PHASE 1
HERITAGE RESOURCES SCOPING REPORT

PROPOSED EXPANSION OF THE EXISTING DAM ON REM PORTION OF THE FARM OVERVLAKTE 125 MS, MUSINA LOCAL MUNICIPALITY, VHEMBE DISTRICT, LIMPOPO PROVINCE

Tua Conserva Environmental and Conservation Services cc
PO Box 960
Fauna Park
Polokwane
0787

Att: Dons Claassens

L. Stegmann and FE Roodt
Under the supervision of Frans Roodt

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SHASA HERITAGE CONSULTANTS
Not VAT registered
Tel: 078 618 6204 (Frans)
064 070 4454
54 Wildebeestfontein, Polokwane
Email: wildwindheritagefarm@gmail.com

CONTENTS

EXECUTIVE SUMMARY

The area proposed for development on the Remaining portion of the farm Overvlakte 125 MS, 61km west of Musina, Limpopo, is an application to extend an existing dam. Total hectares proposed is 98.2 ha of which 32 ha is the existing dam. The farm is mainly utilized as an irrigation water storage farm for citrus production.

The area also lies to the East of Mapungubwe Cultural Landscape. The development, although just outside the proposed buffer zone, falls within one of the farms surveyed as part of the Vele Colliery project. This specific farm was allocated to underground mining.

Due to the World Heritage Status of the Mapungubwe Cultural Landscape, cognizance of the Outstanding Universal Value of associated archaeological sites has been taken into account. Reference is also made to reports submitted by Roodt (2009, 2015) as well as a revised HIA report for Department of Environmental Affairs by Pikirayi, Chirikure, Manyanga, Mothulatshipi and Ntsoane (2012).

Originally (Roodt, 2009), Site 4 in the Vele reports referred to a large area with grain bins stands and ceramic scatters. In 2015 during monitoring (September 2015), Roodt re-evaluated the site and the lower section was deemed to be a separate site, and was allocated as Site 45. From surveys by Mr FE Roodt (March 2018) for the current project, this re-evaluation appears to be correct. Site 4 will not be impacted on by the current development. As Site 4 and 45 are similar, I will use the significance rating allocated by Pikirayi et al (2012:60) that it would be of Medium significance, and would be of interest for academic research.

Recommendations for this project will be left in SAHRA's hands. The site falls outside of proclaimed areas, but is still intrinsically of value in light of the archaeology and heritage of the wider area. Pikirayi et al (2012: 57) makes mention of the impacts of intensive agriculture in the wider area- although specifically referring to areas in the core and buffer areas.

A choice of 3 options exists.

1. No development permitted
2. Phase 2 to be conducted on site 45 (S1-6 2018), with mapping and horizontal excavation for eventual destruction permit application, preferably by a university who can research the area as part of ab greater research project.
3. The applicant to re-design the dam with a buffer of at least 75m between the dam and the site. Dam walls to be adequately constructed to prevent any impact on the site.

Palaeontological recommendation:
This desktop study indicates that there is a very high likelihood of the occurrence of fossils, typically palaeoflora of *Glossopteris*, *Dadoxylon* and *Vertebraria* within the lower Karoo strata. A SACNASP-registered palaeontologist should visit the site to investigate the possibilities of a Cenozoic cover and collect any fossils which are encountered during excavation.

1. INTRODUCTION AND TERMS OF REFERENCE

Application purpose: To extend an existing dam

Area: Musina

Size: 98.2ha of which 32ha is already a dam

General GPS: *S22° 10' 14.7" E29° 37' 20.7"*

Map reference number: 2229 BA

This report will enable the Applicant to take pro-active measures to limit the adverse effects that the development could have on heritage resources.

In terms of the National Heritage Resources Act (1999) the following is of relevance:

Historical remains

Section 34(1) No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

Archaeological remains

Section 35(4) No person may, without a permit issued by the responsible heritage resources authority-

(a) destroy, damage, excavate, alter, deface, or otherwise disturb any archaeological or palaeontological site or any meteorite

Burial grounds and graves

Section 36 (3)(a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority-

(c) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(b) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in detection or recovery of metals.

Culture resource management

Section **38(1)** Subject to the provisions of subsection (7), (8) and (9), any person who intends to undertake a development* …

must at the very earliest stages of initiating such development notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development.

***'development'** 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 a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including-

(a) construction, alteration, demolition, removal or change of use of a place or a structure at a place;
(b) carry out any works on or over or under a place*****;
(e) any change to the natural or existing condition or topography of land, and
(f) any removal or destruction of trees, or removal of vegetation or topsoil;

"place** means a site, area or region, a building or other structure** ..."

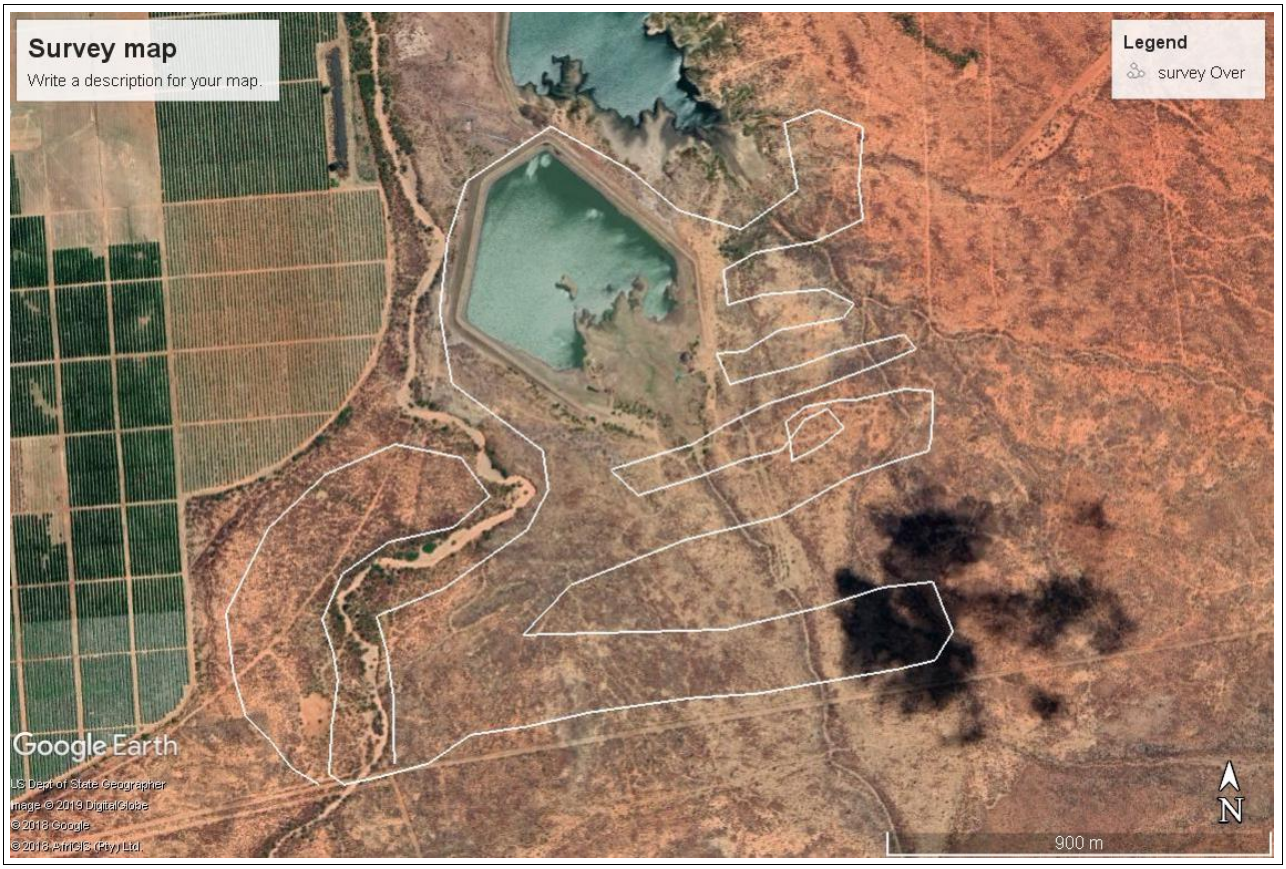
***"structure** means any building, works, device or other facility made by people and which is fixed to the ground, …"

2. METHOD

2.1 Sources of information and methodology

The source of information was primarily the field reconnaissance and referenced literary sources.

A pedestrian survey of the area was undertaken, during which standard methods of observation were applied. The area was surveyed on 7 March 2018 spanning early morning to late afternoon and was thoroughly traversed. Special attention given to any areas displaying soil and or vegetative changes. As most archaeological material occurs in single or multiple stratified layers beneath the soil surface, special attention was given to disturbances, both man-made such as roads and clearings, as well as those made by natural agents such as burrowing animals and erosion. Locations of heritage remains were recorded by means of a GPS (Garmin Etrex 10). Heritage material and the general conditions on the terrain were photographed with a Nikon Coolpix L25 Digital camera.



2.2 Limitations

The scoping survey was thorough, but limitations were experienced due to the fact that archaeological sites are subterranean and only visible when disturbed. Vegetation was moderate and visibility fair.

2.3 Categories of significance

The significance of archaeological sites is ranked into the following categories.

- No significance: sites that do not require mitigation.
- Low significance: sites, which *may* require mitigation.
- Medium significance: sites, which require mitigation.
- High significance: sites, which must not be disturbed at all.

The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences.

A crucial aspect in determining the significance and protection status of a heritage resource is often whether or not the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. Many aspects must be taken into consideration when determining significance, such as rarity, national significance, scientific importance, cultural and religious significance, and not least, community preferences. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be

assessed and mitigated in order to gain data / information which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed. These are generally sites graded as of low or medium significance.

2.4 Terminology

Early Stone Age: Predominantly the Acheulean hand axe industry complex dating to + 1Myr yrs – 250 000 yrs. before present.

Middle Stone Age: Various lithic industries in SA dating from ± 250 000 yr. - 30 000 yrs. before present.

Late Stone Age: The period from ± 30 000-yr. to contact period with either Iron Age farmers or European colonists.

Early Iron Age: Most of the first millennium AD

Middle Iron Age: 10th to 13th centuries AD

Late Iron Age: 14th century to colonial period. *The entire Iron Age represents the spread of Bantu speaking peoples.*

Historical: Mainly cultural remains of western influence and settlement from AD1652 onwards – mostly structures older than 60 years in terms of Section 34 of the NHRA, though more recent remains can be termed historically significant should the remains hold social significance for the local community.

Phase 1 assessment: Scoping surveys to establish the presence of and to evaluate heritage resources in a given area

Phase 2 assessments: In depth culture resources management studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required.

Sensitive: Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains.

3. DESCRIPTION OF THE PROPOSED DEVELOPMENT AND TERRAIN

Vegetation: SVmp 1 Musina Mopane Bushveld

Terrain: The terrain is generally flatlands, interspersed with small drainage lines. Mainly open Mopane veld, characteristic of the area. The dam's original construction has impacted the area.

Proposed development: Dam extension
The extension of the existing dam is located approximately 810 meters in a direction South-to-South East from the Limpopo River. The dam is considered as an off-channel storage dam with water pumped from the Limpopo River. The applicant has a registered volume of water that will be stored in the extension as the two existing dams are too small for the allocated volume**.**

The proposed dam wall will be directly adjoining to the southern embankment wall of the existing dam and will extend to the south.

The dam will exceed 5m in height. It will be constructed as an earth fill dam, with a clay centre. This will be embedded onto the geological substructure.

The spillway will be to the north into the existing second dam situated to the north. Detail designs will be submitted with the WULA-and EIA applications.

The construction process will be managed from the existing farm infrastructure; thus no construction work yard will be established. Building materials, including clay and sand, will be obtained from the surrounding area in the storage footprint and will be below the high-water level mark of the dam. The expected new impoundment created will cover approximately 98.2ha of which 32.1 ha is for the existing dam.

A farm road leads directly to the development site and it would therefore not be necessary to cut an access road to the site. The only construction activity with the potential to create dust and noise pollution of note will be the collection and compacting of building material. As the construction site is situated in a remote area, it should not affect the environment adversely. The owner will, however, dampen the area around the construction site to reduce dust pollution.
(taken from the BID document created by Tua Conserva Environmental Services)


Fig 1: View of area


Fig 2. View of area

Fig 3. View of area

Fig 4. View of area

Fig 5. View of area

Fig 6. View of area

4. RESULTS OF THE SCOPING SURVEY AND DISCUSSION

4.1 SOCIAL and/or RELIGIOUS INTANGIBLE HERITAGE

No areas designated for socio-religious activities were recorded on the site.

The farm is also not currently under land claim.

The farm does however border on the Mapungubwe World Heritage site, and thus partially forms part of the general cultural landscape which crosses the border to Zimbabwe. The area has however been impacted on by agricultural activities and through the original construction of the dam.
As it is understood that cultural landscapes do not have definable borders, it should also be understood that the sites affected by the dam, do highlight that the area was occupied during the Mapungubwe occupation period.

Significance: Low due to previous impacts and erosion

4.2 HISTORICAL PERIOD

No remains or structures from the Historical Period were recorded on site.

Significance: None

4.3 GRAVES

No formal or informal graves could be identified. The farm owner is also not aware of any unmarked graves on the land.

Significance: None

4.4 IRON AGE REMAINS

In terms of Huffman's (2007) distribution sequences of the Iron Age, the project area may contain the remains of the under-mentioned culture historical groups:

 Urewe Tradition, originating in the Great Lakes area of Central Africa, was a secondary dispersal centre for eastern Bantu speakers. It represents the eastern stream of migration into South Africa.

• Kwale Branch:

Mzonjani facies (Broederstroom) AD 450 – 750 (Early Iron Age)

• Moloko (Sotho-Tswana) Branch (Late Iron Age)

Icon facies AD 1300 – 1500: This pottery is associated with the first Sotho Tswana people entering the country.

 Kalundu Tradition, originating in the far North of Angola, was another secondary dispersal centre for eastern Bantu speakers and represents the western stream of migration into South Africa.

• Benfica Sub-branch:

Bambata facies AD 150 – 650 (Early Iron Age)

• Happy Rest Sub-branch:

Happy Rest facies AD 500 – 750 (Early Iron Age)
Malapati facies AD 750 – 1030 (Early Iron Age)
Eiland facies AD 1000 – 1300 (Middle Iron Age)

Mapungubwe facies AD 1250 – 1300 (Middle Iron Age)
Mutamba facies AD 1250 – 1450 (Middle Iron Age)
Khami facies AD 1430 – 1680 (Late Iron Age)
Tavatshena facies AD 1450 – 1600 (Later Iron Age)
Letaba facies AD 1600 – 1840 (Later Iron Age)

Six (6) areas with archaeological remains were recorded on site. These correlate with the finding of ~~F~~ Roodt (2009, 2015) and Pikirayi et al (2012). In 2015, Roodt re-evaluated the site and designated it as Site 45, as it was deemed a separate site to Site 4.

No decorated ceramics were recorded. Originally, Roodt (2009) identified the site as Transitional K2, but (Pikirayi et al, 2012), attributed it to K2/Mapangubwe as it could not be attributed to an exact facies.

The area is in open Mopane veld, and is characterized by a large number of grain bin foundations. Dung deposit within area 2 was separately noted. The area of S2 corresponds exactly with Site 45 from the Roodt (2015) report, and has not degraded with time.

To aid in impact and significance assessment, and for continuity between reports on the area from 2009, 2012 and present, Pikirayi *et al (*2012: 44) data capture sheets has been adjusted for this report.

Recorded Number	GPS	Description
S1	*S22º 10' 15.1" E29º 37' 20.4"*	Small area with scattering of ceramic sherds- undiagnostic
Significance: Low Context – *in situ*- however only a scattering of sherds Design – random artefact Variety – as the sherds are undiagnostic, no variety or differences in facies could be discerned Quantity – small sample Representation – typical as found throughout the wider Limpopo region Research potential- none Local concern- none		
S2	*S22º 10' 01.8" E29º 37' 28.4"*	Main site area with grain bin foundation stones and ceramic sherds
Significance: Medium Context – *in situ*- evidence of original in context grain bin stands- although erosion has affected the sites Design – Discernible spatial pattern with regards to the grain bin stands Variety – as the sherds are undiagnostic, no variety or differences in facies could be discerned. Grain bin stands appear to be from the same occupation time. Quantity – Moderate sample		

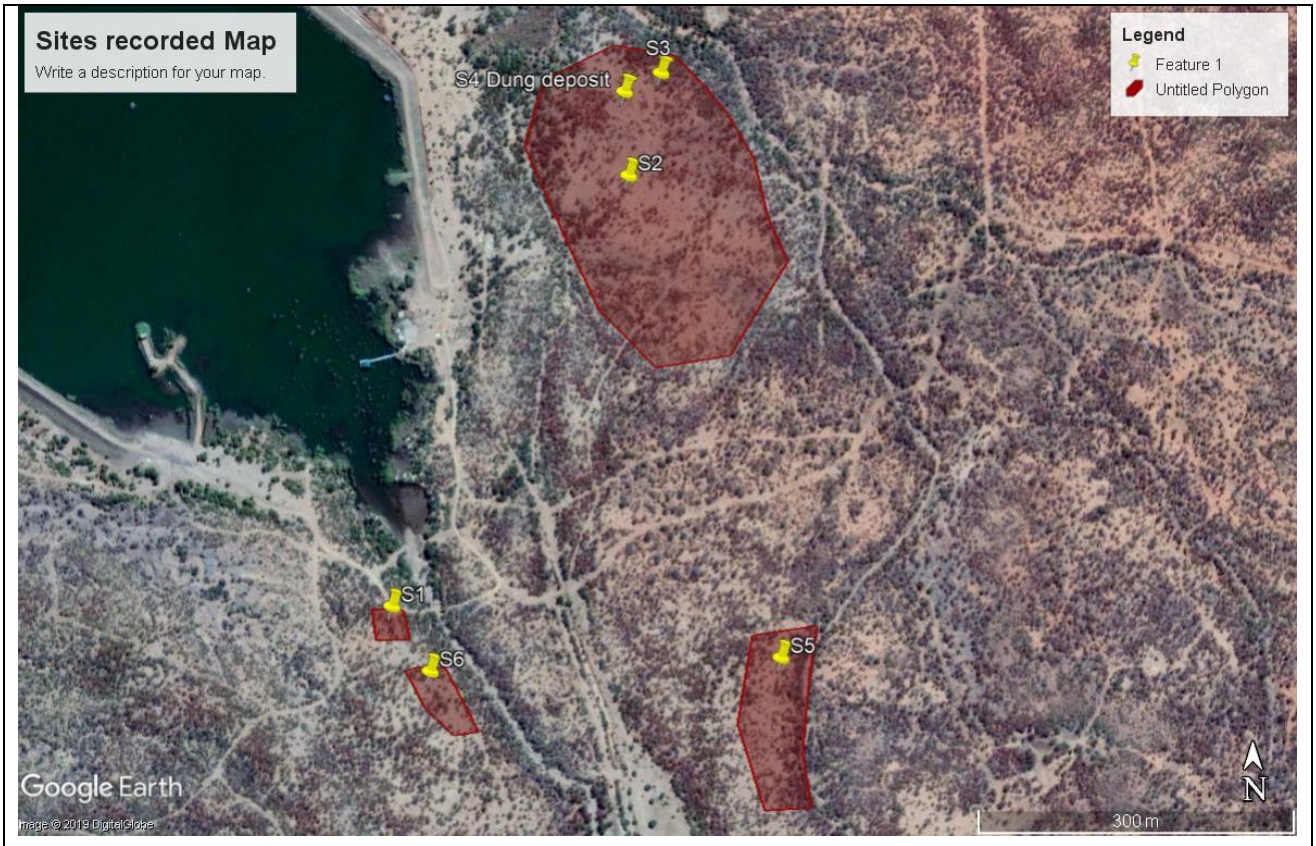
Representation – Unique in terms of the number of grain bin stands Research potential- Medium, in terms of further understanding day to day way of life during the period in question Local concern- medium		
S3	*S22º 09' 58.6"* *E29º 37' 29.5"*	Main site area with grain bin foundation stones and ceramic sherds
Significance: Medium Context – *in situ*- evidence of original in context grain bin stands- although erosion has affected the sites Design – Discernible spatial pattern with regards to the grain bin stands Variety – as the sherds are undiagnostic, no variety or differences in facies could be discerned. Grain bin stands appear to be from the same occupation time. Quantity – Moderate sample Representation – Unique in terms of the number of grain bin stands Research potential- Medium, in terms of further understanding day to day way of life during the period in question Local concern- medium		
S4	*S22º 09' 59.2"* *E29º 37' 28.3"*	Dung deposit
Significance: Medium Context – *in situ*- however no other attributes Design – No discernible pattern to greater area Variety – none Quantity – medium sample Representation – typical as found throughout the wider Limpopo region Research potential- medium Local concern- low		
S5	*S22º 10' 16.7"* *E29º 37' 33.4"*	Ceramic sherds and possible grain bin foundation, not distinct enough to be fully diagnostic of a grain bin.
Significance: Low-Medium Context – *in situ*- however only a scattering of sherds- grain bin can not be positively identified as a stand due to disruption to the context Design – random artefact- sherds- spatial pattern if truly a grain bin stand Variety – as the sherds are undiagnostic, no variety or differences in facies could be discerned Quantity – small sample Representation – small, low significance Research potential- Would require shallow excavation to positively determine if the grain bin stand is true Local concern- low		
S6	*S22º 10' 17.1"*	Ceramic sherds and possible grain bin foundation, not distinct

	E29º 37' 21.7"	enough to be fully diagnostic of a grain bin.

Significance: Medium to low

Context – *in situ*- however only a scattering of sherds- grain bin can not be positively identified as a stand due to disruption to the context
Design – random artefact- sherds- spatial pattern if truly a grain bin stand
Variety – as the sherds are undiagnostic, no variety or differences in facies could be discerned
Quantity – small sample
Representation – small, low significance
Research potential- Would require shallow excavation to positively determine if the grain bin stand is true
Local concern- low

S1 and S6 are in all probability connected. On map at end of report- sites recorded map- buffer zones have been provided for areas where heritage materials/features were located. See Below



Map 1

The significance of the site lies in the number of grain bin stand foundations which are still evident.

Fig 7. Ceramic scatter
Scale equals 1cm

Fig 8. Foundation stone- grain bin stand S2-4

Fig 9. General view of S2-4 area

Fig 10. View of undiagnostic stones of area S5

Fig 11. S5 ceramic scatter
Scale equal 1 cm

Fig 12. View of undiagnostic stone grouping S6

4.5 STONE AGE REMAINS

No Stone Age remains were recorded. The area was searched for Stone Age materials, as 2009 and 2015 survey around Site 4 had recorded Stone Age materials, but none were recorded. The farm also does not have overhangs, caves, drainage lines or rocky areas in the vicinity of the dam. The area has already been impacted on by way of agricultural activities.

Rock art is recorded from within the Mapungubwe National Park, This art is protected. No rock art was recorded on the dam site.

The below mentioned is generic background to the area adapted from Deacon and Deacon: 1999:

The Stone Age covers most of southern Africa and the earliest consist of the Oldowan and Acheul artefacts assemblages. Oldowan tools are regularly referred to as “choppers”. Oldowan artefacts are associated with Homo *habilis*, the first true humans. In South Africa definite occurrences have been found at the sites of Sterkfontein and Swartkrans. Here they are dated to between 1.7 and 2 million years old. This was followed by the Acheulian technology from about 1.4 million years ago which introduced a new level of complexity. The large tools that dominate the Acheulian artefact assemblages range in length from 100 to 200 mm or more. Collectively they are called bifaces because they are normally shaped by flaking on both faces. In plan view they tend to be pear-shape and are broad relative to their thickness. Most bifaces are pointed and are classified as handaxes, but others have a wide cutting end and are termed cleavers. The Acheulian design persisted for more than a million years and only disappeared about 250 000 years ago.

The change from Acheulian with their characteristic bifaces, handaxes and cleavers to Middle Stone Age (MSA), which are characterized by flake industries, occurred about 250 000 years ago and ended about 30 000 – 22 000 years ago. For the most part the MSA is associated with modern humans; Homo sapiens. MSA remains are found in open spaces where they are regularly exposed by erosion as well as in caves. Characteristics of the MSA are flake blanks in the 40 – 100 mm size range struck from prepared cores, the striking platforms of the flakes reveal one or more facets, indicating the preparation of the platform before flake removal (the prepared core technique), flakes show dorsal preparation – one or more ridges or arise down the length of the flake – as a result of previous removals from the core, flakes with convergent sides (laterals) and a pointed shape, and flakes with parallel laterals and a rectangular or quadrilateral shape: these can

be termed pointed and flake blades respectively. Other flakes in MSA assemblages are irregular in form.
The change from Middle Stone Age to Later Stone Age (LSA) took place in most parts of southern Africa little more than about 20 000 years ago. It is marked by a series of technological innovations or new tools that, initially at least, were used to do much the same jobs as had been done before, but in a different way. Their introduction was associated with changes in the nature of hunter-gatherer material culture. The innovations associated with the Later Stone Age "package" of tools include rock art – both paintings and engravings, smaller stone tools, so small that the formal tools less that 25mm long are called microliths (sometimes found in the final MSA) and Bows and arrows. Rock art is an important feature of the LSA and is abundant in the Waterberg and the Makgabeng.

Significance: None

4.6 PALAEONOTOLOGICAL SENSITIVITY

Chris Jones conducted the Palaeontological study for the area: below are excerpts from his report:

Rocks of the Karoo Supergroup are internationally acclaimed for their rich palaeontological heritage. In particular the Karoo documents the catastrophic End Permian Extinction and subsequent proliferation of life, early dinosaurs and the emergence of mammals. Since the Karoo hosts a number of coal seams, and coal is formed from plant remains it follows that these rocks host a well-documented palaeoflora. Fossil plants offer an opportunity to study palaeoecology and have been allocated a very high palaeontological sensitivity by the South African Heritage Resource Agency (SAHRA).

Tshidzi Formation
The glacial deposits of the Tshidzi Formation contain rare palynomorphs (microscopic plant and animal structures) and unspecified plant remains (typically *Glossopteris* sp) associated with thin coal seams.
Madzaringwe Formation

The marshy flood-prone overbank area provided a suitable environment for the accumulation of peat and development of coals. Fossil leaves of *Glossopteris* and to a lesser extent, *Gangamopteris* and *Equisetales* are common, usually associated with coal seams (Van Eeden, 1955).
Mikambeni Formation
The shales and siltstones are very similar to those of the Madzaringwe Formation, but fewer coals are developed. *Glossopteris* fossils are common in siltstone units near the top of the succession, 37 species being identified by Kovács-Endrödy (1983).

This desktop study indicates that there is a very high likelihood of the occurrence of fossils, typically palaeoflora of *Glossopteris*, *Dadoxylon* and *Vertebraria* within the lower Karoo strata. A SACNASP-registered palaeontologist should visit the site to investigate the possibilities of a Cenozoic cover and collect any fossils which are encountered during excavation.

5. BACKGROUND ON THE AREA

The following excerpt is taking from: Heritage Impact Assessment Report and Management Plan relating to the establishment of the Vele Colliery near Mapunbugwe World Heritage Site, Musina, Limpopo Province, April 2012 by Prof Innocent Pikirayi.

> *The MCL demonstrates the rise and fall of the first indigenous kingdom in Southern Africa between 900 and 1300 AD. The core area covers nearly 30,000 ha and is supported by a suggested buffer zone of around 100,000 ha. Within the core of the World Heritage property are the remains of three capitals - Schroda; K2/Bambandyanalo and the final one located around Mapungubwe hill - and their satellite settlements and lands around the confluence of the Limpopo and the Shashe rivers whose fertility supported a large population within the kingdom.*
>
> *Mapungubwe's position at the crossing of the north/south and east/west routes in southern Africa also enabled it to control trade, through the East African ports to India and China, and throughout southern Africa. From its hinterland it harvested gold and ivory - commodities in scarce supply elsewhere – and this brought it great wealth as displayed through imports such as Chinese porcelain and Persian glass beads.*
> *This international trade also created a society that was closely linked to ideological adjustments, and changes in architecture and settlement planning. Until its demise at the end of the 13th century AD, Mapungubwe was the most important inland settlement in the African subcontinent and the cultural landscape contains a wealth of information in archaeological sites that records its development. The evidence reveals how trade increased and developed in a pattern influenced by an elite class with a sacred leadership where the king was secluded from the commoners located in the surrounding settlements.*
> *Mapungubwe's demise was brought about by climatic change. During its final two millennia, periods of warmer and wetter conditions suitable for agriculture in the Limpopo/Shashe valley were interspersed with cooler and drier pulses. When rainfall decreased after 1300 AD, the land could no longer sustain a high population using traditional farming methods, and the inhabitants were obliged to disperse. Mapungubwe's position as a power base shifted north to Great Zimbabwe and, later, Khami. The remains of this famous kingdom, when viewed against the present day fauna and flora, and the geo-morphological formations of the Limpopo/Shashe confluence, create an impressive cultural landscape of universal significance.*

6. EVALUATION AND STATEMENT OF SIGNIFICANCE

Due to the fact that the sites on this farm formed part of the various Heritage Impact Assessments for the Vele Coal mine, and sites were surveyed in 2009, 2012 and 2015, the areas were surveyed to determine if natural patterns of erosion or man made impacts such as agriculture had impacted the known sites during the intervening years.
This does not appear to be the case, as sites recorded in 2018 are in the same condition as nearly a decade ago.
Thus it was decided to keep the significance ratings and site evaluation the same as Roodt and Pikirayi.

6.1	**Significance**	**Rating**
1	The importance of the cultural heritage in the community	Medium

	or pattern of South Africa's history (Historic and political significance)	
2	Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage (Scientific significance).	Medium
3	Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage (Research/scientific significance	Medium
4	Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects (Scientific significance)	Medium
5	Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group (Aesthetic significance)	Low
6	Importance in demonstrating a high degree of creative or technical achievement at a particular period (Scientific significance)	Low
7	Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons (Social significance)	Medium
8	Strong or special association with the life and work of a person, group or organization of importance in the history of South Africa (Historic significance)	None
9	The significance of the site relating to the history of slavery in South Africa.	None

6.2 Section 38(3) (c) An assessment of the impact of the development on such heritage resources.

The impact is considered high. The area would be flooded. Should the dam wall be moved westward, the impact would be less intense, but an impact none the less.

The developer is prepared to conduct a Phase 2 assessment, which should be handled by a university.

6.3 ***Section 38(3) (d) An evaluation of the impact of the development on heritage resources relative to the sustainable economic benefits to be derived from the development***.

The area is a farming community, thus water for agriculture is always in demand. In this particular case, the extension to the existing manmade dam would severely impact the heritage resources especially S1 and S6 with partial impact on S2. See map 1 below.

6.4 ***Section 38(3) (e) The results of consultation with the communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources***.

Social consultative process is ongoing as part of EIA.

6.5 Section 38(3)(f) If heritage resources will be adversely affected by the proposed development the consideration of alternatives.

The alternative is listed below under recommendations- that the dam wall be moved to the west, the impact would be less. A phase 2 assessment would also be able to provide funding to research the site and gain valuable knowledge.

6.6 Section 38(3)(g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.

The below is adapted from the 2012 Pikarayi *et al* report- to specifically focus on the impacts of dam construction (not mining) on the specific farm and associated sites surrounding the dam.

Activity	Potential Impact	Significance without mitigation	Mitigation Measures	Significance with mitigation	Monitoring
Dam construction	Surface and ground disturbance will destroy heritage and environmental resources	High	• Identify heritage resources prior to dam construction • Rescue sites in cases where alternatives are not possible e.g. site 34 • Appointment of resident archaeologist to monitor all ground disturbing activities • Watching briefs during top and sub-soil removing activities Appointment of a palaeontologist to monitor groundworks for evidence of palaeontological materials	Moderate	Monitoring by archaeologist and palaeontologist during groundworks

Activity	Duration	Impact	Level of impact without mitigation	Level of impact with mitigation	Monitoring
Dam construction	During groundworks	Destruction of recorded sites and unknown palaeontological artefacts	Permanent-High	High- although with research further erosion and damage to sites will be mitigated and assist with	To enable unrecorded sites which are subterranean to be recorded and researched.

				dissemination of knowledge to academic and public community	

In order to mitigate the above considered impacts, mitigation measures are listed in part 7 below.

7. RECOMMENDATIONS

Recommendations for this project will be left in SAHRA's hands. The site falls outside of proclaimed areas, but is still intrinsically of value in light of the archaeology and heritage of the wider area. Pikirayi (2012: 57) makes mention of the impacts of intensive agriculture in the wider area- although specifically referring to areas in the core and buffer areas.

A choice of 3 options exists.

1. No development permitted

2. Phase 2 to be conducted on site S1, S2 (also known as site 4 (2012) and site 45 (2009)) and S6, with results published for academic and public communities to better understand the region.

3. The applicant to re-design the dam with a buffer of at least 75m between the dam and the site. Dam walls to be adequately constructed to prevent any impact on the site.

4. Palaeontological mitigation, at least one recognised palaeontologist should be on site to collect fossils that may be exposed during excavation of the dam extension. Any fossils such obtained should be deposited with a recognised authority such as the Council for Geoscience, Bernard Price Institute for Palaeontology or the Department of Geology and Mining, University of Limpopo. An appropriate institution such as those listed above, should also direct the unlikely event of salvaging fossil fauna.

5. *Monitoring to take place during earthworks to mitigate impacts to unknown/unrecorded sites*

The discovery of previously undetected subterranean heritage remains on the terrain must be reported to the Limpopo Heritage Authority or the archaeologist, and may require further mitigation measures.

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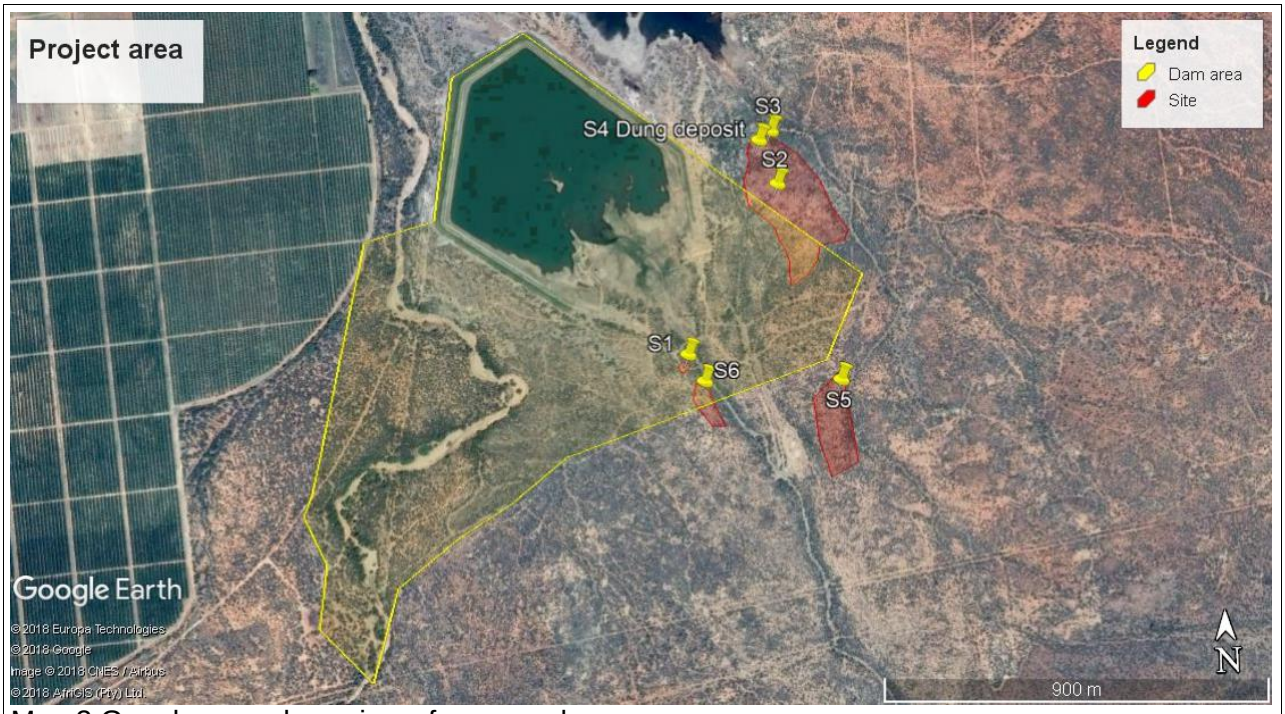
Liesl Stegmann
BA Hons Archaeology Unisa

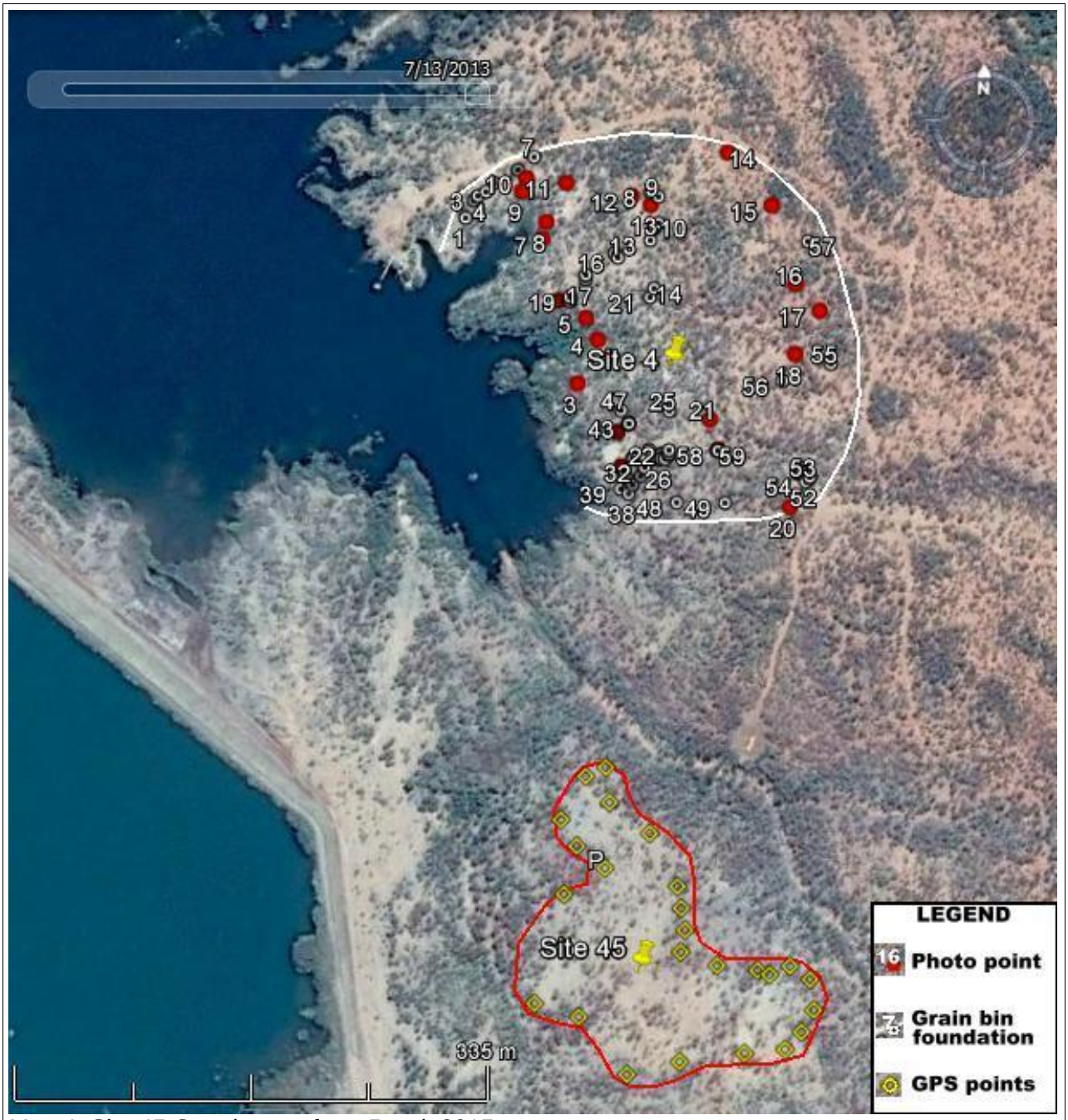
Frans E Roodt
BA Hons Archaeology Unisa

FRANS ROODT (*BA Hons, MA Archaeology, Post Grad. Dip. Museology; UP*)
Principal Investigator for SHASA Heritage Consultants

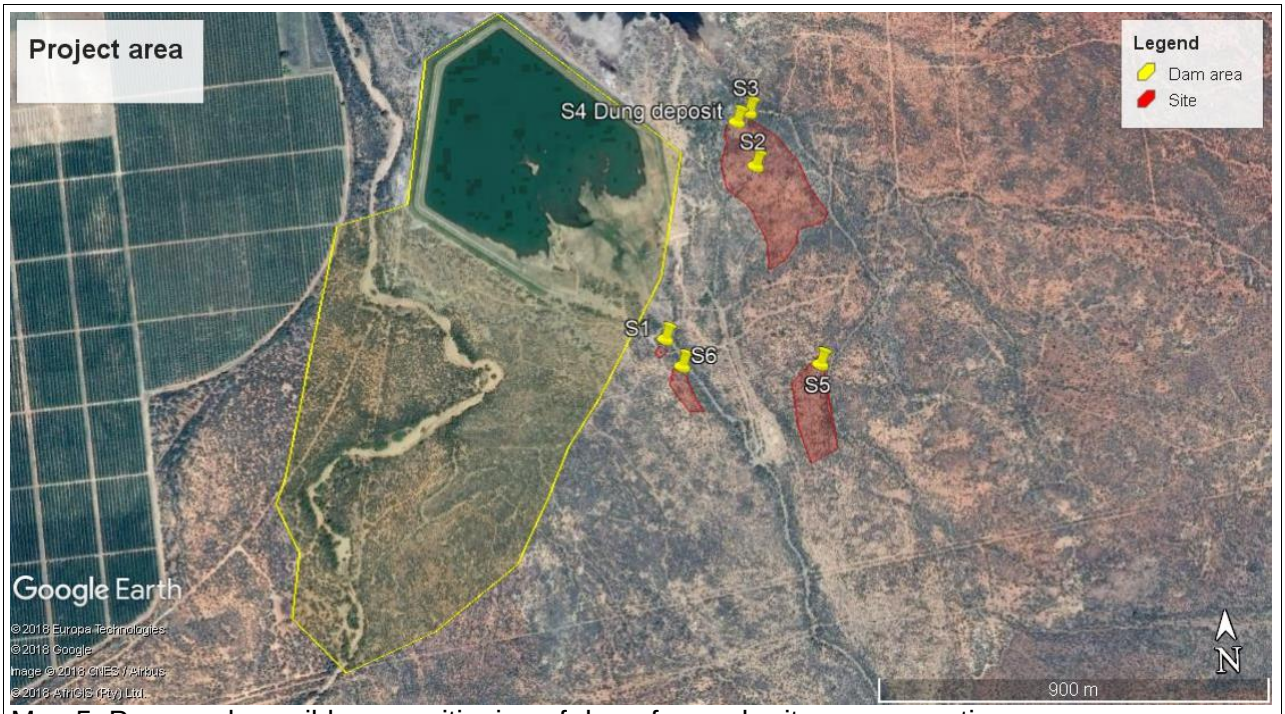


Map 2:Google map close view of proposed area

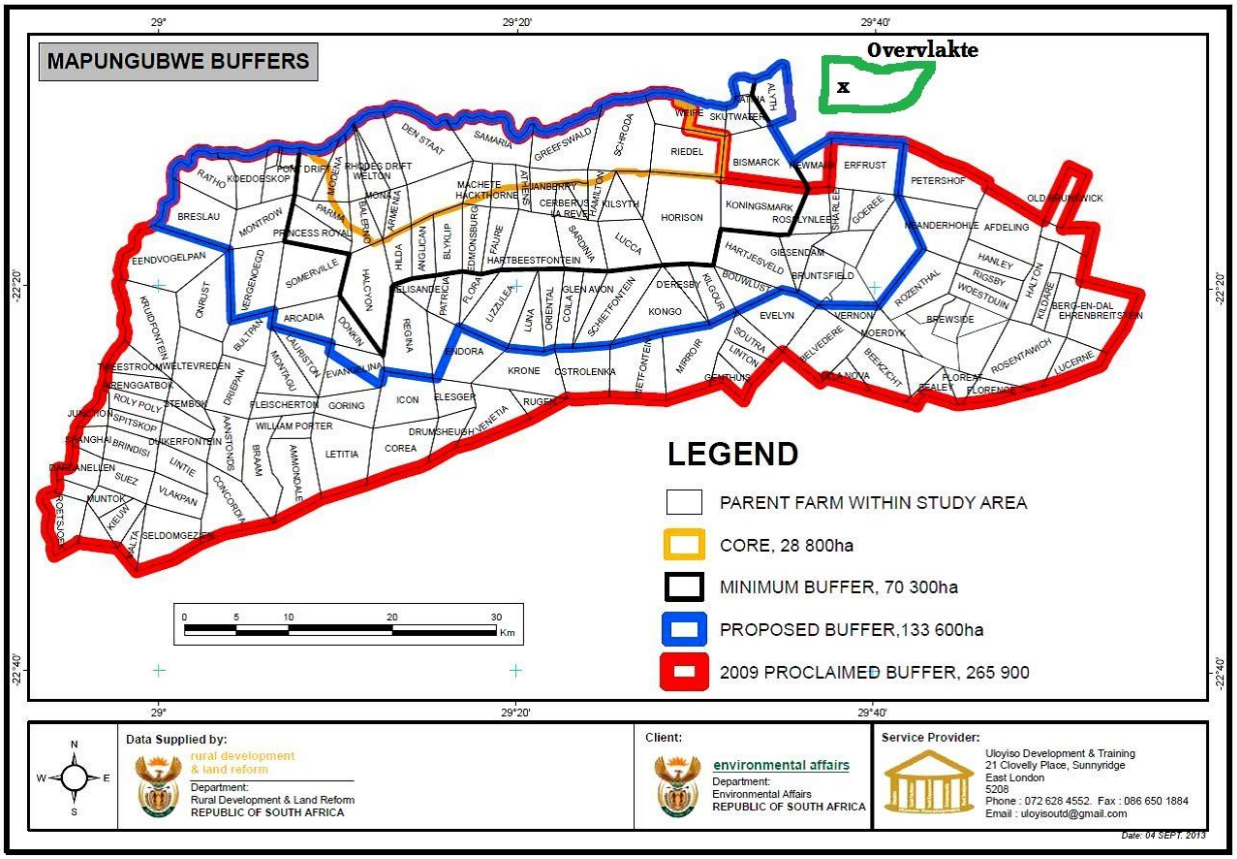
Map 3. View of area in relation to the wider geography



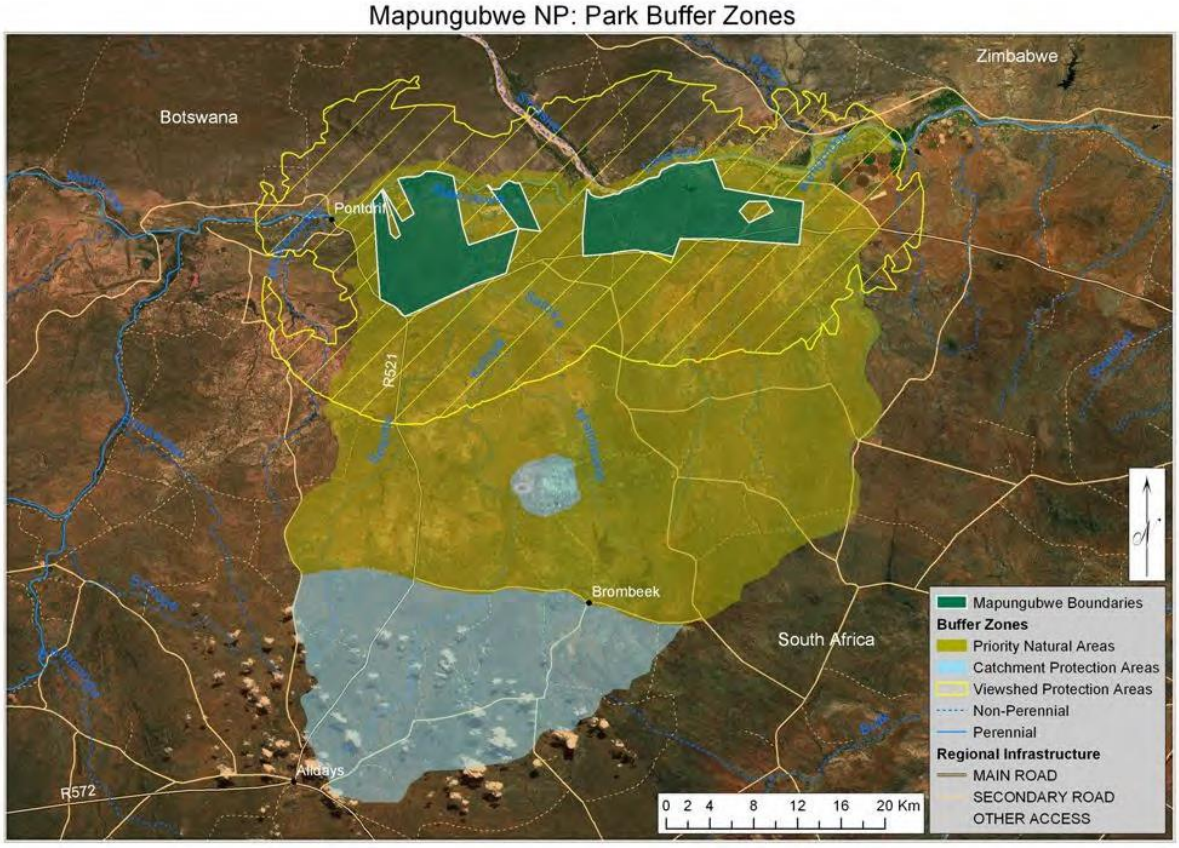
Map 4. Site 45 Google map from Roodt 2015 report.



Map 5. Proposed possible re-positioning of dam- from a heritage perspective.



Map 6. Google Map showing buffer zones with Overvlakte added in. X indicates approximate position of dam.



Map 7. View of MCL buffer zones imposed on Google Map (Pikirayi. 2012)