extension 11, Uitenhage, Eastern Cape. 2011.
- Phase 1 AIA Centane to Qholora and Kei River mouth road upgrade survey, Mnquma Municipality, Eastern Cape. 2011. (SRK Consulting)



- Phase 1 AIA Clidet Data Cable survey, Western Cape, Northern Cape, Free State and Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Karoo Renewable Energy Facility, Victoria West, Northern Cape. 2011. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Hamburg, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Molteno, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Housing Development at Motherwell, P.E. 2010. (SRK Consulting)
- Phase 1 AIA Sand quarry survey in Paterson, Eastern Cape. 2010. (SRK Consulting)
- Phase 1 AIA Quarry Survey at Victoria West. 2010. (Acer [Africa] Environmental Management Consultants)
- Phase 1 AIA Quarry Survey at Port Elizabeth. 2010. (E.P Brickfields)

6 PROFESSIONAL AFFILIATIONS



- Association of Southern African Professional Archaeologists (ASAPA): Professional member
- Association of Southern African Professional Archaeologists (ASAPA): CRM Practitioner (Field Supervisor: Stone Age, Iron Age and Rock Art)
- South African Museums Association: Member

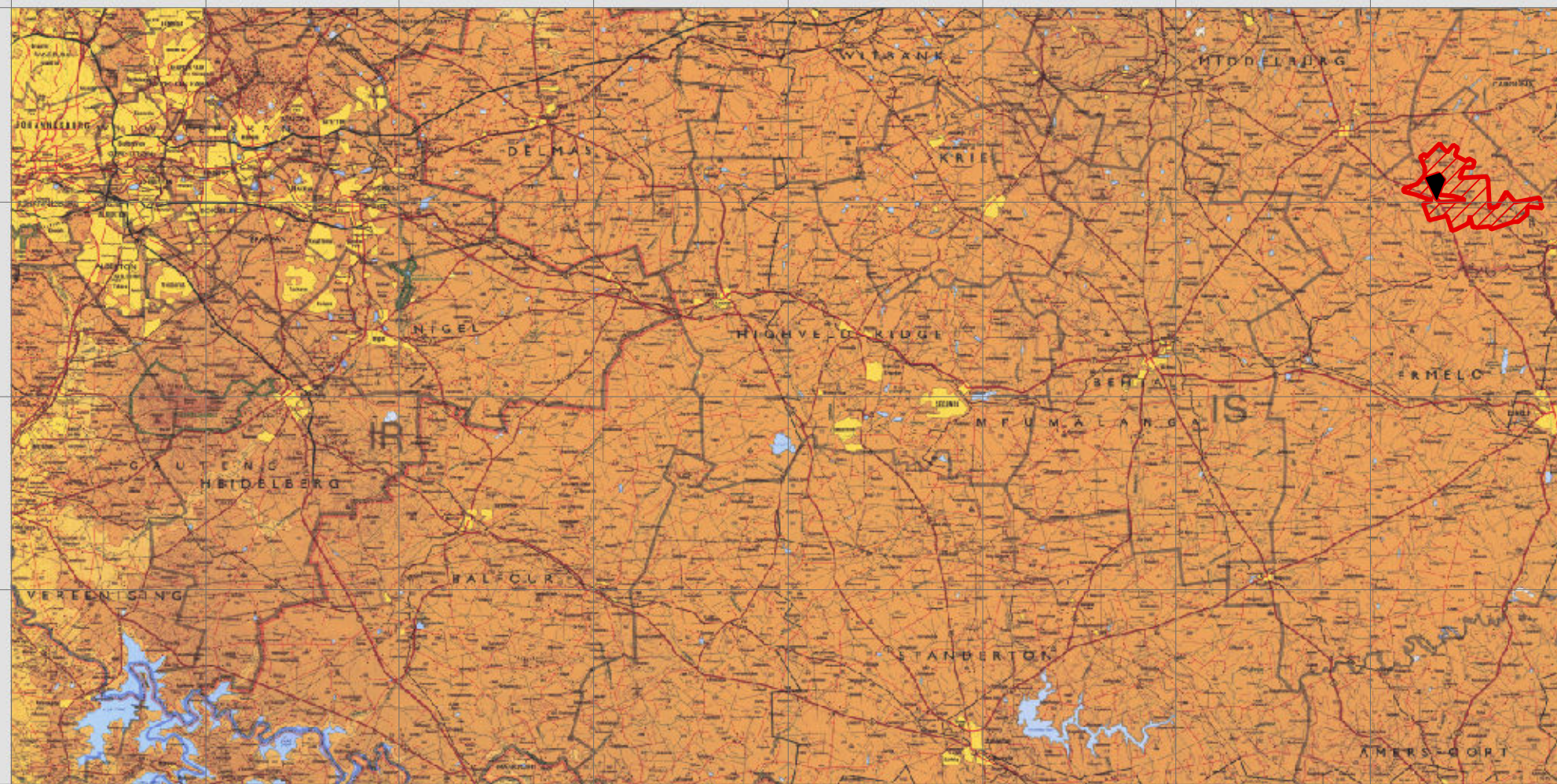
Appendix B: Location and Site Maps

Msobo Coal Consbrey Project

Regional Setting
1:250000

Legend

-  Consbrey A Project Boundary
-  Consbrey Project Boundary



2628 East Rand



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Geographic Coordinate System	Ref #: mpl.MSO1805.201302.128
Datum: WGS 1984	Revision Number: 1
	Date: 27/02/2013





0 5 10 20 30 40

Kilometres
1:850 000

Msobo Coal Consbrey Project

Regional Setting
1:50000

Legend

-  Consbrey A Project Boundary
-  Consbrey Project Boundary

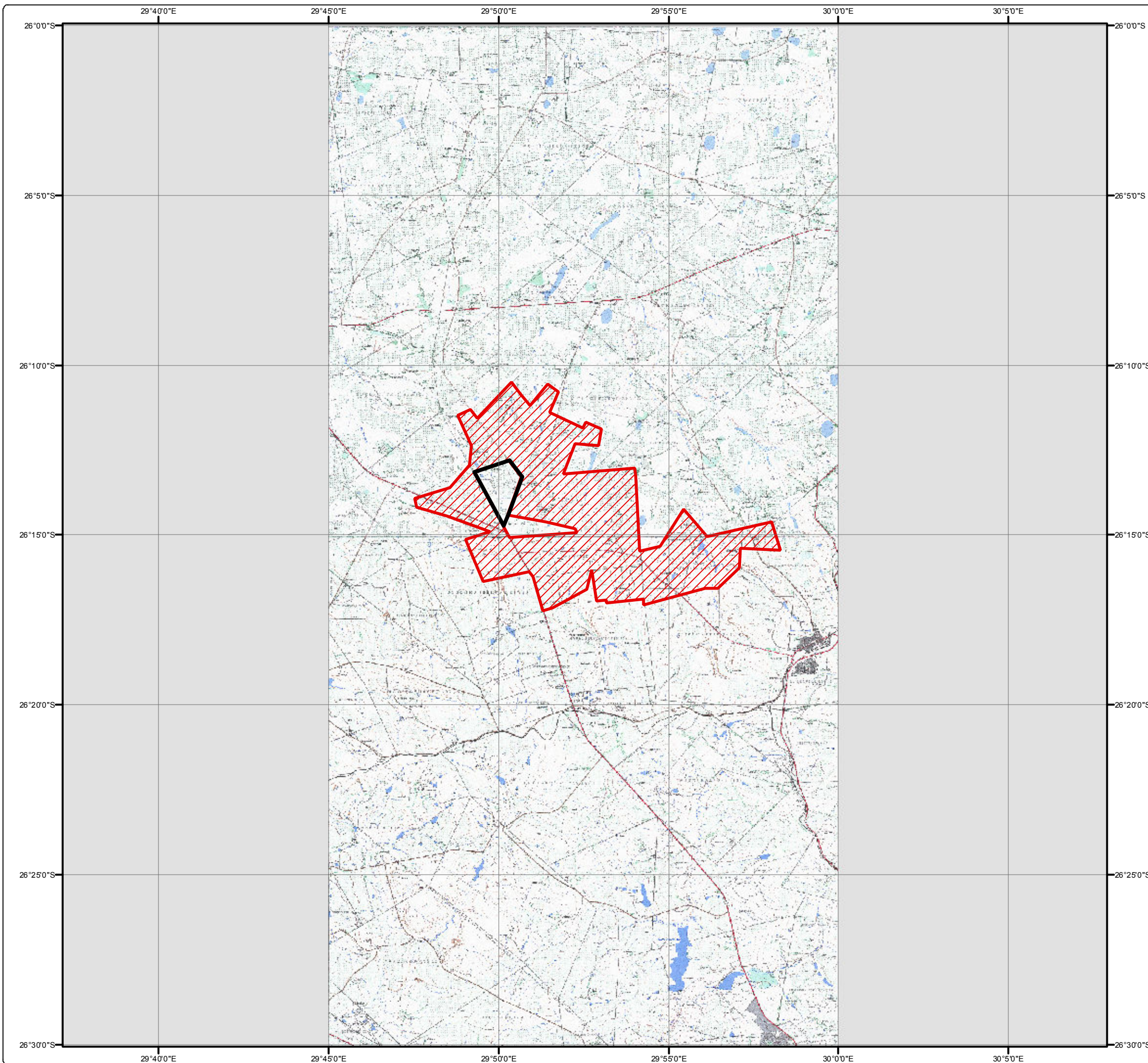
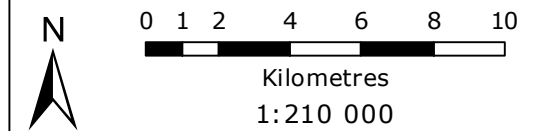
**2629BB Kromkrans
2629BD Breyten**



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Geographic Coordinate System	Ref # : mpl.MSO1805.201302.129
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	Date: 27/02/2013

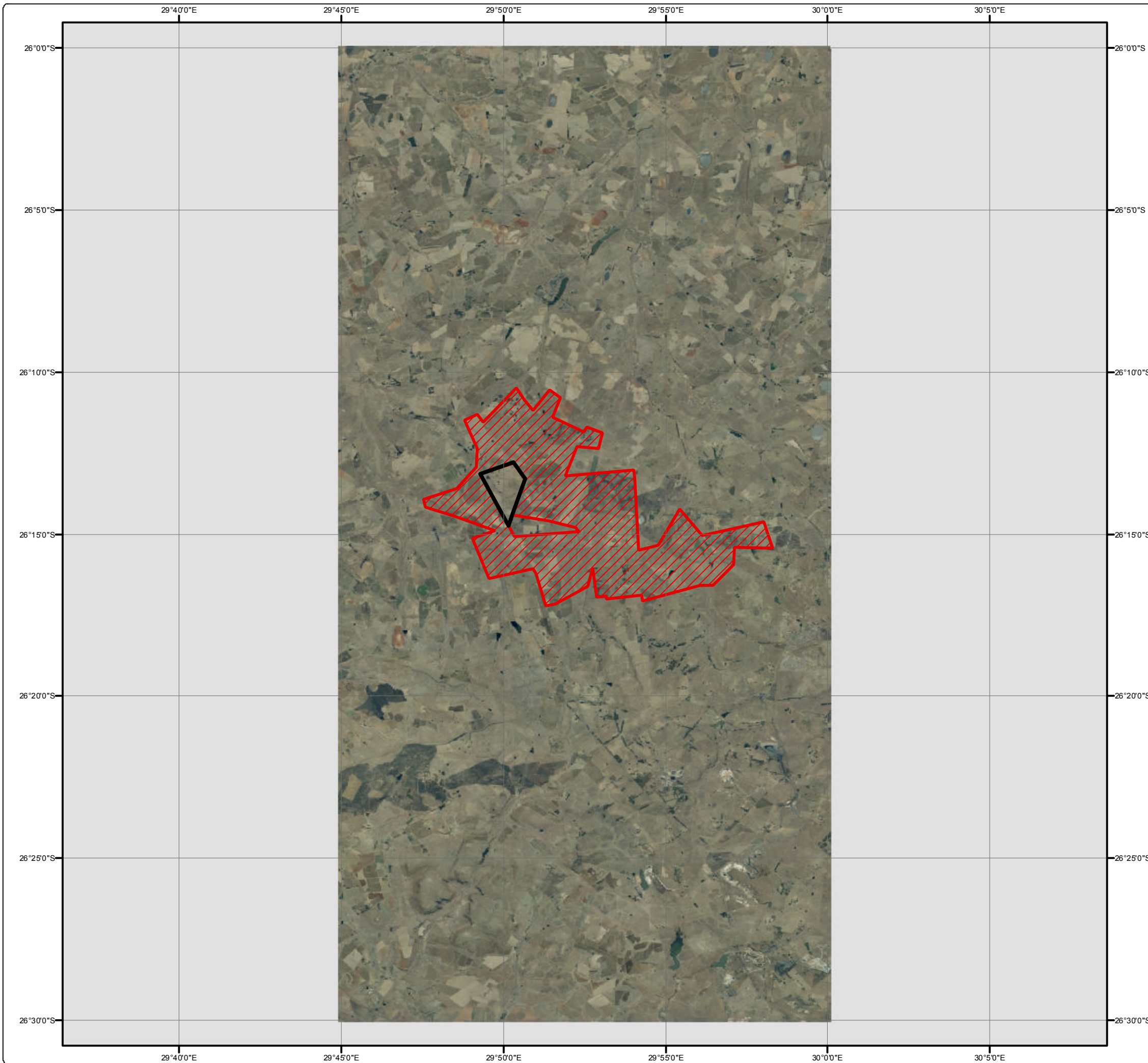


Msobo Coal Consbrey Project

Regional Setting
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Legend

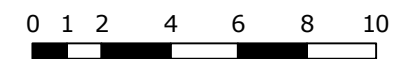
-  Consbrey A Project Boundary
-  Consbrey Project Boundary



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Geographic Coordinate System Ref # : mpl.MSO1805.201302.130
 Datum: WGS 1984 Revision Number: 1
 Date: 27/02/2013








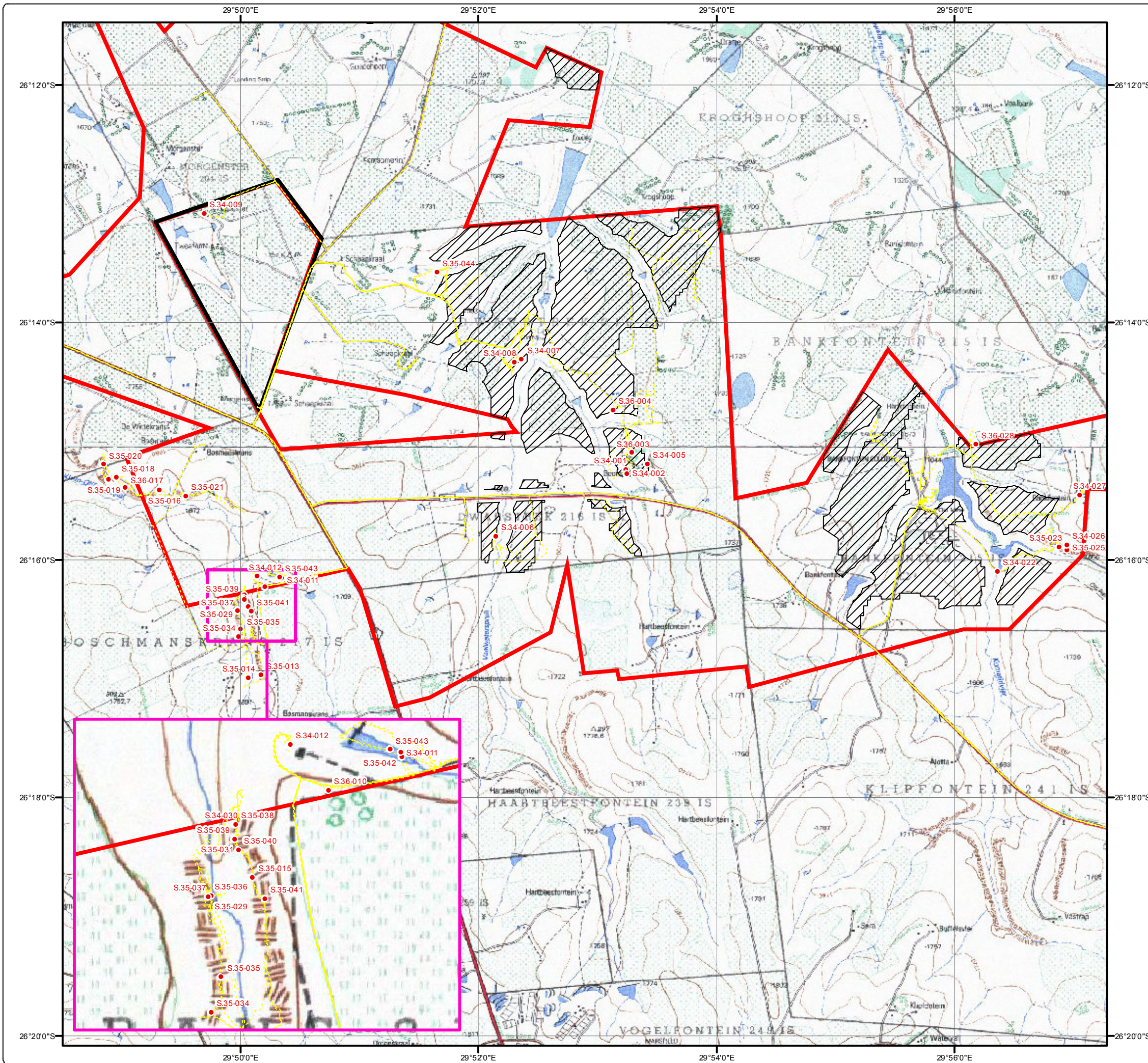
Kilometres
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Msobo Coal Consbrey Project

Heritage Resources & GPS Track Log

Legend

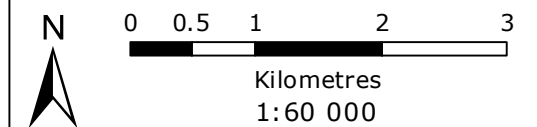
-  Consbrey A Project Boundary
-  Consbrey Project Boundary
-  Heritage Resources
-  GPS Track Log
-  Opencast Areas



2629BB Kromkrans 2629BD Breyten



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 Datum: WGS 1984 Revision Number: 1
 Date: 01/05/2013

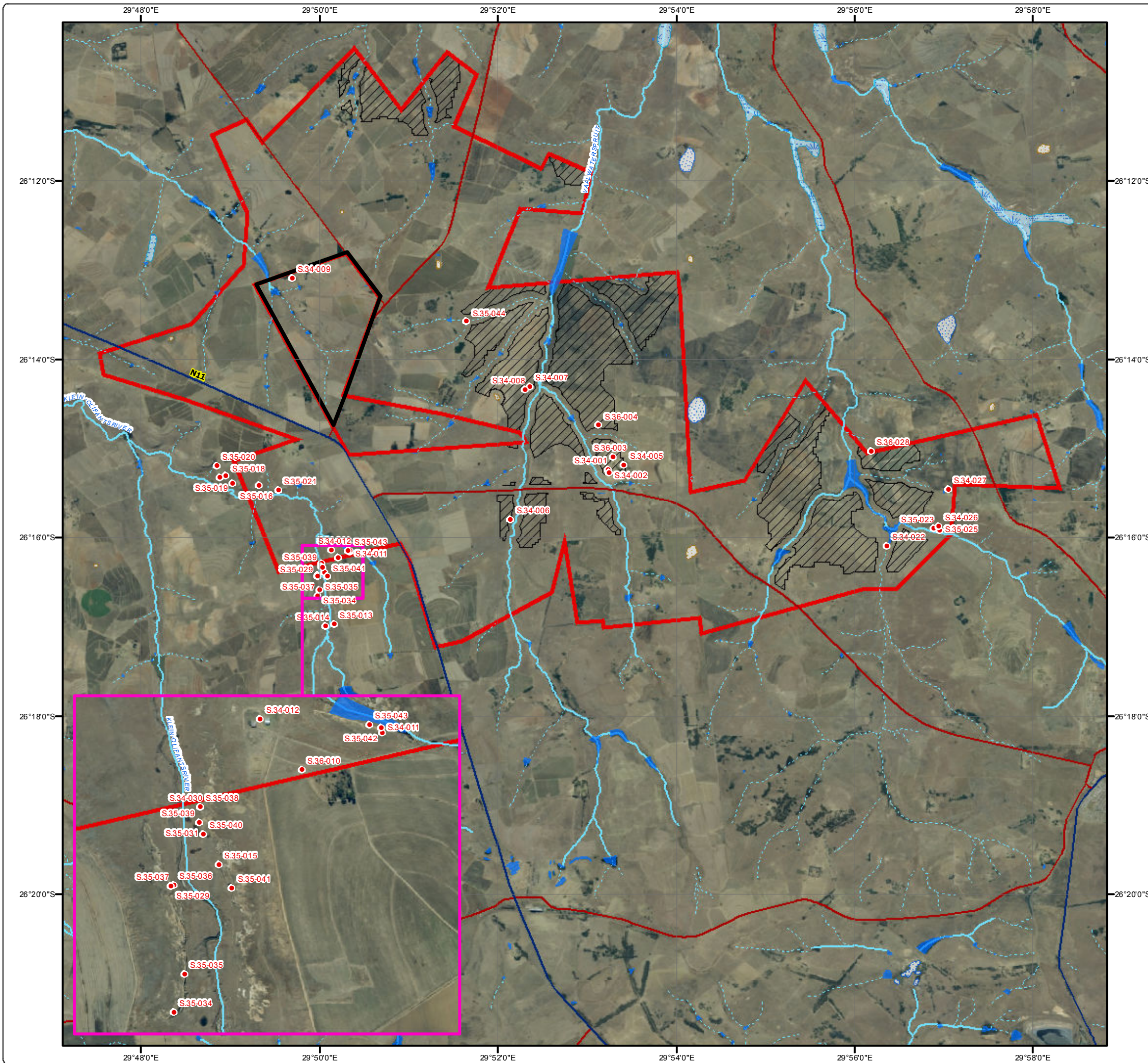


Msobo Coal Consbrey Project

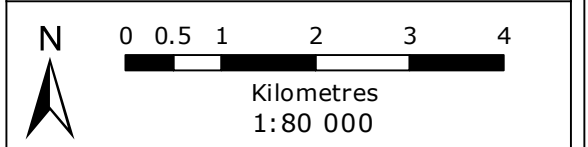
Heritage Resources

Legend

- Heritage Resources
- ▭ Consbrey A Project Boundary
- ▭ Consbrey Project Boundary
- Arterial / National Route
- Main Road
- Perennial River
- - - Non-Perennial River
- Dam
- Wetland
- Perennial Pan
- Non-Perennial Pan
- ▨ Opencast Areas













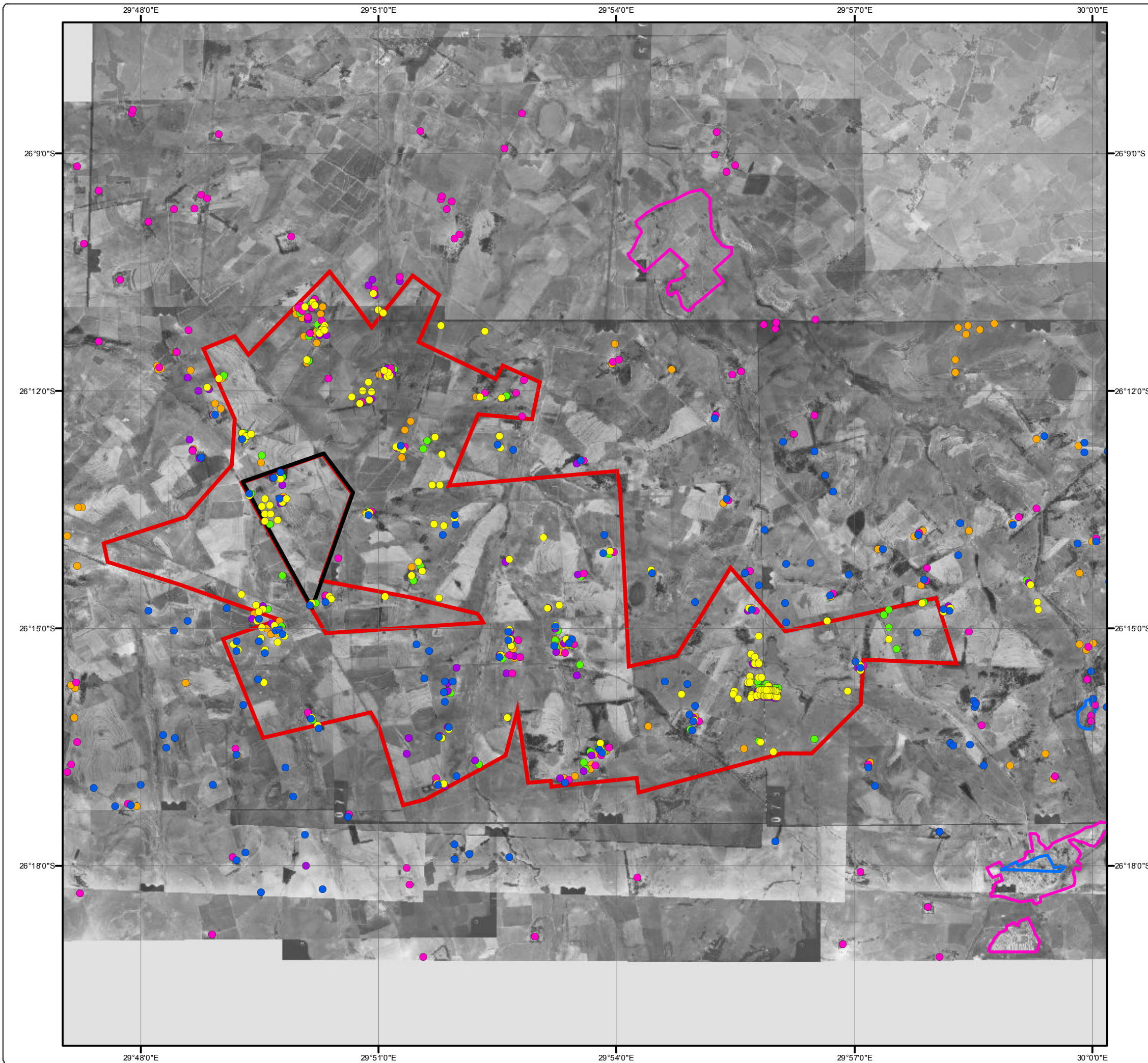
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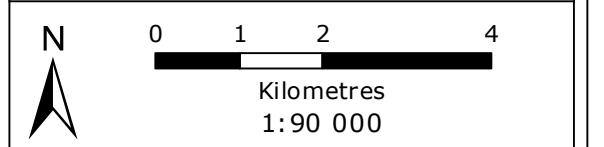
Msobo Coal Consbrey Project Historical Layering

Legend

-  Consbrey A Project Boundary
-  Consbrey Project Area
-  Consbrey 1955
-  Consbrey 1968
-  Consbrey 1979
-  Consbrey 1975
-  Consbrey 1984
-  Consbrey 1991
-  1955
-  1979
















Geographic Coordinate System Ref # : mpl.MSO1805.201302.131
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Msobo Coal Consbrey Project

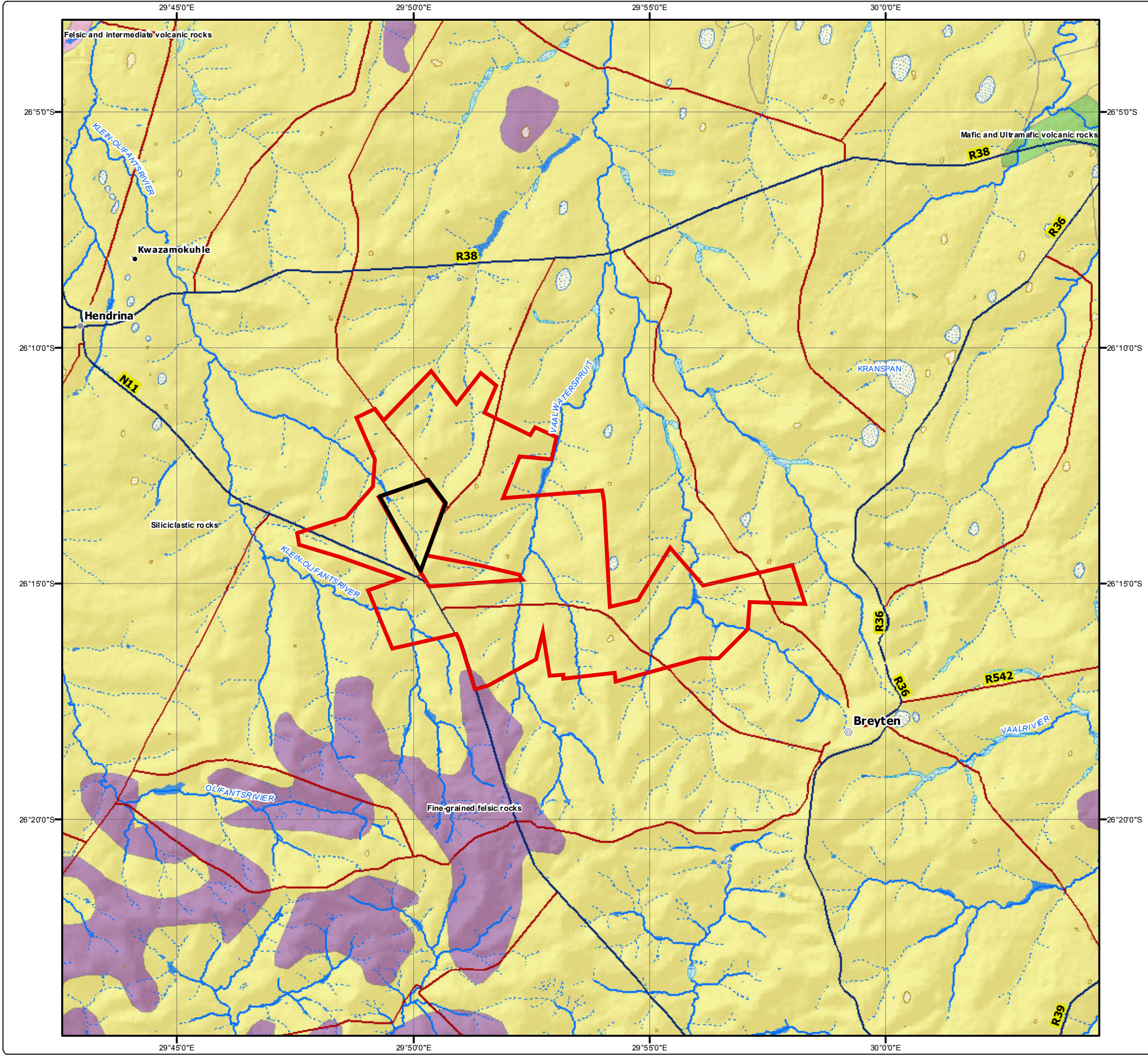
Rock Type

Legend

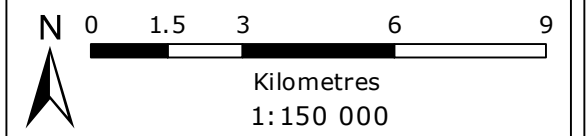
-  Consbrey A Project Boundary
-  Consbrey Project Area
-  Secondary Town
-  Other Town
-  Settlement
-  Arterial / National Route
-  Main Road
-  Perennial River
-  Non-Perennial River
-  Dam
-  Wetland
-  Perennial Pan
-  Non-Perennial Pan

Rock Type

-  Felsic and Intermediate Volcanic Rocks
-  Fine-Grained Felsic Rocks
-  Mafic and Ultramafic Volcanic Rocks
-  Siliciclastic Rocks


















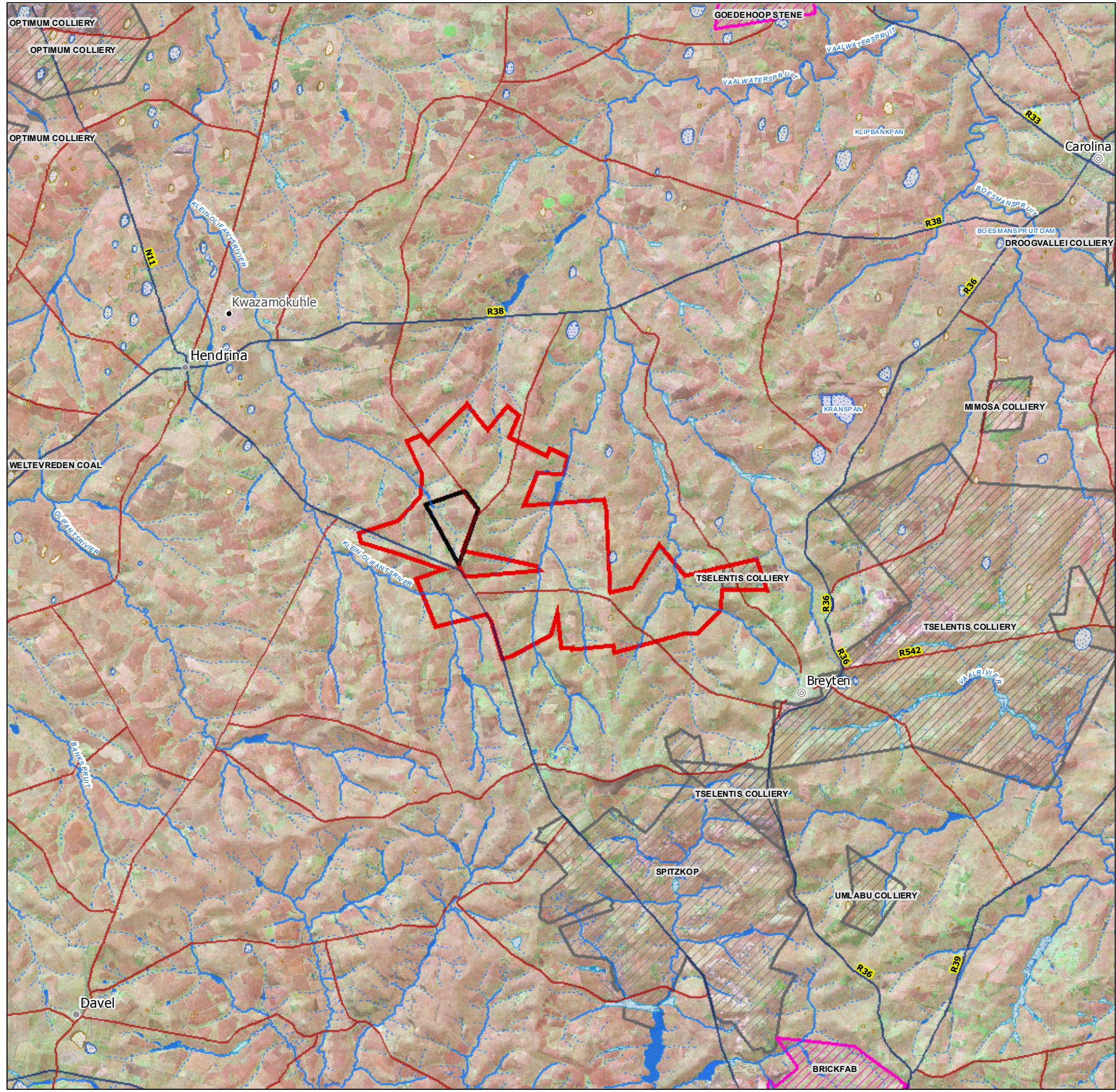
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 Date: 18/04/2013



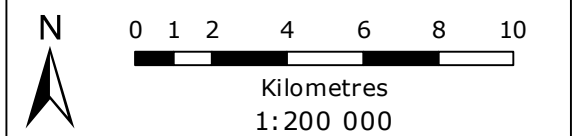
Msobo Coal Consbrey Project Surrounding Mining Areas

Legend

-  Consbrey A Project Boundary
-  Consbrey Project Boundary
-  Secondary Town
-  Other Town
-  Settlement
-  Arterial / National Route
-  Main Road
-  Perennial River
-  Non-Perennial River
-  Dam
-  Wetland
-  Perennial Pan
-  Non-Perennial Pan
- Mining Areas**
-  Coal
-  Clay



Geographic Coordinate System Ref #: anp.MSO1805.201305.042
 Datum: WGS 1984 Revision Number: 1
 Date: 08/05/2013



Appendix C: Site Table List

Site Number	LAT	LONG	Description
MSO1805/2629BD/S.34-001	-26.253816	29.887331	Old milk shed. Has key stone dated to 1892. O. Steyn stated that it has monument status, this has not been confirmed. Built out of sandstone and ferricrete. Has modern brick associated with additions.
MSO1805/2629BD/S.34-002	-26.254398	29.887434	Original farm house, built primarily out of ferricrete. Described as a <i>hartebeeshuis</i> by O. Steyn. Based on style of architecture, it is not a traditional <i>hartebeeshuis</i> .
MSO1805/2629BD/S.36-003	-26.25148	29.888087	Steyn Family Cemetery: 4 Graves
MSO1805/2629BB/S.36-004	-26.245514	29.885488	Informal grave. Dated to 1970, but has no name
MSO1805/2629BD/S.34-005	-26.252993	29.890238	Steyn Farm House. Sandtone farmhouse. Originally on Bankfontein, moved in 1930's. House plans dated to June 1911. Originally Mine Manager (Breyten Collieries (Ltd)) house, bought by Steyn family and reconstructed in its current location.
MSO1805/2629BD/S.34-006	-26.263222	29.869034	Historic stone walled enclosure and terracing. Has tin associated with it. Up against slope.
MSO1805/2629BB/S.34-008	-26.238845	29.871685	Old mine shaft (Continental Collieries?)
MSO1805/2629BB/S.34-009	-26.217978	29.828167	Historic house. Owner says older than 100 years
MSO1805/2629BD/S.36-010	-26.270301	29.836724	Family Cemetery - Janse van Vuuren, Hendrikse families - 5 graves
MSO1805/2629BD/S.34-011	-26.269217	29.839061	Historic sheep dip - stone walled on sandstone outcrop

Site Number	LAT	LONG	Description
MSO1805/2629BD/S.34-012	-26.268828	29.835517	Bosmanskrans farmhouse - Sandstone, keystone dating to 1893.
MSO1805/2629BD/S.35-013	-26.282716	29.836083	Grinding area in sandstone outcrop. Isifuba game engraved into sandstone. Some historic glass found
MSO1805/2629BD/S.35-014	-26.283057	29.834343	Single stone flake
MSO1805/2629BD/S.35-015	-26.273056	29.83431	Rock Art - San
MSO1805/2629BD/S.35-016	-26.256778	29.821903	Rock Art - San
MSO1805/2629BD/S.36-017	-26.256355	29.817046	Informal cemetery - 1 with formal dressing, Bhesy Johanna Mpila, died 1973. Total of 22 graves.
MSO1805/2629BD/S.35-018	-26.255014	29.81583	Stone walled enclosures amongst sandstone outcrop. 30m apart
MSO1805/2629BD/S.35-019	-26.255245	29.814744	Rock Art - Finger Painted, red lines. Possible deposit with LSA microlith
MSO1805/2629BD/S.35-020	-26.253126	29.814073	Stone walled enclosure amongst sandstone outcrop.
MSO1805/2629BD/S.35-021	-26.257594	29.825565	Rock Art - Finger Painted, red lines. Two separate locations. Historic cattle dip directly behind Rock Art site
MSO1805/2629BD/S.34-022	-26.268146	29.939398	Historic bridge - built of sandstone
MSO1805/2629BD/S.35-023	-26.264748	29.948059	Stone walled enclosure, on outcrop associated with shelter
MSO1805/2629BD/S.35-025	-26.265118	29.949145	Isolated potsherd
MSO1805/2629BD/S.34-026	-26.264466	29.949119	Historic cattle / sheep dip - on sandstone outcrop

Site Number	LAT	LONG	Description
MSO1805/2629BD/S.34-027	-26.257483	29.950884	Historic house - dated to 1929
MSO1805/2629BB/S.36-028	-26.250317	29.93634	Informal cemetery - 1 with formal dressing, Solomon Majabo Mashlangu, born 1908, died 1953. Approximately 27 graves. Area overgrown.
MSO1805/2629BD/S.35-029	-26.273691	29.832906	rock art/graffiti
MSO1805/2629BD/S.34-030	-26.271387	29.833757	Stonewall inbetween a sandstone ridge and a sandstone outcrop; and a metal fragment and fence post on the sandstone ridge
MSO1805/2629BD/S.35-034	-26.277381	29.832992	Fossilised Breytenia on a flat sandstone outcrop
MSO1805/2629BD/S.35-035	-26.276266	29.833314	Fossilised plant leaved on a flat sandstone outcrop
MSO1805/2629BD/S.35-036	-26.273667	29.832995	Fossilised Breytenia on a flat sandstone outcrop
MSO1805/2629BD/S.35-040	-26.272183	29.833864	Fossil plant on a sandstone ridge
MSO1805/2629BD/S.35-042	-26.26908	29.839051	Fossilised Breytenia on a flat sandstone outcrop
MSO1805/2629BD/S.35-043	-26.268997	29.838686	A fossil bone on a flat sandstone outcrop
MSO1805/2629BD/S.35-044	-26.226136	29.860824	Fossilised Breytenia on a flat sandstone outcrop

Appendix D: Impact Assessment Methodology and Impact Assessment Matrix



HERITAGE IMPACT MATRIX METHODOLOGY

CRM UNIT MANAGE: JOHAN NEL

MAY 2013

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1 INTRODUCTION

The impact assessment stage includes several steps aimed to evaluate the way in which environmental aspects will/may interact with the cultural landscape (the environment) resulting in environmental impacts to heritage resources. Environmental aspects and impacts are defined as:

- *Environmental aspects*: an element of an organisation's activities or products or services that can interact with the environment' (ISO 14001: 2004 - 3.6); and
- *Environmental impacts*: any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects (ISO 14001: 2004 - 3.7).

However, in terms of cultural heritage resources, environmental impacts should be assessed relative to the heritage value or significance of a resource. The methodology employed in the various stages of the impact assessment process is described in more detail below.

2 STATEMENT OF SIGNIFICANCE OR VALUE

Heritage resources – both cultural and natural – are finite, non-renewable and irreplaceable. They characterise community identity and cultures and are therefore are intrinsic to the history and beliefs of communities. As sources of information, heritage resources have inherent potential to contribute significantly to research, education and tourism, as well as allowing capacity for reconciliation, understanding and mutual respect.

Considering the innate value of heritage resources, the foundation of heritage resources management (HRM) is the acknowledgement that heritage resources have lasting worth as evidence of the origins of life, humanity and society. Every generation is therefore morally obligated to act as trustees of heritage for future generations through conservation, preservation and protection.

Accordingly, HRM must take into account rights of affected communities to be consulted and to participate. Where heritage resources are developed and presented the dignity and respect of diverse cultural values must be ensured. In addition, heritage in its broadest sense must never be used for sectarian purposed or political gain.

Notwithstanding the fundamental value ascribed to heritage, significance of individual resources needs to be determined to allow implementation of appropriate management measures. This is achieved through assessing a heritage resource's value relative to certain prescribed criteria, encapsulated in international conventions as well as national legislation. This is addressed in Section 2.1 below.

The significance/value is established by determining the level of importance taking and assessing the degree of integrity of cultural heritage resources. A resource's value thus influences the intensity of environmental impacts. As a result, environmental impacts that



are rated low may cause severe change in a heritage resources rated as highly significant. Vice versa, severe impacts may cause negligible change to an insignificant resource.

The steps involved in determining the value of a heritage resource is described in more detail below.

2.1 Importance

The importance of a heritage resource is determined on four dimensions – aesthetic, historic, scientific, and social. In turn, each dimension is measured against one or more descriptive attributes, defined in national legislation and international convention: NHRA (1999), UNESCO World Heritage Convention (1972), ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties and the Australian ICOMOS Charter for Places of Cultural Significance (1999) (Burra Charter). These attributes, or criteria, are aimed to provide a guide as to whether a resource should be included in the national estate as defined in these documents and presented in Table 2-1 below.

Importance of each dimension and subsequent attributes must be considered in relation to the resource's authenticity. Notions of authenticity are addressed under Section 2.1.1. Importance ratings must be informed and motivated by certain information sources. The credibility of information sources must therefore be evaluated and referred to when importance is discussed. Credibility is addressed under Section 2.1.2.

Table 2-1: Summary of dimensions and attributes

Dimension	Attributes considered		NHRA Ref.	UNESCO Ref.
Aesthetic & technical	1	Importance in aesthetic characteristics	S.3(3)(e)	
	2	Degree of technical / creative skill at a particular period	S.3(3)(f)	
Historical importance & associations	3	Importance to community or pattern in country's history	S.3(3)(a)	
	4	Site of significance relating to history of slavery	S.3(3)(i)	
	5	Association with life or work of a person, group or organisation of importance in the history of the country	S.3(3)(h)	
Information potential	6	Possession of uncommon, rare or endangered natural or cultural heritage aspects	S.3(3)(b)	
	7	Information potential	S.3(3)(c)	
	8	Importance in demonstrating principle characteristics	S.3(3)(d)	
Social	9	Association to community or cultural group for social, cultural or spiritual reasons	S.3(3)(g)	



2.1.1 Authenticity

Authenticity is an integral concept in cultural heritage resources management and must be considered when determining significance/value of cultural landscapes and heritage resources. The Nara Document on Authenticity (Nara Document) (1993) forms the basis of determining authenticity. Authenticity can refer to design, material, workmanship and setting of a resource. Aesthetic and historical aspects of a landscape or site including its physical, social and historical context, use and function are also covered (Winter & Baumann, 2005, p. 4).

Determining authenticity of a resource requires a sound knowledge of the type of heritage resource as well as the context within which occurs – the cultural landscape. This knowledge can only be gained through a detailed baseline accessing credible information sources.

2.1.2 Credibility

The Nara Document (1993) accepts that understanding authenticity and thus determining importance attributed to heritage resources rely on credible information sources. Information sources are defined as all physical, written, oral, and figurative sources, which make it possible to know the authenticity – nature, specificities, meaning, and history – of cultural heritage resources. This requires knowledge and understanding of information sources employed in relation to original and subsequent characteristics of heritage resources, and their meaning.

Information that should be considered are published, peer reviewed literature, archival research, popular publications, and any other information source that may be relevant (Nara Document on Authenticity, 1993).

Information sources need to be assessed as credible and truthful and referenced when determining importance of a resource and in motivation of its authenticity. Credibility of information sources forms the basis in determining the importance of heritage resources. The importance rating per dimension and attribute discussed above is thus intrinsically linked to the credibility of information sources used.

2.2 Integrity

Integrity is determined by examining the physical condition of a heritage resource – as witnessed at the time of assessment – compared to an ideal or other existing example. Integrity ought to be assessed only after the resource's authenticity has been determined, as the information source/s used should provide comparative examples against which its present condition may be measured. Thresholds and definitions for integrity are described in Table 2-2 below.

Table 2-2: Integrity definitions

Integrity	
0	Resource degraded to extent where no information potential exists; resource cannot be restored; single, isolated find, without any site context;
1	Poor condition, active decay visible; excessive restoration required; little information potential
2	Fair to good condition; well preserved; some decay present; can be easily restored/conserved/preserved; good information potential
3	Excellent/pristine; extremely well preserved; little to no decay present; little restoration required/restoration will greatly enhance resource; excellent information potential



3 IMPACT ASSESSMENT

Assessing environmental impacts on heritage resources are based first on the value of a resource and second how that value may change due to environmental aspects. Environmental management systems employ relative standard terminology that characterises impacts. This terminology has been adapted to provide a well-defined descriptive terminology for use in assessing environmental impacts on heritage resources summarised in Table 3-1.

Table 3-1: Impact characteristic terminology

Characteristic	Description	Designation
Type	Relationship of an assumed impact to a heritage resource (in terms of cause and effect)	Direct Indirect Induced
Scale of change	The physical area (size) of a heritage resource that may change	None Isolated parts / aspects will change Large parts / aspects will change Most or entire resource will change
Duration	Time period over which resource will change	Immediate, non-permanent and fully reversible Long-term, non-permanent and reversible Long-term, permanent and irreversible Immediate, permanent and irreversible
Intensity	How an impact could change the authenticity and integrity, thus importance, of a resource	None Change in integrity without affecting authenticity Change in integrity will affect aspects of authenticity Change in integrity will affect overall authenticity



Characteristic	Description	Designation
Probability	Likelihood of change occurring	None Project-related mitigation will remove change Project-related mitigation will reduce change Project-related mitigation will not reduce change

The rating takes into account:

- Spatial scale of impact;
- Expected duration of impact; and
- Severity of impact;
- Consequence of impact;
- Probability of impact occurring; and
- Value of heritage resource

$$\text{Impact significance} = \text{Value} \times \text{Magnitude}$$

Where

$$\text{Value} = \text{Importance} + \text{Credibility} + \text{Integrity}$$

And

$$\text{Magnitude} = \text{Consequence} \times \text{Probability}$$

And

$$\text{Consequence} = \text{Spatial scale} + \text{Duration} + \text{Severity}$$

The impact rating is applied to pre- and post-mitigation scenarios. The ideal is to remove all impacts to a heritage resource. Where post mitigation significance is not zero, the recommended field rating (heritage) mitigation must be undertaken. The tables below provide the various descriptions and thresholds applicable to the impact assessment ratings.

Table 3-2: Description of magnitude ratings

Score	Description	Rating
0	No/negligible environmental impacts expected on heritage resource	None/negligible
1-8	Low magnitude of environmental impacts on heritage resource	Low
9-16	Medium magnitude of environmental impacts on heritage resource	Medium
17-27	High/exceptional magnitude of environmental impacts on heritage resource	High

Magnitude											
		Consequence									
		0	1	2	3	4	5	6	7	8	9
Probability	0	0	0	0	0	0	0	0	0	0	0
	1	0	1	2	3	4	5	6	7	8	9
	2	0	2	4	6	8	10	12	14	16	18
	3	0	3	6	9	12	15	18	21	24	27

Magnitude = Consequence x Probability

where

Consequence = scale + duration + severity

**Table 3-3: Scores, descriptions and ratings determining consequence of impact**

Scale		
Score	Description	Rating
0	No effect on any part/aspect of heritage resource	None
1	Isolated parts/aspects of heritage resource will be affected	Low
2	Large parts/aspects of heritage resource will be affected	Medium
3	Most or entire heritage resource will be affected	High
Duration		
Score	Description	Rating
0	No impact will occur during life of project	None
1	Impact will be short and reversible	Low
2	Impact will occur throughout life of project, but is reversible	Medium
3	Impact is permanent and irreversible	High
Severity		
Score	Description	Rating
0	Negligible to no change/alteration/damage/destruction of heritage resource	None
1	Reversible changes/alterations to heritage resource	Low
2	Parts/aspects of heritage resource will be permanently altered/changed/destroyed	Medium
3	Entire heritage resource will be permanently altered/changed/destroyed	High



Probability		
Score	Description	Rating
0	Impact will not occur	None
1	Impact could occur, but implementation of appropriate project mitigation measures reduce/remove impacts	Unlikely
2	Impact may occur during life of project regardless of implementation of project mitigation measures	Probable
3	Impact will definitely occur, project mitigation measures will not reduce or remove impacts	Certain

**Table 3-4: Significance of impact on categories of heritage resources**

Score	Magnitude of Impact			
	Rating	Archaeology, Palaeontology	Built Environment/Structures	Historic Landscape
0	No change	No change	No change to fabric or setting	No changes to landscape elements, parcels or components; no visual or audible changes; no changes in amenity or community factors.
1-49	Low	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 or sound quality; very slight changes to use or access; resulting in very small change to historic landscape character.
50-98	Medium	Changes to key archaeological materials, such that the resource is slightly altered; slight changes to the setting.	Change to key historic building elements, such that the resource 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 the historic landscape; limited changes in noise or sound quality; slight changes to use or access; resulting in limited changes to historic landscape character.
99-147	High	Changes to many key archaeological materials, such that the resource is clearly modified; changes to the setting that affect the character of the asset	Change to many key historic building elements, such that the resource is significantly modified; change to setting of an historic building, such that it is significantly modified.	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.



Score	Magnitude of Impact			
	Rating	Archaeology, Palaeontology	Built Environment/Structures	Historic Landscape
		Changes to attributes that convey outstanding national value of national estate; Most or all key archaeological materials, including those that contribute to ONV such that the resource is totally altered; comprehensive changes to setting	Change to key historic building that contributes to outstanding national value of national estate such that the resource is totally altered; Comprehensive changes to setting.	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 on outstanding national value.

4 FIELD RATING (SOUTH AFRICAN PROJECT)

Field ratings, or proposed grading of heritage resources, are required by SAHRA in terms of Section 7(1) of the NHRA. Field ratings are based on the assessments of heritage resources in relation to criteria contained in Section 3(3) of the NHRA (see above). Section Y of the NHRA further outlines a three-tier system for heritage resources management of the national estate based on proposed grading:

- National: SAHRA is responsible for identification and managing of Grade I heritage resources;
- Provincial: Provincial Heritage Resources Authorities (PHRAs) are responsible for identification and managing of Grade II heritage resources; and
- Local: Local authorities (municipalities, metros, local government) are responsible for identification and managing of Grade III heritage resources.

Field ratings are based on (equal to) the value of a heritage resource. The thresholds for field ratings are present in Table 4-1 below.

Table 4-1: Field rating thresholds and descriptions

NHRA SECTION 7 GRADING			
Score	Grade	Protection	Recommended Heritage Mitigation
41-45	Grade I	National	Heritage resource should be nominated as a National Site/Object, included in National Estate
36-40	Grade II	Provincial	Heritage resource should be nominated as a Provincial Site/Object, included in National Estate
31-35	Grade III A	Local	Heritage resource should be nominated as a Regional Site/Object, included in National Estate
16-30	Grade III B	Local	The heritage resource must be mitigated and partly conserved/preserved
8-15	Grade IV A	General	The heritage resource must be mitigated before destruction
1-7	Grade IV B	General	The heritage resource must be recorded before destruction
0	Grade IV C	General	No mitigation required - application for destruction permit



5 REFERENCES

Nara Document on Authenticity, 1993. *ICOMOS: The Nara Document on Authenticity*, United Nations Educational, Scientific and Cultural Organisation: International Council on Monuments and Sites.

Winter, S. & Baumann, N., 2005. *Guideline for Involving Heritage Specialist in EIA Process Edition 1: CSIR Report No ENV-S-C 2005 E*, Cape Town: Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning.

STATEMENT OF SIGNIFICANCE/HERITAGE VALUE									IMPACT ASSESSMENT											HERITAGE MITIGATION						
Heritage Resource Name, Type and Description			STATEMENT OF SIGNIFICANCE/VALUE						Impact	Impact Rating						Impact Rating (after project mitigation)					FIELD RATING	MINIMUM REQUIRED MITIGATION				
Resource ID	Description	Reference in HIA	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE		Nature of Change (N/P)	Scale of Change	Duration of Change	Severity of Change	Consequence	Probability	MAGNITUDE	Nature of Change (1/-1)	Scale of Change	Duration of Change	Severity of Change			Consequence	Probability	MAGNITUDE	
Bankfontein werf	Bankfontein Werf	8.4	-	4	-	-	2	8	The werf will be destroyed by mining activities associated with the opencast.	N	4	7	6	8	7	53	N	2	6	1	4	3	12	Field Rating IV B - General	Record before destruction	
S.34-027	Bankfontein Werf - Farm House dated 1929		-	4	-	-	2	8							0		0						0	0	No heritage mitigation required	None
S.34-026	Bankfontein Werf - Stone walled dip		4	3	4	4	2	8							0		0						0	0	No heritage mitigation required	None
Boomplaats werf	Boomplaats Werf	8.2	4	6	3	6	3	14	The werf will be destroyed by mining activities associated with the opencast.	N	6	7	7	16	7	109	P	2	5	2	7	1	7	Grade III B - Local	Part retained as heritage register site; destructive or alteration mitigation may be possible.	
S.34-005	Boomplaats Werf - Farm House dated 1911		3	5	-	5	3	13							0		0						0	0	No heritage mitigation required	None
S.34-001	Boomplaats Werf - Old Milk-shed on Dwarstrek, dated 1892		-	5	-	5	2	10							0		0						0	0	No heritage mitigation required	None
S.34-002	Boomplaats Werf - Original farm house		-	5	-	5	2	10							0		0						0	0	No heritage mitigation required	None
Bosmanskrans werf	Bosmanskrans Werf	8.3	-	3	-	5	2	8	The werf will be indirectly impacted on by mining activities, such as blasting, dust and increased human presence.	N	3	5	2	4	5	22	P	1	5	1	3	4	12	Field Rating IV B - General	Record before destruction	
S.34-012	Bosmanskrans Werf - Farm House dated 1893		-	5	-	4	3	14							0		0						0	0	No heritage mitigation required	None
S.34-011	Bosmanskrans Werf - Stone walled dip		4	3	4	4	2	8							0		0						0	0	No heritage mitigation required	None
S.35-043	Fossil bone	10.6	-	-	6	-	3	18	The fossil will be negatively affected by indirect impacts associated with mining activities, including blasting, dust and increased human presence.	N	4	5	7	16	3	48	P	7	2	1	10	1	10	Grade I - National	National heritage nomination; conservation	
S.35-034	Fossil Breytenia	10.1	-	-	6	-	3	18		N	7	5	7	19	3	57	P	7	2	1	10	1	10	Grade I - National	National heritage nomination; conservation	
S.35-036	Fossil Breytenia	10.3	-	-	6	-	3	18		N	7	5	7	19	3	57	P	7	2	1	10	1	10	Grade I - National	National heritage nomination; conservation	
S.35-042	Fossil Breytenia	10.5	-	-	6	-	3	18		N	7	5	7	19	3	57	P	7	2	1	10	1	10	Grade I - National	National heritage nomination; conservation	
S.35-044	Fossil Breytenia	10.7	-	-	6	-	3	18		N	7	5	7	19	3	57	P	7	2	1	10	1	10	Grade I - National	National heritage nomination; conservation	

STATEMENT OF SIGNIFICANCE/HERITAGE VALUE								IMPACT ASSESSMENT											HERITAGE MITIGATION						
Heritage Resource Name, Type and Description			STATEMENT OF SIGNIFICANCE/VALUE					Impact	Impact Rating						Impact Rating (after project mitigation)					FIELD RATING	MINIMUM REQUIRED MITIGATION				
Resource ID	Description	Reference in HIA	Aesthetic	Historic	Scientific	Social	INTEGRITY		VALUE	Nature of Change (N/P)	Scale of Change	Duration of Change	Severity of Change	Consequence	Probability	MAGNITUDE	Nature of Change (1/-1)	Scale of Change	Duration of Change			Severity of Change	Consequence	Probability	MAGNITUDE
S.35-035	Fossil Glossopteris leaf	10.2	-	-	6	-	3	18		N	4	5	7	16	3	48	P	7	2	1	10	1	10	Grade I - National	National heritage nomination; conservation
S.35-040	Fossil Glossopteris leaf	10.4	-	-	6	-	3	18		N	4	5	7	16	3	48	P	7	2	1	10	1	10	Grade I - National	National heritage nomination; conservation
S.35-013	Grinding Area in Sandstone	9	-	1	1	-	3	3					0		0					0		0	No heritage mitigation required	None	
S.34-022	Historic Sandstone Bridge	8.1	-	4	-	-	3	12		N	4	7	6	11	7	79	N	2	6	1	6	3	18	Field Rating IV A - General	Mitigation before destruction
S.36-017	Informal Cemetery	11.4	-	-	-	5	2	10		N	7	7	7	12	7	82	N	4	6	2	7	1	7	Field Rating IV A - General	Mitigation before destruction
S.36-028	Informal Cemetery	11.5	-	-	-	5	2	10		N	7	7	7	12	7	82	N	4	6	2	7	1	7	Field Rating IV A - General	Mitigation before destruction
S.36-004	Informal Grave	11.2	-	-	-	5	2	10		N	6	7	7	11	7	78	N	4	6	2	7	1	7	Field Rating IV A - General	Mitigation before destruction
S.35-025	Isolated potsherd	9	0	0	0	0	0	0					0		0					0		0	No heritage mitigation required	None	
S.35-014	Isolated stone flake	9	0	0	1	-	1	0					0		0					0		0	No heritage mitigation required	None	
S.36-010	Janse van Vuuren Family Cemetery	11.3	-	-	-	5	2	10		N	7	7	7	12	7	82	N	2	6	2	6	1	6	Field Rating IV A - General	Mitigation before destruction
S.34-008	Old Mine Shaft	8	-	1	4	4	0	0					0		0					0		0	No heritage mitigation required	None	
S.35-015	Rock Art	9.1	6	5	6	5	2	11		N	5	7	7	12	5	58	P	2	5	4	7	3	20	Field Rating IV A - General	Mitigation before destruction
S.35-016	Rock Art	9.2	6	5	6	5	2	11		N	5	7	7	12	5	58	N	2	5	4	7	3	20	Field Rating IV A - General	Mitigation before destruction
S.35-019	Rock Art	9.3	6	5	6	5	3	17		N	5	7	7	18	5	90	N	2	5	5	11	3	34	Grade II -	Provincial heritage

STATEMENT OF SIGNIFICANCE/HERITAGE VALUE									IMPACT ASSESSMENT											HERITAGE MITIGATION					
Heritage Resource Name, Type and Description			STATEMENT OF SIGNIFICANCE/VALUE						Impact	Impact Rating						Impact Rating (after project mitigation)					FIELD RATING	MINIMUM REQUIRED MITIGATION			
Resource ID	Description	Reference in HIA	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE		Nature of Change (N/P)	Scale of Change	Duration of Change	Severity of Change	Consequence	Probability	MAGNITUDE	Nature of Change (1/-1)	Scale of Change	Duration of Change	Severity of Change			Consequence	Probability	MAGNITUDE
																								Provincial	nomination; conservation
S.35-021	Rock Art	9.4	6	5	6	5	3	17	N	5	7	7	18	5	90	N	2	5	5	11	3	34	Grade II - Provincial	Provincial heritage nomination; conservation	
S.35-029	Rock Art	9.5	6	5	6	5	2	11	N	5	7	7	12	5	58	N	2	5	4	7	3	20	Field Rating IV A - General	Mitigation before destruction	
S.36-003	Steyn Family Cemetery	11.1	-	5	-	5	3	15	N	6	7	7	17	7	117	N	4	6	2	10	1	10	Grade III B - Local	Part retained as heritage register site; destructive or alteration mitigation may be possible.	
S.34-030	Stone wall - includes S.35-031	8	-	2	1	0	1	1					0		0							0	0	No heritage mitigation required	None
S.35-018	Stone walled enclosure	9	-	-	3	-	2	6					0		0							0	0	No heritage mitigation required	None
S.35-020	Stone walled enclosure	9	-	-	3	-	2	6					0		0							0	0	No heritage mitigation required	None
S.34-006	Stone walled enclosure	8	-	2	1	0	2	2					0		0							0	0	No heritage mitigation required	None
S.35-023	Stone walled enclosure	9	-	-	3	-	2	6					0		0							0	0	No heritage mitigation required	None

Appendix E: Registered Stakeholders

Farm name/Company	Contact Person	Tel/Fax No.	Cell No.	Email address	Postal Address
-	Chris Kritzinger	-	082 772 9028	oribi@lantic.net	PO Box 217,Carolina,1185
Florence 78 IT Ptn 3	Mr S J Nel	-	082 492 7031	1950@webmail.co.za	-
Goedverwachting 81 IT Ptn 16	Johannes Hercules Du Preez	-	082 775 2021	-	-
Goedverwachting 81 IT Ptn 17	Johannes Hercules Du Preez	-	082 775 2021	-	-
Haarlem 39 IT RE	-	-	-	-	-
Harwar 58 IT RE	Hannes Botha/Koos Pretorius	086 514 6085	083 630 1251 083 986 4400	d.zoekop@lando.co.za	PO Box 201,Belfast,1100
Harwar 58 IT Ptn 1	Chris Nel	086 514 6085	082 494 7533 079 493 6798	pantbeleggings@gmail.com 1950@webmail.co.za	PO Box 213,Carolina,1185
Iona 77 IT Ptn 5	Davel Jacobus Stephanus	-	082 338 7386	davels@wol.co.za	
Leliefontein 79 IT RE	Jacobus Stephanus Nel	-	082 494 7533	pantbeleggings@gmail.com	PO Box 213,Carolina,1185
Leliefontein 79 IT Ptn 2	Johannes Hercules Du Preez	-	082 775 2021	-	-

Farm name/Company	Contact Person	Tel/Fax No.	Cell No.	Email address	Postal Address
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Lusthof 60 IT RE	Danie Neethling	-	076 067 7749	demooihof@gmail.com	-
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Lusthof 60 IT Ptn 6	Johannes Lodewikus Botha	086 514 6085	083 630 1251 083 986 4400	d.zoekop@lando.co.za	PO Box 201,Belfast,1100
Mooifontein 35 IT Ptn 4	-	-	-	-	-
Mooifontein 35 IT Ptn 5	-	-	-	-	-
Simonsdal 88 IT RE	Johannes Hercules Du Preez	-	082 775 2021	-	-
Tevreden 56 IT Ptn 1	Zicny Vera Stella	-	-	-	-
Tevreden 56 IT Ptn 4	Johannes Hercules Du Preez	-	082 775 2021	-	-
Tevreden 56 IT Ptn 5	Zicny Vera Stella	-	-	-	-

Farm name/Company	Contact Person	Tel/Fax No.	Cell No.	Email address	Postal Address
Tevreden 56 IT Ptn 6	Johannes Hercules Du Preez	-	082 775 2021	-	-
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Tevreden 56 IT Ptn 9	Zicny Vera Stella	-	-	-	-
Vryheid 59 IT RE	Johannes Lodewikus Botha	086 514 6085	083 630 1251 083 986 4400	d.zoekop@lando.co.za	PO Box 201,Belfast,1100
Songoba Home based Care	Stembile Mkhwanazi	-	073 871 3528		491 Kwa Zanele, Breyton, 2330
Escarpment Environment Protection Group (EEPG)	Koos Pretorius	013 253 0051	083 986 4400	d.zoekop@lando.co.za	PO Box 201, Belfast, 1100
Federation of Sustainable Environment	Koos Pretorius	013 253 0051	083 986 4400	d.zoekop@lando.co.za	PO Box 201, Belfast, 1100
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Green Trust	At Nel	013 686 9772	083 369 2210	-	P O Box 159, Ogies, 2230
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SANCO	John Maseko	-	079 286 4709	-	-
SANCO	Ray Mathenjwa	-	078 190 4499	-	-
Ubuntu Boing Club	Victor Nyamuza	-	073 499 2889	-	-
Ubuntu Boing Club	Innocent Mkonza	-	079 647 7465	-	-
Civic SANCO	Thalitha Mkoza	-	072 783 5375	-	-
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Local Link Trading	Sibusiso Hleza	-	072 734 1600	-	-
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Department of Agriculture, Conservation and Environment	Sam Msibi	017 819 2076	083 529 7129	sam@ermagric2.agric.za	Private Bag, X9079, Ermelo, 2350
National Department of Agriculture	Ria Ntuli	013 755 1420	082 967 2662	dounaldm@nda.agric.za	PO Box 1665, Nelspruit, 1200
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Mpumalanga Department of Public Works, Roads & Transport	Mr Moloi	017 801 4000	-	-	-
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Farm name/Company	Contact Person	Tel/Fax No.	Cell No.	Email address	Postal Address
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Appendix F: Chance Find Procedures, Fossil Find Procedures and Fossil Monitoring



**CHANCE FIND PROCEDURES (CFPS)
FOR THE CONSBREY COLLIERY
PROJECT, 2629BB AND 2629BD,
MPUMALANGA PROVINCE**

MSOBO COAL (PTY) LTD

19 JUNE 2013




DIGBY WELLS
ENVIRONMENTAL

This document has been prepared by **Digby Wells Environmental**.

Report Title: Chance Find Procedures (CFPs) for the Consbrey Colliery
Project, 2629BB and 2629BD, Mpumalanga Province

Project Number: MSO1805 CFPs Document

Name	Responsibility	Signature	Date
Justin du Piesanie: HRM Specialist	CFPs Compiler		2013-06-19

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ACRONYMS

BGG	Burial Grounds and Graves
CFPs	Chance Find Procedures
CL	Community Liaison
Digby Wells	Digby Wells Environmental
EC	Environmental Control
HIA	Heritage Impact Assessment
HRM	HRM Resources Management
HS	Health and Safety
ICOMOS	International Council on Monuments and Sites
LIHRA	Limpopo Heritage Resources Authority
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
SAHRA	South African Heritage Resources Authority
SAPS	South African Police Service
UNESCO	United Nations Educational, Scientific and Cultural Organisation

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1 INTRODUCTION

The purpose of this document is to provide Msobo Coal (Pty) Ltd (Msobo Coal) and their contractors with the appropriate response guidelines (extracted and adapted from the National Heritage Resources Act (Act No. 25 of 1999) Regulations Reg No. 6820, GN: 548, taking into consideration international best practice based on World Bank, Equator Principles and the International Finance Corporation Performance Standards, 1972 UNESCO Convention on the Protection of World Cultural and Natural Heritage (World Heritage Convention), ICOMOS Guideline on Heritage Impact Assessment and the Australian ICOMOS Burra Charter (1999)) that should be implemented in the event of chance discovery of heritage resources. These guidelines or chance find procedures (CFPs) can be incorporated into Msobo Coal policies that may have relevance during construction and operational phases.

The CFPs presented by Digby Wells Environmental (Digby Wells) aim to avoid and/or reduce project risks that may result due to chance finds, whilst considering international best practice.

2 DEFINITIONS

For simplicity, the term 'heritage resource' includes structures, archaeology, palaeontology, meteors, and public monuments as defined in the South African National Heritage Resources Act (Act No. 25 of 1999) (NHRA) Sections 34, 35, and 37. Procedures specific to burial grounds and graves (BGG) as defined under NHRA Section 36 will be discussed separately as these require the implementation of separate criteria for CFPs.

3 CHANCE FIND PROCEDURES

The following procedural guidelines must be considered in the event that previously unknown heritage resources or burial grounds and graves (BGG) are exposed or found during the life of the project.

3.1 Initial Identification and/or Exposure

Heritage resources or BGG may be identified during construction or accidentally exposed. The initial procedure when such sites are found aim to avoid any further damage. The following steps and reporting structure must be observed in both instances:

1. The person or group (identifier) who identified or exposed the burial ground must cease all activity in the immediate vicinity of the site;
2. The identifier must immediately inform his/her supervisor of the discovery;
3. The supervisor must ensure that the site is secured and control access; and

4. The supervisor must then inform the relevant Msobo Coal personnel responsible for at least the following portfolios: Community Liaison (CL), Environmental Control (EC) and Health and Safety (HS).

3.2 Chance Find Procedure: Heritage Resources

In the event that previously unidentified heritage resources are identified and/or exposed during construction or operation of the Project, the following steps must be implemented subsequent to those outlined under Section 3.1 above:

1. The Digby Wells project manager and/or Heritage Resources Management (HRM) Unit must be notified of the discovery;
2. Digby Wells will assign a qualified specialist to consider the heritage resource, either via communicating with the EC Officer via telephone or email, or based on a site visit;
3. Appropriate measures will then be presented to Msobo Coal;
4. Should the specialist conclude that the find is a heritage resource protected in terms of the NHRA (1999) Sections 34, 35, 37 and NHRA (1999) Regulations (Regulation 38, 39, 40), Digby Wells will notify the South African Heritage Resources Agency (SAHRA) and/or the Mpumalanga Provincial Heritage Resources Agency (MPHRA) on behalf of Msobo Coal; and
5. Based on the comments received from SAHRA and/or MPHRA, Digby Wells will provide Msobo Coal with a Terms of References Report and relevant associated costs if necessary.

3.3 Chance Find Procedure: BGG

In the event that previously unidentified BGG are identified and/or exposed during construction or operation of the Project, the following steps must be implemented subsequent to those outlined under Section 3.1 above:

1. The Digby Wells project manager and/or the HRM Unit must immediately be notified of the discovery in order to take the required further steps:
 - i. The local South African Police Service (SAPS) will be notified on behalf of Msobo Coal;
 - ii. Digby Wells will deploy a suitably qualified specialist to inspect the exposed burial and determine in consultation with the SAPS:
 - The temporal context of the remains, i.e.:
 - a. forensic,

-
- b. authentic burial grave (informal or older than 60 years, NHRA (1999) Section 36); or
 - c. archaeological (older than 100 years, NHRA (1999) Section 38); and
 - If any additional graves may exist in the vicinity.
 2. Should the specialist conclude that the find is a heritage resource protected in terms of the NHRA (1999) Section 36 and NHRA (1999) Regulations (Regulation 38, 39, 40), Digby Wells will notify SAHRA and/or MPHRA on behalf of Msobo Coal;
 3. SAHRA/MPHRA may require that an identification of interested parties, consultation and /or grave relocation take place;
 4. Consultation must take place in terms of NHRA (1999) Regulations 39, 40, 42; and
 5. Grave relocation must take place in terms of NHRA (1999) Regulations 34.

4 CONCLUSION

The CFP's presented in this document serve as international best practice policy for the accidental discovery of heritage resources and BGG. Based on the definitions provided within this document and the proposed lines of communication, Msobo Coal will be able to mitigate the accidental discovery of heritage resources and BGG throughout the various phases of the project. Where necessary, Digby Wells is available to assist with the recommendation of mitigations for the accidental discovery of heritage resources and BGG.



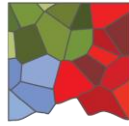
**FOSSIL FIND PROCEDURES (FFPS)
FOR THE CONSBREY COLLIERY
PROJECT, 2629BB AND 2629BD,
MPUMALANGA PROVINCE**

MSOBO COAL (PTY) LTD

19 JUNE 2013

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This document has been prepared by **Digby Wells Environmental**.

Report Title: Fossil Find Procedures (FFPs) for the Consbrey Colliery Project, 2629BB and 2629BD, Mpumalanga Province

Project Number: MSO1805 FFPs Document

Name	Responsibility	Signature	Date
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ACRONYMS

ECO	Environmental Control Officer
FFP	Fossil Find Procedure
MA	Monitoring for Fossils



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1 INTRODUCTION

In the context under consideration, it is improbable that fossil finds will require declarations of permanent “no go” zones. At most, a temporary pause in activity at a limited locale may be required. The strategy is to rescue the material as quickly as possible.

The procedures suggested below are in general terms, to be adapted as befits a context. They are described in terms of finds of fossil bones that usually occur sparsely. However, they may also serve as a guideline for other fossil material that may occur.

Bone finds can be classified as two types: isolated bone finds and bone cluster finds.

2 ISOLATED BONE FINDS

In the process of digging excavations, isolated bones may be spotted in the hole sides or bottom, or as they appear on the spoil heap. By this is meant bones that occur singly, in different parts of the excavation. If the number of distinct bones exceeds six pieces, the finds must be treated as a bone cluster (below).

2.1 Response by personnel in the event of isolated bone finds

The following responses should be undertaken by personnel in the event of isolated bone finds:

- **Action 1:** An isolated bone exposed in an excavation or spoil heap must be retrieved before it is covered by further spoil from the excavation and set aside;
- **Action 2:** The site foreman and Environmental Control Officer (ECO) must be informed;
- **Action 3:** The responsible field person (site foreman or ECO) must take custody of the fossil. The following information is to be recorded:
 - Position (excavation position);
 - Depth of find in hole;
 - Digital image of hole showing vertical section (side); and
 - Digital image of fossil.
- **Action 4:** The fossil should be placed in a bag (e.g. a Ziploc bag), along with any detached fragments. A label must be included with the date of the find, position information, and depth; and
- **Action 5:** The ECO is to inform the developer who then contacts the archaeologist and/or palaeontologist contracted to be on standby. The ECO is to describe the occurrence and provide images via email.

2.2 Response by Palaeontologist in the event of isolated bone finds

The palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established.

3 BONE CLUSTER FINDS

A bone cluster is a major find of bones (e.g. several bones in close proximity or bones resembling parts of a skeleton). These bones will likely be seen in broken sections of the sides of the hole and as bones appearing in the bottom of the hole and on the spoil heap.

3.1 Response by personnel in the event of a bone cluster find

The following responses should be undertaken by personnel in the event of bone cluster finds:

- **Action 1:** Immediately stop excavation in the vicinity of the potential material. Mark or flag the position as well as the spoil heap that may contain fossils;
- **Action 2:** Inform the site foreman and the ECO; and
- **Action 3:** The ECO is to inform the developer who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The ECO is then to describe the occurrence and provide images via email.

3.2 Response by Palaeontologist in the event of a bone cluster find

The palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established. It is likely that a Field Assessment by the palaeontologist will be carried out.

It will be probably be feasible to avoid the find and continue to the excavation farther along, or proceed to the next excavation, so that the work schedule is minimally disrupted. The response time/scheduling of the Field Assessment is to be decided in consultation with the developer/owner and the environmental consultant.

The Field Assessment could have the following outcomes:

- If a human burial, the appropriate authority is to be contacted. The find must be evaluated by a human burial specialist to decide if Rescue Excavation is feasible, or if it is a Major Find.
- If the fossils are in an archaeological context, an archaeologist must be contacted to evaluate the site and decide if Rescue Excavation is feasible, or if it is a Major Find.
- If the fossils are in a palaeontological context, the palaeontologist must evaluate the site and decide if Rescue Excavation is feasible, or if it is a Major Find.

4 RESCUE EXCAVATION

Rescue Excavation refers to the removal of the material from the “design” excavation. This would apply if the amount or significance of the exposed material appears to be relatively circumscribed and it is feasible to remove it without compromising contextual data. The time span for Rescue Excavation should be reasonable rapid to avoid any undue delays, e.g. one to three days and definitely less than one week.

In principle, the strategy during the mitigation is to “rescue” the fossil material as quickly as possible. The strategy to be adopted depends on the nature of the occurrence, particularly the density of the fossils. The methods of collection would depend on the preservation or fragility of the fossil and whether in loose or in lithified sediment. These could include:

- On-site selection and sieving in the case of robust material in sand; and
- Fragile material in loose sediment would be encased in blocks using Plaster-of-Paris or reinforced mortar.

If the fossil occurrence is dense and is assessed to be a “Major Find”, a carefully controlled excavation is required.

5 MAJOR FINDS

A Major Find is the occurrence of material that, by virtue of quantity, importance and time constraints, cannot be feasibly rescued without compromise of detailed material recovery and contextual observations.

5.1 Management Options for Major Finds

In consultation with the developer/owner and the environmental consultant, the following options should be considered when deciding on how to proceed in the event of a Major Find.

Option 1: Avoidance

Avoidance of the Major Find through project redesign or relocation. This ensures minimal impact to the site and is the preferred option from a heritage resource management perspective. When feasible, it can also be the least expensive option from a construction perspective.

The find site will require site protection measures, such as erecting fencing or barricades. Alternatively, the exposed finds can be stabilised and the site refilled or capped. The latter is preferred if excavation of the find will be delayed substantially or indefinitely. Appropriate protection measures should be identified on a site-specific basis and in wider consultation with the heritage and scientific communities.

This option is preferred as it will allow the later excavation of the finds with due scientific care and diligence.

Option 2: Emergency Excavation

Emergency excavation refers to the “no option” situation where avoidance is not feasible due to design, financial and time constraints. It can delay construction and emergency excavation itself will take place under tight time constraints, with the potential for irrevocable compromise of scientific quality. It could involve the removal of a large, disturbed sample by an excavator and conveying this by truck from the immediate site to a suitable place for “stockpiling”. This material could then be processed later.

Consequently, the emergency excavation is not the preferred option for a Major Find.

6 EXPOSURE OF FOSSIL SHELL BEDS

6.1 Response by personnel in the event of intersection of fossil shell beds

The following responses should be undertaken by personnel in the event of intersection with fossil shell beds:

- **Action 1:** The site foreman and ECO must be informed;
- **Action 2:** The responsible field person (site foreman or ECO) must record the following information:
 - Position (excavation position);
 - Depth of find in hole;
 - Digital image of the hole showing the vertical section (side); and
 - Digital images of the fossiliferous material.
- **Action 3:** A generous quantity of the excavated material containing the fossils should be stockpiled near the site, for later examination and sampling;
- **Action 4:** The ECO is to inform the developer who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The ECO is to describe the occurrence and provide images via email.

6.2 Response by the palaeontologist in the event of fossil shell bed finds

The palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established. This will most likely be a site visit to document and sample the exposure in detail, before it is covered up.

7 EXPOSURE OF FOSSIL WOOD AND PEATS

7.1 Response by personnel in the event of exposure of fossil wood and peats

The following responses should be undertaken by personnel in the event of exposure of fossil wood and peats:

- **Action 1:** The site foreman and ECO must be informed;
- **Action 2:** The responsible field person (site foreman or ECO) must record the following information:
 - Position (excavation position);
 - Depth of find in hole;
 - Digital image of the hole showing the vertical section (side); and
 - Digital images of the fossiliferous material.
- **Action 3:** A generous quantity of the excavated material containing the fossils should be stockpiled near the site, for later examination and sampling;
- **Action 4:** The ECO is to inform the developer who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The ECO is to describe the occurrence and provide images via email.

7.2 Response by the palaeontologist in the event of exposure of fossil wood and peats

The palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established. This will most likely be a site visit to document and sample the exposure in detail, before it is covered up.

8 MONITORING FOR FOSSILS

A regular monitoring presence over the period during which excavations are made, by either an archaeologist or palaeontologist, is generally not practical.

The field supervisor or foreman and workers involved in digging excavations must be encouraged and informed of the need to watch for potential fossil and buried archaeological material. Workers seeing potential objects are to report to the field supervisor who, in turn, will report to the ECO. The ECO will inform the archaeologist and/or palaeontologist contracted to be on standby in the case of fossil finds.

To this end, responsible persons must be designated. This will include hierarchically:

- The field supervisor or foreman who is going to be most often in the field;
- The ECO for the project;



- The Project Manager

Should the monitoring of excavations be stipulated in the Archaeological Impact Assessment and/or the Heritage Impact Assessment, the contracted Monitoring Archaeologist (MA) can also monitor for the presence of fossils and make a field assessment of any material brought to attention. The MA is usually sufficiently informed to identify fossil material and this avoids additional monitoring by a palaeontologist. In shallow coastal excavations, the fossils encountered are usually in an archaeological context.

The MA then becomes the responsible field person and fulfils the role of liaison with the palaeontologist and coordinates with the developer and the ECO. If fossils are exposed in non-archaeological contexts, the palaeontologist should be summoned to document and sample/collect them.