

DIGBY WELLS

ENVIRONMENTAL

NOTIFICATION OF INTENT TO DEVELOP

Date: 27 February 2017

Project No.: LED 2003

WATERBERG ONE COAL (PTY) LTD

MINING RIGHT APPLICATION FOR THE FARM KOERT LOUW ZYN

PAN 234 LQ, LIMPOPO PROVINCE

1 Introduction

Digby Wells Environmental (Digby Wells) was requested by Waterberg One Coal (Pty) Ltd (WOC) to undertake a Mining Right Application (MRA) for the farm Koert Louw Zyn Pan, Limpopo Province, in accordance with the Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002) (MPRDA).

This document constitutes a Notification of Intent to Develop (NID) in support of the aforementioned MRA.

2 Project Description

2.1 Project Background

WOC intends to develop the proposed Kubu Coal Mine on the farm Koert Louw Zyn Pan. An Environmental Impact Assessment (EIA) process was originally initiated in 2009, the project however, was suspended and the MRA never submitted to the Department of Mineral Resources (DMR) for adjudication. Subsequently, WOC begun a new EIA process in support of the MRA for Koert Louw Zyn Pan in 2015. Environmental Authorisation was approved for listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and waste management activities in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA). The Mining Right is still outstanding for the proposed project.

A Phase 1 Archaeological Impact Assessment (AIA) was conducted for Koert Louw Zyn Pan in 2009. The AIA was submitted to the South African Heritage Resources Agency (SAHRA)

on 19 March 2009¹. SAHRA consequently issued a Statutory Comment on the AIA on 29 July 2010 wherein the following conditions were stipulated (see Appendix A for complete Statutory Comment):

- Phase 2 mapping and test excavations of sites PGS002, 008, 015, 036, 037, 039,040 and 044;
- Phase 2 Shovel Test Pits (STPs) of sites PGS003, 004, 005, 014, 023, 024, 025, 026, 029 and 035;
- Extensive documentation of sites PGS010 and 033;
- Application for destruction permits for sites that, according to the AIA report, did not require any further mitigation, but that would be monitored;
- An experienced Stone Age specialist must be consulted during Phase 2 investigations; and
- A palaeontological desktop study on areas where bedrock is to be affected, or where river terraces or potentially fossiliferous deposits may occur.

At present, an HIA is excluded with the provision that should any development be proposed at any time, an HIA will be undertaken in line with the NHRA at the time of activity, or otherwise required in terms of Statutory Comment by SAHRA / LIHRA. A condition of authorisation of the EIA is to undertake the requirements stipulated in the Statutory Comments (2009) (Appendix A).

2.2 Baseline Description of the Study Area

The site specific study will be located on the farm Koert Louw Zyn Pan, approximately 60 km north of Lephalale, Limpopo, near the small hamlet of Steenbokpan: see Table 2-1 for detailed location details. The study area is bound by the Limpopo River to the north, the Boikarabelo Coal Mine to the southwest and game farms to the west and east.

The study area is characterised by gently rolling plains, dipping to the north and west towards the Limpopo River valley, with occasional small hills. Numerous seasonal water courses and pans are present, especially in the northern section towards the Limpopo River floodplain. It lies within the Western Sandy Bushveld vegetation region within the Savanna Biome. This is characterised by the occurrence of tall open woodland to low woodland, with trees such as *Acacia erubescens* on flat areas, *Combretum apiculatum* on shallow soils and *Terminalia sericea* on deep soils. Sandstone, mudstone, sandstone, conglomerate, siltstone and shale of the Mokolian Waterberg group are found in the north of this region. The rainfall occurs in

¹ Available from <http://www.sahra.org.za/sahris/heritage-reports/aiakoertlouwzynpanfouriewaug09>).

summer with very dry winters. The average rainfall is 450 mm in the north. The temperature fluctuates between 36°C in summer and -3.7°C in winter.

Table 2-1: Location details

Name of property/ies	Koert Louw Zyn Pan
Coordinates of approximate centre of project area	-23.558341
	27.186889
Town or District	Lephalale
Responsible Municipality	Lephalale Local Municipality / Waterberg District Municipality
Extent of property	1 365 ha
Maximum extent of proposed development	551.37 ha
Current use	Agriculture / game farming
Predominant land use/s of surrounding properties	Agriculture / game farming / mining

The geology within which coal typically occurs is inherently plant fossil rich, but fossils in the coal itself are modified beyond recognition. Associated shale and mudstone allow for better preservation of fossil plants. The study area is located in the Waterberg coalfield, bounded by the Zoefontein fault in the north and the Eenzaamheid fault in the south. North of the Eenzaamheid fault the study area is underlain by the Waterberg Group that stretches around 90 km southward culminating in the Waterberg and Sandrivier mountain ranges. North of the Zoefontein fault a portion of the group extends westwards into Botswana, and another portion extends north-easterly to the Blouberg range.

Rocks present in the mining area comprise of coarse, yellowish, gravely, cross bedded sandstones with ferruginous laminae along the bedding planes are predominantly of the Kransberg Subgroup and the Sandrivierberg formation.

The Waterberg coalfield includes all the classical units of the Karoo Supergroup, subdivision of which is primarily based on lithological boundaries consisting of the Stormberg Group, followed by the Beaufort Group, the Ecca Group and the Dwyka Group, summarised in Table 2-2 below. The Waterberg Group represents the basin floor. The Karoo groups are further subdivided into lithological units (formations), discussed below.


Table 2-2: Summary of lithostratigraphy of the study area

Stratigraphy & Age			Sensitivity	Fossil types	Rock types		
KAROO SUPERGROUP	Jurassic	Stormberg Group	Clarens Formation	High	Silicified wood; plant remains; freshwater crustaceans; primitive bony fish; invertebrate trace fossils; rare dinosaurs e.g. Massospondylus; crocodylomorphs; advanced cynodonts including early mammals, e.g. <i>Erythrotherium</i> ; dinosaurs and mammal track ways; coprolites; eggshell fragments.	Aeolian desert sandstone ("Cave Sandstone") Aeolian (wind-blown) sand, minor playa lake, ephemeral stream deposits, basaltic lava flows.	
	Triassic	Beaufort Group	Eendragtpan Formation	Low	No coals (probably Beaufort Group. or Molteno equivalents)	Variegated mudrock of arid floodplains	
	Permian	Ecca Group	Upper Ecca	Volkstrust Formation	High	Trace; rare temnospondyl amphibian remains; invertebrates (bivalves, insects); minor coals with plant remains; petrified wood; organic microfossils (acritarchs); low-diversity marine to non-marine trace fossil assemblages.	Dark Grey Shale. Basinal dark mudrock with phosphatic / carbonate / sideritic concretions, minor coal offshore shelf, but possibly also nearshore / lacustrine / lagoonal deposits
			Middle Ecca	Goedgedacht Formation	Very high	Glossopterid coal flora abundant; associated with thick coal seams.	Mudstone, sandstone, coal within proglacial alluvial fans, braided streams.
					Moderate	Non-marine trace; vascular plants, including petrified wood; palynomorphs of <i>Glossopteris</i> flora; mesosaurid reptiles; fish including microvertebrate remains, coprolites; crustaceans; sparse marine shelly invertebrates (molluscs, brachiopods); microfossils (radiolarians etc.); insects.	Offshore basin plain (predominantly non-marine) to coastal deltaic sediments, minor volcanic ash (tuff).
	Carboniferous		Dwyka Group	Low	Trace; organic-walled micro; rare marine invertebrates (e.g. molluscs), fish, vascular plants; inter- and post-glacial trace fossil assemblages.	Glacial, inter- and post-glacial siliciclastic sediments (e.g. tillite).	

From the basement, the Dwyka Group is generally present as filled depressions in the floor and primarily comprising greyish diamictite. In places rounded pebble conglomerate as well as fluvio-glacial gravels, products of glacial weathering, are present. The Dwyka Group is only approximately 3 m thick in this region. The Dwyka Group dates to the Carboniferous Period (360 to 300 Ma), with a low fossil sensitivity. The main fossil types that could be expected include trace, organic-walled micro, rare marine invertebrates (e.g. molluscs), fish, vascular plants; inter- and post-glacial trace fossil assemblages.

The Ecca Group overlays the Dwyka Group. It is subdivided into three distinct lithological units, of which the Middle Ecca (Goedgedacht formation) and the Upper Ecca (Volkstrust formation) are present in the study area. The Ecca Group dates to the Permian Period (300 to 250 Ma) and in general is considered to have moderate palaeontological sensitivity. The main fossil types expected in the Ecca Group include non-marine trace, vascular plant (including petrified wood), *Glossopteris* flora palynomorphs; mesosaurid reptile, fish (including microvertebrate remains), coprolites; crustaceans, sparse marine shelly invertebrate (molluscs, brachiopods) and insect fossils, as well as microfossils (radiolarians etc.). The

Middle Ecca Goedgedacht formation is considered to have a very high sensitivity. Fossils expected include abundant *Glossopterid* coal flora associated with thick coal seams. The Upper Ecca Volksrust formation is given a high fossil sensitivity including trace; rare temnospondyl amphibian, invertebrate (bivalves, insects), minor coals with plant remains, petrified wood, organic microfossils (acritarchs) and low-diversity marine to non-marine trace fossil assemblages.

The Beaufort Group in this area comprises of shales of various hues of purple alternating with greenish grey in the upper portion, while light grey mudstones predominate at the base, the unit is approximately 90 m thick in the mining area north of the Daarby fault. The Beaufort Group dates to the Triassic Period (250 to 200 Ma). The Eendragtpan formation is present in study area and has a low fossil sensitivity.

The Stormberg Group overlaying the Beaufort Group dates from the Late Triassic to Early Jurassic Periods (~200 Ma). In the study area, the Clarens formation is present with a high fossil sensitivity. The main fossil types that could be expected include silicified wood, plant, freshwater crustacean, primitive bony fish, invertebrate trace, rare dinosaurs (e.g. *Massospondylus*), crocodylomorphs, advanced cynodonts (including early mammals, e.g. *Erythrotherium*) fossils, as well as dinosaur and mammal track ways, coprolites and eggshell fragments.

Figure 2-1 below is an excerpt from the SAHRIS PalaeoMap indicating the Koert Louw Zyn Pan farm boundaries and the expected palaeontological potential. The study area is situated in an area ranging from moderate to high fossil sensitivity.

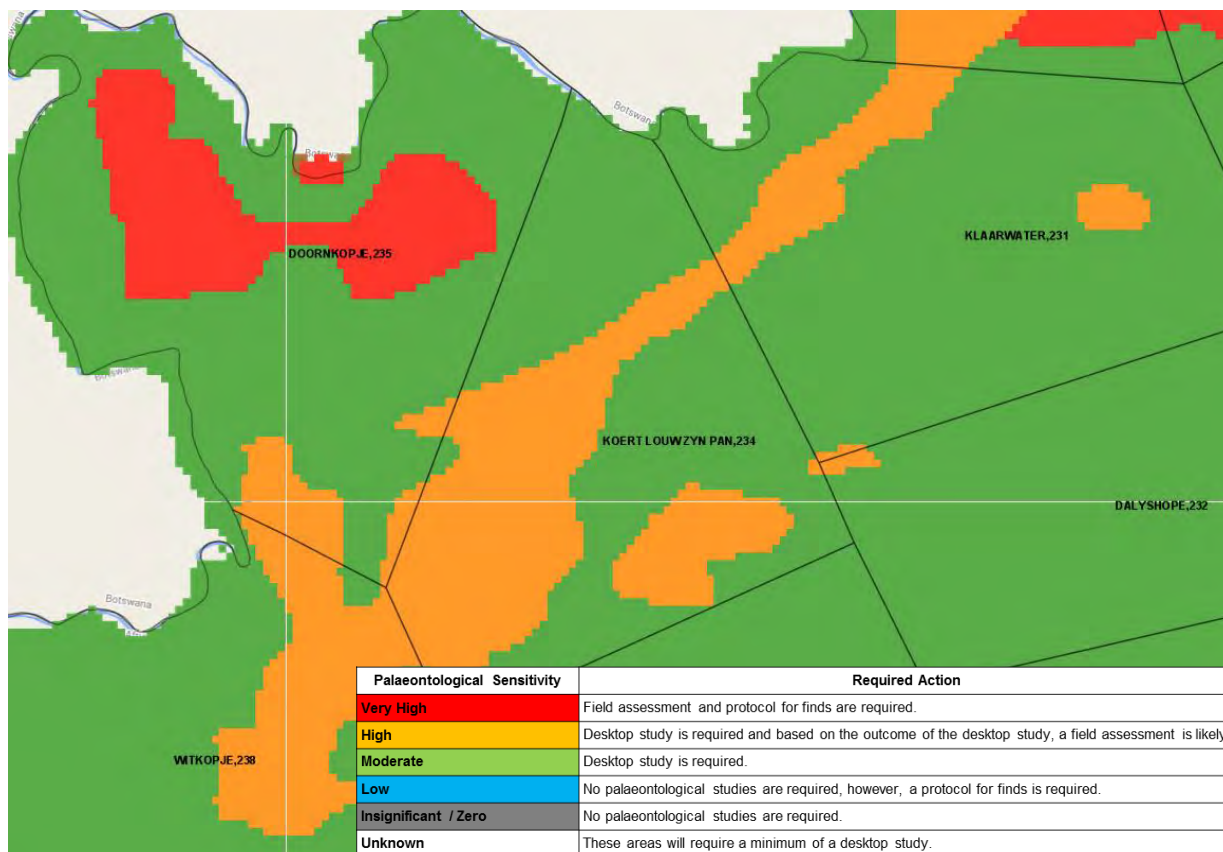


Figure 2-1: SAHRIS PalaeMap excerpt indicating fossil sensitivity of the study area and surrounds

Archaeological Farming Community settlements have been identified both in South Africa and Botswana. There archaeological surveys and excavations indicated extensive Farming Community settlement associated with *Letsibogo* and *Toutswe* ceramic facies from the Moloko and Nkope Branch respectively.

There is a likelihood that similar sites may be found in the South African floodplain, preliminary indicated through the survey results of the 2009 Koert Louw Zyn Pan AIA that identified 42 archaeological sites ranging from a few scattered surface ceramics to more stratified and possibly complex sites. In addition, 142 archaeological sites including Stone Age and Farming Community sites were identified by Digby Wells during a Heritage Impact Assessment (HIA) undertaken on farms to the east of the study area²

Extensive Phase 2 archaeological assessments by Digby Wells of 17 sites out of 25 identified sites on the farms Zeekoeivley 421 LQ and Kalkpan 243 LQ (properties included

² Refer to SAHRIS Case ID 2123

in the Boikarabelo Coal Mine Mining Right) confirmed the presence of Late Farming Community settlements, carbon dated to after the late 17th century to the early 18th century, i.e. 1680s to early 1700s³. These sites are, however, not as extensive as those present in the Botswanan floodplain west of the Limpopo River.

Preliminary evaluation of the fragmented finds of the 2009 Koert Louw Zyn Pan AIA survey, as well as others undertaken by Digby Wells and others, 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. Based on information regarding the local and regional status of archaeological and heritage discoveries, it is evident that more research in this area could contribute positively towards the understanding and conservation of archaeological and heritage resources in the Limpopo Province.

Over and above archaeological sites identified, the 2009 Koert Louw Zyn Pan AIA also identified two contemporary sites (but no burial grounds). Other studies undertaken by Digby Wells furthermore identified 18 burial grounds, 30 historic and four more recent / contemporary sites on surrounding farms. The study area is therefore clearly located within a rich cultural landscape with great temporal depth.

2.3 Registered Owner/s of Property/ies

Table 2-3: Landowner details

Property	Title Deed Owner	Contact Information	Notification Method
Koert Louw Zyn Pan 234 LQ	Cathrich No 102 CC ⁴ Ivan Visnakova	014 763 2433 visnakove@telkomsa.net	Stakeholder Engagement Process.

3 Project / Development details

3.1 NHRA Section 38 Triggers

The following aspects of Section 38 of the NHRA may be triggered by the proposed project.

³ Refer to SAHRIS Case IDs 601, 1074 and 6249, and File Reference 9/2/253/0003 (<http://www.sahra.org.za/sahris/sahris>).

⁴ Resgen South Africa (Pty) Ltd is in the process of purchasing the land.

Table 3-1: NHRA Section 38(1) Triggers

NHRA Section 38 (1) Activities / Triggers			Summary description (e.g. 500 m conveyor belt, open cast pit, etc.)
<input checked="" type="checkbox"/>	a	Any linear development or barrier >300 m	Approximately 8 km of water pipelines within road reserves 6.8 km of haul roads 8.7 km of access roads 8.23 km of conveyor belt
<input type="checkbox"/>	b	Any bridge or similar structure >50 m	
<input checked="" type="checkbox"/>	c	Any development or activity that will change the character of a site:	
	<input checked="" type="checkbox"/>	i ≥5 000m² in extent	Open pit mine Overburden dump Topsoil stockpile and berm Pollution control dams ROM Tip and crusher Infrastructure
	<input type="checkbox"/>	ii Involving ≥3 existing erven/ subdivisions	
	<input type="checkbox"/>	iii Involving ≥3 or more erven/ divisions consolidated within past 5 years.	
<input checked="" type="checkbox"/>	d	Rezoning of a site ≥10 000m² in extent.	Land will be rezoned to mining
<input checked="" type="checkbox"/>	e	Other triggers, e.g.: in terms of other legislation, (i.e.: National Environment Management Act, etc.)	MPRDA, NEMA, NEM:WA

3.2 Activities⁵

The following activities will take place during the lifespan of the proposed project.

⁵ Specified activities previously assessed in 2009 remain. Table presents the updated NEMA EIA Regulations (2014) Listed Activities to comply with current legislative framework.

Table 3-2: Listed Activities relevant to HRM

Activity		Description	Source of Risk
Construction Phase			
1.	Activity 15 GNR 984	Site clearing in preparation for open pit and infrastructure development (including haul and access roads)	Damage / destruction of identified heritage resources
Operational Phase			
1.	Activity 17 GNR 984	Drilling, blasting and mining of RoM coal	Damage / destruction of identified heritage resources

3.3 Additional Impact Assessment Process

The following impact assessment process/es are currently being undertaken for the proposed project.

Table 3-3: EIA Process

Legislation, i.e. NEMA, MPRDA, etc.	MPRDA, NEMA, NEM:WA
Consenting Authority that has/will receive information	Department of Mineral Resources (DMR)
Present phase of process at Authority, e.g. Draft Scoping Report	Final EIA (RoD issued)

4 Identified / Known Heritage Resources and Potential Impacts

The following categories of heritage resources as defined in Section 3 of the NHRA are known to occur within the proposed project area.

Table 4-1: Identified HRM impacts

<input checked="" type="checkbox"/>	3(2)(a)	Places, buildings, structures and equipment of cultural significance
		<i>Description of resource:</i> Partial remains of rubble from a possible labour quarters for farm labourers. The structures were demolished and most rubble cleared. The age of the structures was not known
		<i>Potential impact:</i> Removal of remaining rubble, i.e. complete destruction
<input type="checkbox"/>	3(2)(b)	Places to which oral traditions are attached or which are associated with living heritage

		<i>Description of resource:</i> None identified
		<i>Potential impact:</i> None
<input type="checkbox"/>	3(2)(c)	Historical settlements and townscapes
		<i>Description of resource:</i> None identified
		<i>Potential impact:</i> None
<input checked="" type="checkbox"/>	3(2)(d)	Landscapes and natural features of cultural significance
		<i>Description of resource:</i> Archaeological landscape of the Limpopo River basin.
		<i>Potential impact:</i> Sterilisation of archaeological landscape. Alteration of sense-of-place.
<input type="checkbox"/>	3(2)(e)	Geological resources of scientific or cultural importance
		<i>Description of resource:</i> Ecca Group fossils
		<i>Potential impact:</i> Damage / Destruction of fossil heritage
<input checked="" type="checkbox"/>	3(2)(f)	Archaeology and/or palaeontology (Including archaeological sites and material, fossils, rock art, battlefields & wrecks)
		<i>Description of resource:</i> Numerous sites recovered non-diagnostic potsherds and decorated potsherds (graphite ochre and impression). Predominantly in and around animal burrows. Fragments of possible rubbing/smearing stones and rim -sherds were also recovered. One MSA tool and one MSA core and piece of slag were recovered in footprint
		<i>Potential impact:</i> Damage / destruction of identified heritage resources
<input type="checkbox"/>	3(2)(g)	Graves and burial grounds (eg: ancestral graves, graves of victims of conflict, historical graves & cemeteries)
		<i>Description of resource:</i> None identified
		<i>Potential impact:</i> None
<input type="checkbox"/>	3(2)(a)	Other human remains
		<i>Description of resource:</i> None identified
		<i>Potential impact:</i> None
<input type="checkbox"/>	3(2)(h)	Sites of significance relating to the history of slavery in South Africa
		<i>Description of resource:</i> None identified
		<i>Potential impact:</i> None
<input type="checkbox"/>	3(2)(i)	Movable objects
		<i>Description of resource:</i> None identified
		<i>Potential impact:</i> None

5 Recommendation

Is a Heritage Impact Assessment required?		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
If NO, provide motivation:			
If YES, provide suggested components that may be required or undertaken during HIA.			
<input checked="" type="checkbox"/>	Archaeology	<input type="checkbox"/>	Architecture
<input type="checkbox"/>	Built Environment	<input checked="" type="checkbox"/>	Burial Grounds and Graves
<input checked="" type="checkbox"/>	Palaeontology	<input type="checkbox"/>	Public Participation
<input type="checkbox"/>	Townscapes	<input type="checkbox"/>	Visual Impact
<input type="checkbox"/>	Other:		
<p>Digby Wells had commissioned PGS Heritage Unit on behalf of WOC in 2009 to conduct a Phase 1 AIA for the study area. The AIA report was submitted to SAHRA on 19 March 2009, who consequently issued Statutory Comment on the AIA on 29 July 2010, summarised in and appended to this NID.</p> <p>Specified activities assessed during the 2009 EIA process have been reviewed and amended to correspond to Listed Activities as outlined in the NEMA EIA Regulations (2014). Furthermore, certain activities previously considered have been removed from the MRA, and reduced the total area of impact.</p> <p>At this stage, expected timing for the commencement of mining activities will be approximately 2026. Considering the results of the previously completed AIA, and the Statutory Comments issued by SAHRA, Digby Wells is of the opinion that as a condition of authorisation, a detailed HIA be undertaken prior to implementation to report on the most current information, and where still applicable, adhere to the requirements of the Statutory Comments.</p>			
2016 Recommendation:		2017 Review:	
Name: Johan Nel		Name: Justin du Piesanie	
Capacity: Archaeologist		Capacity: Manager: HRM	



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Archaeological Impact Assessment

Koert Louw Zyn Pan Project for
Resources Generation on the farm
Koert Louw Zyn Pan 234 LQ and
portions of the farm Klaarwater 231
LQ, District Lephalale, Limpopo

Version 1.0

06 March 2009

**Professional Grave
Solutions (Pty)
Limited**

(Registration No: 2003/008940/07)

Bergarend St 906, Waverley, Pretoria, 0186

PO Box 32542, Totiusdal, 0134 South Africa

TEL: +27 12 332 5305,

FAX: 0866 580199

ACKNOWLEDGEMENT OF RECEIPT

CLIENT: Digby Wells & Associates (Pty) Ltd

CONTACT PERSON: Ms. Marike Fourie, Tel: (011) 789 9495, Fax: (011) 504 1440,
Fax to email: 086 502 1588, email: marike@digbywells.co.za

SIGNATURE: _____

LEADING CONSULTANT: Professional Grave Solutions - Heritage Unit

CONTACT PERSON: Wouter Fourie

SIGNATURE: _____

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- i. The results of the project;
- ii. The technology described in any report ; and,
- iii. The recommendations delivered to the Client.

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 Colliery envisaged on the farms Koert Louw Zyn Pan 234 LQ and portions of Klaarwater 231cLQ to the west of the D175 road, District Lephalale, Limpopo Province.

During the survey a total of 44 sites were identified of which 2 sites were identified as contemporary, and 42 was identified as archaeological. No cemeteries or graves were identified during the survey.

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 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 (2008-2009) and Matakoma Heritage Consultants (2006), in the Botswana floodplains just to the north 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 archaeological assessment, yielded 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 South African Heritage Resource Agency (SAHRA) field rating guideline and evaluation of the physical impact envisaged on each site during mining. As no mine-plan or infrastructure layout is known for the mining project, it is presumed that all sites will be impacted on by mining. Once the mine-plan and layout has been identified and confirmed, the proposed mitigation process can be implemented on each of the impacted sites.

Site Name	Impact Significance	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
2327CA-PGS001	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS002	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS003	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS004	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS005	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS006	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS007	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS008	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS009	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS010	13	GP.A	2	1	6	4	Phase 2 Extensive Documentation
2327CA-PGS012	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS013	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS014	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS015	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS016	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS017	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS018	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS019	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS020	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS021	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS022	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS023	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS024	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS025	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS026	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS027	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-	13	GP.C	2	1	6	4	No further mitigation -

Site Name	Impact Significance	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
PGS028							Monitoring
2327CA-PGS029	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS030	13	GP.A	2	1	6	4	Phase 2 Extensive Documentation
2327CA-PGS031	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS032	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS033	13	GP.A	2	1	6	4	Phase 2 Extensive Documentation
2327CA-PGS034	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS035	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS036	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS037	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS038	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS039	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS040	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS041	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS042	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS043	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS044	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations

Table 1 - 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 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;
- 3) Investigation of dating possibilities; and
- 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; and
- 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.

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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 Colliery envisaged on the farms Koert Louw Zyn Pan 234 LQ and portions of Klaarwater 231 LQ to the west of the D175 road, District Lephale, Limpopo Province.

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, 44 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 of Koert Louw Zyn Pan for Resource Generation (RG) 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.

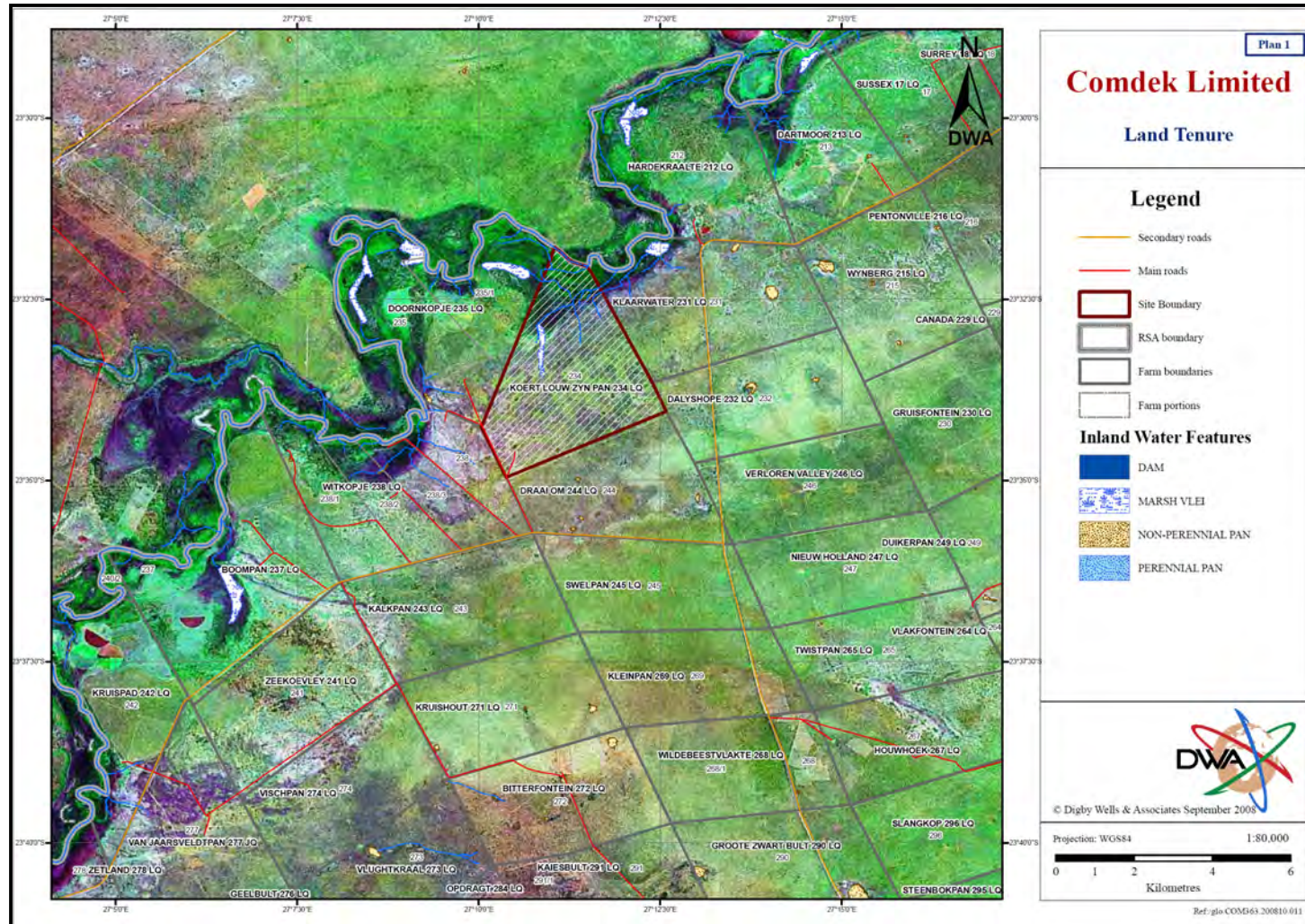


Figure 1 – Locality Map

2.2 PHYSICAL SURVEYING

The project area comprises of approximately 1200 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 20 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.

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;
- v. any change to the natural or existing condition or topography of land;
- vi. 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 90 percent sure of a particular factor of the likelihood of that impact occurring
Possible	1	40 to 70 percent 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 Lentswe Archaeological Consultants.

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 kingdoms 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, 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 beloved 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 Maletle.

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.

The two properties are adjacent to each other with Klaarwater 231 LQ on the north-eastern side of Koert Louw Zyn Pan 234 LQ. Both properties border with the Limpopo River in the north and with other Game Farms on their other boundaries. The Limpopo River forms an extensive floodplain on the two properties with a myriad of channels and wetlands especially on the northern section of Koert Louw Zyn Pan. A section of this floodplain is being cultivated (Lucerne - For animal feed). From the floodplain a limestone ridge rises from the north-east on Klaarwater and follows a line further to the south-west on Koert Louw Zyn Pan. This limestone ridge separates the floodplain from the interior. Other smaller limestone ridges and outcrops were encountered in other areas of the two properties. The main ridge was between 300m and 700m from the Limpopo River and varied in its height and width.



Figure 2 – Limestone Ridge



Figure 3 - Flood plains in study area

6.1 2327CA-PGS001

A small site in a small clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). 5 x non-diagnostic potsherds were recovered in and around several animal burrows from within the clearing. 2 x fragments of possible vitrified hut clay were found from another animal burrow underneath a Shepherds/Mutopi tree (*Boscia foetida* subsp. *rehmanniana*). The Mutopi tree probably settled on the possible hut remains. No diagnostic/decorated potsherds, structures or other features were identified here.

Site size: Approximately 30m in diameter.



Figure 4 - General view of site



Figure 5 - 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 2327CA-PGS002

A site was identified in a clearing in the dense natural bush with extensive animal burrowing activities. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). More than 30 x non-diagnostic potsherds and 3 x decorated potsherds (1 x graphite; 1 x ochre and 1 x impressions) were recovered in and around several animal burrows from within the clearing. 1 x possible rubbing/smearing stone was also found. On closer inspection of the animal burrows a layer of archaeological deposit was identified at a depth of approximately 10-15cm. The layer was approximately 5-10cm thick and consisted mostly of ash and dung deposits. No structures or other features were identified here.

Site size: Approximately 100m in diameter.



Figure 6 - General view of site



Figure 7 - Potshards found on site



Figure 8 - Decorated potshards of site

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

6.3 2327CA-PGS003

A small site in a small clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). 5 x non-diagnostic potsherds were recovered in and around several animal burrows from within the clearing. No diagnostic/decorated potsherds, structures or other features were identified here.

Site size: Approximately 60m in diameter.



Figure 9 - General view of site



Figure 10 - Potshards on site

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

6.4 2327CA-PGS004

A small site in a small clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). 5 x non-diagnostic potsherds were recovered in and around several animal burrows from within the clearing. No diagnostic/decorated potsherds, structures or other features were identified here.

Site size: Approximately 60m in diameter.



Figure 11 - General view of site



Figure 12 - Potshards on site

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

6.5 2327CA-PGS005

A site in a large clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). 10 x non-diagnostic potsherds and 3 x fragments of possible rubbing/smearing stones were recovered in and around several animal burrows from within the clearing. No diagnostic/decorated potsherds, structures or other features were identified here.

Site size: Approximately 150m in diameter.



Figure 13 - General view of site



Figure 14 - Potshards and lithics on site

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

6.6 2327CA-PGS006

Findspot:

2 x non-diagnostic potsherds and a MSA-core were found in and around several animal burrows.

Site size: Approximately 30m in diameter.



Figure 15 - General view of site



Figure 16 - Potshards on site

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

6.7 2327CA-PGS007

Findspot:

3 x non-diagnostic potsherds were found in and around several animal burrows.

Site size: Approximately 30m in diameter.



Figure 17 - General view of site with animal burrows



Figure 18 - Potshards found on site

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

6.8 2327CA-PGS008

A site was identified in a clearing in the dense natural bush, with extensive animal burrowing activities. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). More than 30 x non-diagnostic potsherds, 4 x potsherds with decorations (1 x graphite; 1 x impressions; 2 x graphite, ochre and impressions) and 1 x potsherd with a bored hole through it, were recovered in and around several of the animal burrows as well as from the surface within the clearing. Fragments of vitrified hut rubble and vitrified dung were found. 1 x possible rubbing/smearing stone was also found. On closer inspection of the animal burrows, a layer of archaeological deposit was identified at a depth of approximately 10-15cm. This layer consisted mainly of ash and vitrified dung, but animal bone fragments were also identified. The layer varied in thickness and measured approximately between 10cm and 15cm. No structures or other features were identified here.

Site size: Approximately 200m in diameter.



Figure 19 - General view of site



Figure 20 - Midden material including potshards and bone



Figure 21 - Deposit visible in cutting



Figure 22 - Decorated shards from site



Figure 23 - Worked potshard found on site

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

6.9 2327CA-PGS009

Findspot:

4 x potsherds were found in and around several animal burrows at this location. 2 of these potsherds were decorated with graphite.

Site size: Approximately 20m in diameter.



Figure 24 - General view of site



Figure 25 - Potshards found on site

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

6.10 2327CA-PGS010

A site was identified in a clearing in the dense natural bush, with extensive animal burrowing activities. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). More than 20 x non-diagnostic potsherds, 1 x rim-shard and a fragment of an upper grinding stone were recovered in and around several of the animal burrows as well as from the surface within the clearing. Fragments of vitrified hut rubble and vitrified dung were found. On closer inspection of the animal burrows, a layer of archaeological deposit was identified in one of the burrows at a depth of approximately 10-15cm. This layer consisted mainly of ash and vitrified dung, but animal bone fragments were also identified. The layer varied in thickness and measured approximately between 5cm and 10cm. Another layer was identified in another animal burrow and this layer was also approximately 15cm underneath the present surface. This layer consisted mainly of ash and vitrified dung which was approximately 5cm to 10cm thick.

The ash and vitrified dung were on top of a clay floor which measured 2cm to 4cm thick. The floor was in a fair condition albeit it was damaged and exposed by the animals. No structures or other features were identified here.

Site size: Approximately 120m in diameter.



Figure 26 - General view of site



Figure 27 -Potshards found on site



Figure 28 - Midden deposit



Figure 29 - Cultural layer with dung deposit

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

6.12 2327CA-PGS012

Findspot:

1 x decorated potsherd (impressions) and a MSA-tool were found in and around several animal burrows at this location.

Site size: Approximately 30m in diameter.



Figure 30 - View of site with animal burrows



Figure 31 - Decorated shard on site

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

6.13 2327CA-PGS013

4 x non-diagnostic potsherds and 1 x decorated potsherd (graphite, ochre and impressions) were found in and around several animal burrows at this location.

Site size: Approximately 30m in diameter.



Figure 32 - View of site with animal burrows



Figure 33 - Potshards found on site

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

6.14 2327CA-PGS014

A small site in a small clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). 20 x non-diagnostic potsherds and 4 x decorated potsherds (1 x graphite; 1 x ochre; and 2 x impressions) were recovered in and around several animal burrows from within the clearing. No structures or other features were identified here.

Site size: Approximately 70m in diameter.



Figure 34 - General view of site



Figure 35 - Potshards on site

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

6.15 2327CA-PGS015

A site was identified in a clearing in the dense natural bush, with extensive animal burrowing activities. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). More than 25 x non-diagnostic potsherds, 8 x potsherds with decorations (2 x graphite; 4 x ochre and 2 x impressions) and 1 x rim-shard, were recovered in and around several of the animal burrows as well as from the surface within the clearing. 6 pieces of slag were also found in and around the animal burrows. An ash-concentration was identified in the middle of the clearing. No structures or other features were identified here.

Site size: Approximately 150m in diameter.



Figure 36 - General view of site



Figure 37 - Decorated and undecorated shards on site



Figure 38 - Slag found on site

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

6.16 2327CA-PGS016

Findspot:

A single non-diagnostic potsherd was found in one of several animal burrows at this location

Site size: Approximately 20m in diameter.



Figure 39 - General view of site



Figure 40 - Shard found on site

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

6.17 2327CA-PGS017

Findspot:

1 x non-diagnostic potsherd, 1 x decorated potsherd (graphite, ochre and impressions) and an animal bone fragment were found in and around several animal burrows at this location.

Site size: Approximately 30m in diameter.



Figure 41 - General view of site



Figure 42 - Shards and bone found on site

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

6.18 2327CA-PGS018

Some of the remains and rubble of the possible labour quarters for the farm labourers were identified at this location. A make-shift kraal was identified next to the remains. The structures were demolished and most of the rubble was removed. The age, size and shapes of the structures are unknown. This site was to be associated with Site 2327CA-PGS019 (location of the main farm house).

Site size: Approximately 50m x 50m.



Figure 43 - Remains of workers housing

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

6.19 2327CA-PGS019

Some of the remains and rubble of the main farm house of the farm. All of the structures were demolished and most of the rubble was removed. The age, size and shapes of the structures are unknown.

Site size: Approximately 100m x 100m.



Figure 44 - General site conditions

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

6.20 2327CA-PGS020

Findspot:

2 x non-diagnostic potsherds were found in and around several of the animal burrows at this location.

Site size: Approximately 30m in diameter.



Figure 45 - General view of site



Figure 46 - Potshards found on site

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

6.21 2327CA-PGS021

Findspot:

1 x non-diagnostic potsherd, 1 x decorated potsherd (impressions) and a MSA-tool were found in and around several of the animal burrows at this location.

Site size: Approximately 30m in diameter.



Figure 47 - Animal burrows on site



Figure 48 - Potshards on site

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

6.22 2327CA-PGS022

A small site in a small clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). 5 x non-diagnostic potsherds and 2 x MSA-cores were recovered in and around several animal burrows from within the clearing. No diagnostic/decorated potsherds, structures or other features were identified here.

Site size: Approximately 60m in diameter



Figure 49 - General view of site



Figure 50 - Lithics and shards found on site

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

6.23 2327CA-PGS023

A small site in a small clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). Over 30 x non-diagnostic potsherds, 4 x decorated potsherds (2 x graphite, ochre and impressions; 2 x impressions) were found in and around several animal burrows from within the clearing. No archaeological deposit could be identified in the animal burrows although many potsherds were recovered. No structures or other features were identified here.

Site size: Approximately 50m in diameter.



Figure 51 - View of site



Figure 52 - Potshards found on site

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

6.24 2327CA-PGS024

A site was identified in a clearing in the dense natural bush, with extensive animal burrowing activities. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). More than 30 x non-diagnostic potsherds, 6 x potsherds with decorations (2 x graphite; 2 x ochre; 1 x graphite, ochre and impressions; 1 x impressions) were recovered in and around several of the animal burrows as well as from the surface within the clearing. A possible ash-midden/ash-concentration was identified in the middle of the clearing. No structures, other finds or other features were identified here.

Site size: Approximately 80m in diameter.



Figure 53 - General view of site



Figure 54 - Decorated shards on site

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

6.25 2327CA-PGS025

A small site in a small clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). Over 15 x non-diagnostic potsherds were found in and around several animal burrows from within the clearing. No archaeological deposit could be identified in the animal burrows although a fair amount of potsherds were recovered. No structures, other finds or other features were identified here.

Site size: Approximately 40m in diameter.



Figure 55 - General view of site



Figure 56 - Potshards found on site

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

6.26 2327CA-PGS026

A small site in a small clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). Over 10 x non-diagnostic potsherds and 1 x rim-shard were found in and around the few animal burrows from within the clearing. No archaeological deposit could be identified in the animal burrows. No structures, other finds or other features were identified here.

Site size: Approximately 40m in diameter.



Figure 57 - General view of site



Figure 58 - Potshards on site

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

6.27 2327CA-PGS027

Findspot:

2 x non-diagnostic potsherds were found in and around several of the animal burrows at this location.

Site size: Approximately 20m in diameter.



Figure 59 - Animal burrows on site



Figure 60 - Shards found on site

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

6.28 2327CA-PGS028

Findspot:

1 x non-diagnostic potsherd and 1 x decorated potsherd (impressions) were recovered from the surface in a large open area at this location.

Site size: Approximately 20m in diameter.



Figure 61 - General view of site



Figure 62 - Shards found on site

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

6.29 2327CA-PGS029

A small site in a small clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). 7 x non-diagnostic potsherds and 1 x decorated potsherd (graphite, ochre and impressions) were found in and around the animal burrows from within the clearing. No archaeological deposit could be identified in the animal burrows. No structures, other finds or other features were identified here.

Site size: Approx. 60m x 60m.



Figure 63 - General view of site



Figure 64 - Decorated shards on site

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

6.302327CA-PGS030

A site in a large clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). Over a 100 x non-diagnostic potsherds, 9 x decorated potsherds (1 x ochre; 4 x impressions; 3 x graphite and impressions; 1 x graphite, ochre and impressions), 2 x rim-sherds and a MSA-tool were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing. The animal burrows on the southern end produced the most finds. These animal burrows were closely inspected, but no archaeological deposit could be identified in them. A possible ash-midden/kraal was identified near the middle of the site. No other structures, finds or features were identified here. An amount of damage was caused to the surface of the area and most probably also to the subterranean archaeological deposits due to bush-clearing with earth-moving machinery.

Site size: Approximately 200m in diameter



Figure 65 - General view of site



Figure 66 - Potshards found on site



Figure 67 -Decorated shards



Figure 68 - Decorated shards found on site

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

6.31 2327CA-PGS031

Findspot:

3 x non-diagnostic potsherds were found in and around several of the animal burrows at this location.

Site size: Approximately 20m in diameter.



Figure 69 - General view of site



Figure 70 - Potshards on site

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

6.32 2327CA-PGS032

Findspot:

2 x non-diagnostic potsherds and a rim-shard were recovered from the surface at this location.

Site size: Approximately 20m in diameter.



Figure 71 - General view of site



Figure 72 - Potshards found on site

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

6.33 2327CA-PGS033

A large, extensive site was identified in a clearing in the dense natural bush, with the site extending into the encroaching bushes. Most of the finds were made in and around the extensive animal burrowing activities across the site, although surface finds were also made occasionally. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). More than 60 x non-diagnostic potsherds, 5 x decorated potsherds (2 x impressions; 2 x graphite and ochre; 1 x graphite, ochre and impressions) and a fragment of a lower grinding stone were recovered in and around several of the animal burrows as well as from the surface within the clearing. Fragments of vitrified hut rubble and vitrified dung were found. On closer inspection of the animal burrows, a layer of archaeological deposit was identified in two of the burrows at a depth of approximately 15-20cm. These layers consisted mainly of ash and vitrified dung, but animal bone fragments and potsherds were also identified. The layers varied in thickness and measured approximately between 10cm and 15cm. These layers of ash and dung occurred to the central parts of the identified site. No structures or other features were identified here.

Site size: Approximately 300m in diameter.



Figure 73 - General view of site



Figure 74 - Shards found on site



Figure 75 - Animals burrowing shards from deposit



Figure 76 - Lower grinder on site



Figure 77 - Vitrified dung



Figure 78 - Deposit found on site



Figure 79 - Decorated shards found on site

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

6.34 2327CA-PGS034

Findspot:

1 x non-diagnostic potsherd and 1 x rim-shard were found in and around several of the animal burrows at this location.

Site size: Approximately 30m in diameter.



Figure 80 - General view of site



Figure 81 - Potshards found on site

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

6.35 2327CA-PGS035

A small site in a small clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). 6 x non-diagnostic potsherds were found in and around the animal burrows from within the clearing. No archaeological deposit could be identified in the animal burrows. No structures, other finds or other features were identified here.

Site size: Approximately 30m in diameter.



Figure 82 - General view of site



Figure 83 - Potshards found on site

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

6.36 2327CA-PGS036

A large, extensive site in a large clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). Over 30 x non-diagnostic potsherds, 7 x decorated potsherds (3 x ochre; 1 x impressions; 1 x graphite and impressions; 2 x ochre and impressions) were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing. The animal burrows were closely inspected, but no archaeological deposit could be identified in them. No other structures, finds or features were identified here.

Site size: Approximately 200m in diameter.



Figure 84 - General view of site



Figure 85 - Potshards on site

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

6.37 2327CA-PGS037

A large site in a large clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). 15 x non-diagnostic potsherds and 2 x rim-sherds were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing. The animal burrows on the southern end produced the most finds. These animal burrows were closely inspected, but no archaeological deposit could be identified in them. No other structures, finds or features were identified here.

Site size: Approximately 200m in diameter.



Figure 86 - General view of site



Figure 87 - Shards found on site

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

6.38 2327CA-PGS038

Findspot:

1 x non-diagnostic potsherd and 1 x decorated potsherd (ochre, graphite and impressions) were found in and around several of the animal burrows at this location.

Site size: Approximately 30m in diameter.



Figure 88 - General view of site



Figure 89 - Potshards found on site

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

6.39 2327CA-PGS039

A large site in a large clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). Over 50 x non-diagnostic potsherds, 9 x decorated potsherds (4 x impressions; 3 x graphite; 2 x ochre), 2 x rim-sherds, 1 x MSA-tool, 1 x MSA-core and a piece of slag were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing. The animal burrows were closely inspected and archaeological deposits were identified in them. These deposits were approximately 15cm from the surface and the layers varied in thickness. They consisted mainly of ash, animal bone fragments and a few potsherds. No other structures, finds or features were identified here.

Site size: Approx. 1m x 1m.



Figure 90 - General view of site



Figure 91 - Potshards found on site



Figure 92 - Slag found on site

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

6.40 2327CA-PGS040

A large site in a large clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). Over 50 x non-diagnostic potsherds, 2 x decorated potsherds (1 x impressions: 1 x graphite), 1 x rim-shard and a rubbing/smearing stone were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing. The animal burrows were closely inspected, but no archaeological deposit could be identified in them. No other structures, finds or features were identified here.

Site size: Approximately 300m in diameter.



Figure 93 - General view of site



Figure 94 - Potshards found on site



Figure 95 - Decorated shards found on site

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

6.41 2327CA-PGS041

Findspot:

3 x non-diagnostic potsherds and 1 x MSA-tool were found in and around several of the animal burrows at this location.

Site size: Approximately 30m in diameter.



Figure 96 - General view of site



Figure 97 - Shards found on site

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

6.42 2327CA-PGS042

Findspot:

2 x non-diagnostic potsherds and a rubbing/smearing stone were found in and around several of the animal burrows at this location.

Site size: Approximately 30m in diameter.



Figure 98 - General view of site



Figure 99 - Potshards found on site

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

6.43 2327CA-PGS043

Findspot:

5 x non-diagnostic potsherds were found in and around several of the animal burrows at this location.

Site size: Approximately 30m in diameter.



Figure 100 - General view of site



Figure 101 - Shards found on site

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

6.44 2327CA-PGS044

A large site in a large clearing in the dense natural bush was identified here. The site had red sandy soils with areas mixed with ash or animal dung (wild or domestic). Over 20 x non-diagnostic potsherds, 1 x rim-shard and 2 x fragments of lower grinding stones were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing. The animal burrows were closely inspected, but no archaeological deposit could be identified in them. Two circular structures were identified approximately 15m from each other. They were located approximately 50m from the main concentration of potsherds on the south-eastern section of the site. The first structure consisted of 6 rocks placed in the shape of a circle/oval and it measured approximately 1,2m x 0,8m in size. The second structure was similar in shape and size but consisted of 7 packed rocks. These two small structures could possibly be the remains of grain-bin foundations. No other structures, finds or features were identified here.

Site size: Approximately 150m in diameter.



Figure 102 - General view of site



Figure 103 - Potshards found on site



Figure 104 - Lower grinder on site



Figure 105 - Stone structure on site



Figure 106 - Stone structure on site

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

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 archaeological or 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 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 administered by a local authority. Graves in the category located inside a formal cemetery administered 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 44 sites were identified of which 2 sites were identified as contemporary, and 42 was identified as archaeological. No cemeteries or graves were identified during the survey.

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 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, 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 Toustwe 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
2327CA-PGS001	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS002	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS003	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS004	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS005	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS006	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS007	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS008	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS009	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS010	13	GP.A	2	1	6	4	Phase 2 Extensive Documentation
2327CA-PGS012	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS013	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS014	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS015	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS016	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS017	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS018	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS019	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS020	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS021	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS022	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS023	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS024	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS025	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS026	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS027	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS028	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS029	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS030	13	GP.A	2	1	6	4	Phase 2 Extensive Documentation
2327CA-PGS031	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS032	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS033	13	GP.A	2	1	6	4	Phase 2 Extensive Documentation
2327CA-PGS034	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS035	13	GP.B	2	1	6	4	Phase 2 STP
2327CA-PGS036	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations

Site Name	Impact Significance	Field Rating	Probability	Extent	Duration	Intensity	Mitigation
2327CA-PGS037	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS038	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS039	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS040	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations
2327CA-PGS041	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS042	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS043	13	GP.C	2	1	6	4	No further mitigation - Monitoring
2327CA-PGS044	13	GP.A	2	1	6	4	Phase 2 Mapping and test excavations

Table 8 - 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	The client	The client

adhered 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 9: 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 judgement 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 workface 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 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 should have some sort of contingency plans so that operations could move temporarily elsewhere while the material and data are recovered. The project needs to have an archaeologist available to do such work.

The purpose of the 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.

The main purpose of an archaeological monitoring programme 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; and
 - 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

Wouter Fourie, BA (Hon) Archaeology (UP) – Field Director - ASAPA

Marko Hutten, BA (Hon) Archaeology (UP)

Eric Matho, BA (Hon) Archaeology (Venda)

Wim Biemond – Registered Archaeologist Botswana

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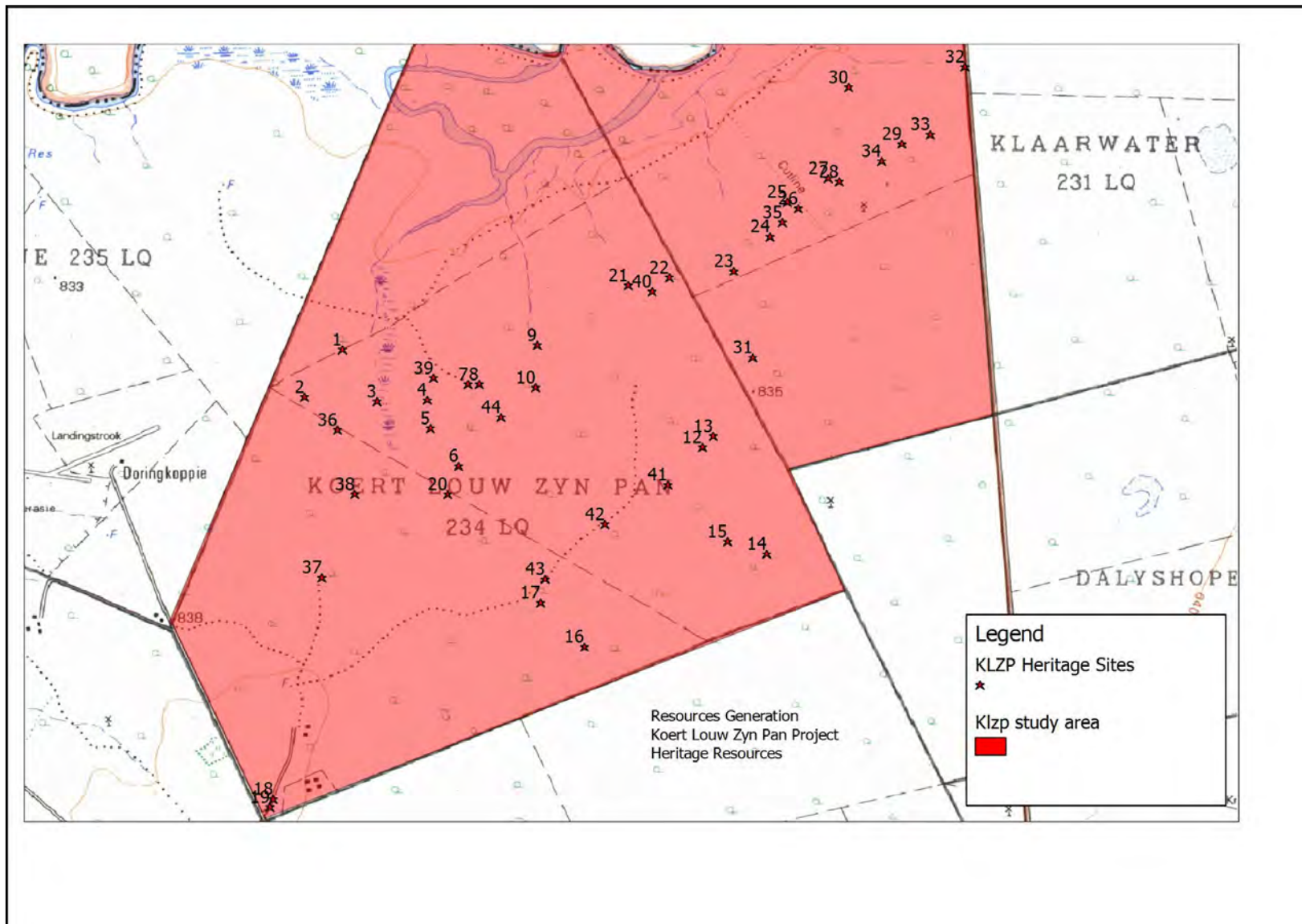
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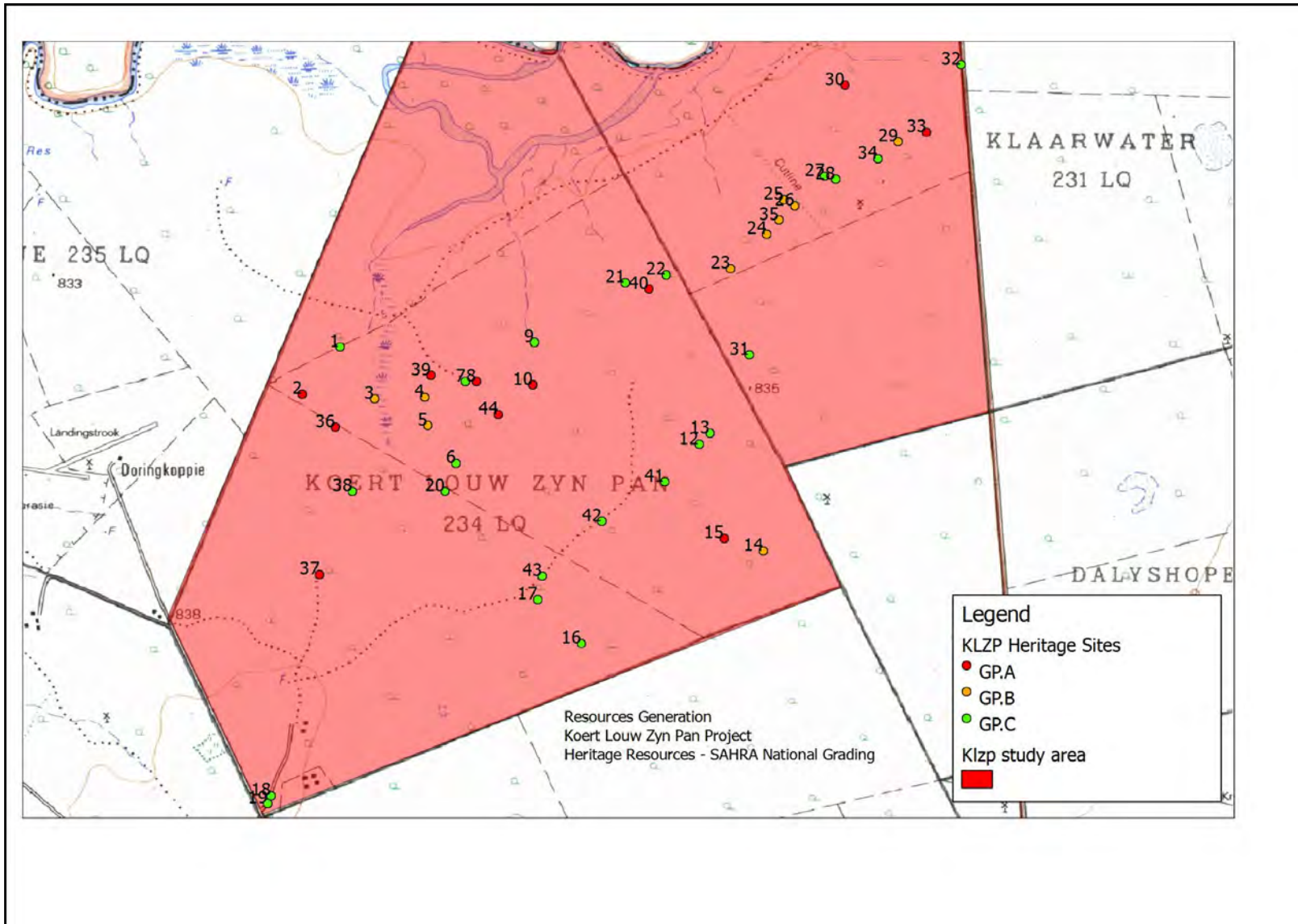
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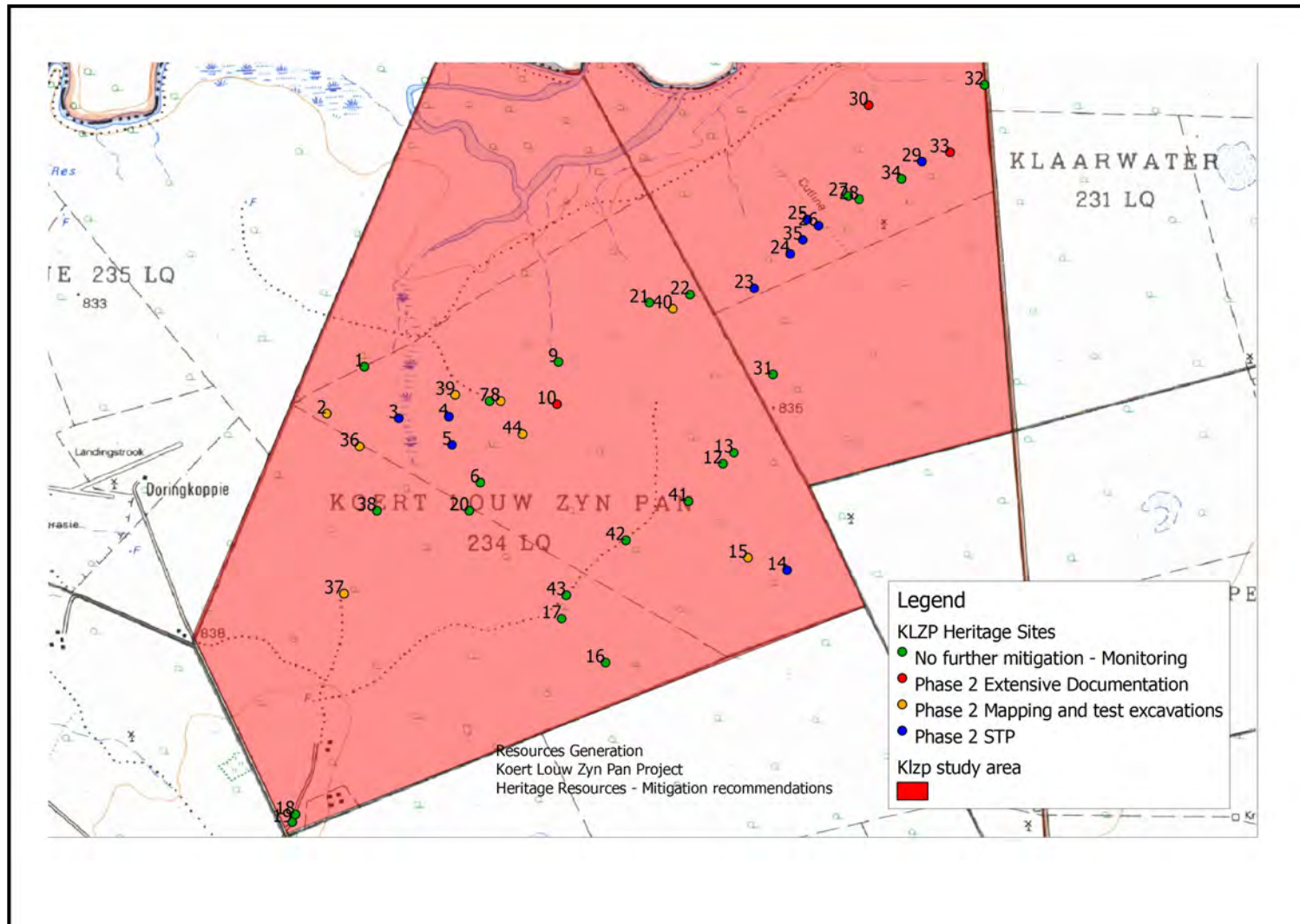
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**ANNEXURE A:
Study area
And Heritage sites**







ANNEXURE B
Heritage Site Coordinates

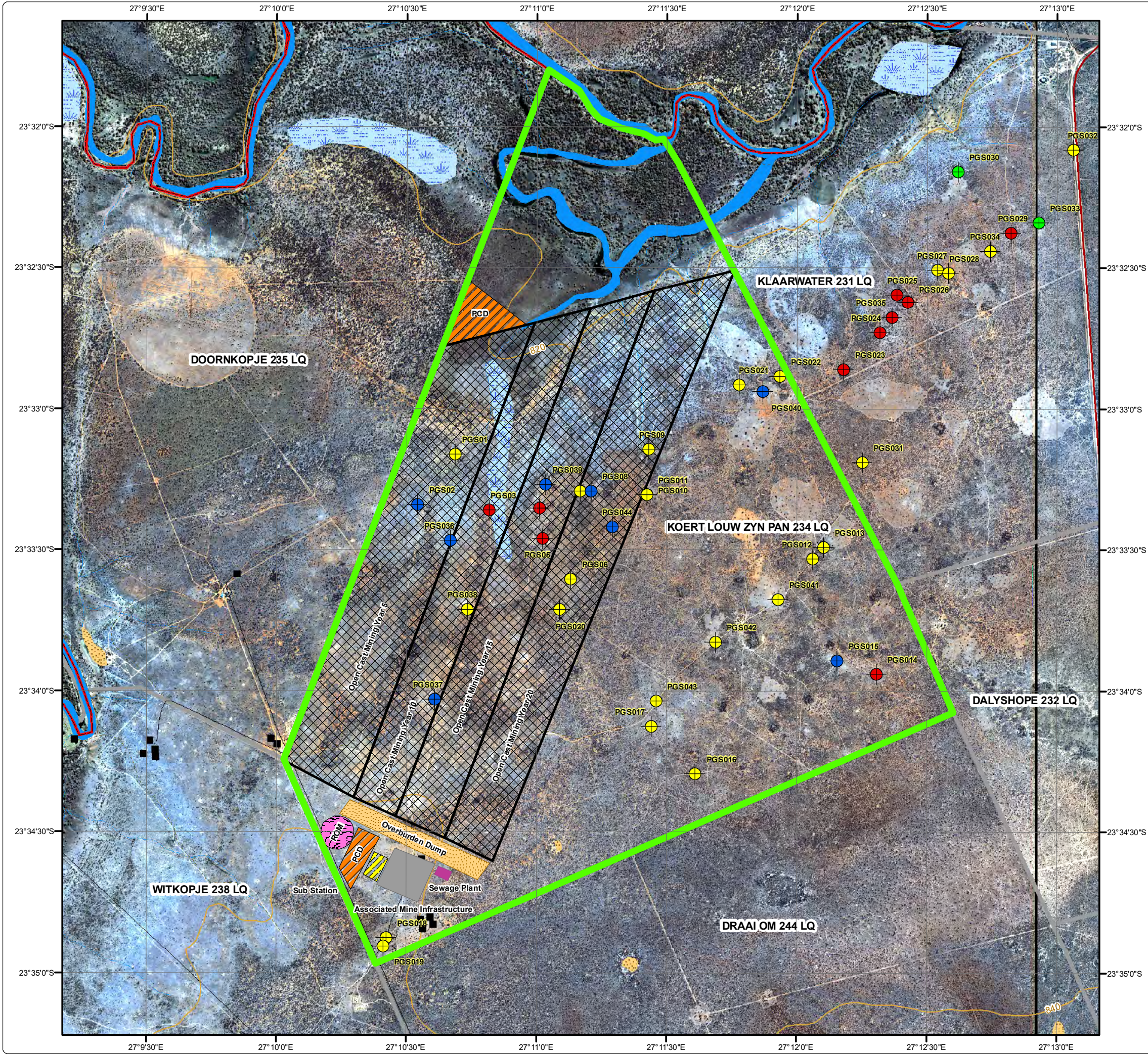
Site Name	Lat	Lon
2327CA-PGS001	-23.5527	27.1781
2327CA-PGS002	-23.5557	27.1757
2327CA-PGS003	-23.5560	27.1803
2327CA-PGS004	-23.5559	27.1835
2327CA-PGS005	-23.5577	27.1837
2327CA-PGS006	-23.5601	27.1855
2327CA-PGS007	-23.5549	27.1861
2327CA-PGS008	-23.5549	27.1868
2327CA-PGS009	-23.5524	27.1905
2327CA-PGS010	-23.5551	27.1904
2327CA-PGS011	-23.5551	27.1904
2327CA-PGS012	-23.5589	27.2010
2327CA-PGS013	-23.5582	27.2017
2327CA-PGS014	-23.5657	27.2051
2327CA-PGS015	-23.5649	27.2026
2327CA-PGS016	-23.5716	27.1935
2327CA-PGS017	-23.5688	27.1907
2327CA-PGS018	-23.5813	27.1737
2327CA-PGS019	-23.5818	27.1735
2327CA-PGS020	-23.5619	27.1848
2327CA-PGS021	-23.5486	27.1963
2327CA-PGS022	-23.5481	27.1989
2327CA-PGS023	-23.5477	27.2030
2327CA-PGS024	-23.5455	27.2053
2327CA-PGS025	-23.5433	27.2064
2327CA-PGS026	-23.5437	27.2071
2327CA-PGS027	-23.5418	27.2090
2327CA-PGS028	-23.5420	27.2097
2327CA-PGS029	-23.5396	27.2137
2327CA-PGS030	-23.5360	27.2103
2327CA-PGS031	-23.5532	27.2042
2327CA-PGS032	-23.5347	27.2177
2327CA-PGS033	-23.5390	27.2155
2327CA-PGS034	-23.5407	27.2124
2327CA-PGS035	-23.5446	27.2061
2327CA-PGS036	-23.5578	27.1778
2327CA-PGS037	-23.5672	27.1768
2327CA-PGS038	-23.5619	27.1789
2327CA-PGS039	-23.5545	27.1839
2327CA-PGS040	-23.5490	27.1978
2327CA-PGS041	-23.5613	27.1988
2327CA-PGS042	-23.5638	27.1948
2327CA-PGS043	-23.5673	27.1910
2327CA-PGS044	-23.5570	27.1882

Waterburg 1 Joint Venture

Archaeology

Legend

- Project Area
- Archaeological Sites**
 - Remaining Sites
 - Phase 2 (Mapping & Test Excavations)
 - Phase 2 (Shovel Test Pit)
 - Phase 2 (Extensive Documentation)
- Mine Plan**
 - Associated Mine Infrastructure
 - Open Cast Mining
 - Overburden Dump
 - PCD
 - ROM
 - Sub Station
 - House
 - Main Road
 - Secondary Road
 - Minor Road
 - Track
 - Contour (20m)
 - Non-perennial Stream
 - Perennial Stream
 - Farm boundaries
 - Dam / Lake
 - Perennial Pan
 - Non-perennial Pan / stream
 - Wetland
 - International Boundary



Projection: Transverse Mercator Ref #: bjt.COM363.200908.018
 Datum: Hartebeesthoek 1994 Revision Number: 1
 Central Meridian: 27°E Date: 05/08/2009

