



Archaeological Impact Assessment

HERITAGE

UNIT

Res Gen SA Boikarabelo Coal Mine
Project on portions of the farms
Orsono 700 LQ, Zeekoevley 421 LQ,
Vischpan 274 LQ, Kruishout 271 LQ,
Kalkpan 243 LQ, Witkopje 238 LQ,
and Diepspruit 386LQ, District
Lephalale, Limpopo

Version 1.0

16 March 2010

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EXECUTIVE SUMMARY

Professional Grave Solutions - Heritage Unit was appointed by Digby Wells & Associates to undertake a Phase 1 Archaeological Impact Assessment that forms part of the Environmental Management Programme for the proposed Res Gen SA Boikarabelo Coal Mine Project on portions of the farms Orsono 700 LQ, Zeekoevley 421 LQ, Vischpan 274 LQ, Kruishout 271 LQ, Kalkpan 243 LQ, Witkopje 238 LQ, and Diepspruit 386 LQ, District Lephhalale, Limpopo.

During the survey a total of 27 sites were identified of which 2 sites were identified as contemporary cemeteries, and 25 was identified as archaeological.

The floodplain region as created along the Limpopo River is similar to the floodplain around the Mapungubwe area, with large areas that could be classified as wetlands. The large settlement concentration that is evident in the Koert Louw Zyn Pan area, just east of the current study area, as well as those identified during archaeological surveys on the Botswana side of the Limpopo River indicates a similar settlement density or trend as in the Mapungubwe landscape.

The surveys conducted, by Lentswe Archaeological Consultants (2008-9) and Matakoma Heritage Consultants (2006), in the Botswana floodplains just to the north of the current study area and by PGS Heritage Unit (2009) on Koert Louw Zyn Pan, just east of the current study area, revealed large concentrations of archaeological sites in an area previously identified as having low archaeological value. Most of the sites identified, and later excavated, during the Botswana survey has shown cultural affinities to the Letsibogo and Toutswe ceramic facies from the Moloko and Nkope Branch respectively. Preliminary evaluation of the fragmented finds of this survey has indicated similar affinities as well as possible ceramic facies related to the Moloko branch. These preliminary finds and extrapolation of the Botswana data indicates possible new research on ceramic typological sequences previously sparsely researched in South Africa.

This information provides the background for the recommendations of mitigation on the archaeological sites identified during this survey.

The following table compiles the evaluation of all the heritage sites identified during the survey of the proposed mining area.

The Table combines the SAHRA field rating guideline, and evaluation of the physical impact envisaged on each site during mining. As now layout is known for the mining project it is presumed that all sites will be impacted on by mining. In the event that a mining layout has been identified the proposed mitigation process can be implemented on each of the impacted sites.

Table 1 - Summary table of heritage resources and classifications

Site Name	Impact Significance	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
Site001	13	GP.C	2	1	6	4	No further mitigation - Monitoring
Site002	13	GP.B	2	1	6	4	Phase 2 STP
Site003	13	GP.B	2	1	6	4	Phase 2 STP
Site004	13	GP.B	2	1	6	4	Phase 2 Mapping and test excavation
Site005	13	GP.A	2	1	6	4	Demarcate and monitor
Site006	13	GP.C	2	1	6	4	Phase 2 STP
Site007	13	GP.C	2	1	6	4	Mapping and destruction permit
Site008	13	GP.A	2	1	6	4	Further palaeontological investigation
Site009	13	GP.A	2	1	6	4	Phase 2 Extensive Documentation
Site010	13	GP.A	2	1	6	4	Phase 2 Extensive Documentation
Site 011	13	GP.C	2	1	6	4	No further mitigation - Monitoring
Site012	13	GP.B	2	1	6	4	Phase 2 Extensive Documentation
Site013	13	GP.C	2	1	6	4	No. further mitigation - monitor
Site014	13	GP.B	2	1	6	4	Phase 2 Mapping and test excavations
Site015	13	GP.C	2	1	6	4	No further mitigation - Monitoring
Site016	13	GP.C	2	1	6	4	No further mitigation - Monitoring
Site017	13	GP.C	2	1	6	4	Phase 2 STP
Site018	13	GP.B	2	1	6	4	Phase 2 STP
Site019	13	GP.C	2	1	6	4	Phase 2 STP
Site020	13	GP.C	2	1	6	4	Phase 2 STP
Site021	13	GP.C	2	1	6	4	Phase 2 STP
Site022	13	GP.B	2	1	6	4	Phase 2 STP
Site023	13	GP.A	2	1	6	4	Demarcate and monitor
Site024	13	GP.B	2	1	6	4	Phase 2 Mapping and test excavations
Site025	13	GP.B	2	1	6	4	Phase 2 Mapping and test excavations
Site026	13	GP.C	2	1	6	4	Phase 2 STP
Site027	13	GP.C	2	1	6	4	Phase 2 STP

Mitigation Description

No further mitigation – Monitoring

Finds at the sites indicate the presence of possible archaeological material. No further mitigation work is required, it is however recommended that the destruction of the site be monitored by a professional archaeologist to identify any significant archaeological deposits.

Procedures need to be agreed upon for the mitigation of such significant finds during destruction of the site.

The following mitigation measures will require:

- An excavation permit issued by South African Heritage Resources Agency (SAHRA) under Section 35 of the National Heritage Resources Act; and
- With the backing of the report documenting the mitigation of each site a permit for the destruction of the relevant sites will be issued by SAHRA.

Phase 2 STP (Shovel Test Pit)

This implies that the site needs to be documented through the placement of a shovel test grid over the extent of the site to identify the possible existence of archaeological remains. The STP method is often used by archaeologists to identify the distribution of artifact concentrations, soil changes, and architectural remains on the landscape, and is thus well suited to pinpointing the locations of possible sites where further investigation may be necessary.

Phase 2 Mapping and test excavations

Should as a minimum include:

- 1) Test excavations to salvage a representative sample of the material record;
- 2) Stratigraphic recording; and
- 3) Investigation of dating possibilities.

Phase 2 Extensive Documentation

This implies the documentation of the site and a systematic representative sampling of the artefacts is necessary.

The documentation of the site should as a minimum include:

- 1) Excavations to salvage a representative sample of the material record;

- 2) Stratigraphic recording; and
- 3) Investigation of dating possibilities.
- 4) Identification of layout and cultural affinities

The following general mitigation measures are recommended:

- When the final layout plan is established for the mine it must be assessed whether any other sites will be impacted upon by roads, services, transmissions lines etc. The appropriate mitigation measures must be employed for these sites
- A Monitoring plan or watching brief must be agreed upon by all the stakeholders for the different phases of the project. An archaeologist is employed by the developer to monitor the excavation of foundation and service trenches, landscaping and any other intrusive work. The developer undertakes to give the archaeologist sufficient time to identify and record and archaeological finds and features.
- If during construction any possible finds are made, the operations must be stopped and the qualified archaeologist be contacted for an assessment of the find.
- A heritage resources management plan must be developed for managing the heritage resources in the study area during construction and operation of the development. This includes basic training for construction staff on possible finds, action steps for mitigation measures, surface collections, excavations and communication routes to follow in the case of a discovery.

Refer to Section 10 of the document for further guidelines for heritage resources management for the mining project.

CONTENTS

1. INTRODUCTION	5
2. APPROACH AND METHODOLOGY	5
2.1. PROJECT DESCRIPTION.....	5
2.2 PHYSICAL SURVEYING	12
3. LEGISLATIVE REQUIREMENTS AND TERMINOLOGY	12
3.1 Legislation	12
3.2 Abbreviations and Terminology	13
4. ASSESSMENT CRITERIA.....	14
4.1 IMPACT.....	15
4.1.1 Nature and existing mitigation	15
4.2 EVALUATION.....	15
4.2.1 Site Significance.....	15
4.2.2 Impact Rating.....	16
5. BACKGROUND OF AREA.....	19
5.1 ARCHAEOLOGICAL BACKGROUND	19
6. SITES OF SIGNIFICANCE	24
6.1 Site 001.....	27
6.2 Site 002.....	29
6.3 Site 003.....	31
6.4 Site 004.....	33
6.5 Site 005.....	36
6.6 Site 006.....	38
6.7 Site 007.....	40
6.8 Site 008.....	42
6.9 Site 009.....	44
6.10 Site 010.....	47
6.11 Site 011	50
6.12 Site 012.....	52
6.13 Site 013.....	55
6.14 Site 014.....	57
6.15 Site 015.....	60
6.16 Site 016.....	61
6.17 Site 017.....	62
6.18 Site 018.....	64
6.19 Site 019.....	66
6.20 Site 020.....	68
6.21 Site 021.....	70

6.22 Site 022	72
6.23 Site 023	74
6.24 Site 024	75
6.25 Site 025	77
6.26 Site 026	79
6.27 Site 027	80
7. ASSUMPTIONS AND LIMITATIONS	80
8. LEGAL AND POLICY REQUIREMENTS	80
8.1 General principles	80
8.1 Graves and cemeteries	82
9. ASSESSMENT AND RECOMMENDATIONS.....	82
10. MANAGEMENT GUIDELINES AND PROCEDURES	86
10.1 ROLES AND RESPONSIBILITIES	89
10.2 IMPACT MANAGEMENT.....	90
10.2.1 Pre-construction phase.....	90
10.2.2 Construction phase	90
10.2.3 Operational phase	92
10.2.4 Decommissioning and closure phase	92
11. LIST OF PREPARES	93
12. REFERENCES.....	93

ANNEXURE

ANNEXURE A – Study area and heritage sites

List of Figures

Figure 1 – Locality Map	11
Figure 2 – Bush conditions during February 2010 survey	25
Figure 3 – Bush conditions during September 2009 survey	25
Figure 4 – Siding area on Diepspruit 386 LQ	26
Figure 5 – Bush conditions in siding area	26
Figure 6 - General view of site	27
Figure 7 - Potshards found on site	28
Figure 8 - General view of site	29
Figure 9 - Potshards found on site	30
Figure 10 - General view of site.....	31
Figure 11 - Potshards on site	32

Figure 12 - General view of site.....	33
Figure 13 - Potshards on site	34
Figure 14 - Lower grinding stones found on site.....	35
Figure 15 - General view of site.....	36
Figure 16 - Stone packed grave on site.....	37
Figure 17 - General view of site.....	38
Figure 18 - Potshards found on site	39
Figure 19 - General view of site.....	40
Figure 20 - General view of site.....	42
Figure 21 - Fossilised imprint.....	43
Figure 22 - General view of site.....	44
Figure 23 - Lower grinder.....	45
Figure 24 - Grain bin platform	45
Figure 25 - General view of site.....	47
Figure 26 -Potshards found on site	48
Figure 27 - Ash deposit.....	49
Figure 28 - View of site with animal burrows.....	50
Figure 29 - Lower grinding stone.....	51
Figure 30 - View of site with animal burrows.....	52
Figure 31 - Potshards found on site	53
Figure 32 - Ash deposit.....	53
Figure 33 - General view of site.....	55
Figure 34 - Lower grinding stone.....	56
Figure 35 - General view of site.....	57
Figure 36 - Undecorated shards on site	58
Figure 37 - Grinding stone found on site.....	58
Figure 38 - General view of site.....	60
Figure 39 - General view of site.....	61
Figure 40 - View of site	62
Figure 41 - Potshards found on site	63
Figure 42 - General site conditions.....	64
Figure 43 - Potshards found on site	65
Figure 44 - General view of site.....	66
Figure 45 - Potshards found on site	67
Figure 46 - General view of site	68
Figure 47 - Potshards on site	69
Figure 48 - General view of site.....	70
Figure 49 - Potshards found on site	71

Figure 50 - View of site	72
Figure 51 - Potshards found on site	73
Figure 52 - General view of site.....	74
Figure 53 - Collection of animal bone and potshards from midden	75
Figure 54 - Potshards found on site	76
Figure 55 - Lower grinding stone found on site	77
Figure 56 - General view of site at foot of ridge	78

List of Tables

Table 1 - Summary table of heritage resources and classifications	iv
Table 2 - South African Heritage Resources - Archaeological Grading Table.....	16
Table 3 - Probability.....	16
Table 4 - Extent	16
Table 5 - Duration	18
Table 6 - Intensity	18
Table 7 - Significance Rating.....	18
Table 8 -: Archaeological context: Sequence and definitions	19
Table 9 - Summary table of heritage resources and classifications	84
Table 10: Roles and responsibilities of archaeological and heritage management.....	90

1. INTRODUCTION

Professional Grave Solutions - Heritage Unit was appointed by Digby Wells & Associates to undertake a Phase 1 Archaeological Impact Assessment that forms part of the Environmental Management Programme for the proposed Res Gen SA Boikarabelo Coal Mine Project on portions of the farms Orsono 700 LQ, Zeekoevley 421 LQ, Vischpan 274 LQ, Kruishout 271 LQ, Kalkpan 243 LQ, Witkopje 238 LQ, and Diepspruit 386 LQ, District Lephalale, Limpopo.

The aim of the study is to identify all heritage sites, document, and assess their importance within Local, Provincial and National context. From this we aim to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

The report outlines the approach and methodology utilised before and during the survey, which includes in Phase 1: Information collection from various sources and public consultations; Phase 2: Physical surveying of the area on foot and by vehicle; and Phase 3: Reporting the outcome of the study.

During the survey 27 heritage sites were identified.

General site conditions and features on site were recorded by means of photos, GPS location, and description. Possible impacts were identified and mitigation measures are proposed in the following report.

2. APPROACH AND METHODOLOGY

The aim of the study is to study data available to compile a background history of the study area; this was accomplished by means of the following phases.

2.1. PROJECT DESCRIPTION

Digby Wells & Associates (DWA) is undertaking a comprehensive environmental assessment for Res Gen SA Boikarabelo Coal Mine who intends to submit a mining right application for the farm in question. The environmental investigations will include an Environmental Impact Assessment in support of South African legislation as well as a bankable feasibility chapter in terms of World Bank Standards.

Coal deposit

The Boikarabelo Coal Mine project is located in the Waterberg coal field which forms part of the Karoo sequence. The coal deposit is fault situated along the Southern and Northern margins and all the classical units of the Karoo sequence are present in this deposit and hence the same nomenclature is applied as in the Karoo basin. The combined Grootegeluk and Vryheid formations represent a stratigraphic thickness of at least 120 meters and are grouped into 11 coal bearing zones that can be correlated across the entire deposit (MWP, 2009).

The most economically viable seams are those found in the zones 2 to 11, and these are expected to be mined. The estimated resource is approximately 4.5 billion tonnes of which there is a measured resource of 411 million tonnes. (MWP, 2009).

ROM and LoM

The total ROM coal to be extracted is estimated at 18Mt per annum ROM, for the first five years, and as from the sixth year of production, it is estimated to increase to 32 Mt per annum ROM during the remaining LoM of which is estimated at 30 years.

Mining method

The mining method which will be undertaken is described as opencast bench method. This involves the utilising of trucks and shovels to excavate the open pit. The pit will be created by establishing a box cut, followed by the creation of mining benches which vary in width. Ramps will be used to access the coal and enable mining to be continued at various depths and widths. The topsoil is initially stripped, followed by the overburden. The topsoil is stockpiled to be used for rehabilitation. The overburden will be stockpiled adjacent to the pit area. The coal benches can then be created at the different widths and depths, dependant on the individual coal seams. The coal is then extracted. The product will be transported to the wash plant where it will be and stockpiled in the ROM) stockpile while awaiting further beneficiation.

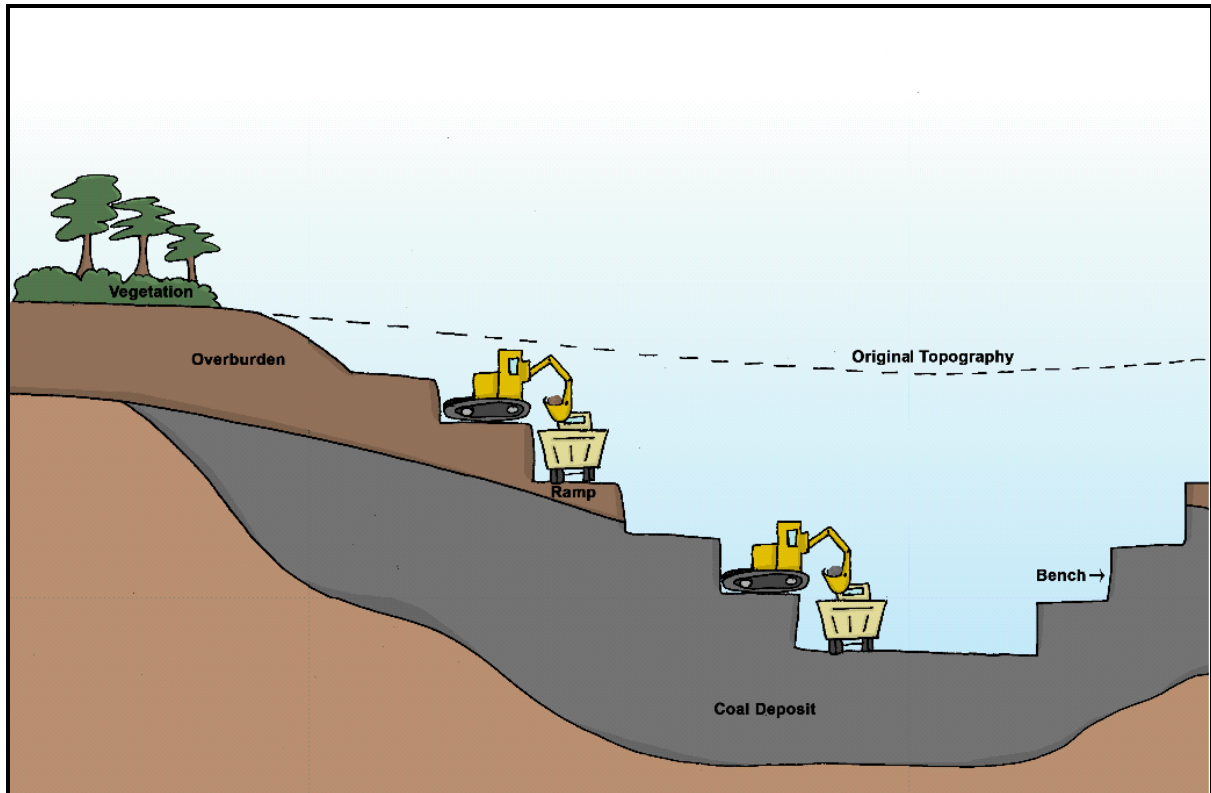


Illustration of bench mining method

Coal processing

Raw ROM coal will be transported by coal haulers to a ROM tip, and after passing progressively through Bradford breakers for crushing to an ultimate 0 x 50 mm topsize, will be processed in a high gravity wash circuit consisting of modular cyclones. Export quality coal will be extracted and stockpiled separately from the Eskom fraction which will be processed through a secondary wash. Discard from the coal washing process will be disposed of within a designed coal discard dump.

Coal market

The Eskom product will be sold at mine gate and deliveries will take place to the power station as arranged by Eskom. The export quality coal will be dispatched by rail to Richards Bay (or an alternative port), where it will be sold Free On Board into the European, Asian and Indian markets on long term contracts and also into the spot market.

Mine infrastructure and servitudes

Various mining infrastructure will be constructed within the project area which has been illustrated on. This infrastructure will include the following:

Coal washing plant;

Offices;

Change house;

Workshops and hard park areas;

Sewage treatment works;

Water treatment plant;

Pollution control dams;

Water storage dams;

Haul roads;

Water diversion berms;

Topsoil, overburden and coal stockpiles;

Explosive magazine;

Electricity distribution and

Water pipelines

Coal will be transported 50km from site to coal loading area facility on a Portion of the farm Diepspruit 385 LQ. Coal will be stockpiled (temporarily) then loaded onto wagons; and sent via rail to ESKOM facility or export terminal.

During operation of the mine a conveyor belt will be built from Boikarabelo Coal Mine to the new Eskom power station to be built in the Steenbok Pan area.

Activities

Phase	Activity	Description
Construction		Recruitment, procurement and employment
		Transport of construction material
		Removal of topsoil
		Development of haul roads
		Construction of surface infrastructure including wash plant, offices, pipelines, powerlines
		Construction of storm water diversion berms and stockpiling of soil and overburden from initial cuts
		Storage of hydrocarbon and explosives
		Blasting and development of initial bench for mining
		Temporary waste management
Operation		Removal of overburden –drilling and blasting
		Use and maintenance of haul roads and transportation of coal
		Mining process removal of coal (bench mining)
		ROM coal Stockpile
		Operation of coal wash plant and coal discard facility
		Operation of fuel depot and hazardous waste storage and removal
		Water use on site, storage of water and water treatment
		Operation of pollution control dam and storm water management systems
		Management of stockpiles and berms
		Development and operation of a general waste site
		Operation of a sewage effluent treatment plant
		Rehabilitation as mining progresses via backfilling of overburden (where possible)
Decommissioning		Retrenchment
		Removal of all infrastructure

		Rehabilitation of void (where possible)
		Spreading of sub-soils and topsoil (where possible)
		Re-vegetation areas disturbed by infrastructure
		Profiling and contouring to assist in drainage lines
		Environmental monitoring of decommissioning activities
Post-closure phase		Post-closure monitoring and rehabilitation

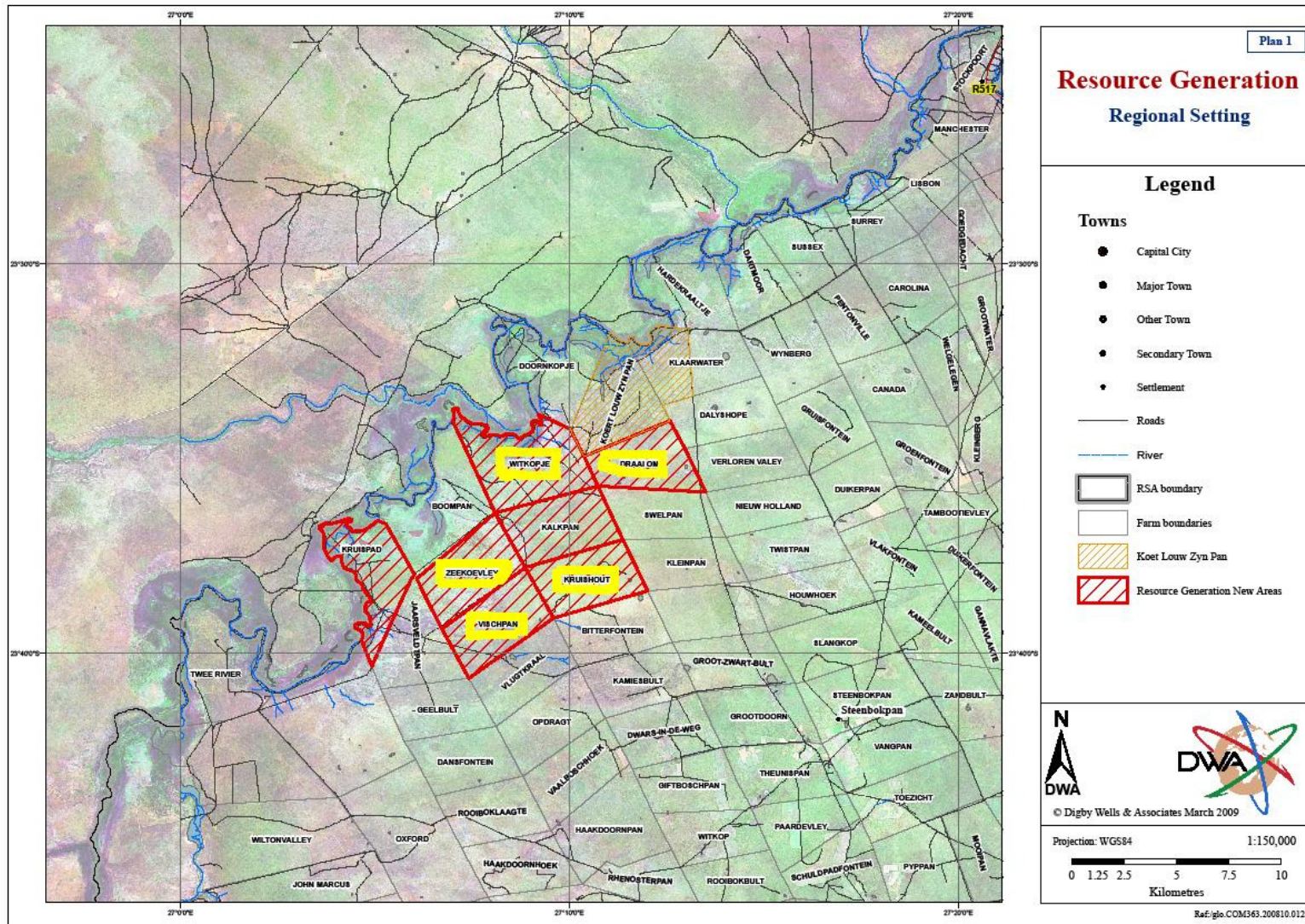


Figure 1 – Locality Map

2.2 PHYSICAL SURVEYING

The project area comprises of approximately 2700 ha. Due to the nature of cultural remains, the majority that occur below surface, a physical walk through of the study area was conducted. A controlled-exclusive surface survey was conducted over a period of 30 days, by means of vehicle and extensive surveys on foot by PGS.

Aerial photographs and 1:50 000 maps of the area were consulted and literature of the area were studied before undertaking the survey. The purpose of this was to identify topographical areas of possible historic and pre-historic activity. All sites discovered both inside and bordering the proposed development area was plotted on 1:50 000 maps and their GPS co-ordinates noted. 35mm photographs on digital film were taken at all the sites.

Track logs of the physical survey are also available on request.

3. LEGISLATIVE REQUIREMENTS AND TERMINOLOGY

3.1 Legislation

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

- ii. National Environmental Management Act (NEMA) Act 107 of 1998;
- iii. National Heritage Resources Act (NHRA) Act 25 of 1999;
- iv. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002;
and
- v. Development Facilitation Act (DFA) Act 67 of 1995.

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

- i. National Environmental Management Act (NEMA) Act 107 of 1998
 - a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
 - b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
 - c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
 - d. Environmental Management Plan (EMP) – Section (34)(b)
- ii. National Heritage Resources Act (NHRA) Act 25 of 1999

- a. Protection of Heritage resources – Sections 34 to 36; and
- b. Heritage Resources Management – Section 38
- iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
 - a. Section 39(3)
- iv. Development Facilitation Act (DFA) Act 67 of 1995
 - a. The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development Facilitation Act, 1995. Section 31.

3.2 Abbreviations and Terminology

ASAPA:	Association of South African Professional Archaeologists
CRM:	Cultural Resource Management
DEAT:	Department of Environmental Affairs and Tourism
DWAF:	Department of Water Affairs and Forestry
EIA practitioner:	Environmental Impact Assessment Practitioner
EIA:	Environmental Impact Assessment
EIA:	Early Iron Age
ESA:	Early Stone Age
GPS:	Global Positioning System
HIA:	Heritage Impact Assessment
I&AP:	Interested & Affected Party
LSA:	Late Stone Age
LIA:	Late Iron Age
MSA:	Middle Stone Age
MIA:	Middle Iron Age
NEMA:	National Environmental Management Act
NHRA:	National Heritage Resources Act
PHRA:	Provincial Heritage Resources Agency
PSSA:	Paleontological Society of South Africa
ROD:	Record of Decision
SAHRA:	South African Heritage Resources Agency
STP:	Shovel Test Pit

Archaeological resources

This includes:

- i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;

- ii. rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- iii. wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- ii. carrying out any works on or over or under a place;
- iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- iv. constructing or putting up for display signs or boards;
any change to the natural or existing condition or topography of land;
- v. any removal or destruction of trees, or removal of vegetation or topsoil

Heritage resources

This means any place or object of cultural significance

4. ASSESSMENT CRITERIA

This chapter describes the evaluation criteria used for the sites listed below.

The significance of archaeological sites was based on four main criteria:

- **site integrity** (i.e. primary vs. secondary context),

- **amount of deposit, range of features** (e.g., stonewalling, stone tools and enclosures),
- **uniqueness** and
- **potential** to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;

B - Mapping of the site and controlled sampling required;

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

D - Preserve site

Impacts on these sites by the development will be evaluated as follows

4.1 IMPACT

The potential environmental impacts that may result from the proposed development activities.

4.1.1 Nature and existing mitigation

Natural conditions and conditions inherent in the project design that alleviate (control, moderate, curb) impacts. All management actions, which are presently implemented, are considered part of the project design and therefore mitigate against impacts.

4.2 EVALUATION

4.2.1 Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised

Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.C)	-	Low Significance	Destruction

Table 2 - South African Heritage Resources - Archaeological Grading Table

4.2.2 Impact Rating

Each impact identified will be assessed in terms of probability (likelihood of occurring), extent (spatial scale), intensity (severity) and duration (temporal scale). To enable a scientific approach to the determination of the impact significance (importance), a numerical value will be linked to each rating scale. The sum of the numerical values will define the significance. The following criteria will be applied to the impact assessment for the project.

Table 3 - Probability

Category	Rating	Description
Definite	3	More than 90 percent sure of a particular factor of the likelihood of that impact occurring
Probable	2	70 to 89percent sure of a particular factor of the likelihood of that impact occurring
Possible	1	40 to 69percent sure of a particular factor of the likelihood of that impact occurring
Improbable	0	Less than 40 percent sure of a particular factor of the likelihood of that impact occurring

Table 4 - Extent

Category	Rating	Description
Site	1	Immediate project site
Local	2	Up to 5 km from the project site
Regional	3	20 km radius from the project site

Provincial	4	Limpopo Province
National	5	South African
International	6	Neighbouring countries/overseas

Table 5 - Duration

Category	Rating	Description
Very short-term	1	Less than 1 year
Short-term	2	1 to 4 years
Medium-term	3	5 to 10 years
Long-term	4	11 to 15 years
Very long-term	5	Greater than 15 years
Permanent	6	Permanent

Table 6 - Intensity

Category	Rating	Description
Very low	0	Where the impact affects the environment in such a way that natural, cultural and social functions are not affected
Low	1	Where the impact affects the environment in such a way that natural, cultural and social functions are only marginally affected
Medium	2	Where the affected environment is altered but natural, cultural and social function and processes continue albeit in a modified way
High	3	Where natural, cultural or social functions or processes are altered to the extent that they will temporarily cease
Very high	4	Where natural, cultural or social functions or processes are altered to the extent that they will permanently cease

Table 7 - Significance Rating

Score	Significance Rating
2 – 4	Low
5 – 7	Low to Moderate
8 – 10	Moderate
11 - 13	Moderate to High
14 – 16	High
17 – 19	Very High

5. BACKGROUND OF AREA

5.1 ARCHAEOLOGICAL BACKGROUND

The following section is provided with input from Professional Grave Solutions - Botswana.

The southern African archaeological environment is divided into the Stone Age, the Iron Age and the Historical Period.

The Stone Age is identified in the archaeological record through stone being the primary raw material used to produce tools and is associated with hunter-gatherer lifestyles.

Iron Age people, known for their skill to manufacture ceramics, work iron and other metals, and who also practiced agriculture and animal husbandry, are associated with aggregated lifestyles, forming kingships and civilisations.

The Historical Period is marked by the advent of writing, in southern Africa primarily associated with the first European travellers (Mitchell 2002). During the latter part of the Later Stone Age (LSA) hunter-gatherers shared the landscape with both pastoralists and Early Iron Age people. A complex association of people, including LSA hunter-gatherers, Late Iron Age (LIA) people and colonial occupation (Lane & Reid 1998), marks the advent of the Historical period in southern Africa.

Table 8 -: Archaeological context: Sequence and definitions

PERIOD	APPROXIMATE DATES
Early Stone Age	> 2 000 000 years ago – 250 000/200 000 years ago
Middle Stone Age	250 000/200 000 years ago – 25 000 years ago
Later Stone Age	25 000 years ago – AD 200 (up to historic times in certain areas)
Early Iron Age	AD 200 – AD 900
Middle Iron Age	AD 900 – AD 1300
Late Iron Age	AD 1300 – AD 1850

The Stone Age

The Stone Age is divided into the Earlier (ESA), Middle (MSA) and Later Stone Age (LSA)

and refers to the earliest people of Southern Africa who mainly relied on stone for their tools.

The ESA may date back to approximately two million years ago and lasted until 250 000 years ago (Mitchell 2002). The ESA is typically divided into the earlier Oldowan and the later Acheulean Complexes, focusing primarily on core technology. An assemblage at Sterkfontein Cave, Gauteng, represents the Oldowan complex. The Acheulean is identified by hand axes and cleavers as prime artefacts and is geographically widespread. (Sampson 1974).

The lithic assemblage of the MSA (500 000 to 40 000 years ago) is characterised by blade and flake technology, often in association with prepared platforms. Formal tools include retouched points, blades, segments, knives and a variety of scraper forms.

LSA (40 000 years ago to the early nineteenth century) deposits comprise macro- and microlithic Industries, featuring composite tools. The LSA is further associated with symbolic human behaviour, including the manufacture of jewellery and formal burial of the dead. Paintings and engravings are often associated with LSA San hunter-gatherer communities (Mitchell 2002).

The Iron Age Traditions

The earliest identified Iron Age tradition in east-central Botswana is the Happy Rest facies (dating from approximately 400 AD to 700 AD). The Happy Rest people settled in the gorges of the Tswapong range in small villages comprising of stone platform houses (Denbow 1984). The earliest remains were found at Maunatlala dating to 400 AD and at Goo-Tau in the Tswapong Hills (Campbell 1998). The Happy Rest facies developed into the Diamant facies, present in the archaeological record until approximately 900 AD. A further development of the Diamant facies into the Eiland facies in the former Transvaal continued until the fifteenth century in South-Eastern Botswana region as the Broadhurst facies (Denbow 1981).

A second Iron Age tradition, the Zhizo facies (700 AD to 1000 AD), settled in Eastern Botswana, becoming the Toutswe facies at 1000 AD. The movement of Leokwe people from the Shashe-Limpopo into the area around 1000 AD initiated the start of the Toutswe chiefdom. By 1050 AD there were three large villages situated on hilltops (Toutswe mogale, Bosutswe and Sung) occupying six or more hectares. These Toutswe people living on hilltops were the wealthiest, while the less affluent built their villages on surrounding hills. The poorer people lived in much smaller villages on the hills below.

Toutswe village layout always consisted of a central cattle byre/midden surrounded by houses and granaries with some grain pits in the byres/middens (Denbow 1982). The Toutswe facies disappeared by 1280 AD followed by the fall of the Mapungubwe State by 1290 AD (Huffman 2000). Current research shows the boundaries of the Toutswe chiefdom extending to the Palapye-Mahalapye-Shoshong area (Denbow 1983). Their material culture included beads, pottery, iron implements, furnace remains, spindle whorls and clay figurines found in the middens.

After the decline of the Mapungubwe civilisation (1290 AD), the cultural metropolis shifted to Great Zimbabwe. The Great Zimbabwe civilisation thrived on gold and ivory trade with the east coast. Other commodities traded included woven bark cloth, iron implements, exotic furs and dogs (Tlou & Campbell 2003). With the fall of Great Zimbabwe by 1450 AD, and the rise of the Rozwi Mambo in 1440 AD, the capital shifted further west to Khami, Zimbabwe. Under the Rozwi, gold mining in the Tati area (Botswana) continued, but the lack of specialized Kalanga mining traditions and diminishing water resources resulted in total disappearance of the industry by the eighteenth century.

The Rozwi Mambo was overthrown by Changamire I, and political turmoil continued to characterize the area until the early sixteenth century when the province became independent under Changamire II, who re-established the Monomotapa kingdom. In the early nineteenth century, the Monomotapa kingdom was reduced to a small chiefdom. At the time the proto-Venda of Monomotapa left, crossing the Limpopo to settle in the Soutpansberg mountains of South Africa. The Rozwi dynasty survived until the 1860s when the last effective Mambo died when besieged by the Nguni, and the Rozwi remnants fled to the west, settling in Botswana (Huffman 1986, Tlou & Campbell 2003; Van Waarden 1998).

It was during the early nineteenth century that the Mambo appointed his son Mengwe to the Kalanga paramouncy. After Mengwe, succession to the Kalanga paramouncy was finally lost to the Ndebele and in the late nineteenth century to the Ngwato. The exact area of Kalanga rule is not known but it is generally accepted that it stretched to the Shoshong hills of the Central District in the south from western Zimbabwe in the north.

The people that further added to the cultural mixture of the Central District, were the Sotho-Tswana. The Sotho-Tswana core is archaeologically characterised by the Uitkomst and Buispoort ceramic facies. Wealth in cattle (and metal) resulted in rapid population growth, complex hierarchical social systems and associated fission, dispersal and

migration. By the end of the eighteenth century, the original Bankenveld territory was saturated. Westward expansion was characterised by more stable chiefdoms located on a grid of trade communications and localized production of commodities (Parsons 1973; Tlou & Campbell 2003).

The same cultural process thus led not only to the rise but also the destruction of the Sotho-Tswana chiefdoms, when Shaka's circa 1818 revolution resulted in the difaqane. The original Iron Age cultural pattern of southern Africa is thus expressed in the pre-difaqane chiefdoms. Shattered by the difaqane, the system was replaced in the 1840-70s by a new State system motivated by long distance trade (and ultimately overseas capitalist trade) (Schapera 1953).

The Khurutshe were the first Hurutshe cluster offshoot to dominate part of the Central District, settling in the Shoshong hills. Khurutshe is the Shona name given to Hurutshe who reached the north. The Kaa joined the Khurutshe and paid tribute to them, but famine led many Khurutshe to head further north. The Kaa rose up and subdued the remaining Khurutshe. In turn they were joined by tributary Kgalagadi and Kalanga and by 1770 AD to 1790 AD by tributary Ngwato. The Lesele-Khurutshe accompanied or led the Ngwato to the Shoshong hills in the late eighteenth century.

The Kaa were an early offshoot of the central Rolong. The Kaa separated from the main clan around 1 500 AD and moved to the Gaborone area (Schapera 1953). By 1650 AD, under chief Mmopane, they moved to the Buffelsdrift area. After moving along the Limpopo River they finally settled at the Shoshong Hills, encountering the Khurutshe at the hills, replacing them. Currently the Kaa are associated with the Letsibogo ceramic facies (Biemond 2009).

The Bapofu confederacy migrated from the north and settled at Mabyanamatshaana near Brits in the Northwest province of South Africa under chief Malope. He had a daughter called Mohurutshe in his first house and a son, Kwena, in the second house. Following his death, the people became divided and those who followed Mohurutshe were called BaHurutshe, and those who followed Kwena were called BaKwena (Tlou & Campbell 2003).

The Ngwato chiefdom originated from the Kwena cluster of the Bapofu confederacy. Ngwato is credited with having founded the clan in the sixteenth century, and it remained a section of the Kgabo-Kwena (Kwena of Sechele) chiefdom until the late eighteenth century. The Ngwato were probably an ancient section of the Kwena, with

the north-west portion ascribed as their territorial area (Parsons 1973). Prior to the difaqane, the Hurutse was the senior chiefdom of the Bapofu confederacy, centered at KaDitshwene, South Africa, circa 1823 (Schapera 1953). Kwena economic activities focused on agriculture and livestock, manufacturing, mining, transport and trade. The Kwena became known for their skill in mining, smelting and refining of metal ore; a trade that always retained a lower status than pastoralism. A low level of capitalization existed in transport and trade but no merchant class was independent of the chieftaincies. Trade beads (blue glass and porcelain of foreign origin) became possibly the most important monetary medium (Tlou & Campbell 2003).

The Ngwato were a section of the Kgabo-Kwena under Kgabo I or Kgabo II. After their arrival in the Kweneng District they expelled the Kgalagadi, and Motshodi, grandson of Kgabo II became Kgosi (1740 AD). Motshodi was succeeded by his grandson Motswasele I. The Ngwato-Kwena section, under Motswasele, broke away from the Kgabo-Kwena. The first independent Ngwato Kgosi was Mathiba, who succeeded his regent uncle Mokgadi. Friction between Mathiba and Motswasele peaked when a Ngwato woman deserted her husband for Motswasele. Her husband's revenge led to a counter attack by Motswasele and the Ngwato fled to Shoshong (1780 AD).

Factionalism and impermanence of residence eventually led Mathiba's Ngwato to split in two. His sons, Kgama and Tawana, also disputed the inheritance of chieftainship. Kgama won and Tawana and his followers retired to the Boteti River and finally Ngamiland, where he founded the Tawana chiefdom. Mathiba followed his favourite son Tawana, but was spurned and returned to the Shoshong hills. After being rejected also by Kgama, he committed suicide in 1795 AD.

After Kgama's involvement in the 'Molosiwa' rebellion, the Ngwato community was reduced in numbers and much weakened. The geo-political picture of the Central District at the beginning of the nineteenth century was one with many small, highly mobile clans, in a large and poorly watered territory, with no effective paramountcy. Only in the Shosong hills did communities, including the Ngwato, pay tribute to the Kaa. After the Kaa discovered that the Ngwato had planned to usurp them, Kgama fled to Selolwane and Meojaneng, north of Serowe. Here he was joined by the rebels of Molosiwa. Kgama I died in about 1817. His son Kgari inherited a reconsolidated Ngwato clan.

Under Kgari, the Ngwato first emerged as a kingdom organized around the Ngwato core-group. Kgari transformed the old system into one of headmen on a national scale and formed the last of the four sections in which the wards of the Ngwato state were

arranged (Ditimamodimo, Basimane, Maaloso and Maaloso-a-ngwana). He continued to amalgamate smaller communities into his kingdom. Kgari died (ruled c. 1817-1828) after the battle of the 'Flodden of the BaNgwato', a battle in the valley of the Matopo hills.

The Ngwato were dispersed by the Kololo and Ndebele invasions of the difaqane and the kingdom had to be regrouped by Kgari's son Sekgoma I. He expelled the Kaa from the Shoshong heartland in 1849, signifying the start of the Ngwato kingdom as a sovereign state. Sekgoma ruled from 1835 and by 1899, under his son Khama III, the Ngwato state occupied all of the present Central District of Botswana. All of the population, whatever their origin, had become 'bamaNgwato', by virtue of their allegiance to the Ngwato kingship.

In the early nineteenth century the Tswapong hills area was a predominant Tswapong - Tsweneng cultural zone, where groups lived in relative independence. In the south, Tsweneng dominance was replaced in the late nineteenth century by a South-African Nguni group under Maletse.

In the nineteenth and early twentieth century, the Seleka and Birwa were the two strongest groups resisting Ngwato power in the Central District. The Seleka, a Nguni group by origin, settled at Ngwapa. The Birwa, of Zimbabwe Rozwi/proto-Venda origin, settled at Bobonong in the northeast corner of the Central District.

6. SITES OF SIGNIFICANCE

The study area is located on topographical sheet 2327CA.

Survey conditions differed dramatically during the September 2009 and February 2010 field seasons for this project. Although vegetation density differed the incidence of sites stayed consistent with clusters of site found closer to the old riverine areas of the farm Zeekoevley as well as the areas of Witkopje closer to the calcrete outcrops. Further away from the river the incidence drop sharply.

Further away towards the siding site on Diepspruit 386 IQ the area was predominantly flat and had red sandy soils. Typical lush bushveldt vegetation with grasses and woodlands were encountered.



Figure 2 – Bush conditions during February 2010 survey



Figure 3 – Bush conditions during September 2009 survey



Figure 4 – Siding area on Diepspruit 386 LQ



Figure 5 – Bush conditions in siding area

6.1 Site 001

GPS: 23.58986 S 27.115788 E

A small site on the edge of a previously cleared field was identified here. A low density scatter of potsherds was observed and 6 x non-diagnostic potsherds were recovered from and around several animal burrows in this area. No other artifacts, structures or features were identified.

Site size: Approximately 30m in diameter.



Figure 6 - General view of site



Figure 7 - Potshards found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	No further mitigation - Monitoring

6.2 Site 002

GPS: 23.59086 S 27.15922 E

A small site was identified in a clearing in the dense natural bush. A low density scatter of potsherds was observed and 14 x non-diagnostic potsherds were recovered from and around several animal burrows in this area. No other artifacts, structures or features were identified.

Site size: Approximately 50m in diameter.



Figure 8 - General view of site



Figure 9 - Potshards found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.B	2	1	6	4	Phase 2 STP

6.3 Site 003

GPS: 23.60233 S 27.14765 E

A small site in a small clearing in the dense natural bush was identified here. A low density scatter of potsherds was observed 6 x non-diagnostic potsherds were recovered from the surface from within the clearing. No other artifacts, structures or other features were identified here.

Site size: Approximately 30m in diameter.



Figure 10 - General view of site



Figure 11 - Potshards on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.B	2	1	6	4	Phase 2 STP

6.4 Site 004

GPS: 23.59107 S 27.14430 E

A site in a clearing in the dense natural bush was identified here. 12 x non-diagnostic potsherds were recovered from the surface of a possible midden. This midden had a low density scatter of potsherds and ash mixed with the red sandy soil. It measured approximately 5m in diameter. Fragments of two lower grinding stones were also recovered in close proximity of the midden. No other artifacts, structures or other features were identified here.

Site size: Approximately 80m in diameter.



Figure 12 - General view of site



Figure 13 - Potshards on site



Figure 14 – Lower grinding stones found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.B	2	1	6	4	Phase 2 Mapping and test excavation

6.5 Site 005

GPS: 23.57081 S 27.15830 E

A cluster of approximately 15 informal graves was identified at this location. The graves were placed in a haphazard fashion, but all were orientated from east to west. The graves had informal stone packed mounds as dressings of which most were disturbed or damaged. The graves were not maintained and several of the graves were also covered with vegetation. No grave goods were identified. There was also no indication of the age and affinity of these graves.

Site size: Approximately 25m x 20m.



Figure 15 - General view of site



Figure 16 – Stone packed grave on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.A	2	1	6	4	Demarcate and monitor

6.6 Site 006

GPS: 23.57060 S 27.16174 E

A small site was identified in a clearing in the dense natural bush. A low density scatter of potsherds was observed and 10 x non-diagnostic potsherds were recovered from and around several animal burrows in this area. No other artifacts, structures or features were identified.

Site size: Approximately 40m in diameter.



Figure 17 - General view of site



Figure 18 - Potshards found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	Phase 2 STP

6.7 Site 007

GPS: 23.56906 S 27.15936 E

The remains of the foundations of an old rectangular shaped structure were identified at this location. The remains of the foundations measured approximately 5m x 15m and consisted of flat rocks with mud used as mortar. The foundations of the structure were slightly raised and steps were placed at the entrances. A few modern metal artifacts were found near the remains of the foundations of the structure. The structure most probably served as homestead for the early occupants of the farm, and is probably associated with the grave at **Site 23**.

Site size: Approximately 30m x 30m.



Figure 19 - General view of site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	Mapping and destruction permit

6.8 Site 008

GPS: 23.61063 S 27.13367 E

The site is located on a small ridge running east west on the farm Zeekoevley. A single rock with a coarse crystal structure was found at this site. The rock bears the imprint of some organic material. Professor Rubidge at the Wits Palaeontological Department advised a further palaeontological investigation into the area of the find spot



Figure 20 - General view of site



Figure 21 – Fossilised imprint

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.A	2	1	6	4	Further palaeontological investigation

6.9 Site 009

GPS: 23.63169 S 27.13259 E

A site was identified in a clearing in the natural bush. The remains of 7 possible grain bin foundations in various states of preservation were identified over an extended area. Two lower grinding stones were also found in this area. No other artifacts, structures or features were identified.

Site size: Approximately 150m in diameter.

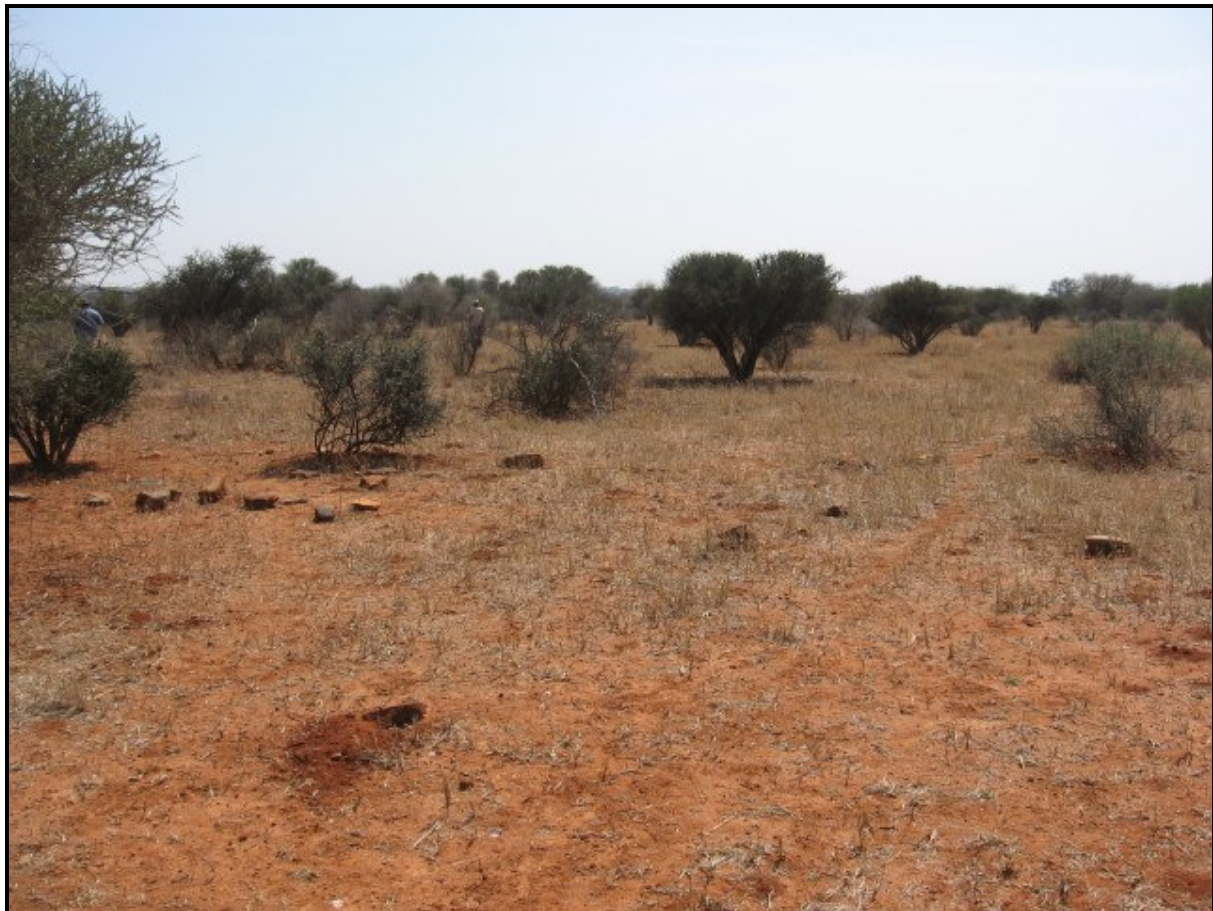


Figure 22 - General view of site



Figure 23 – Lower grinder



Figure 24 – Grain bin platform

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.A	2	1	6	4	Phase 2 Extensive Documentation

6.10 Site 010

GPS: 23.63040 S 27.13388 E

A site was identified in a clearing in the natural bush. A low density scatter of potsherds was observed and approximately 20 x non-diagnostic potsherds were recovered from and around several animal burrows in this area. On closer inspection of the animal burrows thin layers with archaeological deposit were identified at a depth of approximately 10-15cm. The layers were approximately 5cm thick and consisted mostly of ash and dung deposits. A few potsherds were also recovered from these layers. No other artifacts, structures or features were identified.

Site size: Approximately 75m in diameter.



Figure 25 - General view of site



Figure 26 -Potshards found on site



Figure 27 – Ash deposit

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.A	2	1	6	4	Phase 2 Extensive Documentation

6.11 Site 011

GPS: 23.62635 S 27.14091 E

A single, fragmented lower grinding stone was found at this location. The lower grinding stone was found amongst a loose scatter of other rocks. No other artifacts, structures or features were identified.

Site size: Approximately 25m in diameter..



Figure 28 - View of site with animal burrows



Figure 29 - Lower grinding stone

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	No further mitigation - Monitoring

6.12 Site 012

GPS: 23.63640 S 27.12973 E

A site was identified in a clearing in the natural bush. A low density scatter of potsherds was observed and approximately 15 x non-diagnostic potsherds were recovered from and around several animal burrows in this area. On closer inspection of the animal burrows thin layers with archaeological deposit were identified at a depth of approximately 10-15cm. The layers were approximately 8cm thick and consisted mostly of ash and dung deposits. A few potsherds were also recovered from these layers. No other artifacts, structures or features were identified.

Site size: Approximately 50m in diameter



Figure 30 - View of site with animal burrows



Figure 31 - Potshards found on site



Figure 32 - Ash deposit

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.B	2	1	6	4	Phase 2 Extensive Documentation

6.13 Site 013

GPS: 23.63745 S 27.12823 E

A single, fragmented lower grinding stone was found at this location. No other artifacts, structures or features were identified.



Figure 33 - General view of site



Figure 34 - Lower grinding stone

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	No. further mitigation - monitor

6.14 Site 014

GPS: 23.61938 S 27.12991 E

A site was identified in a clearing in the natural bush. A low density scatter of potsherds was observed and approximately 15 x non-diagnostic potsherds were recovered from the surface. A loose scatter of rocks was also observed and a possible lower grinding stone was identified amongst the rocks. The grinding stone had three small holes in the bottom of which the purpose was unknown. No other artifacts, structures or other features were identified here.

Site size: Approximately 70m in diameter.



Figure 35 - General view of site



Figure 36 - Undecorated shards on site



Figure 37 - Grinding stone found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.B	2	1	6	4	Phase 2 Mapping and test excavations

6.15 Site 015

GPS: 23.63492 S 27.11224 E

Findspot:

1 x non-diagnostic potsherd and 1 x decorated potsherd were found in one of several animal burrows at this location

Site size: Approximately 20m in diameter.



Figure 38 - General view of site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	No further mitigation - Monitoring

6.16 Site 016

GPS: 23.63341 S 27.10998 E

Findspot:

2 x non-diagnostic potsherds were found in one of several animal burrows at this location

Site size: Approximately 25m in diameter.



Figure 39 - General view of site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	No further mitigation - Monitoring

6.17 Site 017

GPS: 23.61427 S 27.14582 E

A small site was identified in a clearing in the natural bush. A low density scatter of potsherds was observed and 5 x non-diagnostic potsherds were recovered from and around several animal burrows in this area. No other artifacts, structures or features were identified.

Site size: Approximately 30m in diameter.



Figure 40 - View of site



Figure 41 – Potshards found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	Phase 2 STP

6.18 Site 018

GPS: 23.61578 S 27.15096 E

A small site was identified in a clearing in the dense natural bush. A low density scatter of potsherds was observed and 9 x non-diagnostic potsherds were recovered from the surface from within the clearing. These potsherds were all found in a small concentration and seemed to be from the same ceramic vessel. No other artifacts, structures or features were identified.

Site size: Approximately 5m in diameter.



Figure 42 - General site conditions



Figure 43 – Potshards found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.B	2	1	6	4	Phase 2 STP

6.19 Site 019

GPS: 23.61565 S 27.15288 E

A small site in a small clearing in the dense natural bush was identified here. A low density scatter of potsherds was observed and 5 x non-diagnostic potsherds and 1 x decorated potsherd were recovered from and around several animal burrows in the area. No other artifacts, structures or other features were identified here.

Site size: Approximately 20m in diameter.



Figure 44 - General view of site



Figure 45 - Potshards found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	Phase 2 STP

6.20 Site 020

GPS: 23.60606 S 27.14661 E

A small site in a small clearing in the dense natural bush was identified here. A low density scatter of potsherds was observed and 7 x non-diagnostic potsherds and 1 x potsherd decorated with ochre were recovered from and around several animal burrows in the area. No other artifacts, structures or other features were identified here.

Site size: Approximately 30m in diameter.



Figure 46 – General view of site



Figure 47 - Potshards on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	Phase 2 STP

6.21 Site 021

GPS: 23.60612 S 27.15590 E

A small site in a small clearing in the dense natural bush was identified here. A low density scatter of potsherds was observed and 10 x non-diagnostic potsherds were recovered from and around several animal burrows in the area. No other artifacts, structures or other features were identified here.

Site size: Approximately 30m in diameter.



Figure 48 - General view of site



Figure 49 - Potshards found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	Phase 2 STP

6.22 Site 022

GPS: 23.60573 S 27.15650 E

A small site was identified in a clearing in the dense natural bush. A low density scatter of potsherds was observed and 10 x non-diagnostic potsherds and 1 x lip shard were exposed and recovered from the graded gravel road in this area. No other artifacts, structures or features were identified.

Site size: Approximately 40m in diameter.



Figure 50 - View of site



Figure 51 - Potshards found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.B	2	1	6	4	Phase 2 STP

6.23 Site 023

GPS: 23.56866 S 27.15950E

The site consists of the single grave of Amarentie Petronella Swanepoel died 21 May 1914.

Site size: Approximately 10m in diameter.



Figure 52 - General view of site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.A	2	1	6	4	Demarcate and monitor

6.24 Site 024

GPS: 23.59383 S 27.15375 E TO 23.59451 S 27.15347 E

An extensive site was identified at this locality. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). Over 30 x non-diagnostic potsherds and animal bone were found in and around several animal burrows. No archaeological deposit could be identified in the animal burrows although a fair amount of potsherds were recovered. Identified in the area were some grain bin platforms, ash/midden deposits as well as a cattle kraal area.

Site size: Approximately 80m in diameter.



Figure 53 – Collection of animal bone and potshards from midden



Figure 54 - Potshards found on site

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.B	2	1	6	4	Phase 2 Mapping and test excavations

6.25 Site 025

GPS: 23.61144 S 27.13332E

A small site in a clearing on the side of the runway on the farm Zeekoevley was identified here. The area is quite compacted through animal and human movement in the area. The site is characterized by a medium density scatter of potshards, at least three grain bin platforms and one lower grinding stone. No archaeological deposit could be identified in the animal burrows.

Site size: Approximately 40m in diameter.



Figure 55 – Lower grinding stone found on site



Figure 56 – General view of site at foot of ridge

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.B	2	1	6	4	Phase 2 Mapping and test excavations

6.26 Site 026

GPS: 23.56817 S 27.16016 E

A small site was identified in a clearing in open terrain on a ridge. A low density scatter of potsherds was observed and 10 x non-diagnostic potsherds and 1 x lip shard were exposed and recovered from the graded gravel road in this area. No other artifacts, structures or features were identified.

Site size: Approximately 20m in diameter.

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.C	2	1	6	4	Phase 2 STP

6.27 Site 027

GPS: 23.59810 S 27.15373 E

A small site was identified in a clearing in dense bush. A low density scatter of potsherds was observed and 15 x non-diagnostic potsherds and 1 x lip shard were exposed and recovered from the graded gravel road in this area. No other artifacts, structures or features were identified.

Site size: Approximately 20m in diameter.

Impact Rating	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
13	GP.B	2	1	6	4	Phase 2 STP

7. ASSUMPTIONS AND LIMITATIONS

Not subtracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the archaeological and heritage resources located during the fieldwork do not necessarily represent all the archaeological and heritage resources located there. This may be due to various reasons, including the subterranean nature of some archaeological sites and dense vegetation cover. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted. Such observed or located archaeological or heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This is true for graves and cemeteries as well.

8. LEGAL AND POLICY REQUIREMENTS

8.1 General principles

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and paleontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In the new legislation, permits are required to damage, destroy, alter, or disturb them. People who already possess material are required to register it.

The management of heritage resources are integrated with environmental resources and this means that before development takes place heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves, which are older than 60 years and are not in a cemetery (such as ancestral graves in rural areas), are protected. The legislation protects the interests of communities that have interest in the graves: they may be consulted before any disturbance takes place.

The graves of victims of conflict and those associated with the liberation struggle will be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resource authority and if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the developer's cost. Thus developers will be able to proceed without uncertainty about whether work will have to be stopped if a heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that:

An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects, meteorites and rare geological specimens;
- visual art objects;
- military objects;
- numismatic objects;
- objects of cultural and historical significance;
- objects to which oral traditions are attached and which are associated with living heritage;
- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act,

1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and

- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection, to all historic and pre-historic cultural remains, including graves and human remains.

8.1 Graves and cemeteries

Graves younger than 60 years fall under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning, or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation. If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

9. ASSESSMENT AND RECOMMENDATIONS

*A locality map is provided in **Annexure A***

During the survey a total of 27 sites were identified of which 2 sites were identified as contemporary cemeteries, and 25 was identified as archaeological.

The floodplain region as created along the Limpopo River is similar to the floodplain around the Mapungubwe area, with large areas that could be classified as wetlands. The large settlement concentration that is evident in the Koert Louw Zyn Pan area, just east of the current study area, as well as those identified during archaeological surveys on the Botswana side of the Limpopo River indicates a similar settlement density or trend as in the Mapungubwe landscape.

The surveys conducted, by Lentswe Archaeological Consultants (2008-9) and Matakoma Heritage Consultants (2006), in the Botswana floodplains just to the north of the current study area and by PGS Heritage Unit (2009) on Koert Louw Zyn Pan, just east of the current study area, revealed large concentrations of archaeological sites in an area previously identified as having low archaeological value. Most of the sites identified, and later excavated, during the Botswana survey has shown cultural affinities to the Letsibogo and Toutswe ceramic facies from the Moloko and Nkope Branch respectively. Preliminary evaluation of the fragmented finds of this survey has indicated similar affinities as well as possible ceramic facies related to the Moloko branch. These preliminary finds and extrapolation of the Botswana data indicates possible new research on ceramic typological sequences previously sparsely researched in South Africa.

This information provides the background for the recommendations of mitigation on the archaeological sites identified during this survey.

The following table compiles the evaluation of all the heritage sites identified during the survey of the proposed mining area.

The Table combines the SAHRA field rating guideline, and evaluation of the physical impact envisaged on each site during mining. As now layout is known for the mining project it is presumed that all sites will be impacted on by mining. In the event that a mining layout has been identified the proposed mitigation process can be implemented on each of the impacted sites.

Site Name	Impact Significance	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
Site001	13	GP.C	2	1	6	4	No further mitigation - Monitoring
Site002	13	GP.B	2	1	6	4	Phase 2 STP
Site003	13	GP.B	2	1	6	4	Phase 2 STP
Site004	13	GP.B	2	1	6	4	Phase 2 Mapping and test excavation
Site005	13	GP.A	2	1	6	4	Demarcate and monitor
Site006	13	GP.C	2	1	6	4	Phase 2 STP
Site007	13	GP.C	2	1	6	4	Mapping and destruction permit
Site008	13	GP.A	2	1	6	4	Further palaeontological investigation
Site009	13	GP.A	2	1	6	4	Phase 2 Extensive Documentation
Site010	13	GP.A	2	1	6	4	Phase 2 Extensive Documentation
Site 011	13	GP.C	2	1	6	4	No further mitigation - Monitoring
Site012	13	GP.B	2	1	6	4	Phase 2 Extensive Documentation
Site013	13	GP.C	2	1	6	4	No. further mitigation - monitor
Site014	13	GP.B	2	1	6	4	Phase 2 Mapping and test excavations
Site015	13	GP.C	2	1	6	4	No further mitigation - Monitoring
Site016	13	GP.C	2	1	6	4	No further mitigation - Monitoring
Site017	13	GP.C	2	1	6	4	Phase 2 STP
Site018	13	GP.B	2	1	6	4	Phase 2 STP
Site019	13	GP.C	2	1	6	4	Phase 2 STP
Site020	13	GP.C	2	1	6	4	Phase 2 STP
Site021	13	GP.C	2	1	6	4	Phase 2 STP
Site022	13	GP.B	2	1	6	4	Phase 2 STP
Site023	13	GP.A	2	1	6	4	Demarcate and monitor
Site024	13	GP.B	2	1	6	4	Phase 2 Mapping and test excavations
Site025	13	GP.B	2	1	6	4	Phase 2 Mapping and test excavations
Site026	13	GP.C	2	1	6	4	Phase 2 STP
Site027	13	GP.C	2	1	6	4	Phase 2 STP

Table 9 - Summary table of heritage resources and classifications

Mitigation Description

No further mitigation – Monitoring

Finds at the sites indicate the presence of possible archaeological material. No further mitigation work is required, it is however recommended that the destruction of the site be monitored by a professional archaeologist to identify any significant archaeological deposits.

Procedures need to be agreed upon for the mitigation of such significant finds during destruction of the site.

The following mitigation measures will require:

- **An excavation permit issued by South African Heritage Resources Agency (SAHRA) under Section 35 of the National Heritage Resources Act; and**
- **With the backing of the report documenting the mitigation of each site a permit for the destruction of the relevant sites will be issued by SAHRA.**

Phase 2 STP (Shovel Test Pit)

This implies that the site need to be documented through the placement of a shovel test grid over the extent of the site to identify the possible existence of archaeological remains. The STP method is often used by archaeologists to identify the distribution of artifact concentrations, soil changes, and architectural remains on the landscape, and is thus well suited to pinpointing the locations of possible sites where further investigation may be necessary.

Phase 2 Mapping and test excavations

Should as a minimum include:

- 1) Test excavations to salvage a representative sample of the material record;
- 2) Stratigraphic recording; and
- 3) Investigation of dating possibilities.

Phase 2 Extensive Documentation

This implies the documentation of the site and a systematic representative sampling of the artefacts is necessary.

The documentation of the site should as a minimum include:

- 5) Excavations to salvage a representative sample of the material record;
- 6) Stratigraphic recording; and

- 7) Investigation of dating possibilities.
- 8) Identification of layout and cultural affinities

The following general mitigation measures are recommended:

- When the final layout plan is established for the mine it must be assessed whether any other sites will be impacted upon by roads, services, transmissions lines etc. The appropriate mitigation measures must be employed for these sites
- A Monitoring plan or watching brief must be agreed upon by all the stakeholders for the different phases of the project. An archaeologist is employed by the developer to monitor the excavation of foundation and service trenches, landscaping and any other intrusive work. The developer undertakes to give the archaeologist sufficient time to identify and record and archaeological finds and features.
- If during construction any possible finds are made, the operations must be stopped and the qualified archaeologist be contacted for an assessment of the find.
- A heritage resources management plan must be developed for managing the heritage resources in the study area during construction and operation of the development. This includes basic training for construction staff on possible finds, action steps for mitigation measures, surface collections, excavations and communication routes to follow in the case of a discovery.

10. MANAGEMENT GUIDELINES AND PROCEDURES

Management Guidelines

1. The National Heritage Resources Act (Act 25 of 1999) states that, any person who intends to undertake a development categorised as-

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50m in length;
- (c) any development or other activity which will change the character of a site-
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In the event that an area previously not included in an archaeological or cultural resources survey, is to be disturbed, the South African Heritage Resources Agency (SAHRA) needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.

2. In the event that a further heritage assessment is required it is advisable to utilise a qualified heritage practitioner preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA).

This survey and evaluation must include:

- (a) The identification and mapping of all heritage resources in the area affected;
- (b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Cultural Resources Act;
- (c) an assessment of the impact of the development on such heritage resources;
- (d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- (e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- (f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- (g) plans for mitigation of any adverse effects during and after the completion of the proposed development.

3. It is advisable that an information section on cultural resources be included in the SHEQ training given to contractors involved in surface earthmoving activities. These sections must include basic information on:

- a. Heritage;
- b. Graves;
- c. Archaeological finds; and
- d. Historical Structures;

This module must be tailor made to include all possible finds that could be expected in that area of construction.

4. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.

5. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
6. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.
7. After mitigation an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
8. If during the initial survey sites of cultural significance is discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such site. Such a program must include a *watching brief*, timeframe and agreed upon schedule of actions between the company and the archaeologist.
9. In the event that human remain are uncovered or previously unknown graves are discovered a qualified archaeologist needs to be contacted and an evaluation of the finds made.
10. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA needs to followed. This includes an extensive social consultation process.

The definition of an archaeological watching brief is a formal program of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

The purpose of a watching brief is:

- To allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works
- To provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard.
- A watching brief is not intended to reduce the requirement for excavation or preservation of known or inferred deposits, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits.

- The objective of a watching brief is to establish and make available information about the archaeological resource existing on a site.

Professional Grave Solutions – Heritage Unit can be contacted on the way forward in this regard.

10.1 ROLES AND RESPONSIBILITIES

ROLE	RESPONSIBILITY	IMPLEMENTATION
A responsible specialist needs to be allocated and should sit in at all relevant meetings, especially when changes in design are discussed, and liaise with SAHRA	The client	Archaeologist and a competent archaeology supportive team
If chance finds and/or graves or burial grounds are identified during construction or operational phases, a specialist must be contacted in due course for evaluation.	The client	Archaeologist and a competent archaeology supportive team
Comply with defined national and local cultural heritage regulations on management plans for identified sites;	The client	Environmental Consultancy and the Archaeologist
Consult the managers, local communities and other key stakeholders on mitigation of archaeological sites;	The client	Environmental Consultancy and the Archaeologist
Implement additional programs, as appropriate, to promote the safeguarding of our cultural heritage. (i.e. integrate the archaeological components into employee induction course)	The client	Environmental Consultancy and the Archaeologist,
If required, conservation or relocation of burial grounds and/or graves according to the applicable regulations and legislation	The client	Archaeologist, and/or competent authority for relocation services
Ensure that recommendations made in the Heritage Report are adhered	The client	The client

by		
Provision of services and activities related to the management and monitoring of significant archaeological sites	The client	Environmental Consultancy and the Archaeologist
After the specialist/archaeologist has been appointed, comprehensive feedback reports should be submitted to relevant authorities during each phase of development.	Client and Archaeologist	Archaeologist

Table 10: Roles and responsibilities of archaeological and heritage management

10.2 IMPACT MANAGEMENT

10.2.1 Pre-construction phase

Based on the findings of the Heritage Report, all stakeholders and key personnel should undergo an archaeological induction course during this phase. Induction courses generally form part of the employees' (miners') overall training and the archaeological component can easily be integrated into these training sessions. Two courses should be organised – one aimed more at managers and supervisors, highlighting the value of this exercise and the appropriate communication channels that should be followed after chance finds, and the second targeting the actual workers and getting them to recognize artefacts, features and significant sites. This needs to be supervised by a qualified archaeologist. This course should be reinforced by posters reminding operators of the possibility of finding archaeological sites.

10.2.2 Construction phase

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of mining area and small scale infrastructure development associated with the opencast mining area, such as ablution facilities or small offices. Construction activities related to the mine encompass the total destruction of the land surface and subsequent to that, all cultural and natural relics located in the directly affected area will be lost.

It is possible that cultural material will be exposed during operations and feasibly may be recoverable, but this is the high-cost front of the operation, and so any delays should be minimised. Development surrounding infrastructure and construction of facilities result in

significant disturbance, but construction trenches do offer a window into the past and it may be possible to rescue some of these data and materials. It is also possible that substantial alterations are implemented during this phase of the project and these must be catered for. Temporary infrastructure are often changed or added to the subsequent history of the project. In general these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. A responsible archaeologist must be appointed for this commission. This person does not have to be a permanent employee, but needs to sit in at relevant meetings, for example when changes in design are discussed, and notify SAHRA of these changes. The archaeologist would inspect the site and any development recurrently, with more frequent visits to the actual workforce and operational areas. In addition, feedback reports can be submitted by the archaeologist to the client and SAHRA to ensure effective monitoring. This archaeological monitoring and feedback strategy should be incorporated into the Environmental Management Plan (EMP) of the mine. Should an archaeological site or cultural material be discovered during construction (or operation), such as burials or grave sites, the project needs to be able to call on a qualified expert to make an expert decision on what is required and if necessary to carry out emergency recovery. SAHRA would need to be informed and may give advice on procedure. The developers therefore should have some sort of contingency plans so that operations could move temporarily elsewhere while the material and data are recovered. The project thus needs to have an archaeologist available to do such work.

The purpose of an archaeological monitoring programme is to provide general information to the developer with regards to management recommendations and cost estimates for the archaeological component, a specialist sub-section of the Environmental Impact Assessment (EIA) process, for the project.

Such a monitoring programme is planned for observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land where there is a possibility that archaeological deposit may be disturbed or destroyed. Its main purpose is:

- To allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works
- To provide an opportunity, if needed, for the monitoring archaeologist to signal to all interested parties, before the destruction of the material in question, that an

archaeological find has been made for which the resources allocated to the monitoring programme itself are not sufficient to support treatment to a satisfactory and proper standard.

- A monitoring programme is not intended to reduce the requirement for excavation or preservation of known or inferred deposits, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits.

In essence, the objective of a monitoring programme is to establish and make available information about the archaeological resource existing on a site.

10.2.3 Operational phase

Once the mining project is up and running, the urgency to identify, document and assess archaeological and heritage resources in the opencast area declines, but does not cease. Undocumented sites are still protected by law as no permit would have been issued for their destruction. Apart from any significant changes in operation design, which call for the inclusion of an archaeologist in decision making and notification of SAHRA, there is the accumulated impact of a project on the land surface, and this could result in erosion exposing further sites. Periodic monitoring by an archaeologist and awareness promotion therefore remain tasks. The client and the archaeologist would need to draw up a schedule for this.

10.2.4 Decommissioning and closure phase

During the decommissioning and closure phase of the project, no new areas are expected to be disturbed and/or impacted. Subsequently, no additional sites of archaeological and heritage significance are expected to be impacted on during decommissioning. Furthermore, the majority of sites of archaeological and heritage significance (cultural and natural) would have been recorded and/or assessed in preceding phases. During the decommissioning and closure phase, it may be recommended that the appointed archaeologist review management procedures and ensure that effective measures were implemented. A comprehensive feedback report should be submitted by the archaeologist to the client, and SAHRA.

11. LIST OF PREPARES

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**ANNEXURE A:
Study area
and heritage sites**

